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Project: National Paediatric Hospital

Report Type: Summary of Noise and Vibration Monitoring Results

Period of Monitoring: Sensor data 6th November – 4th December 2017

Introduction

Contained within the project documents for the National Paediatric 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.

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

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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 (6th November – 4th December 2017) there were up to 12 active vibration monitors installed at the perimeter of the site.

Location of Vibration and Noise Monitors:



Location of Vibration Monitors

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Location of Vibration Monitors around O'Reilly Avenue

Observations:

Executive Summary:

The majority of vibration readings recorded below the limit specified within the Project EIS. However six number monitors recorded readings above the limit specified within the Project EIS. These breaches were generally caused by commencement of piling and earth work activities. Vibration monitors have been placed at the 'closest part of the sensitive properties' as per the EIS where this is feasible.

Detailed Summary:

Sensor (9151) (South Circular Road)

- There was 1 number vibration reading recorded above the limit specified within the Project EIS. This reading was recorded on 9th November. The size of this reading is orders of magnitude larger than the readings recorded during normal construction works during the rest of the period and is of very short duration. This size of reading is indicative of the vibration monitor being physically moved or hit rather than a record of vibration transmitted through the ground to the sensor by construction works. The report comments *"For values in the range of this breach, the vibration sensor would have had to be physically knocked / moved"*.

Sensor (9244) (O'Reilly Avenue)

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

Sensor (8681) (Mount Brown)

- There were 2 number vibration readings recorded above the limit specified within the Project EIS. These readings were recorded on the 8th and 22nd November. The readings appears to be isolated incidents with the readings either side of the peaks well within the specified limit.

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Sensor (9141) (Hospital A&E)

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

Sensor (9005) (Cameron Square)

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

Sensor (8898) (O'Reilly Avenue)

- There were 2 number vibration readings recorded above the limit specified within the Project EIS. These readings were recorded on the 9th and 26th November. The reading from the 9th November is noted within the report as being due to borehole works directly to the rear of O'Reilly Avenue. We have been advised that these works are associated with identifying suitable remedial measures for the buildings on O'Reilly Avenue and that the Residents were advised of these works. The reading on 26th November is noted as occurring outside of working hours for the site (a Sunday) and the vibration possibly originated from within the property. The reading appears to be an isolated incident.

Sensor (8939) (Cameron Square)

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

Sensor (8995) (O'Reilly Avenue)

- There were approximately 3 number vibration readings recorded above the limit specified within the Project EIS. These readings were recorded on 13th November. The report indicates that *"Core sampling, hand digging, and drilling crews were working in close proximity to the vibration unit when these breaches occurred. The hand dig crew were responsible for the initial breach and were put on hold while the drilling crews carried on"*. We have been advised that these works are associated with identifying suitable remedial measures for the buildings on O'Reilly Avenue and that the Residents were advised that these works would be taking place.

Sensor (8983) (O'Reilly Avenue)

- There were 6 number vibration readings recorded above the limit specified within the Project EIS. The readings were recorded on 7th and 24th November.

For the 5 readings on 7th November (over a timeframe of 80 minutes) the reports notes *"Investigation works by borehole piling was being completed in the back garden and in close proximity to the vibration unit. These alerts not related to the main on-site construction works."* We have been advised that these works are associated with identifying suitable remedial measures for the buildings on O'Reilly Avenue and that the Residents were advised that these works would be taking place.

The size of the reading on 24th November is orders of magnitude larger than the readings recorded during normal construction works during the rest of the period and is of very short duration. This size of reading is indicative of the vibration monitor being physically moved or hit rather than a record of vibration transmitted through the ground to the sensor by construction works. The report comments *"This breach occurred when the surveyor was changing the batteries and accidentally nudged the sensor"*.

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Sensor (9737) (O'Reilly Avenue)

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

Sensor (9750) (Rialto Luas)

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

Sensor (9734) (Hospital Entrance)

- All vibration readings recorded 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 (6th November – 4th December 2017) summarised for this report there were up to 13 active monitors at the site boundaries. Monitor 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, and 13 (shown on the map view above) have recorded results.

Observations:

Executive Summary:

Ten of the thirteen monitors recorded noise levels above the limits set out in the Project EIS, these are 02, 03, 04, 05, 06, 07, 08, 09, 10, 12, and 13.

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 Monitor 01 recorded levels below those set out in the Project EIS for the duration of the timeframe covered in this report.

Monitor 02 (O'Reilly Avenue)

- Noise Monitor 02 recorded levels above those set out in the Project EIS on 2 separate days (7th & 14th Nov).

The readings on 7th and 14th November coincide with the works associated with identifying suitable remedial measures for the buildings on O'Reilly Avenue. We have been advised that the Residents were advised that these works would be taking place.

Monitor 03 (South Circular Road)

Noise Monitor 03 recorded levels above those set out in the Project EIS on 3 separate days, 24th, 25th Nov and 2nd Dec. Noise monitor 03 is located on the boundary hoarding and it has been reported that works to the boundary fence itself were completed on the 24th and 25th December. The noise triggers for these dates have been attributed to this work.

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There were no construction works on site on the 2nd December and the noise trigger for this date has been attributed to road traffic outside the site.

Monitor 04 (Mount Brown Road)

- Noise Monitor 04 is located at Mount Brown and is exposed to high levels of ambient noise caused by traffic. On two occasions (30th Nov & 2nd Dec) the noise levels exceeded 80 dB LA_{eq1hr}. The reading on 2nd December was noted as occurring outside of site working hours and therefore likely generated outside the site.

Monitor 05 (O'Reilly Avenue)

- Noise Monitor 05 is located to the rear of Number 72 O'Reilly Avenue. The monitor recorded readings above those set out in the Project EIS on 2 separate days (13th and 14th November 2017). Site activities during 13th and 14th November included site investigation works to the rear of O'Reilly Avenue associated with identifying suitable remedial measures for the buildings on O'Reilly Avenue. The noise monitor was offline from 17th November to 24th November.

Monitor 06 (O'Reilly Avenue)

- Noise Monitor 06 is located to the rear of Number 68 O'Reilly Avenue. The monitor recorded readings above those set out in the Project EIS on 10th November 2017 with a peak of 73 dB LA_{eq1hr}. Site activities on the 10th November included site investigation works to the rear of O'Reilly Avenue associated with identifying suitable remedial measures for the buildings on O'Reilly Avenue.

Monitor 07 (Hospital A&E)

- Noise Monitor 07 recorded levels above those set out in the Project EIS on the following dates: November 6th, 7th, 13th, 14th, 16th, 17th, 20th, 22nd, 23rd & 24th 2017 with a peak of 76 dB LA_{eq1hr}. The readings either side of the triggers are below the limits specified in the Project EIS suggesting that the triggers are being reacted to – however triggers have been recorded on multiple days.

Monitor 08 (Pharmacy)

- Noise Monitor 08 is adjacent to the St James Hospital site and recorded levels above those set out in the Project EIS on the following dates: November 6th, 7th, 13th, 15th, 22nd, 23rd, 24th, 25th, 28th & 29th, December 1st 2017.
- The monitoring report indicates that Construction activity on site was only taking place in this area on 15th, 22nd, 23rd, and 24th November. It is reported that deliveries to St James take place in this area with these deliveries causing the remaining triggers. The sensor appears to be offline on the 20th & 21st of November.

Monitor 09 (Rialto LUAS)

- Noise Monitor 09 recorded levels above those set out in the Project EIS on 11 separate days (6th, 7th, 8th, 10th, 11th, 13th, 22nd, 23rd, 24th, 27th November 2017 and 1st December 2017). It is reported that many of the triggers can be attributed to ambient noise associated with the LUAS and the recorded times of the triggers would support this. On 3 days the triggers were noted as being due to works associated with water main installation. The sensor was offline

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from 25th-26th November and 2nd & 3rd December. This noise monitor is fixed to the site boundary (rather than the nearest adjacent property as stipulated in the Project EIS) which is a more onerous monitoring regime.

Monitor 10 (Brookfield Clinic)

- Noise Monitor 10 recorded levels below those set out in the Project EIS for the duration of the timeframe covered in this report.

Monitor 11 (Cameron Square)

- Noise Monitor 11 recorded levels below those set out in the Project EIS for the duration of the timeframe covered in this report.

Monitor 12 (Cameron Square)

- Noise Monitor 12 recorded levels above those set out in the Project EIS on the 16th of November likely caused by excavation works on site.

Monitor 13 (O'Reilly Avenue)

- Noise Monitor 13 recorded levels above those set out in the Project EIS on the 9th of November likely caused by borehole drilling on site.