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Member of the SNC-Lavalin Group

Project: National Paediatric Hospital

Report Type: Summary of Noise Vibration & Movement Monitoring Results

Period of Monitoring: 5th July 2021 – 1st August 2021

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 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 features of adjacent properties require it.

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

O'Reilly Avenue/ Energy centre –Loading Bay, Deliveries, Waste skip removal and removal of excavation materials. FM Tunnel works. Façade works.
Hospital – Construction of upper levels and interior works, breaking of temporary wall and construction traffic, waste removal and façade works.
Cameron Square – No works listed in the Environmental Monitoring Report.
South Circular Road – Interior works, HGV Loading bay, Façade stone works and Scaffolding loading
Mount Brown – Waste removal, concrete deliveries and ground works.
Brookfield Clinic – No works listed in the Environmental Monitoring Report.
Energy Centre – Steel fixing, waste removal, rebar and steel fixing, ground works. Movement of materials, area clean up and façade works.

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 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 Noise and Vibration Monitors

Memo

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.

Location of Noise and Vibration 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. Most vibration readings during the monitoring period recorded readings below the limit specified within the Project EIS. Vibration monitors V1, V13, V18, V19, V20, 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:

- 2 monitor recorded readings above the limit specified within the Project EIS.
- No monitors were offline during the timeframe covered in this report.

Detailed Summary:

Sensor (V2 – 3666) (James' Walk)

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

Sensor (V3 – 8995) (South Circular Road)

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

Sensor (V5 – 5037) (Cameron Square)

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

Sensor (V6 - 5044) (Cameron Square)

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

Sensor (V7 - 5017) (Old Kilmainham Road)

- Vibration readings recorded vibrations above the limit specified within the Project EIS on the following days:
    - 19.07.2021: Cause: "This breach was caused by an accidental knock to the monitor from the homeowner. There was no construction activity in the area at this time." Time: Approx. 4PM. Mitigation: None.
    - 23.07.2021: Cause: "This breach was caused by an accidental knock to the monitor. There was no construction activity at this time." Time: Approx. 3PM. Mitigation: None.
    - 24.07.2021: Cause: "This breach was caused by an accidental knock to the monitor from the homeowner – out of construction hours." Time: Weekend. Mitigation: None.
    - 01.08.2021: Cause: "These breaches were caused by an accidental knock to the monitor – out of construction hours." Time: Weekend. Mitigation: None.

Sensor (V8 - 5035) (Brookfield Clinic

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

Sensor (V9 – 5056) (O'Reilly Avenue)

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

Sensor (V10 – 4183) (O'Reilly Avenue)

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

Sensor (V11 – 8988) (O'Reilly Avenue)

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

Sensor (V12 – 5043) (O'Reilly Avenue)

- Vibration readings recorded vibrations above the limit specified within the Project EIS on the following days:
    - 05.07.2021: Cause: "These breaches were caused by unintentional knocks to the monitor. Many breaches were out of constructions hours late at night. During construction hours breaches were investigated - A watering can could be seen on top of the unit." Time: Pre 8AM. Mitigation: None.
    - 21.07.2021: Cause: "These breaches were caused by a knock to the monitor from the homeowner. Upon investigation the residents could be seen sitting adjacent to the monitor on garden furniture." Time: Approx. 5PM. Mitigation: None.

- 22.07.2021: Cause: “These breaches were caused by an accidental knock to the monitor from the resident.” Time: During work hours 9-5. Mitigation: None.
- 28.07.2021: Cause: “This breach was caused by an unintentional knock to the monitor.” Time: Approx. 3PM. Mitigation: None.
- 29.07.2021: Cause: “These breaches were caused by an accidental knock to the monitor.” Time: 10AM. Mitigation: None.
- 31.07.2021: Cause: “This breach was caused by an accidental knock to the monitor.” Time: 11AM. Mitigation: None.

Sensor (V14 - 3835) (South Circular Road)

- 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 summarised for this report there were up to 20 active monitors at the site boundaries.

Observations:

Executive Summary:

Noise monitors 07, 08, 15, 16, 17, 18, 19 & 20 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:

- 5 number monitors recorded readings above the limit specified within the Project EIS.
- 1 number monitors were offline for at least 1 day during the timeframe covered by this report.

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)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 02 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 03 (Mace)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 26th, 27th, 28th, 29th, 30th and 31st July 2021 and 1st August 2021. The noise report stated "The monitor is located close to the busy SC road as well as over a busy shop. It is

often in breach out of construction hours. [These] exceedances are due to traffic and elevated voices passing the monitor." Exceedances were noted on weekends when there was no construction reported on site.

- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 04 (Mount Brown Road)

Noise levels above the limit specified within the Project EIS were recorded on the following dates: 5th, 6th, 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 July 2021 and 1st August 2021. The noise report stated "This noise monitor is located on the busy R810 road. The monitor is constantly in breach due to its close proximity to the road. We often see high breaches outside of construction hours therefore these breaches are deemed to be due to ambient traffic noise." Exceedances were noted on weekends when there was no construction reported on site.

- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 05 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 06 (O'Reilly Avenue)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 09 (James' Walk)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 10 (Brookfield Clinic)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 11 (Cameron Square)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 24th July 2021. The noise report stated: "All of these breaches took place out of construction hours. [After 8PM]"

- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 12 (Cameron Square)

- All noise readings recorded noise levels below the limit specified within the Project EIS.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 13 (64 O'Reilly Avenue)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 1st August 2021. The noise report stated: "There was no construction activity on the date."
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.

Monitor 14 (South Circular Road)

- Noise levels above the limit specified within the Project EIS were recorded on the following dates: 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 25th, 26th, 27th, 28th, 29th, 30th and 31st July 2021 and 1st August 2021. The noise report stated "This noise monitor is located on the busy South Circular Road. The monitor is constantly in breach, inclusive of outside of construction hours, as seen here, therefore these breaches are deemed to be due to ambient traffic noise." Exceedances were noted on weekends when there was no construction on site.
- This monitor was offline for the entire 23rd and 24th of July 2021.
- All noise readings recorded noise levels below the limit specified within the DCC 10-hour limit.