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ATKINS

Project: National Paediatric Hospital

Report Type: Summary of Noise & Vibration Monitoring Results

Period of Monitoring: Sensor data 30th July 2018 – 3rd September 2018

Introduction

Contained within the project documents for the National Children's Hospital development are requirements for Environmental Monitoring to be completed during construction works. This monitoring regime includes recording dust deposition, noise at the perimeter of the site, and ground vibration at the perimeter of the site. Permissible limits for each monitoring regime have been set out in the Project EIS which was submitted with the Planning Permission for the Hospital.

The number of Monitoring points will vary throughout the project depending on the construction works being undertaken. Additional monitoring points may be added if particular features of adjacent properties require it.

Works on site during this monitoring period include, but are not limited to:

- Demolition of old utility tunnel and excavating material from site at O'Reilly Avenue/Energy Centre.
- Excavation of materials from site and construction of basement slab at the hospital entrance.
- Steel works for capping bean and excavation of material from site near Cameron Square.
- Construction of basement slab at South Circular Road.
- Excavation of materials from site near mount brown.

Vibration Monitoring.

Vibration monitors have been located at the 'closest part of sensitive property' as per the Project Environmental Impact Statement where feasible or alternatively at the site hoarding. The monitors will be located as per the above adjacent to locations where significant works are ongoing on site.

The Project Environmental Impact Statement (EIS) that was part of the project Planning Permission established vibration limit at structures depending on their condition and type. Please see tables below for the limits set.

Table 11.7: Allowable vibration during construction phase for soundly constructed buildings

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	**10 to 50Hz**	**50 to 100Hz (and above)**
15 mm/s	20 mm/s	50 mm/s

Table 11.8: Allowable vibration during construction phase for sensitive buildings

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	**10 to 50Hz**	**50 to 100Hz (and above)**
3 mm/s	3 – 8 mm/s	8 – 10 mm/s

Site operations are monitored using a traffic light trigger system of Green, Amber and Red trigger levels with the Red trigger level set at a vibration limit of 3mm/s PPV which corresponds to the lowest permissible vibration limit for sensitive structures. Any vibration level recorded below Red levels is acceptable within the limits established in Planning.

Number of Monitors on Site:

During the monitoring period summarised for this report (30th July 2018 – 3rd September 2018) there were up to 16 active vibration monitors installed at the perimeter of the site.

Location of Vibration and Noise Monitors:

The layout of the monitors is as seen below:

Location of Vibration Monitors

There are concentrations of monitors at the boundaries with Cameron Square and O'Reilly Avenue where works have been ongoing on site in proximity to neighbouring properties.

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Location of Noise Monitors near O'Reilly Avenue

Observations:

Executive Summary:

Vibration monitors have been placed at the 'closest part of the sensitive properties' as per the EIS where this is feasible. The majority of vibration readings during the monitoring period recorded readings below the limit specified within the Project EIS. Vibration monitors V1, V13, V18, A1 & A2 have been excluded from this report as they are not relevant to the conditions for the residents adjacent to the site. From the remaining 11 monitors:

- 5 number monitors recorded readings above the limit specified within the Project EIS.
- 4 number monitors were offline for portions of the monitoring period and are noted below.

Detailed Summary:

Sensor (V2 – 9750) (Previously numbered 9144) (Rialto Luas)

- The sensor was offline on the following dates: 1st August 2018.
- Vibrations above the limit specified within the project EIS were recorded on the following dates: 28th of August 2018.
- The vibration reports states that the cause of these readings was *"an accidental knock".*

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Sensor (V3 – 8838) (South Circular Road)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V5 – 9155) (Cameron Square)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V6 - 9736) (Cameron Square)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V7 - 8681) (Old Kilmainham Road)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V8 - 3485) (Brookfield Clinic)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

Sensor (V9 – 8995) (O'Reilly Avenue)

- The sensor was offline on the following dates: 13th August 2018.
- Vibrations above the limit specified within the project EIS were recorded on the following dates: 14th of August 2018.
- The vibration report states that these readings were *"caused by an accidental knock".*

Sensor (V10 – 8939) (Previously numbered 8943) (O'Reilly Avenue)

- The sensor was offline on the following dates: 30th, 31st July 2018 & 1st August 2018.
- Vibrations above the limit specified within the project EIS were recorded on the following dates: 2nd, 8th, 10th August 2018 and 1st September 2018.
- The vibration report states that the cause of these readings were either *"accidental knocks"* or *"unknown noise source as no works were present at that time"*

Sensor (V11 – 8983) (Previously numbered 9461) (O'Reilly Avenue)

- The sensor was offline on the following dates: 8th August 2018.
- Vibrations above the limit specified within the project EIS were recorded on the following dates: 1st, 15th and 20th August 2018.
- The vibration report states that the cause of these readings was *"accidental".*

Sensor (V12 3252) (O'Reilly Avenue)

- Vibrations above the limit specified within the project EIS were recorded on the following dates: 1st September 2018.
- The vibration report states that the cause of these readings was *"an unknown source as no works were present at this time".*

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Sensor (V14 - 9737) (Mount Shannon)

- All vibration readings recorded vibrations below the limit specified within the Project EIS.

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Noise Monitoring.

During the report period noise monitors have been placed at the 'closest part of sensitive property' as per the Project EIS where this has been feasible, or alternatively to the outside face of the site hoarding. When works are ongoing the noise monitor sensors run continuously and readings are recorded in decibels (dB) LA_{eq1hr}. Decibels is the standard unit of measurement of sound energy and 'LA_{eq1hr}' means that sensors record all levels of sound over a 1 hour period and then calculate an average equivalent decibel level as if the sound was continuous. Isolated instantaneous loud noises are thus averaged out.

The Project Environmental Impact Statement (EIS) that was part of the project Planning Permission established a noise limit at residential dwellings of 70dB LA_{eq1hr}. Site operations are monitored using a traffic light trigger system of Green, Amber and Red trigger levels with the Red trigger level set at the noise limit set out in the project EIS (70 dB LA_{eq1hr}.). Any noise level recorded below Red levels is acceptable within the limits established in Planning.

Number of Noise Monitors on Site:

During the monitoring period (30th July 2018 – 3rd September 2018) summarised for this report there were up to 16 active monitors at the site boundaries.

Observations:

Executive Summary:

Noise monitors 07, 08, 15 & 16 have been excluded from this report as they are not relevant to the conditions for the residents adjacent to the site. From the remaining 12 monitors:

- 11 number monitors recorded readings above the limit specified within the Project EIS.
- 4 number monitor was offline for portions of the monitoring period and are noted below.

Detailed Summary:

The monitoring results for noise for this period were within the limits set out in the Project EIS with the following exceptions:

Monitor 01 (Cameron Square)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 13th, 16th & 17th August 2018 and 1st September 2018. The highest noise recording was 80 dB LA_{eq1hr}.
- The noise report states that the cause of these breaches was *"tree surgeons trimming trees"*.

Monitor 02 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 15th and 29th August 2018. The highest noise recording was 76 dB LA_{eq1hr}.
- The noise report states that the cause of these breaches was *"cleaning up works".*

Monitor 03 (Mace)

- This is a new monitor which began recording on the 7th September 2018.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th,

25th, 26th, 27th, 28th, 29th, 30th and 31st August 2018 and 1st, 2nd and 3rd September 2018. The highest noise recording was 80 dB LA_{eq1hr}.
- The noise report states that these breaches were caused by *"Ambient Traffic".*

Monitor 04 (Mount Brown Road)

- The background noise readings for this sensor outside of construction hours are consistently above the normal limit of 70 dB LA_{eq1hr}. An alternate limit of 80 dB LA_{eq1hr} was chosen for this location.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 15th August 2018. The highest noise recording was 80 dB LA_{eq1hr}.
- The noise report states that these breaches were caused by *"Ambient Traffic".*

Monitor 05 (O'Reilly Avenue)

- The sensor was offline of the following dates: 30th July 2018.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 15th August 2018. The highest noise recording was 76 dB LA_{eq1hr}.
- The noise report states that this breach was caused by *"cleaning up works".*

Monitor 06 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 15th, 17th, 27th August 2018. The highest noise recording was 72 dB LA_{eq1hr}.
- The noise report states that these breaches were caused by *"scrub clearing"* near hoarding.

Monitor 09 (Rialto LUAS)

- The sensor was offline of the following dates: 11th, 12th, 15th, 19th, 23rd, 24th, 25th and 26th August 2018.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 30th & 31st July 2018 and 1st, 2nd, 3rd, 14th, 15th, 16th, 17th, 20th, 21st, 22nd, 23rd, 26th, 28th , 29th 30th & 31st August 2018. The highest noise recording was 74 dB LA_{eq1hr}.
- The noise report states that these breaches were caused by *"Ambient Luas Noise"*

Monitor 10 (Brookfield Clinic)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 8th, 13th, 14th, 17th and 21st August 2018. The highest noise recording was 80 dB LA_{eq1hr}.
- The noise report states that the breaches where caused by *"Pile Anchoring".*

Monitor 11 (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.

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Monitor 12 (Cameron Square)

- The sensor was offline of the following dates: 7th & 8th August 2018.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 17th, 20th, 27th, 28th, 29th, 30th and 31st of August 2018. The highest noise recording was 76 dB LA_{eq1hr}.
- The noise report states that the breaches were caused by *"demolition of the utility tunnel".*

Monitor 13 (O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 15th of August 2018. The highest noise recording was 76 dB LA_{eq1hr}.
- The noise report states that these breaches were caused by *"scrub clearing"* near hoarding.

Monitor 14 (Mount Shannon Road)

- The sensor was offline of the following dates: 30th July 2018 and 8th, 9th, 29th and 30th August 2018.
- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 30th and 31st of June 2018 and 1st, 2nd and 3rd of July 2018 and 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th and 31st August 2018 and 1st September 2018. The highest noise recording was 75.5 dB LA_{eq1hr}.
- The noise report states that these breaches were caused by *"Ambient Traffic Noise".*