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# Environmental Noise Assessment

**Prepared: 19<sup>th</sup> April 2021**

|                  |                                                    |
|------------------|----------------------------------------------------|
| <b>Report No</b> | 21498-1                                            |
| <b>Client</b>    | Vistry Southern                                    |
| <b>Site</b>      | Pump Station<br>Catherington Park<br>Waterlooville |

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## 1. Quality Management

|                      |                                |
|----------------------|--------------------------------|
| <b>Report Number</b> | 21498 - 1                      |
| <b>Issue</b>         | Issue 1                        |
| <b>Prepared</b>      | 19 <sup>th</sup> April 2021    |
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### 3. Executive Summary

3.1.1. An environmental noise assessment has been carried out for a proposed residential development at Pump Station, Catherington Park, Waterloooville ("Proposed Development").

#### 3.2. Measurement, Assessment and Evaluation

3.2.1. The survey was carried out to BS7445-1:2003,<sup>1</sup> BS7445-2:1991<sup>2</sup> and BS4142:2014<sup>3</sup> which are covered under our UKAS Accreditation.

3.2.2. The interpretation of the data and the specification of suitable mitigation or treatment are outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.

#### 3.3. Scope

3.3.1. This report covers all aspects of the noise survey, including:

- the identification of acoustic design criteria;
- the identification of specific sound sources;
- an objective sound pressure level survey of the existing site;
- a 3D noise model to predict the propagation of sound across site;
- assessment of the specific sound sources based on guidance contained in BS4142:2014; and
- an assessment of the potential impact of vibration on the proposed receivers

#### 3.4. Results Summary

3.4.1. A numerical BS4142 assessment shows that there is an indication that the specific sound will have a low impact on proposed new residential receivers and, generally, the lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact.

3.4.2. In this situation, the proposed new specific sources are being introduced near to proposed receivers. This is likely to result in a reduced impact compared with a situation where the new specific source is being introduced near to existing receivers.

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<sup>1</sup> BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Description of quantities and procedures"

<sup>2</sup> BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

<sup>3</sup> BS4142:2014 "Methods for rating and assessing industrial and commercial sound"

## 4. Contents

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## 5. Background

### 5.1. Noise Policy Statement for England

- 5.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is 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”*.
- 5.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- 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.
- 5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

### 5.2. National Planning Policy Framework

- 5.2.1. The National Planning Policy Framework (NPPF) was published on 19<sup>th</sup> June 2019 and sets out the Government’s planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:
- “preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability”*.
- 5.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:
1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
  2. mitigate and reduce to a minimum potential adverse impact resulting from noise from new development; and,
  3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.
- 5.2.3. Existing businesses near to proposed development should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.

### 5.3. National Planning Practice Guidance

- 5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was updated on the 22<sup>nd</sup> July 2019 to reflect the changes made to the NPPF and make it more accessible.<sup>4</sup>

<sup>4</sup> <http://planningguidance.communities.gov.uk/>

- 5.3.2. It advises on how planning can manage potential noise impacts in new development. The guidance is regularly reviewed and updated and noise is listed as a specific category. A summary of the effects of noise exposure (in terms of health and quality of life) associated with both noise generating developments and noise sensitive developments is presented within the PPG and reproduced in Table 1.

| Perception                                               | Examples of outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 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.<br>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 (NOAEL)  | No specific measures required    |
| <b>Lowest Observed 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 intrusive                            | 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                          |

Table 1 – Noise exposure hierarchy

- 5.3.3. There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.
- 5.3.4. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

## 6. Introduction

6.1.1. An environmental noise assessment has been carried out for a proposed residential development at Catherington Park, Waterlooville. It is proposed that a pump station be installed adjacent to the proposed dwellings.

## 6.2. Proposed Development

6.2.1. An image showing the proposed location and layout of the Proposed Development is given in Figure 1.



Figure 1 - Plan showing the layout of the Proposed Development

## 6.3. Noise Climate

6.3.1. At the time of the survey, it was noted that the general noise climate was dominated by transient road traffic noise from the nearby residential roads.

## 6.4. Specific Sound Sources

- 6.4.1. A pump station is proposed to be installed on the boundary of the site. The details of the unit and the location are given in Table 2 and Figure 2 respectively. Manufacturer's documentation is available in the appendix.

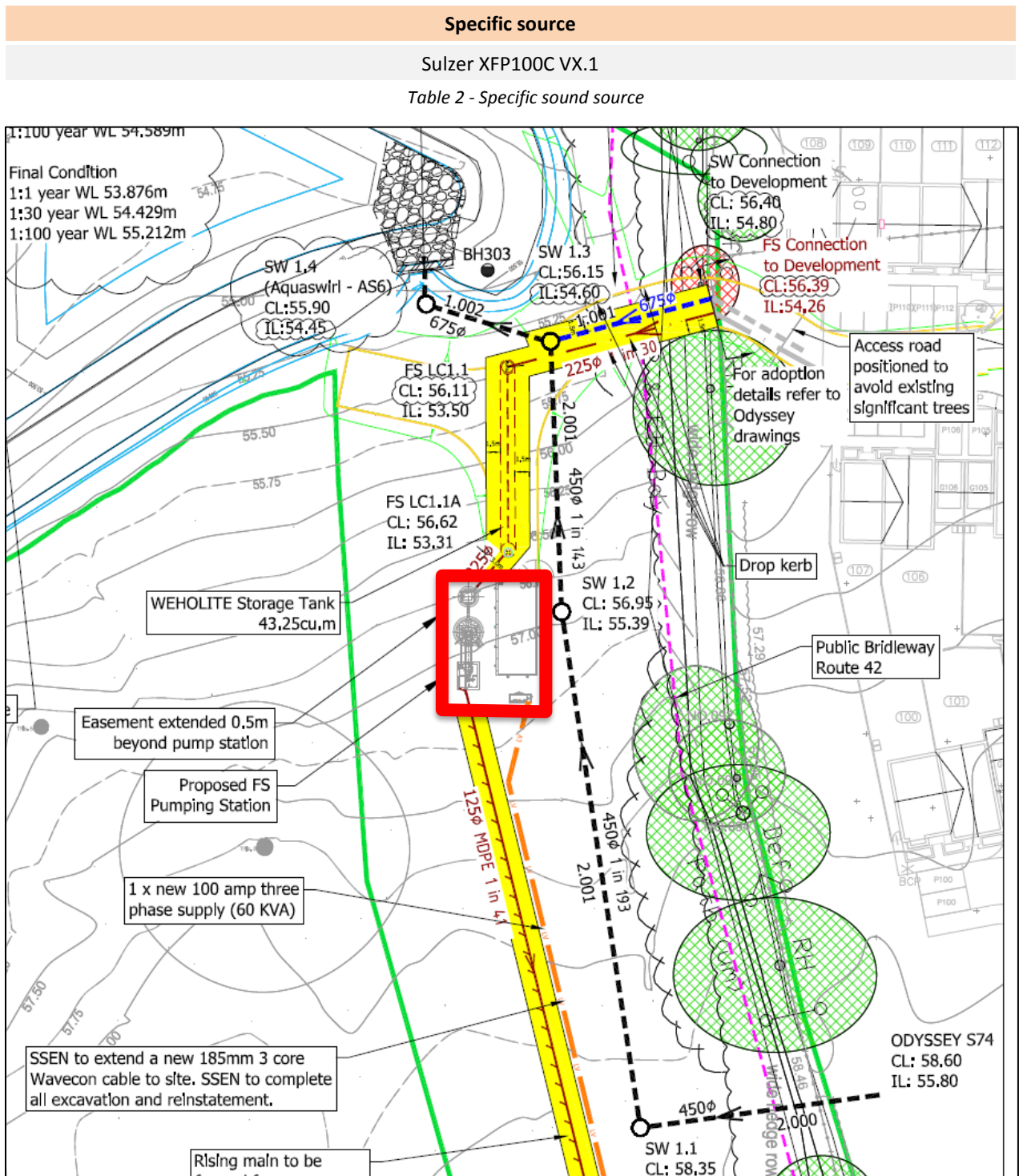


Figure 2 - Location of pump station on boundary of site

## 7. Assessment Criteria

### 7.1. BS4142:2014

- 7.1.1. BS4142 provides methods for rating and assessing **specific sound sources** of an industrial and/or commercial nature, which includes: industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant/vehicles associated with industrial/commercial premises (e.g. fork-lift trucks). The **assessment location** is outside a residential receptor.
- 7.1.2. The standard is specifically precluded from being used to assess the likely impact inside a building or from the assessment of various sound sources for which other (more relevant) guidance exists, including: music/entertainment noise, noise from people and construction noise.
- 7.1.3. The foundation of the assessment is to establish the following quantities, either by measurement or prediction:
- **Ambient sound:** The overall sound at the assessment location
  - **Residual sound:** The ambient sound without the specific sound source operating
  - **Specific sound:** The ambient sound with the specific sound source operating, corrected for residual sound
  - **Background sound:** Residual sound present for 90% of the time
- 7.1.4. How these quantities relate to the sound that would be measured during a survey has been illustrated in Figure 3.

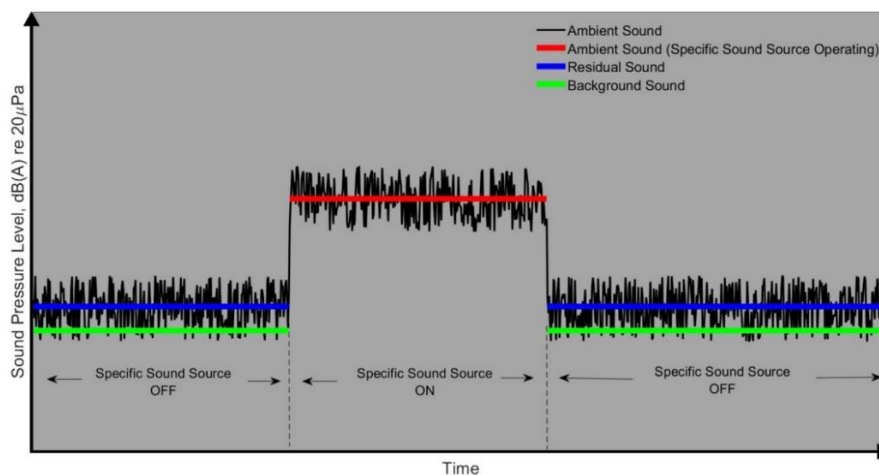


Figure 3 –  
Diagrammatic  
illustration of the  
definitions of ambient,  
residual, specific and  
background sound

- 7.1.5. Once the specific sound level has been determined, this must be corrected for the presence of acoustic features that are audible at the assessment location to determine the **rating level**:

$$\text{Rating Level} = \text{Specific Sound Level} + \text{Character Corrections}$$

- 7.1.6. Normally it is possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:
- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', and rising to +6dB for 'highly perceptible' tones.
  - Impulsivity (rapidity of change and overall change in level): +3 dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
  - Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise-sensitive receivers, +3dB.

- 7.1.7. It should be noted that, where one feature is clearly perceived as dominant, it may be appropriate to apply a single correction. Where multiple features are likely to affect perception and response, each should be added arithmetically.
- 7.1.8. An estimate of the magnitude of the impact is evaluated by subtracting the measured background sound level at the assessment location from the rating level

$$\text{Assessment Level} = \text{Rating Level} - \text{Background Sound Level}$$

- 7.1.9. Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific. As an initial estimate, BS4142 states that:
- A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context
  - A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context
  - Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context
- 7.1.10. Where the initial estimate of the impact needs to be modified due to the context, other factor should be considered, including: absolute sound levels, the character and level of the residual sound and the sensitivity of the receiver, which includes the effect of building façade sound insulation.

## 7.2. Guideline Internal Sound Levels

- 7.2.1. BS8233:2014 draws on the results of research and experience to provide information on the design of buildings that have internal acoustic environments appropriate to their function. The standard provides guideline internal values for dwellings for steady external noise sources. These have been summarised in Table 3.

| Activity                   | Location    | 07:00 to 23:00               | 23:00 to 07:00              |
|----------------------------|-------------|------------------------------|-----------------------------|
| Resting                    | Living Room | 35dB $L_{Aeq,16\text{hour}}$ | -                           |
| Dining                     | Dining Room | 40dB $L_{Aeq,16\text{hour}}$ | -                           |
| Sleeping (daytime resting) | Bedroom     | 35dB $L_{Aeq,16\text{hour}}$ | 30dB $L_{Aeq,8\text{hour}}$ |

Table 3 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

- 7.2.2. The guideline values are issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise. They are expected to be achieved based on normal annual data and not in all circumstances. For example, it is normal to exclude occasional events such as fireworks night or New Year's Eve.
- 7.2.3. For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB  $L_{Aeq,T}$  with an upper guideline value of 55dB  $L_{Aeq,T}$  which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In such cases, the lowest practicable levels should be achieved in external amenity areas but the development should not be prohibited.

### 7.3. Ventilation and Overheating Requirements

- 7.3.1. This section addresses ventilation issues that may conflict with the acoustic design of the building. They are provided for reference purposes only as this report is addressing the acoustic parameters of the development and building design only.
- 7.3.2. BS8233:2014 states that, if relying on closed windows to achieve the guideline values, there needs to be an appropriate alternative ventilation scheme that does not compromise the facade sound insulation or the resulting noise level. However, rooms should have adequate ventilation, i.e. trickle ventilators should be assumed to be open for any assessment.
- 7.3.3. Ventilation requirements for dwellings are covered under Building Regulations Approved Document F<sup>5</sup> ("ADF"). It describes the purpose of ventilation as for the removal of stale air from inside a building and replacement with fresh air from outside.
- 7.3.4. ADF prescribes three types of ventilation provision:
1. **Whole dwelling ventilation** – running continuously (includes background ventilation)
  2. **Extract ventilation** – removing vapour/pollutants from a space e.g. from bathrooms and kitchens
  3. **Purge ventilation** – manually controlled rapid ventilation
- 7.3.5. Where a means of ventilation is required as an alternative to open windows, there are four broad categories of ventilation system that each meet the requirements of ADF:
- System 1** – Background ventilators and intermittent extract fans
- System 2** – Passive stack ventilation
- System 3** – Continuous mechanical extract ventilation (MEV)
- System 4** – Continuous mechanical supply and extract with heat recovery (MVHR)
- Systems 1-3 require penetrations in the facade to allow air to flow into and out of the building. In order to control the noise break-in from external noise sources, it should be checked that the penetration offers sufficient resistance to the passage of sound. The sound insulation of these, typically small, penetrations is often specified in terms of the element normalised sound pressure level difference,  $D_{n,e,w}$ , which is often corrected for the spectrum shape of road traffic using the  $C_{tr}$  correction term.
- 7.3.6. Ventilation provisions, including open windows, will not necessarily meet cooling needs. Building Regulations Approved Document L2a<sup>6</sup> ("ADL2a") requires that overheating be mitigated by controlling the solar gains by means of building orientation, shading and the g-value of the glazing. It recommends that the developer assess the overheating risk using CIBSE TM 37.<sup>7</sup>

### 7.4. Local Planning Authority Criteria

- 7.4.1. The local planning authority has provided specific noise-related planning requirements for the Proposed Development. The noise-related requirements have been reproduced in Figure 4.

*Prior to the first occupation of the dwellings hereby approved, the following details shall be submitted to and approved in writing by the Local Planning Authority:*

*i) plans showing the external appearance of the pumping station including any form of enclosure to the station;*

*ii) a scheme for protecting the proposed dwellings from noise and vibration from the pumping station.*

*The pumping station shall thereafter be constructed and maintained in accordance with the approved details unless otherwise agreed in writing by the Local Planning Authority.*

*Reason: In the interests of the character and amenity of the area and neighbouring residents having due regard to policy CS16 of the Havant Borough Local Plan Core Strategy which forms part of the Local Development Framework, and the National Planning Policy Framework, March 2012.*

Figure 4 - Noise related planning requirements provided by the local planning authority

<sup>5</sup> Approved Document F: Means of Ventilation (2010 Edition)

<sup>6</sup> Approved Document L2a : Conservation of Fuel and Power (2013 Edition)

<sup>7</sup> CIBSE Guide TM 37 "Design for Improved Solar Shading Control"

## 8. Survey

### 8.1. Measurement Locations

- 8.1.1. Fixed position noise and vibration monitoring took place at one position to account for the likely dominant noise sources. The monitoring equipment was located 1.5m from the ground and at least 3m from the next nearest reflecting surface. The monitoring position is shown in Figure 5. The monitoring position was chosen as 'representative' of on site levels due to ongoing construction works occurring on site.

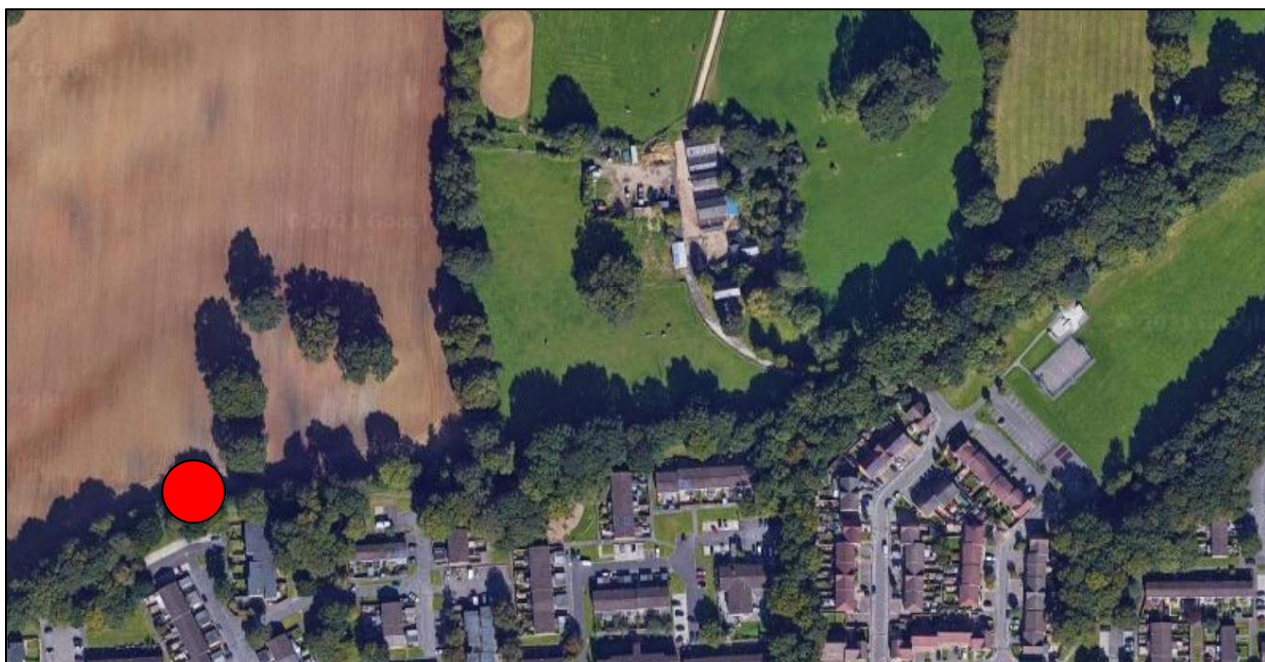


Figure 5 – Noise and vibration monitoring location on site

- 8.1.2. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003<sup>8</sup> before and after the surveys. The calibration details are also detailed in the appendix.

### 8.2. Meteorology

- 8.2.1. During the survey the weather information was noted. This is summarised in Table 4.

|                                          | 8 <sup>th</sup> April 2021 | 9 <sup>th</sup> April 2021 |
|------------------------------------------|----------------------------|----------------------------|
| Roads(Wet/Dry)                           | Dry                        | Dry                        |
| Wind Speed (ms <sup>-1</sup> )/Direction | 4 / WSW                    | 4 / SSW                    |

Table 4 - Meteorological data noted during the survey

### 8.3. Measurement and Timescale

- 8.3.1. Unattended monitoring was carried out between 8<sup>th</sup> April 2021 and 9<sup>th</sup> April 2021. The measurements that have been made are summarised in Table 5. (PPV = Peak Particle Velocity mm/s)

| Monitoring position | Date                  | Type       | Quantity         |
|---------------------|-----------------------|------------|------------------|
| 1                   | 08/04/2021–09/04/2021 | Unattended | LA90,15mins, PPV |

Table 5 – Measurements made at the site of the Proposed Development

<sup>8</sup> BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"

## 8.4. Results Summary

### Background Sound Levels

- 8.4.1. Figure 6 shows the results of the data analysis in terms of the frequency of occurrence of each data value during the daytime and the night-time respectively.

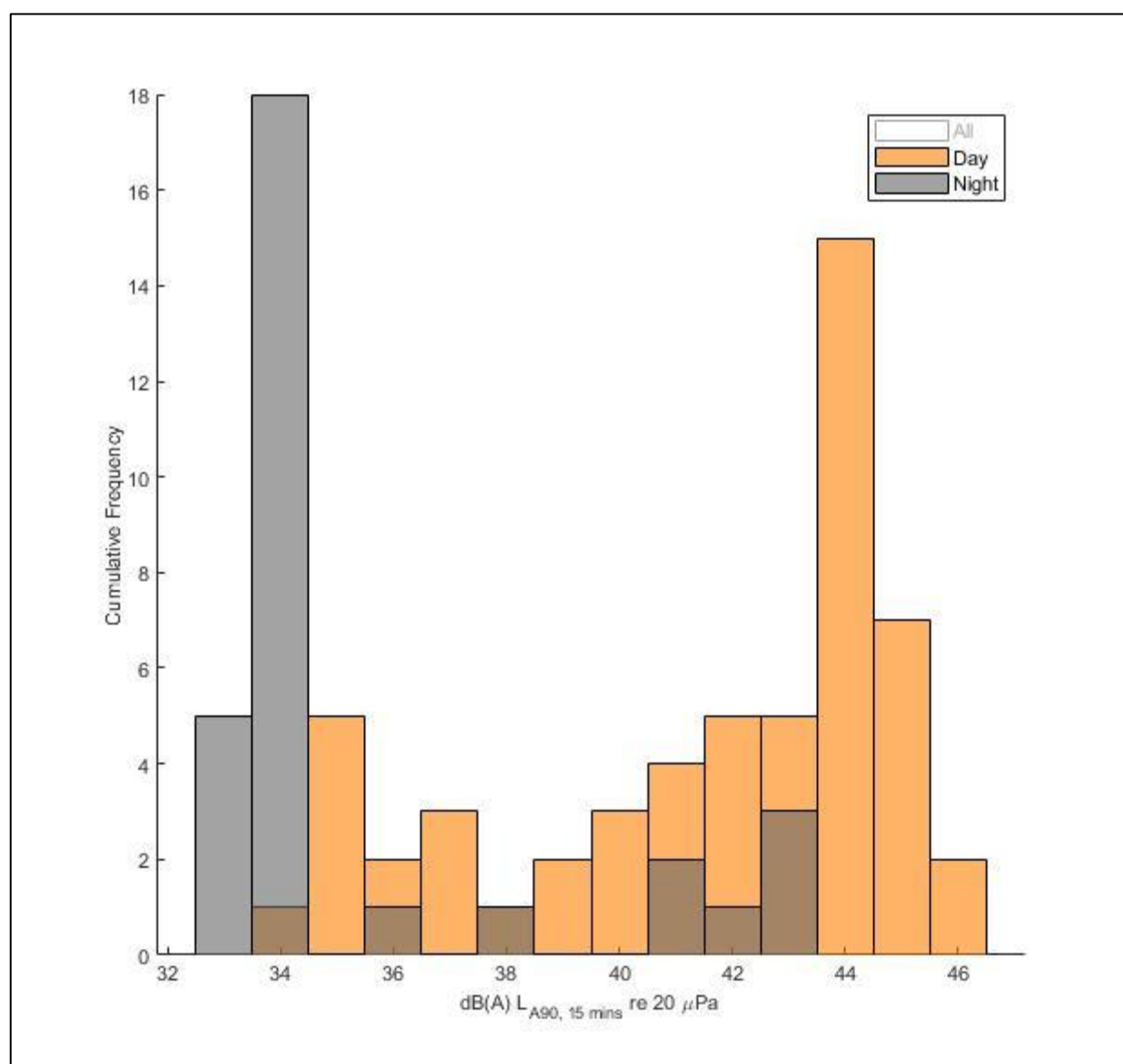


Figure 6 – Distribution of background sound levels during the daytime (07:00-23:00)

- 8.4.2. As can be seen in Figure 6 the background sound levels ranged between 34dB  $L_{A90, 15 \text{ mins}}$  and 46dB  $L_{A90, 15 \text{ mins}}$  during the daytime period and the background sound levels ranged between 31dB  $L_{A90, 15 \text{ mins}}$  and 43dB  $L_{A90, 15 \text{ mins}}$  during the night-time period.
- 8.4.3. The typical background sound level has been taken to be 44dB  $L_{A90, 15 \text{ mins}}$  during the daytime and 34dB  $L_{A90, 15 \text{ mins}}$  for the night-time.

## 8.5. Specific sound levels

8.5.1. Information regarding the proposed pump equipment has been provided by the client. The formula from Engineering Noise Control<sup>9</sup> to predict the sound pressure level at 1m from a pump unit.

8.5.2. The tables of formulas is given in Table 6 and the formula used in this case has been highlighted in green.

| Speed range (rpm) | Drive motor nameplate power                      |                               |
|-------------------|--------------------------------------------------|-------------------------------|
|                   | Under 75 kW                                      | Above 75 kW                   |
| 3000-3600         | <b><math>72 + 10 \log_{10} \text{ kW}</math></b> | $86 + 3 \log_{10} \text{ kW}$ |
| 1600-1800         | $75 + 10 \log_{10} \text{ kW}$                   | $89 + 3 \log_{10} \text{ kW}$ |
| 1000-1500         | $70 + 10 \log_{10} \text{ kW}$                   | $84 + 3 \log_{10} \text{ kW}$ |
| 450-900           | $68 + 10 \log_{10} \text{ kW}$                   | $82 + 3 \log_{10} \text{ kW}$ |

Table 6 - Table 11.10 of Engineering Noise Control

8.5.3. Using the formula highlighted in Table 6 and the information provided by the client regarding the unit (3000rpm and 2.95kW) gives a sound pressure level at 1m from the unit of 76.7dB. Table 11.11 then gives frequency adjustments to provide a spectrum. It should be noted that a -3dB correction has been applied to the values in Table 8 to account for reflections from the façade.

8.5.4. gives the predicted A weighted sound pressure level at 1m from the unit.

| Predicted sound pressure level @1m, dB | A weighted Octave Band levels, dB |      |       |       |       |      |      |      |      | Single figure A weighted sound pressure level @1m, dB |
|----------------------------------------|-----------------------------------|------|-------|-------|-------|------|------|------|------|-------------------------------------------------------|
|                                        | 31Hz                              | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz |                                                       |
| 76.7                                   | 24.3                              | 38.5 | 49.6  | 59.1  | 64.5  | 70.7 | 68.9 | 64.7 | 56.6 | 74.3                                                  |

Table 7 - Summary of prediction results

8.5.5. It should be noted that the client's specification includes for two identical pump units and so this has been taken into account in the assessment. It should also be noted that the pump units are submerged pumps, meaning that they will be underwater. This is likely to reduce the noise breakout into the air and so this assessment is considered to be worst case, as the model in the following section has assumed that there is no water surrounding the pump units.

<sup>9</sup> Engineering Noise Control – Theory and Practice – Table 11.10, Page 443 - David A. Bies and Colin H. Hansen - 1996

## 9. 3D Noise Model

- 9.1.1. A 3D noise model has been constructed using SoundPLAN™ in order to predict the propagation of sound across the site of the Proposed Development. The calculation procedure has been used from ISO9613-2:1996<sup>10</sup> to predict the propagation of sound from source to receiver, taking into account distance, screening, and atmospheric and ground conditions. Terrain elevation data for the area has been taken from DEFRA. The pumps have been included as point sources in a service pit 2.5m below the ground level.
- 9.1.2. The results of the model have been illustrated in the noise contour map in Figure 7.

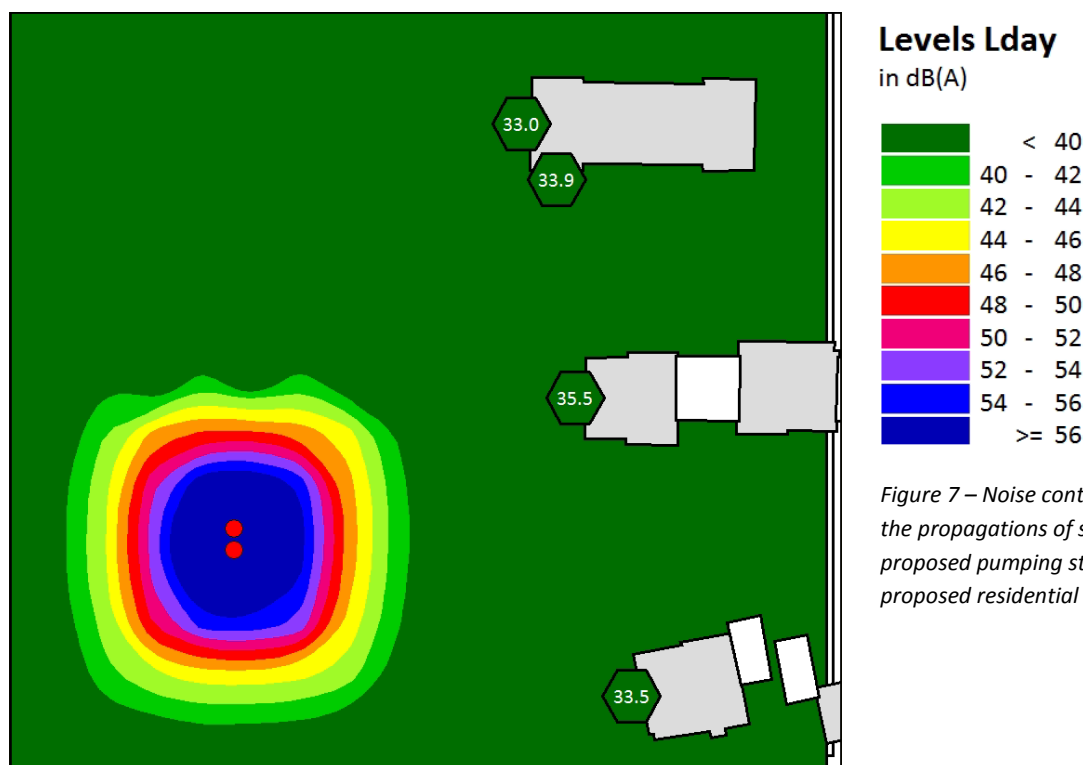


Figure 7 – Noise contour plot showing the propagations of sound from the proposed pumping station to the proposed residential receivers

- 9.1.3. It should be noted that a -3dB correction has been applied to the values in Table 8 to account for reflections from the façade.

| Predicted worst case $L_{Aeq,T}$ due to pump units |
|----------------------------------------------------|
| 32.5dB(A)                                          |

Table 8 – Predicted worst case  $L_{Aeq,T}$  caused by pump units

<sup>10</sup> ISO9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation"

## 10. BS4142 Assessment

### 10.1. Rating level

- 10.1.1. The commercial sound sources were not installed at the time of the attended survey. Assumptions have been made regarding the character of the sound based on the type of equipment. The adjustments to the specific sound levels for acoustic features have been discussed in the following sections.

#### ***Tonality***

- 10.1.2. As the pumps are submerged, it is not considered likely that any tonal sound will be perceptible at the nearest residential receiver. Therefore, no correction for tonality has been applied.

#### ***Impulsivity***

- 10.1.3. As the pumps are submerged, it is not considered likely that any impulsive sound will be perceptible at the nearest residential receiver. Therefore, no correction for impulsivity has been applied.

#### ***Intermittency***

- 10.1.4. The pump units are not expected to turn on and off multiple times in an hour period. Therefore, no correction for intermittency has been applied.

### 10.2. Assessment

- 10.2.1. The BS4142 assessment is detailed in Table 9.

|                                                                                                                                                                              | Level, dB             |                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|
|                                                                                                                                                                              | Daytime (07:00-23:00) | Night-time (23:00-07:00) |
| <b>Background sound level, dB L<sub>A90,15min</sub></b>                                                                                                                      | 44                    | 34                       |
| <b>Specific sound level, dB(A)</b>                                                                                                                                           | 33                    | 33                       |
| <b>Acoustic feature corrections</b>                                                                                                                                          |                       |                          |
| Tonality                                                                                                                                                                     | 0                     | 0                        |
| Impulsivity                                                                                                                                                                  | 0                     | 0                        |
| Intermittency                                                                                                                                                                | 0                     | 0                        |
| Other                                                                                                                                                                        | 0                     | 0                        |
| <b>Rating level</b>                                                                                                                                                          |                       |                          |
| Specific sound level + corrections                                                                                                                                           | 33                    | 33                       |
| <b>Assessment Level</b>                                                                                                                                                      |                       |                          |
| Rating level – Background sound level                                                                                                                                        | -11                   | -1                       |
| <i>“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”</i> |                       |                          |

Table 9 - The assessment procedure from BS4142

### 10.3. Context

- 10.3.1. In this situation, the proposed new specific sources are being introduced near to proposed receivers. This is likely to result in a reduced impact compared with a situation where the new specific source is being introduced near to existing receivers.

## 12. Vibration

- 12.1.1. A vibration survey to measure the peak particle velocity (PPV) in each axis was carried out to determine the existing levels of vibration on site. A summary of the measured vibration events is given in Figure 8.

| Type | Serial No. | Date/Time          | No. Chan | Trigger | Tran Peak (mm/s) | Vert Peak (mm/s) | Long Peak (mm/s) | Mic Peak (pa./dB) | PVS1 (mm/s) | Description   |
|------|------------|--------------------|----------|---------|------------------|------------------|------------------|-------------------|-------------|---------------|
| W    | UM8055     | Apr 8 /21 14:04:22 | 3        | Long    | 0.221            | 0.197            | 0.268            | ***               | 0.372       | Waterlooville |
| W    | UM8055     | Apr 8 /21 14:21:57 | 3        | Tran    | 0.197            | 0.102            | 0.110            | ***               | 0.197       | Waterlooville |
| W    | UM8055     | Apr 8 /21 15:06:11 | 3        | Tran    | 0.205            | 0.102            | 0.118            | ***               | 0.234       | Waterlooville |
| W    | UM8055     | Apr 8 /21 15:06:24 | 3        | Tran    | 0.292            | 0.150            | 0.181            | ***               | 0.326       | Waterlooville |
| W    | UM8055     | Apr 8 /21 15:06:26 | 3        | Tran    | 0.276            | 0.158            | 0.181            | ***               | 0.294       | Waterlooville |
| W    | UM8055     | Apr 8 /21 15:06:28 | 3        | Tran    | 0.662            | 0.370            | 0.528            | ***               | 0.892       | Waterlooville |
| W    | UM8055     | Apr 8 /21 15:06:30 | 3        | Tran    | 0.733            | 0.284            | 0.378            | ***               | 0.833       | Waterlooville |
| W    | UM8055     | Apr 8 /21 18:15:31 | 3        | Tran    | 0.426            | 0.181            | 0.102            | ***               | 0.428       | Waterlooville |
| W    | UM8055     | Apr 8 /21 21:44:29 | 3        | Long    | 0.567            | 0.244            | 0.560            | ***               | 0.746       | Waterlooville |
| W    | UM8055     | Apr 9 /21 03:40:04 | 3        | Tran    | 0.434            | 0.300            | 0.370            | ***               | 0.561       | Waterlooville |
| W    | UM8055     | Apr 9 /21 03:40:10 | 3        | Tran    | 0.339            | 0.197            | 0.173            | ***               | 0.356       | Waterlooville |
| W    | UM8055     | Apr 9 /21 03:40:12 | 3        | Tran    | 0.213            | 0.118            | 0.079            | ***               | 0.218       | Waterlooville |
| W    | UM8055     | Apr 9 /21 06:18:21 | 3        | Tran    | 0.363            | 0.307            | 0.268            | ***               | 0.384       | Waterlooville |
| W    | UM8055     | Apr 9 /21 08:55:59 | 3        | Tran    | 0.197            | 0.126            | 0.063            | ***               | 0.214       | Waterlooville |

Figure 8 - Measured vibration events during survey

- 12.1.2. Figure 8 shows that the current levels of vibration in the area are <1mm/s.
- 12.1.3. The pump set is approximately 31m from the nearest receivers property and being rotating centrifugal equipment the vibration from the pump units is not expected to exceed 1mm/s and as such is not expected to be perceptible at the proposed residential receivers.

## 13. Conclusions

- 13.1.1. An environmental noise and vibration assessment has been carried out according to BS4142 and considering the Local Authority Criteria at the site of a proposed residential development at Catherington Park, Waterlooville to determine the impact of the proposed pump units on the nearby residential receivers.
- 13.1.2. A numerical BS4142 assessment shows that there is an indication that the specific sound will have a low impact on proposed new residential receivers and, generally, the lower the rating level is relative to the background sound level, the less likely it is that the specific sound source will have an adverse impact.
- 13.1.3. In this situation, the proposed new specific sources are being introduced near to proposed receivers. This is likely to result in a reduced impact compared with a situation where the new specific source is being introduced near to existing receivers. In addition, the predicted levels are worst case based on pit mounted pumps not submerged pumps.
- 13.1.4. The pump units are not expected to cause vibration levels of over 1mm/s at 2m and as such the vibration caused by the pump units is not expected to be perceptible at the nearest residential receiver.
- 13.1.5. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

## 14. Appendix

### APPENDIX A: Summary Information

| Required ISO Test Report Information (cross referenced where required) |                                                       |                                                                                                  |                             |
|------------------------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------|
|                                                                        |                                                       | Measurements carried out to:                                                                     | Analysed to:                |
| <b>A</b>                                                               | Standards                                             | BS 7445-1: 2003<br>BS 7445-2: 1991<br>BS4142:2014                                                | BS 8233:2014<br>BS4142:2014 |
| <b>B</b>                                                               | Organisation performed the measurements               | noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU. |                             |
| <b>C</b>                                                               | Name of Client                                        | Vistry Southern                                                                                  |                             |
| <b>D</b>                                                               | Full site address                                     | Pump Station<br>Catherington Park<br>Waterlooville                                               |                             |
| <b>E</b>                                                               | Date of surveys                                       | Survey Date: 8 <sup>th</sup> April 2021 – 9 <sup>th</sup> April 2021                             |                             |
| <b>F</b>                                                               | Description & identification of Proposed Development  | It is proposed to develop the site for residential use.                                          |                             |
| <b>G</b>                                                               | Brief Description of details of Procedure & equipment | See Section 5 of this report.                                                                    |                             |

### APPENDIX B: Technical Appendix

14.1.1. Measurements were made using the following equipment:

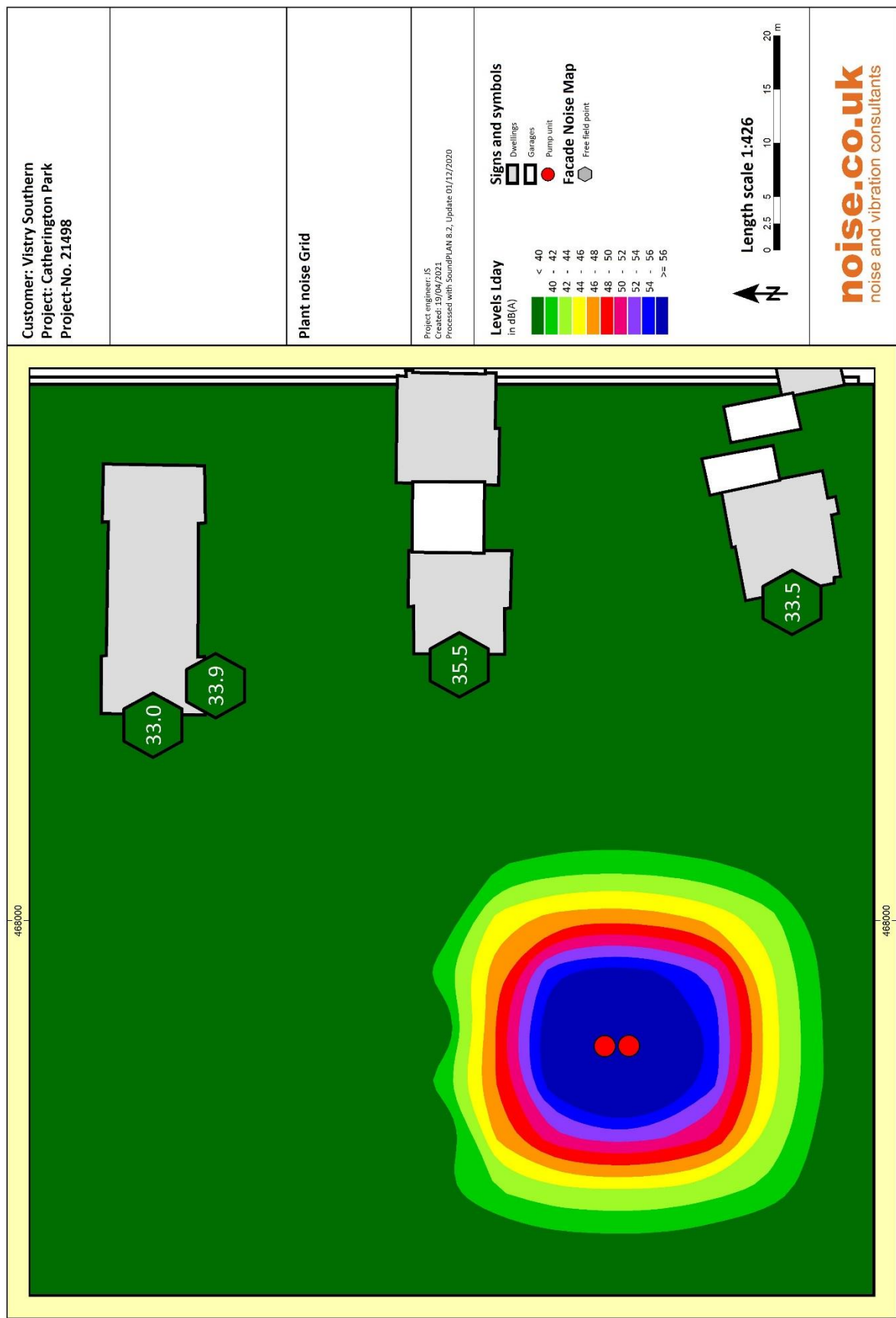
| Equipment             | Sound Level Meter (Serial Number) | Calibrator (Serial Number) |
|-----------------------|-----------------------------------|----------------------------|
| 1 – Sound level meter | Norsonic 140 (1405560)            | Norsonic 1251 (33824)      |
| Equipment             | Vibration monitor (Serial Number) |                            |
| 2 – Vibration monitor | Instantel Micromate (UM8055)      |                            |

14.1.2. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

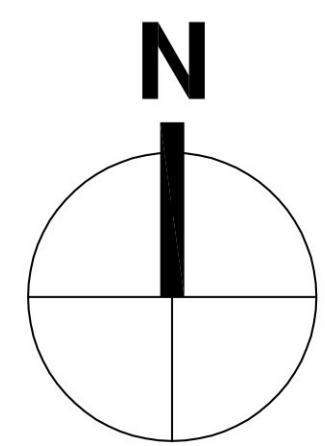
| Sound Level Meter      | Before   | After    |
|------------------------|----------|----------|
| Norsonic 140 (1405560) | 114.0 dB | 114.0 dB |

14.1.3. There was no adverse deviation.

APPENDIX C: Full size SoundPLAN image map



## APPENDIX D: Client information



- KEY:**
- 3843 HOUSE TYPE REFERENCE
  - 139 PLOT NUMBER
  - 1122 ASSIGNED PARKING SPACE NUMBERS
  - V UNASSIGNED/VISITOR PARKING
  - EXISTING TREE CANOPY
  - INDICATIVE NEW TREE
  - INDICATIVE NEW PLANTING
  - 1200mm METAL RAILINGS - TO PATIOS
  - 600mm TIMBER KNEE RAIL
  - 1800mm HIGH TIMBER FENCE
  - 1800mm HIGH BRICK WALL
  - 600mm HIGH BRICK WALL + 1200mm RAILINGS WITH PILES
  - BRICK RETAINING WALL
  - BOLLARDS - FOLDING FOR EMERGENCY / SERVICE ACCESS
  - DOOR LOCATION
  - GARDEN GATE
  - GARDEN SHED / CYCLE STORE
  - REFUSE & RECYCLING BINS
  - ★ \* BINS BIN COLLECTION POINTS
  - SITE BOUNDARY
  - RESIDENTIAL PHASE 18 SITE BOUNDARY

