

## Appendix 14.4

|                |                        |                  |    |
|----------------|------------------------|------------------|----|
| <b>Title</b>   | Vibration Assessment   |                  |    |
| <b>Project</b> | Stockton's, Manchester |                  |    |
| <b>Date</b>    | 5 December 2024        | <b>Author(s)</b> | TF |

### 1.0 Introduction

1.1 A detailed planning application is to be submitted for the Proposed Scheme set out in **Chapter 4 Development Specification** of the accompanying Environmental Statement (ES).

1.2 **Chapter 14** of the ES covers noise and vibration. This appendix deals with vibration from the environment upon the Proposed Scheme, to allow for an acceptable level of amenity to be maintained.

### 2.0 Design Criteria

2.1 The following vibration criteria, as taken from BS 6472-1:2008<sup>1</sup> has been adopted for the assessment for the Proposed Scheme and compared to the measured Vibration Dose Value (VDV), corrected to a 16-hour daytime and 8-hour night-time level.

**Table 1** BS 6472:2008 Table 1. Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings

| Place and Time                     | Vibration Dose Value, $\text{ms}^{-1.75}$       |                          |                                      |
|------------------------------------|-------------------------------------------------|--------------------------|--------------------------------------|
|                                    | Low probability of adverse comment <sup>A</sup> | Adverse comment possible | Averse comment probable <sup>B</sup> |
| Residential buildings<br>16hr day  | 0.2 – 0.4                                       | 0.4 – 0.8                | 0.8 – 1.6                            |
| Residential buildings<br>8hr night | 0.1 – 0.2                                       | 0.2 – 0.4                | 0.4 – 0.8                            |

<sup>A</sup> Below these ranges adverse comment is not expected

<sup>B</sup> Above these ranges adverse comment is very likely

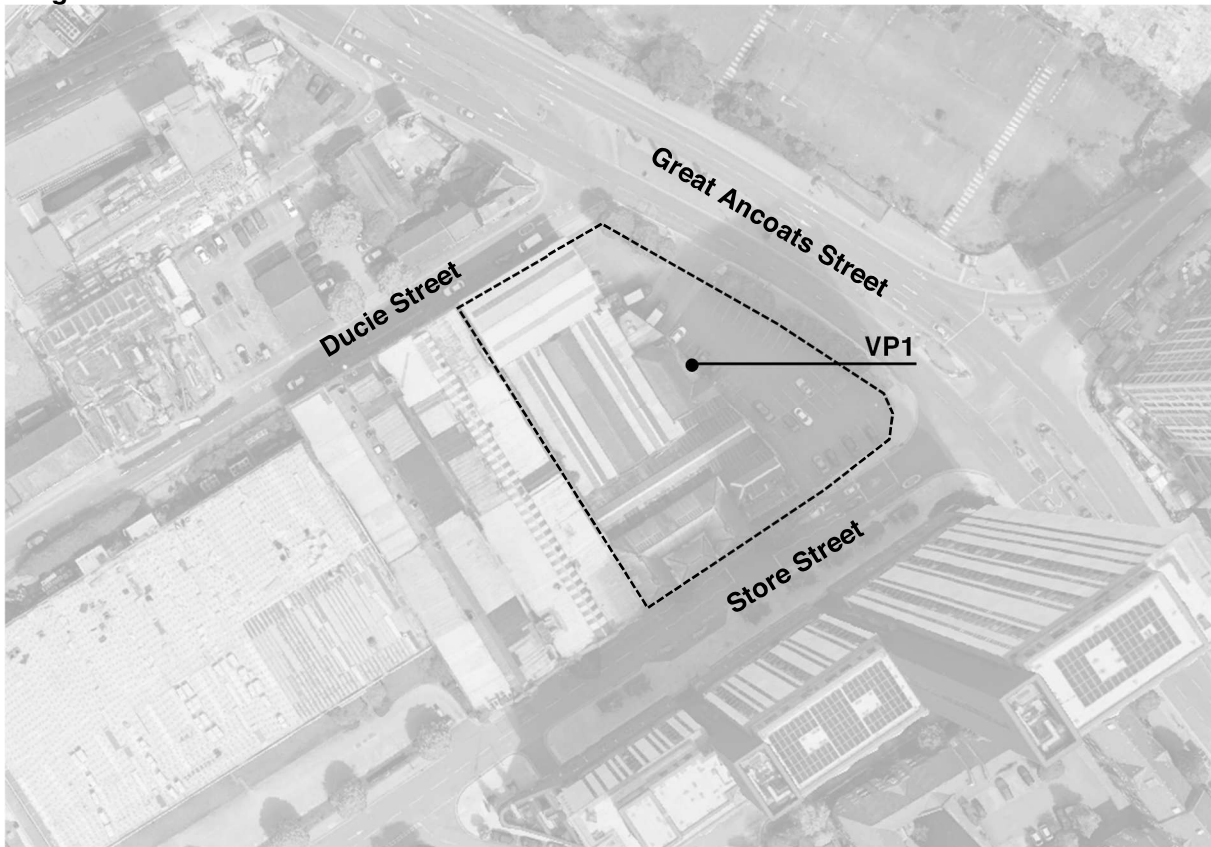
### 3.0 Vibration Survey

#### Methodology and Equipment

3.1 Attended measurements of vibration were undertaken during daytime hours on Thursday 31<sup>st</sup> October 2024. The measurement position is shown as 'VM1' on the following figure.

<sup>1</sup> BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting

**Image 1 – Vibration measurement location**



Courtesy Google Maps

3.2 Unattended tri-axial vibration measurements were captured over consecutive 1-minute periods throughout an hour-long period.

3.3 The vibration measurements were captured using the equipment set out in the following table.

**Table 2** Vibration measurement equipment

| Location | Item                   | Detail        |
|----------|------------------------|---------------|
| VM1      | Human vibration meter  | Svantek SV106 |
|          | Triaxial accelerometer | Svantek SV84  |

## Results

3.4 The 16-hour daytime and 8-hour night-time VDV at position VM1 were corrected to 16-hour and 8-hour values respectively, on the assumption that the measured hour-long vibration data would represent every hour of the day.

**Table 3** Measured Vibration Dose Values at position VM1

| Time Period                         | Measured Vibration Dose Value $\text{ms}^{-1.75}$ |        |        |
|-------------------------------------|---------------------------------------------------|--------|--------|
|                                     | x-axis                                            | y-axis | z-axis |
| 16-hour daytime $VDV_{\text{day}}$  | 0.00                                              | 0.00   | 0.01   |
| 8-hour daytime $VDV_{\text{night}}$ | 0.00                                              | 0.00   | 0.01   |

3.5 Measured levels of vibration have been compared with the criteria in BS 6472. During both the day and the night-time, the measured levels of vibration are well below the threshold for a “low probability of adverse comment”. BS 6472 advises therefore that at this level “adverse comment is not expected”.

3.6 It is possible for a building structure to amplify the vibration present in the ground, conversely; certain types of foundation can attenuate a proportion of the energy in the ground, meaning that a reduced level of energy will be present in the structure compared to that measured on an open site.

3.7 The Transportation Noise Reference Book (Butterworths, 1987) contains details of typical levels of attenuation that are offered by different types of foundation. Data in respect of typical levels of amplification that can occur with suspended concrete floors are also presented.

3.8 In this instance we are assuming that any buildings constructed on the site would be of a masonry construction on spread footings. Considering the frequencies of excitation in the ground for this site, the attenuation offered by the foundations would largely counter any amplification caused by any suspended floor structures. While some slight amplification in vibration levels is possible, it is anticipated that levels would remain well below those where there would be a “low probability of adverse comment”.

3.9 Accordingly, we conclude there is no requirement for the recommendation of any vibration isolation treatment for the development

