

Confidential

The Hoxton
199-203 High Holborn
London WC1V 7BD

Vibration Monitoring Performance Specification

For

Garenne Interiors

Project Number: 10795

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1.0 SCOPE SPECIFICATION

- 1.1. This specification intends to form a performance monitoring specification for the piling operation to be carried out during the proposed extension to The Hoxton Hotel.
- 1.2. Vibration monitoring will be undertaken in accordance with the British Standard BS 5228-1:2009.
- 1.3. This monitoring specification is intended to specify vibration monitoring during the proposed piling operation only.

2.0 SITE DESCRIPTION AND PROPOSAL

- 2.1. The current site consists of a 1970's built concrete framed building, which was converted to hotel accommodation circa 2013. The building layout forms a 'L-shaped', with approximately equal length wings located on High Holborn and Newton Street.
- 2.2. The foundations to the existing building are anticipated as being founded at a depth of around 4mbgl to the Newton Street Wing, however the formation level of the existing foundations has not been proven. The High Holborn Wing contains an existing basement level.
- 2.3. The Crossrail westbound running tunnel runs south-west through the site beneath the end of the Newton Street wing and the service yard.
- 2.4. The proposal consists of a 6-storey steel framed extension within the service yard of the hotel. With the foundations to the extension bridging over the Crossrail tunnel where required, bearing onto pile caps either side of the tunnel exclusion zone.
- 2.5. Piled foundations are to constitute a combination of 300mm and 450mm bored in situ cast concrete piles, up to a maximum depth of circa 26m.
- 2.6. A contiguous piled wall is to be formed around ground beam and pile caps to act as temporary works to facilitate excavation during construction, which is to be formed of 300mm diameter piles at 600mm centres, with a total pile length of 5m.
- 2.7. Vibration monitoring is to be undertaken during both the contiguous piled wall, and permanent foundation piled installations, in order to ensure vibrations associated with building/structure damage are not exceeded during these piling operations.

3.0 INSTRUMENTATION

3.1. Vibration monitoring is to be undertaken using tri-axial vibration monitors or similar specification.

3.2. The vibration monitors are to have the following performance characteristics:

Range	Up to 127 mm/s (5 in/s)
Resolution	0.125 mm/s (0.005 in/s)
Accuracy	+/- 1% @ 15Hz
Transducer Density	208 g/cc (130 lbs/ft)
Frequency Range	2 to 250 Hz

3.3. The vibration monitors are to be calibrated prior to installation on site and will be used in full accordance with the manufactures recommendations.

3.4. The vibration monitors will be dismantled from monitoring positions at the end of each specified test period and charged before the next required test to ensure continuous fault free operation.

3.5. Where specified an alarm facility will be incorporated in the vibration monitors such that a beacon will illuminate should a recorded vibration exceed a predefined threshold trigger level.

3.6. Definitions:

Partial velocity: Velocity of particles set into motion by the propagation of a disturbance through the ground and a structure by a source of vibration.

Frequency: The frequency of vibration of such particles.

Peak Particle Velocity (PPV): The maximum instantaneous particle velocity at a point during a given time interval. The PPV is the peak vector sum of the component velocities measured in three orthogonal axes.

Peak Component Particle Velocity (PCPV): The maximum value of any one of the three orthogonal component particle velocities measured during a given time interval. Vibrations in excess of 0.9mm/s are clearly perceptible, at 2.5mm/s-3mm/s PPV can vibrations can be clearly perceived.

4.0 MONITORING – BACKGROUND VIBRATION

- 4.1. Initial monitoring will be undertaken to establish background vibration levels. The vibration source of primary concern is from piling operations and associated site machinery.
- 4.2. The instrument's sensors be will installed by placing each on a level surface using the integral thumb screws and securing in place with a sand bag or supplied weight where necessary.
- 4.3. The sensors and monitors will be run continuously such that a full working days record for each of the node points is built up over a 8/9 hour period.
- 4.4. Results are to be processed and presented graphically to give a vibration 'fingerprint' for each node point.

5.0 MONITORING – SITE ACTIVITIES

- 5.1. Monitoring of site activities will be undertaken to ensure site generated vibration does not exceed maximum acceptable levels.
- 5.2. In combination with the maximum permitted vibration levels provided, appropriate threshold trigger levels are to be determined with reference to the recorded background vibration levels.
- 5.3. Instruments will be set up adjacent to the working area(s), in accordance with manufacturer's guidelines, and will record peak particle velocity caused by site machinery and associate operations. Instruments are to be repositioned throughout the piling operations in order to maintain a suitable proximity to the areas being worked keeping in accordance with the manufacturer's guidelines for positioning.
- 5.4. At the discretion of the person responsible for the monitoring activities, piling work activities will be suspended until the full implications (if any) of elevated vibration levels can be assessed.
- 5.5. Recorded vibration data will be down loaded from each instrument to be compiled and reported upon.

6.0 VIBRATION LIMITS

- 6.1. The following vibration limits are to be adopted in order to ensure that BRE Digest 521 category 1 damage is not exceeded:

Action Values: No greater than 10mm/s over the frequency range of 1 Hz – 80 Hz.

Note also the limits and guidance set out in table B.1 of BS 5228 part 2 for additional information.

Threshold values: 70% of the action values, or suitably set based on background vibration levels.

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