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Executive summary

An assessment has been undertaken by the TT Acoustics team to consider the potential noise impacts arising from the operation of STACK Manchester, within the administrative area of Manchester City Council, for the purposes of amending planning Condition 6a of planning permission Ref: 140907/FO/2024.

The proposed venue will comprise an entertainment venue with food and beverage vendors, games area, and live and recorded music.

Prior to the noise assessment, the scope of the assessment was issued to the Environmental Health Department at Manchester City Council (MCC).

To assess the impact of the proposed development, existing sensitive residential and commercial receptors that could experience a noise impact from the venue have been identified. Baseline noise levels have been measured at locations which are considered to be representative of the identified receptors.

This assessment has considered the sound emissions from the venue against the limits in planning Condition 6a (Planning Ref: 140907/FO/2024) from MCC. It shows that, with appropriate controls on the music sound output from the loudspeakers installed, noise from the operation of STACK Manchester can meet with the requirements of MCC.

In addition, the development includes fixed plant. Noise from any fixed plant and service areas will be controlled to avoid any adverse noise impacts at sensitive receptors.

A robust commissioning process will be undertaken once the development is complete, but prior to opening to confirm compliance. This commissioning process will look to set appropriate noise limits on the loudspeaker system and from fixed plant and equipment.

These limits will be set so as to ensure compliance with the planning condition imposed by MCC. These limits will be checked and tested on a regular basis, to reduce disturbance at local residents.

Therefore, the assessment presented herein identifies that condition 6(a) relating to planning approval 140907/FO/2024 can be amended.

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1 Introduction

1.1 Stack Manchester

1.1.1 TT have been commissioned by STACK (Manchester) Limited to undertake an acoustic assessment for the operation of STACK Manchester.

1.1.2 The development has been granted planning permission by Manchester City Council (MCC) on the 5th September 2024 (Ref: 140907/FO/2024) with conditions.

1.1.3 The development was described as;

> 'Erection of one and two storey structures for flexible commercial uses (Use Classes E(a), E(b), E(c) and Sui Generis (Drinking Establishments at ground and first floor levels with stage for live music performance associated access arrangements, landscaping, lighting, and associated external seating areas and courtyard space.'

1.1.4 Planning Conditions 6 and 7 relate to noise, and state;

> 6) a) Prior to the commencement of the development, a noise study to acoustically insulated and limit the break out of noise from the premises and a scheme of acoustic treatment, shall be submitted to and approved in writing by the City Council as local planning authority.
>
> The scheme shall be implemented in full before the use commences.
>
> Where entertainment noise is proposed the LAeq (entertainment noise) shall be controlled to 5dB below the LA90 (without entertainment noise) in each octave band at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63HZ and 125Hz octave frequency bands shall be controlled so as not to exceed (in habitable rooms) 47dB and 41dB (Leq,5min), respectively.
>
> b) Prior to occupation of the development a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along
>
> 7) a) Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location. Prior to commencement of the use hereby approved the scheme shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the site. The scheme shall be implemented in full before the use commences.
>
> b) Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post

> completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

1.1.5 The development is not yet operational, and so this report considers only Condition 6(a). Therefore, this assessment has been prepared to accompany an application to amend these conditions.

1.1.6 The venue comprises an entertainment venue with food vendors, and live and recorded music. The development is in a mixed-use area to the east of Oxford Road, and within the space under the A57(M) flyover.

1.1.7 Residential receptors have been identified to the north-west, north, and north-east of the development. These receptors have been considered herein.

1.1.8 An environmental sound survey has been undertaken to quantify the existing noise climate at existing sensitive receptors.

1.1.9 An assessment of operational noise from the site has been undertaken by calculating and assessing noise emissions from STACK Manchester in accordance with appropriate technical and planning guidance and the requirements of MCC stated in Conditions 6 and 7.

1.1.10 Mitigation measures have been specified, where necessary, to reduce any adverse noise impacts at the residential noise sensitive receptors and meet the requirements of Conditions 6a and 7a.

1.1.11 TT is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The NIA has been undertaken with integrity, objectivity, and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.

2 Site Description

2.1 Planning History

2.1.1 There has previously been a venue at the location of STACK Manchester, which was similar to the proposed uses. This previous venue was operated by Hatch. The previous venue was granted planning approval by MCC (Ref: 124502/FO/2019). The planning approval was granted following the preparation of a number of noise impact assessment reports prepared by Fisher Acoustics. Furthermore, an assessment was undertaken by Wardell Armstrong LLP (WA) for the operation of STACK Manchester. However, the scheme assessment by WA was not taken forward.

2.1.2 Information from these noise impact assessments has been utilised in this assessment report.

2.2 Existing Site

Building Description

2.2.1 STACK Manchester comprises a structure formed from former shipping containers under the existing A57(M) flyover on Oxford Rd Manchester.

2.2.2 The Client has already sought to embed noise control measures into the development proposals, to ensure it is demonstrated that the venue does not cause any disturbance to sensitive receptors. A noise management plan will be prepared for the venue. The entrance into the venue would be lobbied, and a 1.8m high glass screen will be included on the façade fronting Oxford Road. Where practical, the venue layout has been used to provide noise screening and to limited noise break-out from the venue.

2.2.3 Within the premises there are hot/cold food and drink vendors, a stage, and patron seating areas throughout the venue.

Nearest Residential Receptors

2.2.4 Residential receptors are considered the most noise-sensitive to the impact from the development based on the proposed times of operation and impact upon resting conditions. Figure 2 in Appendix G and Section 3 details the nearest residential premises relative to the site.

Surrounding Uses

2.2.5 The venue lies within a mixed use area of Manchester City centre. The venue is surrounded by educational buildings, food vendors, residential units and a sports centre. Therefore the background sound levels are high and typical of a city centre location.

2.3 Development Details

2.3.1 The premises features a main plaza bordered by a structure of shipping containers housing bars and hot food vendors. The plaza is focused on a main stage for live and recorded music

performances, with seating and standing areas populating the central plaza area and the remaining floor space across the venue.

2.3.2 A directional loudspeaker sound system will be installed based on a zonal speaker arrangement. The principle of the zonal system is to distribute and direct several speakers across the audience at a lower level than an system based on a low number of high-capacity stage-based loudspeakers. In short more speakers throughout the venue allowing for a lower sound level without compromising sound quality.

2.3.3 The installed system will also allow the precise control of individual speakers through a signal processor to focus, tune and mitigate the system levels as required. All loudspeakers are individually limited with fixed maximum limits through the signal processor to control noise levels.

3 Assessment Methodology & Consultation

3.1 Introduction

3.1.1 This section of the report sets out the assessment methodology and consultation which has been used to prepare this report.

3.2 Consultation

3.2.1 Email consultation has been undertaken with the Environmental Health Team at MCC on the 16th September 2025. At the time of writing no response has been received from Manchester City Council.

3.2.2 Therefore, this assessment has therefore been undertaken in line with best practice assessment methods and our previous experience of other similar developments.

3.3 Policy & Guidance

3.3.1 The assessment follows the requirements of the planning condition; however, the following technical noise guidance has also been referenced with full details provided in Appendix A.

- British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (BS8233).
- British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' (BS4142).

3.4 Assessment Criteria

3.4.1 This assessment considers the potential adverse noise impact of the operation of STACK Manchester on the surrounding sensitive receptors. The methodology considers entertainment sound from the venue, within the noise sensitive receptors, in octave bands so that it remains 5dB below the existing L_{A90} background sound level.

3.4.2 In addition, this assessment consider the sound from any fixed plant and equipment following the methodology which is detailed in BS4142 so that noise form the plant is up to 5dB below the existing L_{A90} background sound level.

3.5 Baseline Survey

3.5.1 As part of this assessment, TT has carried out attended and unattended surveys, to assess the current ambient and background sound levels at existing sensitive receptors.

3.5.2 The results of the noise survey are detailed in Section 4 of this report.

3.6 Noise Modelling

3.6.1 SoundPLAN v9.1 noise modelling software has been used to calculate the propagation of noise from STACK Manchester at ESRs and to determine the need for any mitigation measures.

3.6.2 The modelling has been carried out in accordance with ISO 9613-2:1996 Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation (ISO9613). The software uses geographical information to create a model of the study area on which to generate noise contours and includes objects that affect the propagation of sound such as buildings and topography.

3.6.3 Further details on the noise modelling undertaken can be found in Section 5.3 of this report, modelling assumptions and parameters are provided in Appendix C and on Figure 3 in Appendix G.

4 Baseline Conditions

4.1 Introduction

4.1.1 The existing baseline situation, including the identification of the nearest existing sensitive receptors, has been informed by a site visit and review of online, free to view, aerial photography.

4.2 Existing Noise Sensitive Receptors

4.2.1 The following ESRs have been identified as the closest to the proposed development. Other receptors may be affected by noise from STACK Manchester, however, the impact at the other receptors will be equal to or less than at the receptors identified. The ESRs are described in Table 4.1 below and shown on Figure 1 in Appendix G.

Table 4.1: Location of the Existing Noise Sensitive Receptors

Receptor	Receptor Type	Location	Bearing from Site	Co-ordinates		Approximate Distance to Site (m)
				X	Y	
ESR 1	Residential	Circle Square, Plots 5 and 6	North	384188.4	397414.3	181
ESR 2	Residential	Circle Square, Plot 9	North	384268.4	397450.9	202
ESR 3	Offices	Circle Square, Plot 4	North	384215.4	397365.8	115
ESR 4	Residential	Circle Square, Plot 10	North	384318.4	397423	175
ESR 5	Offices	Circle Square, Plot 2	North	384246.5	397312.4	77
ESR 6	Residential	Circle Square, Plots 7 and 8	North	384313.6	397356.8	109
ESR 7	Residential	Circle Square, Plot 11	North	384347.5	397370.2	135
ESR 8	Residential	Princess House	North	384375	397402	176
ESR 9	Offices	Oxford House	North	384320.9	397271.9	16
ESR 10	Hotel	Circle Square, Premier Inn Hotel	North	384377.3	397293.7	98

4.3 Baseline Noise Survey

4.3.1 A baseline noise survey has been undertaken by TT in three locations between the 24th September and 1st October 2025.

4.3.2 The noise measurements were unattended; however, observations were conducted during the set-up and decommissioning of the equipment.

4.3.3 The noise measurements were undertaken using three Class 1 sound level meters which were calibrated before and after the noise measurements, and no significant drift was identified.

4.3.4 The measurement microphones were located on lampposts and street furniture at locations which are considered to be representative of the receptors. Photographs of the monitoring location is provided in Appendix D.

4.3.5 A-weighted L_{eqs} were measured. The maximum and minimum sound pressure levels, A-weighted $L_{(f)90s}$, A-weighted $L_{(f)10s}$ were also measured to provide additional information. The monitoring equipment also allows for Z and C weightings to be measured. The measured sound levels are set out in Appendix E. A full data set is available on request as it contains several hundred lines of information.

4.3.6 The monitoring locations are shown in Figure 1 of Appendix G, and are described as.

- ML1 – Measurements were undertaken between 1400hrs on the 25th until 1546hrs on the 30th September 2025 to the north-west of the site. The noise measurements captured at this location are considered to be representative of the noise sensitive receptor ESR10.
- ML2 – Measurements were undertaken between 1400hrs on the 25th until 1121hrs on the 30th September 2025 to the east of the site. The noise measurements captured at this location are considered to be representative of the noise sensitive receptors ESR1, ESR3, ESR5 & ESR9.
- ML3 – Measurements were undertaken between 1300hrs on the 30th September until 1351hrs on the 1st October 2025. This monitoring location is within the Circle Square development. The noise measurements captured at this location are considered to be representative of the noise sensitive receptors ESR2, ESR4, ESR6, ESR7, & ESR8.

4.3.7 A review of the measured data, coupled with our observations during the installation and commissioning of the equipment identified road traffic on the A57(M), and Oxford Road as the dominant source of sound at the receptors.

4.3.8 Other sources of sound included noise from pedestrians and extraction plant and equipment associated with the surrounding commercial and food premises.

4.4 Measured Noise Levels

4.4.1 The following noise levels have been measured at the locations which are considered to be representative of the existing noise sensitive receptors as described in Table 4.1. The noise levels presented are the logarithmic average L_{Aeq} sound level over the assessment period, and the representative L_{A90} background sound level which has been assessed based on the

measured levels. The broadband measured levels are set out in Table 4.2 below, and in one-third octaves in Appendix E.

Table 4.2: Measured Sound Levels

Noise Monitoring Location	16hr Daytime (0700-2300hrs)		8hr Night-time (2300-0700hrs)	
	$L_{Aeq,t}$	$L_{A90,t}$	$L_{Aeq,t}$	$L_{A90,t}$
ML1	65	63	59	55
ML2	66	66	61	58
ML3	63	58	53	50

4.4.2 The noise measurements obtained at the MLs have been used to establish representative ambient and background sound levels for the relevant daytime, and night-time periods.

4.5 Building Construction

Introduction

4.5.1 Information in this section has been ascertained from our site visit and survey which was undertaken on the 24th September 2025.

Building Envelope

4.5.2 STACK Manchester is located beneath the existing flyover for the A57(M) which is approximately 6.5m above the surrounding area. The flyover was constructed in the mid-1960s and is of masonry construction. The road carries a 30mph speed limit. As a result, the A57(M) flyover provides a moderate background sound level, and significant noise screening for STACK Manchester at receptors.

4.5.3 The venue has been constructed from shipping containers placed below the A57(M) flyover.

Noise Transmission to Adjoining Buildings

4.5.4 There are no noise sensitive premises directly adjoining the STACK venue, and this has not been considered further.

5 Noise Impact Assessment

5.1 Introduction

5.1.1 This section of the report sets out the assessment of noise from the proposed development, at the ESRs.

5.1.2 To understand the likely noise sources associated with STACK Manchester, an operational acoustic survey has been undertaken at other venues, and this information has been fed into the design, details are provided in Appendix B.

5.1.3 The noise sources associated with STACK Manchester have been input into a computer noise model which has been used to determine the noise impact at the ESRs during the typical operations of the development.

5.2 Description of the Development

5.2.1 The venue comprises a music and entertainment venue across the ground floor of the existing premises. The premises includes bars, food vendors, toilets and seating areas for patrons.

5.3 Details of the Noise Model

5.3.1 To calculate the specific sound levels associated with operation of the STACK development at the ESRs, a 3D model has been built using SoundPLAN v9.1 proprietary noise modelling software. The model calculates the contribution from each noise source input as a specified source type (e.g. point, line, area) at selected locations, i.e., the nearest ESRs.

5.3.2 The model predicts sound levels under light down-wind conditions based on hemispherical sound propagation with corrections for atmospheric absorption, ground effects, screening and directivity based on the procedure detailed in ISO 9613-2:2024 ‘Acoustics — Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors’.

5.3.3 The ground between the site and the receiver locations has been modelled as hard ground with a ground factor of G = 0.25. Terrain contour data have been entered into the model based on OS land contours. The nearest buildings to development have been included in the model.

5.3.4 The same noise modelling techniques have been used by TT on numerous sites in the UK and worldwide and there is a high degree of confidence in the model.

5.3.5 To understand the likely noise sources associated with STACK Manchester, an acoustic survey has been undertaken at STACK Seaburn on Saturday 18th April and 1st June 2023 (Appendix B). Attended noise measurements were undertaken throughout the venue, and include.

- Patron noise (measured in the middle of the busy seating area 1m from nearest patrons), no background music.
- Background Music

- Live Acoustic Set
- Live Band / Tribute act
- DJ Set

5.3.6 On the day of the surveys, the venue hosted live music performances, running from early afternoon into the evening and night-time periods. Further details of this acoustic survey can be found in Appendix B.

5.3.7 To assess the impact of STACK Manchester, noise models have been created to allow prediction of noise from the venue and proposed operations at sensitive receptors. Further details of the noise model set-up are provided in Figure 3 in Appendix G.

5.3.8 The following modelling scenarios have been considered:

- Figure 4 (Appendix G) – Development at typical capacity – Standard Operations live music (including tribute bands) and patrons – up to 89dB(A) opposite the stage, and 80dB(A) in other areas. The contour plot provides a visual representation of noise propagating at 1.5m from the ground.

5.4 Embedded Mitigation

Venue Operations

5.4.1 The following operational hours will be applied to the development to reduce the potential noise impact at sensitive receptors.

5.4.2 The venue will be subject to the following operating hours.

- Monday to Sunday:
  - Venue opening times: 0700 hours to 2300 hours.
  - Development will be supervised by venue staff throughout operational hours.
  - CCTV will be operational covering the whole venue.
- There will be live music played over the following time periods.
  - Monday to Sunday (including bank holidays): 1200 to 2200 hours.
- There will be a DJ Set over the following time periods.
  - Sunday to Thursday: 2100 to 2300 hours.
  - Friday & Saturday: 2100 to 2300 hours.
- The installed audio system will be supplied by Martin Audio system. This is a high-end speaker system that provides greater control over the directivity of the sound than may have been present in the venue when operated by others. This system has been considered in this assessment, however, further reduction in noise at receptors may be possible during commissioning and testing of the system.
  - Any loudspeakers installed will be fitted with a suitable noise limiter so that.
    - Stage speakers are limited to 89dB(A), when measured 3m from the speaker.

    - Other ground floor speakers are limited to 80dB(A), when measured 3m from the speaker.
- Any loudspeakers installed will be controlled with notch and high pass filters to limit sound levels at certain frequencies, as required.
- A Noise Management Plan will be prepared for the venue.

5.5 External Doors

5.5.1 All external doors will always remain closed when not in use for access or being used in case of an emergency. External fire doors would only be opened in case of an emergency.

5.6 Results and Discussion

Introduction

5.6.1 This part of the assessment presents the results of the assessment, identifies any potential adverse noise impact, and makes recommendations for noise mitigation measures as appropriate.

5.6.2 The assessment is robust and represents a worst-case prediction of noise levels.

5.6.3 The example music spectrum used to calibrate the sound system is taken from measured levels during events at STACK Seaburn venue and then adjusted further to meet with the requirements of the planning condition.

Noise Break-Out at Receptors – Standard Operations & Live Music

5.6.4 There is potential for noise break-out from within the venue to adversely affect the surrounding noise sensitive receptors. Therefore, MCC have implemented a planning condition to ensure that receptors are not adversely affected.

5.6.5 The planning condition limits music noise from the venue to a level which is 5dB below the L_{A90} background sound level in each octave band. The assessment of music noise from the venue, when considered against the L_{A90}, in each octave band, is shown in full in Appendix F.

5.6.6 The initial assessment shows that with appropriate controls in place, that sound emissions from the operation of STACK Manchester can meet with the noise limits at residential receptors. The results of the assessment are shown in Appendix F.

5.6.7 This will be confirmed through the robust and comprehensive commission process.

5.7 Noise Impact from Plant and Servicing

Fixed Plant

5.7.1 Full details of the proposed plant and locations are not currently available. However, noise limits have been conditioned as part of any planning approval to ensure that any proposed plant does not adversely impact local sensitive receptors. Any noise limits will be set based on British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and

commercial sound (BS4142), which describes a method for rating and assessing sound of an industrial nature, and the requirements of MCC.

5.7.2 To ensure ESRs are not adversely affected by any proposed plant, it is recommended that noise limits are set to ensure the rating level from all proposed plant is not greater than 5dB below $L_{A90,t}$ background sound levels, as detailed in Table 5.1, at ESRs.

Table 5.1: Noise Limits for Fixed Plant

Receptor	Receptor Type	Location	Measured Background LA90		Plant Noise Limit	
			Daytime	Night-time	Daytime	Night-time
ESR 1	Residential	Circle Square, Plots 5 and 6	61	60	56	55
ESR 2	Residential	Circle Square, Plot 9	53	53	48	48
ESR 3	Offices	Circle Square, Plot 4	61	60	56	55
ESR 4	Residential	Circle Square, Plot 10	53	53	48	48
ESR 5	Offices	Circle Square, Plot 2	61	60	56	55
ESR 6	Residential	Circle Square, Plots 7 and 8	53	53	48	48
ESR 7	Residential	Circle Square, Plot 11	53	53	48	48
ESR 8	Residential	Princess House	53	53	48	48
ESR 9	Offices	Oxford House	61	60	56	55
ESR 10	Hotel	Circle Square, Premier Inn Hotel	59	58	54	53

Service Vehicles

5.7.3 The proposed development, when operational, will require deliveries and collections to maintain its operations. Noise related to service vehicles can be intrusive, depending on the vehicle and operation. Therefore, where possible delivery and collections should avoid sensitive periods, such as the night-time (2300 to 0700) and early mornings (0700 to 0800).

5.7.4 The operation of service vehicle would be controlled with the Noise Management Plan associated with the development.

5.8 Further Noise Control Measures & Mitigation

Introduction

5.8.1 The assessment has shown that noise from the music sound system and patrons can be controlled to meet with the requirements of the planning condition. However, we have recommended that good practice noise control measures are implemented into the proposed development, as well and noise control measures for any fixed plant and equipment.

Sound System

5.8.2 The proposed sound system will comprise state of the art Martin Audio speakers and Subwoofer. The sound system will be designed to limit noise impact at ESRs whilst maintaining viable operating sound levels throughout the venue.

5.8.3 Limiters will be placed on the sound system and loudspeakers to ensure noise levels are not exceeded those acceptable to nearby receptors, particularly on speakers located externally.

5.8.4 The acceptable limits on each loudspeaker are as follows:

- The $L_{Aeq,5min}$ maximum limit to the entertainment noise is 90dB, front of house 5m from the stage.
- The $L_{Ceq,5min}$ maximum limit to the entertainment noise is 95dB, front of house 5m from the stage.

5.8.5 The commissioning test will consider the sound levels at the nearest sensitive receptors as reference locations. The sound system would be calibrated during commissioning testing to ensure compliance with Condition 6a and b.

5.8.6 Only the fixed installed loudspeaker system shall be used (except for instrument amplifiers).

Operational Mitigation

5.8.7 General operation of the venue and standard control measures can be implemented so that noise emissions are appropriately controlled, we would therefore recommend the following to be implemented.

- A Noise Management Plan
- Signage would be place around the venue area, and at access points requesting that patrons respect the local area and avoid creating excessive noise when using the terrace areas and exiting the venue.
- A complaints procedure detailing should be drawn-up to identify how complaints relating to noise would be addressed by the venue management team.

Summary

5.8.8 The assessment has shown that noise from the proposed development can meet with the requirements of the Planning Condition 6(a) with appropriate controls and commissioning testing.

5.8.9 In summary, noise from the development is not likely to cause a significant adverse noise effect at the existing noise sensitive receptors and the development is in keeping with the soundscape of the local area.

6 UNCERTAINTY AND LIMITATONS

Uncertainty

6.1.1 To reduce measurement uncertainty, the following steps have been taken:

- The noise measurement locations were selected to be representative of the ESRs.
- The noise measurements were taken during dry and calm weather conditions for the monitoring period.
- The noise measurements were undertaken during proposed operational times and are representative of the daytime and evening periods.
- The results of each measurement period were reported to the nearest 0.1dB.
- Baseline sound measurements were made using a Class 1 integrating sound level meter.
- Occasional visits were made to the monitoring locations during the survey period to maintain the equipment and make observations.
- Operation assessment data has been taken from an existing STACK venue, reducing uncertainty around source data.

Limitations

6.1.2 The following limitations apply to the assessment.

6.1.3 The exact construction of the envelope of the existing building is not known and is based on experience of other buildings and surface observations. However, the building will include some new and existing opening, such as doors, and glazed areas on thew western façade, and roof lights. These new openings have been included into the computer noise model and are considered to be the weakest areas of the building envelope.

6.1.4 The exact height of each and every building surrounding the site is not known the building heights have been assessed using site imagery, and open-source aerial photography.

7 Conclusions

7.1 STACK - Manchester

7.1.1 An assessment has been undertaken to consider the potential for an adverse noise impact on existing noise sensitive receptors for the continued operation of STACK Manchester against the noise limits in Condition 6(a) associated with planning approval 140907/FO/2024 from MCC.

7.1.2 To assess the impact of STACK Manchester, existing sensitive receptors in the vicinity were identified, and a baseline noise monitoring scope was issued to the Environmental Health Department at MCC. The sensitive residential receptors likely to experience the highest noise impact from the venue were identified as part of the noise assessment.

7.1.3 The noise assessment has assessed all sources of noise from the proposed venue.

7.1.4 The assessment has shown that following the noise controls stated in this assessment, and once commissioning testing has been undertaken, that entertainment noise emissions from the operation of STACK Manchester will meet with the noise limits stated in Planning Condition 6(a).

7.1.5 In addition, noise from fixed plant and equipment will be appropriately controlled, full details of the plant scheme will be provided in due course..

7.1.6 When considering the context of the sound from the development our assessment has shown that noise from the development is in keeping with the existing sound environment, and no significant effects are expected on local sensitive receptor, and planning condition 6(a) can be amended.

Appendices

Appendix A
Guidance and Legislation

Appendix A

National Planning Policy Framework

In December 2024 the 'National Planning Policy Framework' (NPPF) was amended as the current planning policy guidance within England.

Paragraph 198 of the NPPF states:

> *'Planning policies and decisions should also ensure that new development is appropriate for its location taking in account the likely effects (including cumulative effects) of pollution on heath, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impact that could arise from the development. In doing so they should:*
>
> *Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impact on health and the quality of life;*
>
> *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'…*

Paragraph 200 of the NPPF states:

> *'Planning policies and decisions should ensure that new development can be integrated with existing business and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'*

Noise Policy Statement for England

With regard to 'significant adverse impacts on health and the quality of life' the NPPF refers to the 'Noise Policy Statement for England' (NPSE).

The Noise Policy Statement for England refers to the World Health Organisation when discussing noise impacts and introduces observed effect levels which are based on established concepts from toxicology that are applied to noise impacts by WHO.

Three levels are defined as follows:

'NOEL – No Observed Effect Level

- This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

- This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

- This is the level above which significant adverse effects on health and quality of life occur'.

The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided. The second aim refers to the situation where the impact lies somewhere between LOAEL and

SOAEL, and it requires that all reasonable steps are taken to mitigate and minimise the adverse effects of noise. However, this does not mean that such adverse effects cannot occur.

Planning Practice Guidance - Noise

The Planning Practice Guidance for Noise (PPG-N) provides further detail about how the effect levels can be recognised. Above the NOEL noise becomes noticeable, however it has no adverse effect as it does not cause any change in behaviour or attitude. Once noise crosses the LOAEL threshold it begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. Increasing noise exposure further might cause the SOAEL threshold to be crossed. If the exposure is above this level the planning process should be used to avoid the effect occurring by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused. At the highest extreme the situation should be prevented from occurring regardless of the benefits which might arise. Table A.1 summarises the noise exposure hierarchy.

Table A. 1: National Planning Practice Guidance Noise Exposure Hierarchy

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

The PPG-N summarises the approach to be taken when assessing noise. It accepts that noise can override other planning concerns, but states:

> *"Neither the Noise Policy Statement for England nor the National Planning Policy Framework (which reflects the Noise Policy Statement) expects noise to be considered in isolation, separate from the economic, social and other environmental dimensions of proposed development"*

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise

ProPG provides practitioners with guidance on a recommended approach to the management of noise within the planning system in England for new residential development. The guidance has been produced by the ANC, IOA and Chartered Institute of Environmental Health (CIEH) and is widely adopted by planning authorities as good practice when considering noise affecting new residential development.

The guidance reflects the Government's overarching National Planning Policy Framework, the Noise Policy Statement for England, and Planning Practice Guidance (including PPG-Noise) and draws on other authoritative sources of guidance. It provides advice for Local Planning Authorities and developers, and their professional advisors, on achieving good acoustic design in and around new residential developments.

The ProPG advocates a systematic, proportionate, risk based, two stage, approach, namely:

- Stage 1: an initial noise risk assessment of the proposed development site; and where required
- Stage 2: a systematic consideration of four key elements.

The four key elements to be consider during Stage 2 are listed below.

- Element 1: Good Acoustic Design Process;
- Element 2: Internal Noise Level Guidelines;
- Element 3: External Amenity Area Noise Assessment; and
- Element 4: Other Relevant Issues.

Stage 1 Risk Assessment

Error! Reference source not found. summarises the Stage 1 Initial Site Noise Risk Assessment of the ProPG. The level of noise incident on the site (in the absence of any development) is used to provide a sense of the noise challenge at a potential residential development site and should be interpreted flexibly having regard to the locality, the project and the wider context.

In the final column, the initial noise risk assessment is aligned with pre-planning application guidance that highlights the increasing importance of good acoustic design as the noise risk increases.

Table A.2: ProPG Initial Site Noise Risk Assessment

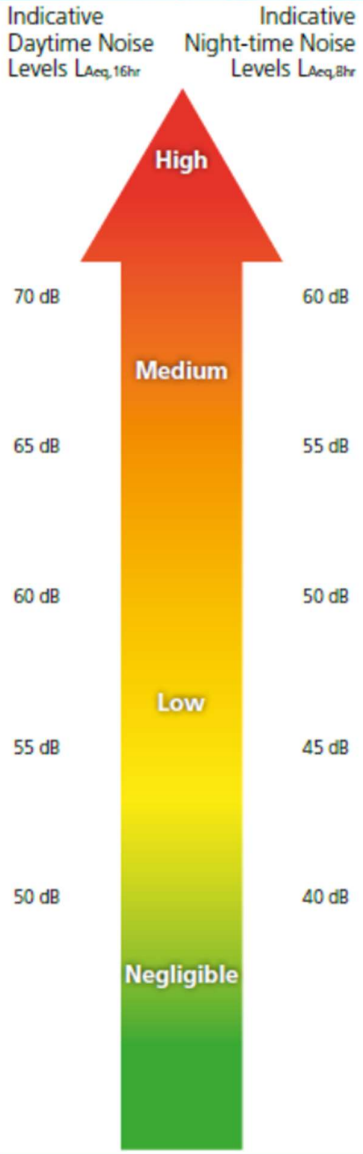
NOISE RISK ASSESSMENT	EFFECT WITHOUT NOISE MITIGATION	PRE-PLANNING APPLICATION ADVICE
	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

Figure 1 Notes:

a. Indicative noise levels should be assessed without inclusion of the acoustic effect of any scheme specific noise mitigation measures.

b. Indicative noise levels are the combined free-field noise level from all sources of transport noise and may also include industrial/commercial noise where this is present but is "not dominant".

c. $L_{Aeq,16hr}$ is for daytime 0700 – 2300, $L_{Aeq,8hr}$ is for night-time 2300 – 0700.

d. An indication that there may be more than 10 noise events at night (2300 – 0700) with $L_{Amax,F} > 60$ dB means the site should not be regarded as negligible risk.

Stage 2 Element 1 - Good Acoustic Design Process

One of the key focuses of the ProPG is on achieving good acoustic design. The ProPG states that planning applications for new residential development should include evidence that the following have been properly considered:

- Check the feasibility of relocating or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost, CDM (construction, design and management) etc.
- Assess the viability of alternative solutions.
- Assess external amenity area noise.

The ProPG also states that the level of detail to be included in the Stage 2 assessment (referred to as an Acoustic Design Statement) is proportional to the level of risk identified at Stage 1.. For example, where the noise risk is identified as 'high', detailed evidence that good acoustic design has been implemented is required.

Stage 2 Element 2 – Internal Noise Level Guidelines

The ProPG provides guidance on desirable internal ambient noise levels that should be achieved in residential dwellings. These are based upon the guidance in British Standard (BS) 8233:2014: 'Guidance on sound insulation and noise reduction for buildings' and are reproduced below:

Table A.3: ProPG Internal Noise Level Guidelines

Activity	Location	Daytime (07:00 – 23:00 hrs)	Night-time (23:00 – 07:00 hrs)
Resting	Living room	35 dB $L_{Aeq,16r}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16r}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16r}$	30 dB $L_{Aeq,16r}$ 45 dB $L_{Amax,F}$ (Note 4)

Accompanying Note 4, 5, 6 & 7 from Figure 2 of the ProPG states the following:

> *"NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than ten times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).*
>
> *NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g., trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.*

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D)."

Paragraphs 2.34 to 2.36 of the ProPG contain guidance regarding the use of open windows in relation to ventilation and overheating:

"Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which may be the case in urban areas and at sites adjacent to transportation noise sources, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment. In such circumstances, internal noise levels can be assessed with windows closed but with any façade openings used to provide "whole dwelling ventilation" in accordance with Building Regulations Approved Document F (e.g., trickle ventilators) in the open position (see Supplementary Document 2). Furthermore, in this scenario the internal L_{Aeq} target noise levels should not generally be exceeded.

It should also be noted that the internal noise level guidelines are generally not applicable under "purge ventilation" conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g., to remove odour from painting and decorating or from burnt food).

In addition to providing purge ventilation, open windows can also be used to mitigate overheating. Therefore, should the LPA accept a scheme is to be assessed with windows closed, but this scheme is reliant on open windows to mitigate overheating, it is also necessary to consider the potential noise impact during the overheating condition. In this case a more detailed assessment of the potential impact on occupants should be provided in the ADS. It should be noted that overheating issues will vary across the country and any specific design solutions will need to be developed alongside advice from energy consultants."

Paragraph 2.38 of the ProPG states the following with respect to noise from internal building services systems:

Where mechanical services are used as part of the ventilation or thermal comfort strategy for the scheme, the impact of noise generated by these systems on occupants should also be assessed.

Stage 2 Element 3 – External Amenity Area Noise Assessment

The ProPG refers to the design ranges in BS 8233:2014 with respect to the assessment of external amenity, as well as guidance in the PPG-N. Based on these two documents the following guidance is provided with respect to the assessment of noise in external amenity areas:

3(i) "If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended".

3(ii) "The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB $L_{Aeq,16hr}$."

3(iii) "These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces."

3(iv) "Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process."

3(v) "Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g., garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

- *a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e., an enclosed balcony) as part of their dwelling; and/or*
- *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g., a garden, roof garden or large open balcony in a different, protected, location); and/or*
- *a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, publically accessible, external amenity space (e.g., a public park or a local green space designated because of its tranquillity) that is nearby (e.g., within a five-minute walking distance)."*

Stage 2 Element 4 – Other Relevant Issues

The ProPG states that the following other relevant issues, should be considered, where appropriate:

- compliance with relevant national and local policy;
- magnitude and extent of compliance with the ProPG criteria;
- likely occupants of the development;
- acoustic design vs unintended adverse consequences; and
- acoustic design vs wider planning objectives.

ProPG Planning Recommendations

Having followed the ProPG stage 2 assessment process, it is envisaged that noise practitioners will then have a choice of one of four possible recommendations to present to the decision maker. In simple terms, the choice of recommendations are as follows:

- Planning consent may be granted without any need for noise conditions;
- Planning consent may be granted subject to the inclusion of suitable noise conditions;
- Planning consent should be refused on noise grounds in order to avoid significant adverse effects ("avoid"); or
- Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects ("prevent")

British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings

British Standard 8233 "Guidance on sound insulation and noise reduction for buildings" 2014 (BS 8233:2014), suggests the following guideline noise levels and states that they are based on guidelines issued by the World Health Organisation (WHO);

- 35 dB LAeq (16 hour) during the daytime in noise sensitive rooms
- 30 dB LAeq (8 hour) during the night-time in bedrooms
- 45 dB LAmax,F during the night time in bedrooms
- 50 dB LAeq (16 hour) desirable external noise levels for amenity space such as gardens and patios
- 55 dB LAeq (16 hour) upper guideline value which would be acceptable in noisier environments.

In addition, for internal noise levels it states;

> *"Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."*

Furthermore, with regard to external noise, the Standard states;

> *"However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited".*

British Standard 4142:2014 Methods for rating and assessing industrial and commercial sound (BS 4142)

BS 4142 is used to rate and assess sound of an industrial and/or commercial nature including:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The standard is applicable to the determination of the following levels at outdoor locations:

- rating levels for sources of sound of an industrial and/or commercial nature; and
- ambient, background and residual sound levels, for the purposes of:

  1) Investigating complaints;

  2) Assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

  3) Assessing sound at proposed new dwellings or premises used for residential purposes.

The purpose of the BS 4142 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

BS 4142 refers to noise from the industrial source as the 'specific noise' and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with industrial noise. The 'specific noise' sources, of the existing industrial premises that have been observed are detailed in Section 3 of this report.

BS 4142 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}). Section 3 of this report provides details of the background noise survey undertaken.

Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. In particular, BS 4142 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS 4142 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristic, or is expected to be present. The specific noise level along with any applicable correction is referred to as the 'rating level'.

The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS 4142 are as follows:

The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS 4142 are as follows:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

During the daytime, BS 4142 requires that noise levels are assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

Where the initial estimate of the impact needs to be modified due to context, BS 4142 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and,
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Appendix B
Survey of other STACK Venue

CLIENT:	DANIELI GROUP
PROJECT:	STACK Seaburn
SUBJECT:	Operational Acoustic Survey
JOB NO.:	NT16226
DATE:	18th April 2023
PREPARED BY:	Lee Whitehall
APPROVED BY:	Simon Urquhart

F.1 INTRODUCTION

F.1.1 Wardell Armstrong was commissioned by Danieli Group to undertake an operational acoustic survey of STACK Seaburn to establish operational sound levels and to create and archive of sound data. STACK Seaburn has an operational capacity of 2000 patrons. This data captured can be used to predict the noise emissions from future developments when assessing the potential noise impact. It can also be used to aid in the design and management of current and future STACK Sites.

F.1.2 The noise survey was undertaken on the between 15:30 on Saturday 18th February and 00:24 Sunday 19th February 2023. This day was chosen due to the site being fully operational, with a combination live music, Bingo, pre-recorded music, and a DJ set. The operational schedule of events during the noise survey were as follows:

- 15:30 – 16:15 - Acoustic Band with PA system
- 16:15 – 16:45 - Break with Background music
- 16:45 – 17:30 - Acoustic Band with PA system
- 17:30 – 19:00 - Bingo
- 19:00 – 19:45 - Rock off Jukebox – Live Band
- 19:45 – 20:15 - Break with background music
- 20:15 –21:00 - Rock off Jukebox – Live Band
- 21:00 – 24:00 - DJ Set

F.2 NOISE SURVEY

F.2.1 Two noise monitors were utilised on site. One stationary monitor installed at the sound technician booth at height of 3m which will remain throughout the duration of monitoring period. The second monitor used was a handheld monitor used to take specific noise measurements and create a noise map detailing the noise levels across the site during each of the operations. Details of the noise monitors are as follows:

Table E.1: Noise Monitor Details

Name and Location	Serial Number	Before survey calibration	Post survey calibration	Drift
Svan – Stationary	60696	0.83	0.79	0.04
Fuision – Roaming	11072	0.09	0.05	-0.04

F.2.2 The roaming monitoring Locations are shown in Figures E.1 and E.2 with the results detailed below and full details have been provided in Annex A. The noise measurements were undertaken across the ground and first floors of the venue. The ground floor consists of the main stage, plaza including seating areas, and food and beverage vendors. The first floor consists of covered seating areas and food and beverage vendors. The main speaker system is located on the stage however smaller individual speakers are strategically located throughout the venue to provide an even coverage of music, without excessive sound levels for one group of speakers.

F.2.3 When monitoring the noise from the patrons, the measurements were taken in the centre of the groups of tables, approximately 1m from the closest patrons. During the monitoring, approximately 100 people occupied the first two rows of tables, closest to the stage. When measuring noise from patrons, a location in the centre of these tables was selected (Ref: ML21, Annex A-1). Due to the arrangement of tables each measurement was dominated by noise from several tables at once. This value therefore should not be considered to be an individual voice, rather the noise emission per m^2.

Table E.2: Noise Measurement Results

Measurement Ref	Time	Duration	Floor	Ref	LAeq,t	LAmax
M1	15:38	30 Seconds	Ground Floor	Acoustic Set	84.4	89.9
M2	15:40	30 Seconds	Ground Floor	Acoustic Set	87.8	91.5
M3	15:41	30 Seconds	Ground Floor	Acoustic Set	86.1	90.4

M4	15:42	30 Seconds	Ground Floor	Acoustic Set	80.3	83
M5	15:42	30 Seconds	Ground Floor	Acoustic Set	85.6	91.2
M6	15:44	30 Seconds	Ground Floor	Acoustic Set	83.1	88.6
M7	15:45	30 Seconds	Ground Floor	Acoustic Set	87.5	91.2
M8	15:46	30 Seconds	Ground Floor	Acoustic Set	87.4	91.3
M9	15:49	30 Seconds	Ground Floor	Acoustic Set	88.4	92.1
M10	15:50	30 Seconds	Ground Floor	Acoustic Set	89.2	94.6
M11	15:51	30 Seconds	Ground Floor	Acoustic Set	89.1	92.1
M12	15:52	30 Seconds	Ground Floor	Acoustic Set	90.8	93.7
M13	15:55	30 Seconds	First Floor	Acoustic Set	88.6	91.1
M14	15:56	30 Seconds	First Floor	Acoustic Set	87.3	90.7
M15	15:58	30 Seconds	First Floor	Acoustic Set	86.4	89.2
M16	16:00	30 Seconds	First Floor	Acoustic Set	86.4	90.4
M17	16:01	30 Seconds	First Floor	Acoustic Set	89.2	93.8
M18	16:02	30 Seconds	First Floor	Acoustic Set	88.7	91.8
M19	16:15	30 Seconds	Ground Floor	No Music – Patron Noise	78.4	84.6
M20	16:16	30 Seconds	Ground Floor	No Music – Patron Noise	75	77.6
M21	16:17	30 Seconds	Ground Floor	No Music – Patron Noise	76.3	81
M22	16:18	30 Seconds	Ground Floor	No Music – Patron Noise	72.7	76.3
M23	16:19	30 Seconds	First Floor	No Music – Patron Noise	76.8	82.1
M24	16:20	30 Seconds	First Floor	No Music – Patron Noise	72.4	75.2
M25	16:21	30 Seconds	First Floor	No Music – Patron Noise	77.3	81.1

M26	16:22	30 Seconds	Ground Floor	No Music – Patron Noise	74.8	81.1
M27	16:27	30 Seconds	Ground Floor	Background Music	81.9	88.1
M28	16:28	30 Seconds	Ground Floor	Background Music	82.8	91.3
M29	16:29	30 Seconds	Ground Floor	Background Music	84.5	90
M30	16:30	30 Seconds	Ground Floor	Background Music	82.8	88.4
M31	16:31	30 Seconds	Ground Floor	Background Music	80	85.7
M32	16:33	30 Seconds	Ground Floor	Background Music	86.9	91.3
M33	16:34	30 Seconds	Ground Floor	Background Music	86.2	90.1
M34	16:35	30 Seconds	Ground Floor	Background Music	81.4	86.3
M35	16:36	30 Seconds	Ground Floor	Background Music	84.9	89.4

STACK Seaburn
Annex A

Ref	
AS	Acoustic Set
NM	No Music
BM	Background Music

Spot Measurements

Measure Ref	Time	Duration	Floor	Ref	Comment	LAeq,t	LAmax
M1	15:38	30 Seconds	GF	AS		84.4	89.9
M2	15:40	30 Seconds	GF	AS		87.8	91.5
M3	15:41	30 Seconds	GF	AS		86.1	90.4
M4	15:42	30 Seconds	GF	AS	Taken at same location	80.3	83
M5	15:42	30 Seconds	GF	AS		85.6	91.2
M6	15:44	30 Seconds	GF	AS		83.1	88.6
M7	15:45	30 Seconds	GF	AS		87.5	91.2
M8	15:46	30 Seconds	GF	AS		87.4	91.3
M9	15:49	30 Seconds	GF	AS		88.4	92.1
M10	15:50	30 Seconds	GF	AS	Same location as M11 (Guy taking to surveyour during this measurement)	89.2	94.6
M11	15:51	30 Seconds	GF	AS	Same location as M10, little further back than M12, but ideal location for calibrating sound from gig in the centre of the space.	89.1	92.1
M12	15:52	30 Seconds	GF	AS	Middle of stage and tables, ideal location for calibrating sound from gig in the centre of the space.	90.8	93.7
M13	15:55	30 Seconds	F 1	AS		88.6	91.1
M14	15:56	30 Seconds	F 1	AS		87.3	90.7
M15	15:58	30 Seconds	F 1	AS		86.4	89.2
M16	16:00	30 Seconds	F 1	AS		86.4	90.4
M17	16:01	30 Seconds	F 1	AS		89.2	93.8
M18	16:02	30 Seconds	F 1	AS		88.7	91.8
M19	16:15	30 Seconds	GF	NM	Ladies laughing at table next to	78.4	84.6
M20	16:16	30 Seconds	GF	NM		75	77.6
M21	16:17	30 Seconds	GF	NM		76.3	81
M22	16:18	30 Seconds	GF	NM		72.7	76.3
M23	16:19	30 Seconds	F 1	NM	Same location, M23 includes guy shouting towards Lee, and girls asking him	76.8	82.1
M24	16:20	30 Seconds	F 1	NM		72.4	75.2
M25	16:21	30 Seconds	F 1	NM		77.3	81.1
M26	16:22	30 Seconds	GF	NM		74.8	81.1
M27	16:27	30 Seconds	GF	BM		81.9	88.1
M28	16:28	30 Seconds	GF	BM		82.8	91.3
M29	16:29	30 Seconds	GF	BM		84.5	90
M30	16:30	30 Seconds	GF	BM		82.8	88.4
M31	16:31	30 Seconds	GF	BM		80	85.7
M32	16:33	30 Seconds	GF	BM		86.9	91.3
M33	16:34	30 Seconds	GF	BM		86.2	90.1
M34	16:35	30 Seconds	GF	BM		81.4	86.3
M35	16:36	30 Seconds	GF	BM	Approx 1.9m from speaker (s)	84.9	89.4

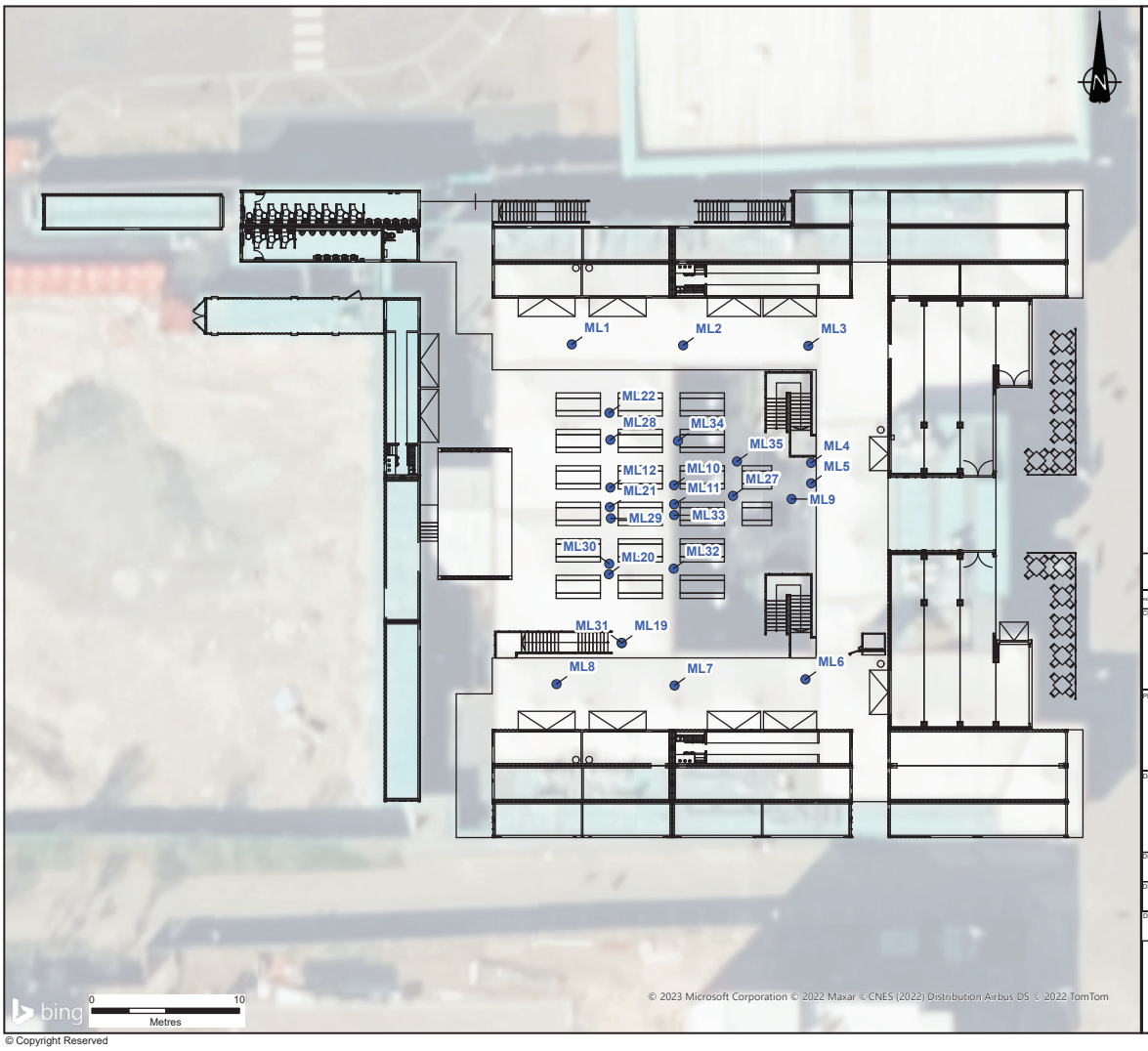
Measure Ref	20 Hz	25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
M1	9	17	17	23	43	58	60	61	64	65	65	71	73	73	79	75	76
M2	8	16	17	21	44	56	60	63	70	67	67	73	76	78	80	79	79
M3	18	21	20	25	38	48	58	61	64	61	65	71	72	75	77	76	77
M4	6	15	18	27	42	55	56	58	66	60	60	72	69	68	73	70	72
M5	7	15	18	26	45	53	58	68	65	67	67	70	72	75	80	74	75
M6	18	25	22	27	43	54	63	68	64	62	67	69	70	75	72	72	74
M7	9	17	18	24	46	52	59	64	67	64	67	71	73	78	79	78	78
M8	11	19	21	26	43	51	54	62	61	65	66	70	76	76	74	80	78
M9	8	16	18	24	37	49	62	65	64	62	67	69	71	79	76	81	77
M10	4	12	13	22	43	55	66	69	67	70	72	73	78	75	80	81	78
M11	4	11	13	21	44	54	65	70	66	71	72	73	79	75	80	81	78
M12	3	10	15	32	55	58	69	76	70	78	78	74	79	79	81	83	81
M13	1	7	10	23	43	53	58	65	65	71	70	74	74	81	80	76	79
M14	4	11	16	25	40	51	60	64	61	65	68	73	72	77	80	76	79
M15	10	14	19	23	37	50	55	66	62	58	68	70	72	76	75	78	77
M16	13	19	17	25	47	52	58	61	59	65	73	71	73	76	76	77	79
M17	3	8	15	22	47	56	55	59	62	66	66	70	76	80	79	78	79
M18	5	12	13	19	40	49	51	57	65	68	72	72	72	77	79	79	80
M19	8	16	21	25	30	31	35	37	42	47	49	53	56	60	66	68	71
M20	7	14	16	22	26	28	32	35	39	47	48	53	57	60	64	66	67
M21	8	13	16	22	27	34	31	36	40	47	50	54	58	61	65	67	68
M22	6	12	15	22	26	27	31	35	39	46	48	53	55	59	62	64	65
M23	6	15	16	20	26	27	31	38	41	47	50	53	56	61	66	68	67
M24	10	17	15	21	27	28	31	38	41	45	48	52	55	58	63	64	64
M25	8	14	16	20	27	29	31	37	43	49	49	52	56	61	68	69	70
M26	4	11	13	20	26	26	31	37	42	47	47	52	55	60	63	68	67
M27	5	13	15	39	53	57	61	60	66	66	62	62	67	70	69	72	74
M28	7	11	17	37	56	61	69	67	65	66	70	67	69	71	76	73	73
M29	2	9	15	35	49	58	69	66	68	66	67	69	71	73	79	75	73
M30	2	12	15	32	51	54	60	59	59	63	67	66	66	72	76	75	73
M31	5	16	17	28	41	51	56	53	58	56	61	62	62	67	70	72	72
M32	8	17	18	30	44	58	61	63	71	65	69	71	74	77	75	77	80
M33	6	14	16	30	46	60	58	62	60	57	64	68	68	75	74	77	78
M34	8	14	15	23	40	52	56	61	63	66	70	68	65	70	70	73	73
M35	12	17	19	26	37	51	58	67	66	64	69	67	66	71	72	74	77

Measure Ref	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	20 kHz
M1	74	74	69	67	66	65	63	58	57	56	51	41	30	17
M2	79	78	75	72	69	68	71	66	64	62	56	44	31	16
M3	79	77	75	70	68	70	71	64	62	58	53	43	31	16
M4	68	71	67	64	62	61	59	57	55	53	49	42	31	17
M5	75	75	74	70	70	71	65	60	59	58	53	44	32	17
M6	74	74	72	67	65	66	62	59	57	55	51	43	31	16
M7	77	79	76	71	70	71	69	63	61	59	54	45	33	17
M8	78	79	77	74	71	70	72	65	63	62	56	48	36	21
M9	80	79	79	73	71	75	77	68	66	64	61	49	38	21
M10	80	81	78	73	71	71	73	68	65	63	57	49	38	22
M11	80	80	77	73	72	72	73	67	66	62	57	48	38	21
M12	80	80	80	76	75	73	73	68	68	67	63	53	42	27
M13	79	80	77	73	73	70	67	62	59	58	54	45	36	22
M14	78	78	77	71	70	69	66	61	59	59	54	45	37	23
M15	79	76	76	72	71	71	69	62	60	58	54	44	34	20
M16	77	78	75	69	68	67	65	61	58	57	52	43	33	18
M17	82	80	80	76	74	72	71	65	63	61	58	49	38	25
M18	81	80	77	75	72	73	72	64	63	63	59	50	42	27
M19	73	70	69	66	64	62	60	55	51	47	43	35	26	15
M20	67	67	66	63	61	60	58	53	49	46	42	36	23	13
M21	68	68	68	65	62	60	57	52	48	46	41	37	23	13
M22	64	64	63	60	59	57	54	49	46	44	40	32	20	10
M23	69	69	68	65	65	65	61	52	48	46	42	33	23	13
M24	63	63	62	61	61	59	56	50	46	45	40	30	19	9
M25	69	68	67	64	65	62	57	52	48	45	40	32	22	19
M26	68	65	64	61	62	59	55	50	46	43	38	29	19	8
M27	74	72	71	69	67	66	64	61	57	57	52	43	29	14
M28	72	71	70	67	65	64	62	60	58	57	52	46	38	20
M29	73	71	72	72	69	66	65	61	58	58	54	49	42	24
M30	73	70	71	70	69	66	66	62	58	57	52	47	41	22
M31	71	70	70	68	66	64	61	56	52	50	46	39	30	13
M32	78	77	75	73	72	70	66	63	62	58	52	41	28	15
M33	77	77	77	74	74	71	66	64	62	57	52	43	29	15
M34	71	71	69	68	66	63	60	57	57	52	46	36	21	9
M35	77	75	74	73	70	71	69	71	68	65	59	53	40	18

Running Order	
Acoustic Set	15:30
Break	16:15
Acoustic Set	16:45
Bingo (approx)	17:30
Rock oF 1 Jukebox (Band)	19:00
Break (Approx)	19:45
Rock oF 1 Jukebox (Band) (Approx)	20:15
DJ set (Approx)	21:00

Summary of Events

Name	Duration hh:mm	Laeq	LAmax
Acoustic Band	00:45	86.7	98.3
Talking	00:09	74.3	90
Background Music	00:19	88.6	104.9
Bingo	01:30	87.9	104
Rock off Jukebox	00:45	91.3	105
DJ	02:59	87.3	106.4



KEY

Stack Seaburn Ground Floor

Noise Monitoring Locations

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD

CLIENT

DANIELI GROUP

PROJECT

STACK WHITLEY BAY

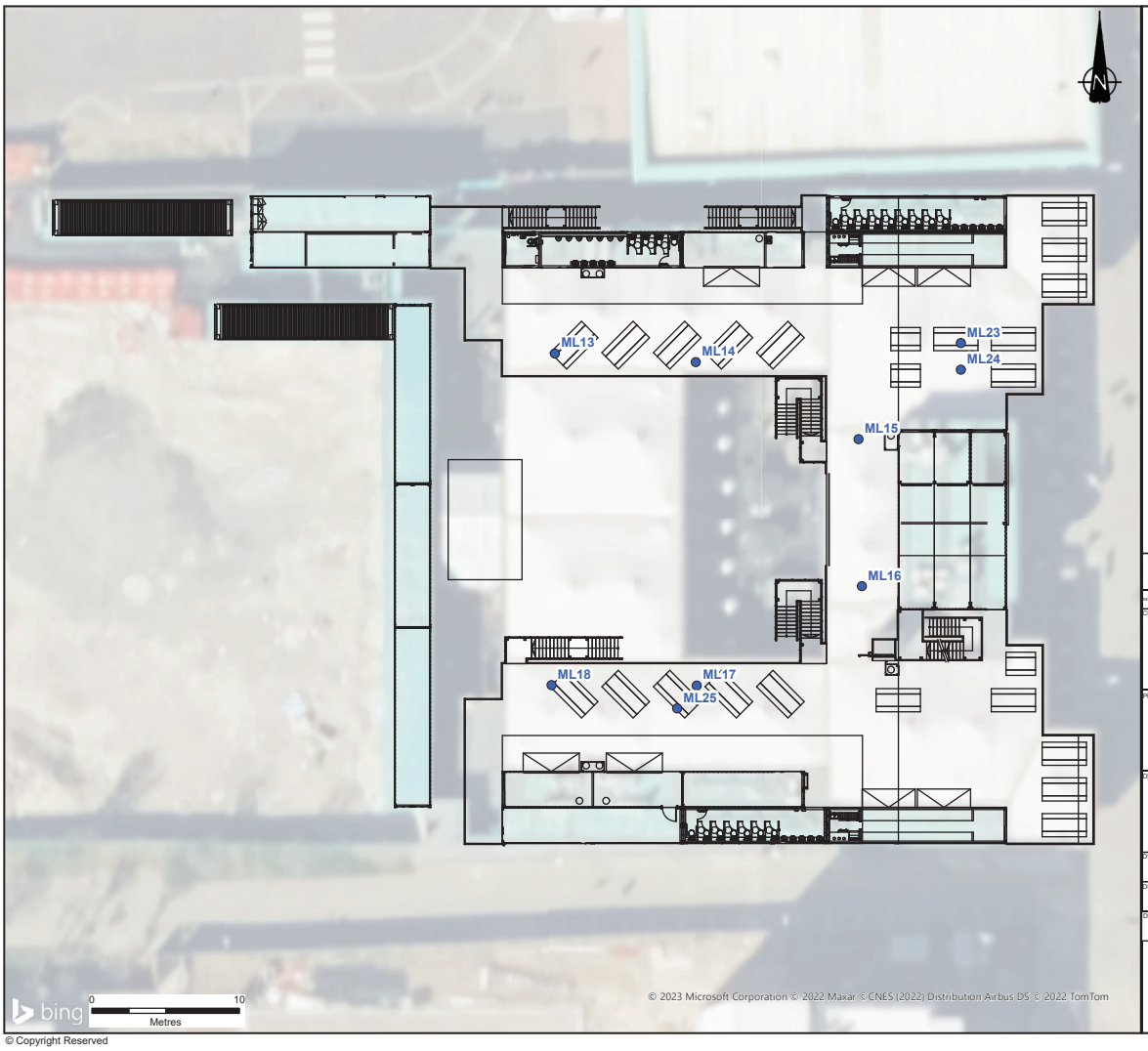
DRAWING TITLE

ANNEX A-1
SEABURN STACK GROUND FLOOR
NOISE MONITORING LOCATIONS

DRG No.		REV
NT16226-Annex A-1		A
DRG SIZE	SCALE	DATE
A3	1:250	08/03/2023
DRAWN BY	CHECKED BY	APPROVED BY
EF	LW	SU

wardell armstrong

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KEY

Stack Seaburn First Floor

Noise Monitoring Locations

Notes:

Boundaries are indicative. Aerial imagery shown for context purposes only.

REVISION	DETAILS	DATE	DRAWN	CHKD	APPD

CLIENT

DANIELI GROUP

PROJECT

STACK WHITLEY BAY

DRAWING TITLE

ANNEX A-2
SEABURN STACK FIRST FLOOR
NOISE MONITORING LOCATIONS

DRG No.		REV
NT16226-Annex A-2		A
DRG SIZE	SCALE	DATE
A3	1:250	08/03/2023
DRAWN BY	CHECKED BY	APPROVED BY
EF	LW	SU

wardell armstrong

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Appendix C
Noise Modelling Assumptions

Acoustic Model and Assessment QMS

Job no.	ENV-21426
Project name:	STACK - Manchester
Prepared by:	R Calvert
Date:	25th June 2026

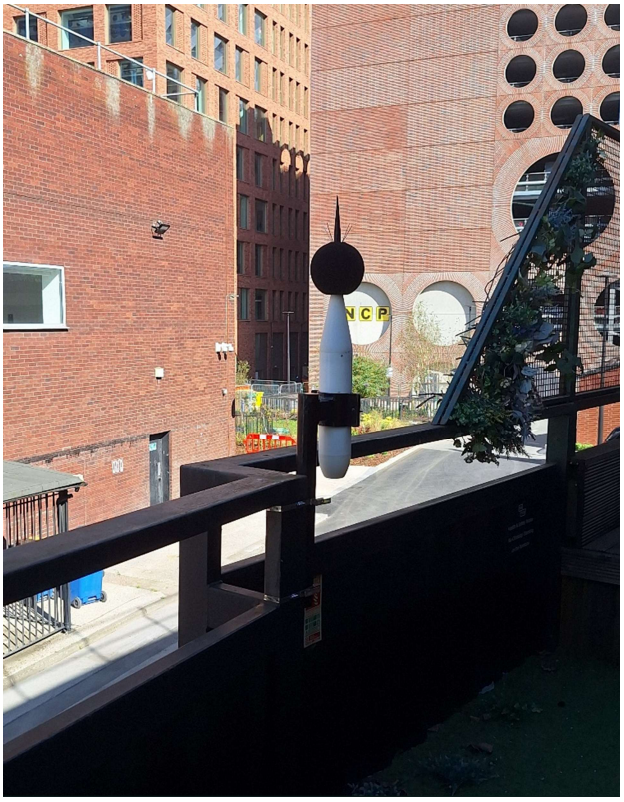
Sources included in the model:

Name	No of items	Source Type	Source Dimensions [m]			Height above Ground [m]	Overall Sound Power Level, Lw [dBA]	On time/ Other Inputs	Data Source
		Type	x	y	z				
Speakers		Point Source	x	x	x	2 & 7	90 to 103	100%	Measured from other STACK venue
L.F. Speakers	2	Point Source	x	x	x	2	103	100%	
Crowd Noise	1	Area Source	30	26	0	1	76	100%	

Appendix D
Photograph of Monitoring Locations

ML1





ML2



ML3


ATTENTION
PARKING CHARGE OF £100
Parking limited to a maximum
stay of 30 minutes
with no return within 2 hours
Automated payment line 0344 848 1410
TAP
HOUSE
Products
ucts.co.uk
7788

Appendix E
Measured Noise Levels

Appendix D – Summary of Measured Noise Levels

Receptor	Start	End	Period	LA90	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	16000 Hz
ML1	14:00	23:00	Day	58.6	55.8	54.6	53.2	54.9	53.5	56.1	49.8	37.8	27.6	26.2
ML1	23:00	01:00	Night	57.5	55	53.6	52	53.7	52.4	55.1	48.8	36.4	27	26.1
ML2	14:00	23:00	Day	60.8	56.6	56.1	55.1	56.6	56.2	57.7	52.7	42.7	32.1	27.1
ML2	23:00	01:00	Night	60.2	56.6	55.6	54.6	56.2	55.7	57.2	52.1	42	31.4	27.1
ML3	14:00	23:00	Day	53.1	52	51	47.7	49.5	49.9	50.1	44.3	33.5	23.9	23.4
ML3	23:00	01:00	Night	52.7	51.6	50.6	47.6	49.3	49.8	49.6	43.5	32.2	22.7	23.2

Appendix F
Entertainment Noise at Receptors

		Model Results						
		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
ESR1 Circle Sq	GF	9.4	15.0	21.1	28.6	28.4	25.8	8.1
ESR1 Circle Sq	F 1	8.6	13.8	22.0	30.3	28.6	26.0	8.5
ESR1 Circle Sq	F 2	9.0	14.2	22.3	30.3	28.6	26.4	9.5
ESR1 Circle Sq	F 3	9.5	14.8	22.5	30.4	28.8	26.6	10.0
ESR1 Circle Sq	F 4	10.0	15.4	22.9	30.6	28.8	26.5	10.0
ESR1 Circle Sq	F 5	10.5	16.7	24.1	31.4	29.5	26.6	9.7
ESR1 Circle Sq	F 6	12.6	18.2	25.9	33.8	32.5	29.9	14.0
ESR1 Circle Sq	F 7	13.0	18.9	25.9	33.8	32.5	29.3	12.4
ESR1 Circle Sq	F 8	13.4	19.5	25.8	33.6	33.1	31.8	15.2
ESR1 Circle Sq	F 9	13.8	20.1	25.5	34.2	35.1	31.9	14.8
ESR1 Circle Sq	F 10	14.1	20.6	25.9	35.6	35.1	31.6	14.3
ESR1 Circle Sq	F 11	14.4	21.0	26.1	31.8	31.2	26.8	9.6
ESR1 Circle Sq	F 12	14.6	21.4	26.6	32.3	31.8	25.2	8.8
ESR1 Circle Sq	F 13	14.8	21.5	26.9	32.7	32.7	26.0	9.3
ESR1 Circle Sq	F 14	14.9	21.7	27.1	33.1	33.1	26.8	10.8
ESR1 Circle Sq	F 15	15.0	21.8	27.3	33.3	33.2	27.2	10.9
ESR1 Circle Sq	F 16	15.2	22.1	27.6	33.7	34.0	28.1	11.8
ESR1 Circle Sq	F 17	15.5	22.3	27.9	33.9	34.0	28.1	11.8
ESR1 Circle Sq	F 18	15.7	22.6	28.3	34.3	34.4	28.3	12.3
ESR1 Circle Sq	F 19	15.9	22.7	28.2	34.1	34.0	27.7	11.2
ESR1 Circle Sq	F 20	16.1	22.8	28.3	34.2	33.8	27.4	10.8
ESR1 Circle Sq	F 21	15.7	22.6	28.1	34.0	33.6	27.1	10.6
ESR1 Circle Sq	F 22	15.8	22.5	27.9	33.6	33.0	26.4	9.7
ESR1 Circle Sq	F 23	15.5	22.2	27.4	32.9	32.0	24.6	7.2
ESR1 Circle Sq	F 24	15.7	22.3	27.3	32.6	31.4	23.7	6.4
ESR1 Circle Sq	F 25	15.6	22.0	26.9	31.9	30.4	22.4	5.2
ESR1 Circle Sq	F 26	15.7	21.9	26.6	31.5	29.7	21.6	4.4
ESR1 Circle Sq	F 27	15.7	21.8	26.3	31.2	29.1	20.9	3.7
ESR1 Circle Sq	F 28	15.7	21.9	26.3	31.0	28.7	20.3	3.3
ESR1 Circle Sq	F 29	15.8	21.9	26.2	30.8	28.2	19.8	2.9
ESR1 Circle Sq	F 30	15.8	21.9	26.1	30.7	27.8	19.3	2.5
ESR1 Circle Sq	F 31	15.8	21.9	26.1	30.6	27.5	18.8	2.3
ESR1 Circle Sq	F 32	15.8	21.9	26.1	30.6	27.2	18.5	2.1
ESR1 Circle Sq	F 33	15.3	21.5	25.8	30.5	27.0	18.2	2.0
ESR1 Circle Sq	F 34	15.3	21.4	25.7	30.3	26.8	18.0	1.9
ESR1 Circle Sq	F 35	14.7	21.1	25.4	30.2	26.6	17.9	1.8
ESR2 - Circle Sq	GF	5.8	10.0	12.7	18.4	18.5	13.8	-2.3
ESR2 - Circle Sq	F 1	5.2	9.3	13.4	18.7	17.8	12.9	-3.1
ESR2 - Circle Sq	F 2	5.4	9.8	13.9	18.4	17.7	12.5	-3.4
ESR2 - Circle Sq	F 3	5.7	10.5	14.2	18.6	17.8	12.4	-3.5
ESR2 - Circle Sq	F 4	6.1	11.0	14.6	18.9	17.9	12.3	-3.7
ESR2 - Circle Sq	F 5	6.5	11.4	15.0	19.3	18.0	12.1	-3.8
ESR2 - Circle Sq	F 6	6.9	11.8	15.5	19.7	18.1	12.0	-4.0
ESR2 - Circle Sq	F 7	7.3	12.3	16.0	20.1	18.4	12.0	-4.0
ESR2 - Circle Sq	F 8	9.1	14.2	17.5	21.5	20.6	13.2	-3.2
ESR2 - Circle Sq	F 9	9.4	14.6	18.0	22.0	21.2	13.5	-3.1
ESR2 - Circle Sq	F 10	9.7	14.8	18.6	22.6	21.9	13.9	-2.8
ESR2 - Circle Sq	F 11	10.0	15.3	19.3	23.4	22.8	14.5	-2.3
ESR2 - Circle Sq	F 12	10.3	15.8	20.0	24.3	23.6	15.2	-1.4
ESR2 - Circle Sq	F 13	10.5	16.2	20.6	25.2	24.5	16.0	-0.2
ESR2 - Circle Sq	F 14	10.7	16.6	21.2	26.1	25.3	16.8	1.5
ESR2 - Circle Sq	F 15	10.9	16.8	21.6	26.6	25.8	17.5	3.0
ESR2 - Circle Sq	F 16	11.1	17.3	22.1	27.3	26.2	17.8	3.3
ESR3 - Circle Sq	GF	7.2	21.0	26.7	33.6	33.9	31.0	15.1
ESR3 - Circle Sq	F 1	6.8	20.1	28.1	35.1	34.5	32.3	17.0
ESR3 - Circle Sq	F 2	7.0	21.4	28.9	35.9	35.8	33.5	19.0
ESR3 - Circle Sq	F 3	9.2	21.9	29.2	36.2	36.1	33.9	19.8
ESR3 - Circle Sq	F 4	9.9	22.2	29.4	36.6	36.7	35.7	22.3
ESR3 - Circle Sq	F 5	8.9	21.5	29.8	37.8	37.7	36.3	21.9
ESR3 - Circle Sq	F 6	9.1	20.4	29.2	38.3	37.1	35.6	21.3
ESR3 - Circle Sq	F 7	7.2	19.3	27.8	34.9	33.7	30.9	16.4
ESR3 - Circle Sq	F 8	7.1	18.1	26.5	32.7	31.0	26.5	10.5

	Measured LA90 (Octaves) - 2025						
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
24.8	31.6	40.9	46.7	50.1	45.5	34.5
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7
29.9	39.0	48.0	53.0	57.7	53.9	43.7

	Excess over Background						
63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
-20.5	-24	-26.9	-24.4	-29.3	-28.1	-35.6
-21.3	-25.2	-26	-22.7	-29.1	-27.9	-35.2
-20.9	-24.8	-25.7	-22.7	-29.1	-27.5	-34.2
-20.4	-24.2	-25.5	-22.6	-28.9	-27.3	-33.7
-19.9	-23.6	-25.1	-22.4	-28.9	-27.4	-33.7
-19.4	-22.3	-23.9	-21.6	-28.2	-27.3	-34
-17.3	-20.8	-22.1	-19.2	-25.2	-24	-29.7
-16.9	-20.1	-22.1	-19.2	-25.2	-24.6	-31.3
-16.5	-19.5	-22.2	-19.4	-24.6	-22.1	-28.5
-16.1	-18.9	-22.5	-18.8	-22.6	-22	-28.9
-15.8	-18.4	-22.1	-17.4	-22.6	-22.3	-29.4
-15.5	-18	-21.9	-21.2	-26.5	-27.1	-34.1
-15.3	-17.6	-21.4	-20.7	-25.9	-28.7	-34.9
-15.1	-17.5	-21.1	-20.3	-25	-27.9	-34.4
-15	-17.3	-20.9	-19.9	-24.6	-27.1	-32.9
-14.9	-17.2	-20.7	-19.7	-24.5	-26.7	-32.8
-14.7	-16.9	-20.4	-19.3	-23.7	-25.8	-31.9
-14.4	-16.7	-20.1	-19.1	-23.7	-25.8	-31.9
-14.2	-16.4	-19.7	-18.7	-23.3	-25.6	-31.4
-14	-16.3	-19.8	-18.9	-23.7	-26.2	-32.5
-13.8	-16.2	-19.7	-18.8	-23.9	-26.5	-32.9
-14.2	-16.4	-19.9	-19	-24.1	-26.8	-33.1
-14.1	-16.5	-20.1	-19.4	-24.7	-27.5	-34
-14.4	-16.8	-20.6	-20.1	-25.7	-29.3	-36.5
-14.2	-16.7	-20.7	-20.4	-26.3	-30.2	-37.3
-14.3	-17	-21.1	-21.1	-27.3	-31.5	-38.5
-14.2	-17.1	-21.4	-21.5	-28	-32.3	-39.3
-14.2	-17.2	-21.7	-21.8	-28.6	-33	-40
-14.2	-17.1	-21.7	-22	-29	-33.6	-40.4
-14.1	-17.1	-21.8	-22.2	-29.5	-34.1	-40.8
-14.1	-17.1	-21.9	-22.3	-29.9	-34.6	-41.2
-14.1	-17.1	-21.9	-22.4	-30.2	-35.1	-41.4
-14.1	-17.1	-21.9	-22.4	-30.5	-35.4	-41.6
-14.6	-17.5	-22.2	-22.5	-30.7	-35.7	-41.7
-14.6	-17.6	-22.3	-22.7	-30.9	-35.9	-41.8
-15.2	-17.9	-22.6	-22.8	-31.1	-36	-41.9
-19	-21.6	-28.2	-28.3	-31.6	-31.7	-36.8
-19.6	-22.3	-27.5	-28	-32.3	-32.6	-37.6
-19.4	-21.8	-27	-28.3	-32.4	-33	-37.9
-19.1	-21.1	-26.7	-28.1	-32.3	-33.1	-38
-18.7	-20.6	-26.3	-27.8	-32.2	-33.2	-38.2
-18.3	-20.2	-25.9	-27.4	-32.1	-33.4	-38.3
-17.9	-19.8	-25.4	-27	-32	-33.5	-38.5
-17.5	-19.3	-24.9	-26.6	-31.7	-33.5	-38.5
-15.7	-17.4	-23.4	-25.2	-29.5	-32.3	-37.7
-15.4	-17	-22.9	-24.7	-28.9	-32	-37.6
-15.1	-16.8	-22.3	-24.1	-28.2	-31.6	-37.3
-14.8	-16.3	-21.6	-23.3	-27.3	-31	-36.8
-14.5	-15.8	-20.9	-22.4	-26.5	-30.3	-35.9
-14.3	-15.4	-20.3	-21.5	-25.6	-29.5	-34.7
-14.1	-15	-19.7	-20.6	-24.8	-28.7	-33
-13.9	-14.8	-19.3	-20.1	-24.3	-28	-31.5
-13.7	-14.3	-18.8	-19.4	-23.9	-27.7	-31.2
-22.7	-18	-21.3	-19.4	-23.8	-22.9	-28.6
-23.1	-18.9	-19.9	-17.9	-23.2	-21.6	-26.7
-22.9	-17.6	-19.1	-17.1	-21.9	-20.4	-24.7
-20.7	-17.1	-18.8	-16.8	-21.6	-20	-23.9
-20	-16.8	-18.6	-16.4	-21	-18.2	-21.4
-21	-17.5	-18.2	-15.2	-20	-17.6	-21.8
-20.8	-18.6	-18.8	-14.7	-20.6	-18.3	-22.4
-22.7	-19.7	-20.2	-18.1	-24	-23	-27.3
-22.8	-20.9	-21.5	-20.3	-26.7	-27.4	-33.2

ESR3 - Circle Sq	**F 9**	6.9	17.0	24.5	30.5	28.7	24.1	7.2	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-23	-22	-23.5	-22.5	-29	-29.8	-36.5
ESR3 - Circle Sq	**F 10**	5.8	15.8	21.4	26.8	24.1	19.5	3.8	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-24.1	-23.2	-26.6	-26.2	-33.6	-34.4	-39.9
ESR3 - Circle Sq	**F 11**	5.9	15.9	21.4	27.0	24.0	18.8	3.2	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-24	-23.1	-26.6	-26	-33.7	-35.1	-40.5
ESR3 - Circle Sq	**F 12**	6.9	15.9	21.3	26.9	23.9	18.2	2.7	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-23	-23.1	-26.7	-26.1	-33.8	-35.7	-41
ESR3 - Circle Sq	**F 13**	8.5	16.6	22.0	27.6	24.4	18.3	2.5	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-21.4	-22.4	-26	-25.4	-33.3	-35.6	-41.2
ESR4 - CIRCLE sQ	**GF**	0.7	8.5	13.7	18.8	20.3	16.4	0.4	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-24.1	-23.1	-27.2	-27.9	-29.8	-29.1	-34.1
ESR4 - CIRCLE sQ	**F 1**	-0.5	7.0	14.4	20.6	19.9	15.1	-1.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-25.3	-24.6	-26.5	-26.1	-30.2	-30.4	-35.5
ESR4 - CIRCLE sQ	**F 2**	-0.5	7.5	14.8	20.4	19.6	14.8	-1.4	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-25.3	-24.1	-26.1	-26.3	-30.5	-30.7	-35.9
ESR4 - CIRCLE sQ	**F 3**	-0.5	7.7	15.4	20.4	19.5	14.5	-1.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-25.3	-23.9	-25.5	-26.3	-30.6	-31	-36.1
ESR4 - CIRCLE sQ	**F 4**	-0.3	7.7	16.1	20.8	20.9	14.3	-1.9	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-25.1	-23.9	-24.8	-25.9	-29.2	-31.2	-36.4
ESR4 - CIRCLE sQ	**F 5**	0.0	7.7	18.3	23.2	22.6	15.2	-2.1	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-24.8	-23.9	-22.6	-23.5	-27.5	-30.3	-36.6
ESR4 - CIRCLE sQ	**F 6**	0.5	8.0	18.7	23.7	23.6	16.0	-2.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-24.3	-23.6	-22.2	-23	-26.5	-29.5	-36.5
ESR4 - CIRCLE sQ	**F 7**	1.2	8.5	19.0	24.2	24.5	17.1	-1.1	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-23.6	-23.1	-21.9	-22.5	-25.6	-28.4	-35.6
ESR4 - CIRCLE sQ	**F 8**	1.8	9.5	19.2	24.6	25.1	17.9	0.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-23	-22.1	-21.7	-22.1	-25	-27.6	-34.5
ESR4 - CIRCLE sQ	**F 9**	2.0	12.2	19.1	24.7	25.1	18.1	0.3	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-22.8	-19.4	-21.8	-22	-25	-27.4	-34.2
ESR4 - CIRCLE sQ	**F 10**	2.8	17.2	23.3	30.2	28.2	22.4	4.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-22	-14.4	-17.6	-16.5	-21.9	-23.1	-29.9
ESR4 - CIRCLE sQ	**F 11**	4.0	17.9	23.9	30.4	28.5	23.3	6.8	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-20.8	-13.7	-17	-16.3	-21.6	-22.2	-27.7
ESR4 - CIRCLE sQ	**F 12**	6.7	18.6	24.7	31.0	28.7	23.3	7.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-18.1	-13	-16.2	-15.7	-21.4	-22.2	-27.5
ESR4 - CIRCLE sQ	**F 13**	7.2	16.9	23.7	30.1	27.9	22.6	5.9	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-17.6	-14.7	-17.2	-16.6	-22.2	-22.9	-28.6
ESR5 - Circle Sq	**GF**	18.5	26.4	33.8	41.7	40.6	37.6	22.7	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-11.4	-12.6	-14.2	-11.3	-17.1	-16.3	-21
ESR5 - Circle Sq	**F 1**	18.6	26.8	34.9	42.6	41.9	39.4	25.1	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-11.3	-12.2	-13.1	-10.4	-15.8	-14.5	-18.6
ESR5 - Circle Sq	**F 2**	18.8	27.4	35.1	42.9	42.4	40.1	26.4	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-11.1	-11.6	-12.9	-10.1	-15.3	-13.8	-17.3
ESR5 - Circle Sq	**F 3**	19.5	27.8	35.4	43.1	42.7	40.6	28.0	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-10.4	-11.2	-12.6	-9.9	-15	-13.3	-15.7
ESR5 - Circle Sq	**F 4**	19.6	27.8	35.4	43.3	43.1	42.9	29.5	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-10.3	-11.2	-12.6	-9.7	-14.6	-11	-14.2
ESR5 - Circle Sq	**F 5**	20.1	28.8	35.9	44.7	44.8	43.0	29.6	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-9.8	-10.2	-12.1	-8.3	-12.9	-10.9	-14.1
ESR5 - Circle Sq	**F 6**	21.1	29.8	36.9	45.9	44.9	42.8	29.4	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-8.8	-9.2	-11.1	-7.1	-12.8	-11.1	-14.3
ESR5 - Circle Sq	**F 7**	21.7	30.7	38.0	46.2	46.4	43.1	29.5	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-8.2	-8.3	-10	-6.8	-11.3	-10.8	-14.2
ESR5 - Circle Sq	**F 8**	22.2	31.3	38.9	46.8	47.0	43.6	30.1	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-7.7	-7.7	-9.1	-6.2	-10.7	-10.3	-13.6
ESR5 - Circle Sq	**F 9**	22.6	31.7	38.9	46.7	47.1	43.1	29.4	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-7.3	-7.3	-9.1	-6.3	-10.6	-10.8	-14.3
ESR5 - Circle Sq	**F 10**	22.9	32.0	39.2	46.7	47.1	43.0	29.4	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-7	-7	-8.8	-6.3	-10.6	-10.9	-14.3
ESR5 - Circle Sq	**F 11**	23.3	32.2	39.4	46.6	46.5	42.4	29.6	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-6.6	-6.8	-8.6	-6.4	-11.2	-11.5	-14.1
ESR5 - Circle Sq	**F 12**	23.5	32.0	38.8	45.8	45.5	40.7	26.9	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-6.4	-7	-9.2	-7.2	-12.2	-13.2	-16.8
ESR5 - Circle Sq	**F 13**	23.1	31.5	38.0	45.0	44.6	38.9	24.1	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-6.8	-7.5	-10	-8	-13.1	-15	-19.6
ESR5 - Circle Sq	**F 14**	23.4	31.6	37.9	44.5	43.8	37.8	22.7	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-6.5	-7.4	-10.1	-8.5	-13.9	-16.1	-21
ESR5 - Circle Sq	**F 15**	23.2	31.3	37.4	43.8	42.3	37.1	22.0	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-6.7	-7.7	-10.6	-9.2	-15.4	-16.8	-21.7
ESR5 - Circle Sq	**F 16**	22.7	30.7	36.8	43.1	41.4	35.6	21.0	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-7.2	-8.3	-11.2	-9.9	-16.3	-18.3	-22.7
ESR5 - Circle Sq	**F 17**	22.6	30.6	36.6	42.8	40.8	34.9	20.2	29.9	39.0	48.0	53.0	57.7	53.9	43.7	-7.3	-8.4	-11.4	-10.2	-16.9	-19	-23.5
ESR6 - Circle Sq	**GF**	10.1	16.7	20.0	24.8	25.0	22.8	7.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-14.7	-14.9	-20.9	-21.9	-25.1	-22.7	-26.9
ESR6 - Circle Sq	**F 1**	10.6	16.6	21.4	26.4	24.9	21.6	6.4	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-14.2	-15	-19.5	-20.3	-25.2	-23.9	-28.1
ESR6 - Circle Sq	**F 2**	11.5	17.8	22.9	27.5	25.5	21.5	6.1	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-13.3	-13.8	-18	-19.2	-24.6	-24	-28.4
ESR6 - Circle Sq	**F 3**	12.6	19.4	24.1	28.6	27.3	21.4	5.9	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-12.2	-12.2	-16.8	-18.1	-22.8	-24.1	-28.6
ESR6 - Circle Sq	**F 4**	13.7	20.9	25.3	29.9	29.9	24.1	6.4	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-11.1	-10.7	-15.6	-16.8	-20.2	-21.4	-28.1
ESR6 - Circle Sq	**F 5**	14.9	22.5	27.4	32.1	32.6	28.0	11.7	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-9.9	-9.1	-13.5	-14.6	-17.5	-17.5	-22.8
ESR6 - Circle Sq	**F 6**	17.1	25.4	30.9	36.5	33.6	29.7	12.8	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-7.7	-6.2	-10	-10.2	-16.5	-15.8	-21.7
ESR6 - Circle Sq	**F 7**	17.9	26.8	33.0	39.3	37.3	33.4	16.5	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-6.9	-4.8	-7.9	-7.4	-12.8	-12.1	-18
ESR6 - Circle Sq	**F 8**	18.5	27.7	34.2	41.0	40.2	36.9	22.4	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-6.3	-3.9	-6.7	-5.7	-9.9	-8.6	-12.1
ESR6 - Circle Sq	**F 9**	19.2	28.3	34.9	41.8	40.6	37.7	23.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-5.6	-3.3	-6	-4.9	-9.5	-7.8	-11.5
ESR6 - Circle Sq	**F 10**	19.1	28.3	34.8	41.7	40.6	38.1	23.5	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-5.7	-3.3	-6.1	-5	-9.5	-7.4	-11
ESR6 - Circle Sq	**F 11**	19.2	28.3	35.0	42.5	41.1	38.6	23.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-5.6	-3.3	-5.9	-4.2	-9	-6.9	-10.9
ESR6 - Circle Sq	**F 12**	19.4	28.5	35.5	42.6	41.5	38.4	23.4	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-5.4	-3.1	-5.4	-4.1	-8.6	-7.1	-11.1
ESR6 - Circle Sq	**F 13**	19.4	28.6	35.5	42.9	41.6	38.2	22.8	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-5.4	-3	-5.4	-3.8	-8.5	-7.3	-11.7
ESR6 - Circle Sq	**F 14**	20.1	29.1	35.6	43.2	41.3	37.5	22.1	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-4.7	-2.5	-5.3	-3.5	-8.8	-8	-12.4
ESR6 - Circle Sq	**F 15**	20.2	29.1	35.7	42.8	41.2	37.2	21.9	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-4.6	-2.5	-5.2	-3.9	-8.9	-8.3	-12.6
ESR6 - Circle Sq	**F 16**	20.2	29.1	35.7	42.5	40.9	37.0	21.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-4.6	-2.5	-5.2	-4.2	-9.2	-8.5	-12.9
ESR7 - Circle Sq	**GF**	11.8	19.5	24.5	30.2	33.3	27.6	12.3	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-13	-12.1	-16.4	-16.5	-16.8	-17.9	-22.2
ESR7 - Circle Sq	**F 1**	12.0	19.0	25.7	32.0	34.0	28.2	13.5	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-12.8	-12.6	-15.2	-14.7	-16.1	-17.3	-21
ESR7 - Circle Sq	**F 2**	12.8	19.9	26.8	33.0	35.2	30.0	16.7	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-12	-11.7	-14.1	-13.7	-14.9	-15.5	-17.8
ESR7 - Circle Sq	**F 3**	13.5	20.9	27.2	33.4	35.5	30.4	17.7	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-11.3	-10.7	-13.7	-13.3	-14.6	-15.1	-16.8
ESR7 - Circle Sq	**F 4**	14.6	22.0	28.1	34.2	35.8	30.6	17.8	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-10.2	-9.6	-12.8	-12.5	-14.3	-14.9	-16.7
ESR7 - Circle Sq	**F 5**	15.0	22.6	29.1	35.1	36.5	31.1	18.3	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-9.8	-9	-11.8	-11.6	-13.6	-14.4	-16.2
ESR7 - Circle Sq	**F 6**	16.0	23.7	29.9	36.0	36.7	31.7	18.7	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-8.8	-7.9	-11	-10.7	-13.4	-13.8	-15.8
ESR7 - Circle Sq	**F 7**	16.4	24.3	30.5	36.7	37.0	32.2	18.5	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-8.4	-7.3	-10.4	-10	-13.1	-13.3	-16
ESR7 - Circle Sq	**F 8**	17.1	24.8	31.2	37.6	38.1	34.3	20.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-7.7	-6.8	-9.7	-9.1	-12	-11.2	-14.5
ESR7 - Circle Sq	**F 9**	17.8	25.7	32.1	38.7	38.8	34.9	20.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-7	-5.9	-8.8	-8	-11.3	-10.6	-14.5

ESR7 - Circle Sq	**F 10**	17.6	25.5	31.8	38.5	38.5	35.2	20.5	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-7.2	-6.1	-9.1	-8.2	-11.6	-10.3	-14
ESR7 - Circle Sq	**F 11**	17.8	26.0	32.2	38.9	38.5	35.8	20.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-7	-5.6	-8.7	-7.8	-11.6	-9.7	-13.9
ESR8 - Princess House	**GF**	7.9	12.8	19.5	25.0	25.0	20.7	4.9	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-16.9	-18.8	-21.4	-21.7	-25.1	-24.8	-29.6
ESR8 - Princess House	**F 1**	9.8	14.8	22.6	29.1	29.8	24.7	13.3	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-15	-16.8	-18.3	-17.6	-20.3	-20.8	-21.2
ESR8 - Princess House	**F 2**	10.3	15.8	23.1	29.4	30.3	25.7	14.9	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-14.5	-15.8	-17.8	-17.3	-19.8	-19.8	-19.6
ESR8 - Princess House	**F 3**	10.8	16.4	23.5	29.8	30.9	26.8	12.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-14	-15.2	-17.4	-16.9	-19.2	-18.7	-22.5
ESR8 - Princess House	**F 4**	11.2	17.0	23.9	30.1	31.6	28.4	14.2	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-13.6	-14.6	-17	-16.6	-18.5	-17.1	-20.3
ESR8 - Princess House	**F 5**	11.7	17.6	24.3	30.3	31.8	28.6	14.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-13.1	-14	-16.6	-16.4	-18.3	-16.9	-19.9
ESR8 - Princess House	**F 6**	12.7	19.1	25.4	31.3	31.9	28.6	14.6	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-12.1	-12.5	-15.5	-15.4	-18.2	-16.9	-19.9
ESR8 - Princess House	**F 7**	13.0	19.7	25.9	31.8	32.8	28.7	14.9	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-11.8	-11.9	-15	-14.9	-17.3	-16.8	-19.6
ESR8 - Princess House	**F 8**	13.6	20.0	26.6	32.5	33.5	29.2	14.7	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-11.2	-11.6	-14.3	-14.2	-16.6	-16.3	-19.8
ESR8 - Princess House	**F 9**	14.0	20.6	27.1	33.2	34.1	29.7	15.0	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-10.8	-11	-13.8	-13.5	-16	-15.8	-19.5
ESR8 - Princess House	**F 10**	14.2	21.1	27.7	33.9	34.7	30.1	15.3	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-10.6	-10.5	-13.2	-12.8	-15.4	-15.4	-19.2
ESR8 - Princess House	**F 11**	14.5	21.7	28.2	34.6	35.2	30.8	15.8	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-10.3	-9.9	-12.7	-12.1	-14.9	-14.7	-18.7
ESR8 - Princess House	**F 12**	15.2	22.4	28.9	35.2	35.2	30.6	15.5	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-9.6	-9.2	-12	-11.5	-14.9	-14.9	-19
ESR8 - Princess House	**F 13**	15.5	23.0	29.1	35.8	35.7	31.0	15.7	24.8	31.6	40.9	46.7	50.1	45.5	34.5	-9.3	-8.6	-11.8	-10.9	-14.4	-14.5	-18.8
ESR9 - Oxford House	**GF**	34.2	39.7	43.4	47.4	47.3	43.7	32.7	29.9	39.0	48.0	53.0	57.7	53.9	43.7	4.3	0.7	-4.6	-5.6	-10.4	-10.2	-11
ESR9 - Oxford House	**F 1**	37.7	44.3	51.1	56.5	56.0	54.9	44.7	29.9	39.0	48.0	53.0	57.7	53.9	43.7	7.8	5.3	3.1	3.5	-1.7	1	1
ESR9 - Oxford House	**F 2**	38.6	46.6	54.4	60.2	59.8	56.2	45.2	29.9	39.0	48.0	53.0	57.7	53.9	43.7	8.7	7.6	6.4	7.2	2.1	2.3	1.5
ESR9 - Oxford House	**F 3**	38.3	45.8	53.7	59.2	57.7	52.8	40.8	29.9	39.0	48.0	53.0	57.7	53.9	43.7	8.4	6.8	5.7	6.2	0	-1.1	-2.9
ESR10 - Premier Inn	**F 11**	17.0	23.8	29.9	35.0	37.5	34.8	22.8	28.4	37.1	46.3	50.3	56.1	51.0	38.8	-11.4	-13.3	-16.4	-15.3	-18.6	-16.2	-16
ESR10 - Premier Inn	**F 12**	17.5	24.9	32.0	37.4	39.9	34.5	22.4	28.4	37.1	46.3	50.3	56.1	51.0	38.8	-10.9	-12.2	-14.3	-12.9	-16.2	-16.5	-16.4
ESR10 - Premier Inn	**F 13**	17.7	25.6	32.0	37.4	39.7	34.2	21.9	28.4	37.1	46.3	50.3	56.1	51.0	38.8	-10.7	-11.5	-14.3	-12.9	-16.4	-16.8	-16.9
ESR10 - Premier Inn	**F 14**	18.0	25.7	32.1	37.4	39.5	33.9	21.5	28.4	37.1	46.3	50.3	56.1	51.0	38.8	-10.4	-11.4	-14.2	-12.9	-16.6	-17.1	-17.3
ESR10 - Premier Inn	**F 15**	18.4	25.8	32.1	37.4	39.3	33.6	21.1	28.4	37.1	46.3	50.3	56.1	51.0	38.8	-10	-11.3	-14.2	-12.9	-16.8	-17.4	-17.7

Appendix G
Figures

TETRA TECH



Key

- Monitoring Location

Notes
1. This Drawing has been prepared in accordance with the scope of RPS' appointment with its client, and is subject to the terms and conditions of that appointment. RPS accepts no liability for the use of this document other by its client and only for the purposes for which it was prepared and provided.
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DRG Size	Scale	Date Drawn
A3	1:750	26/06/2026
Drawn by: R Calvert	Checked by:	Approved by:

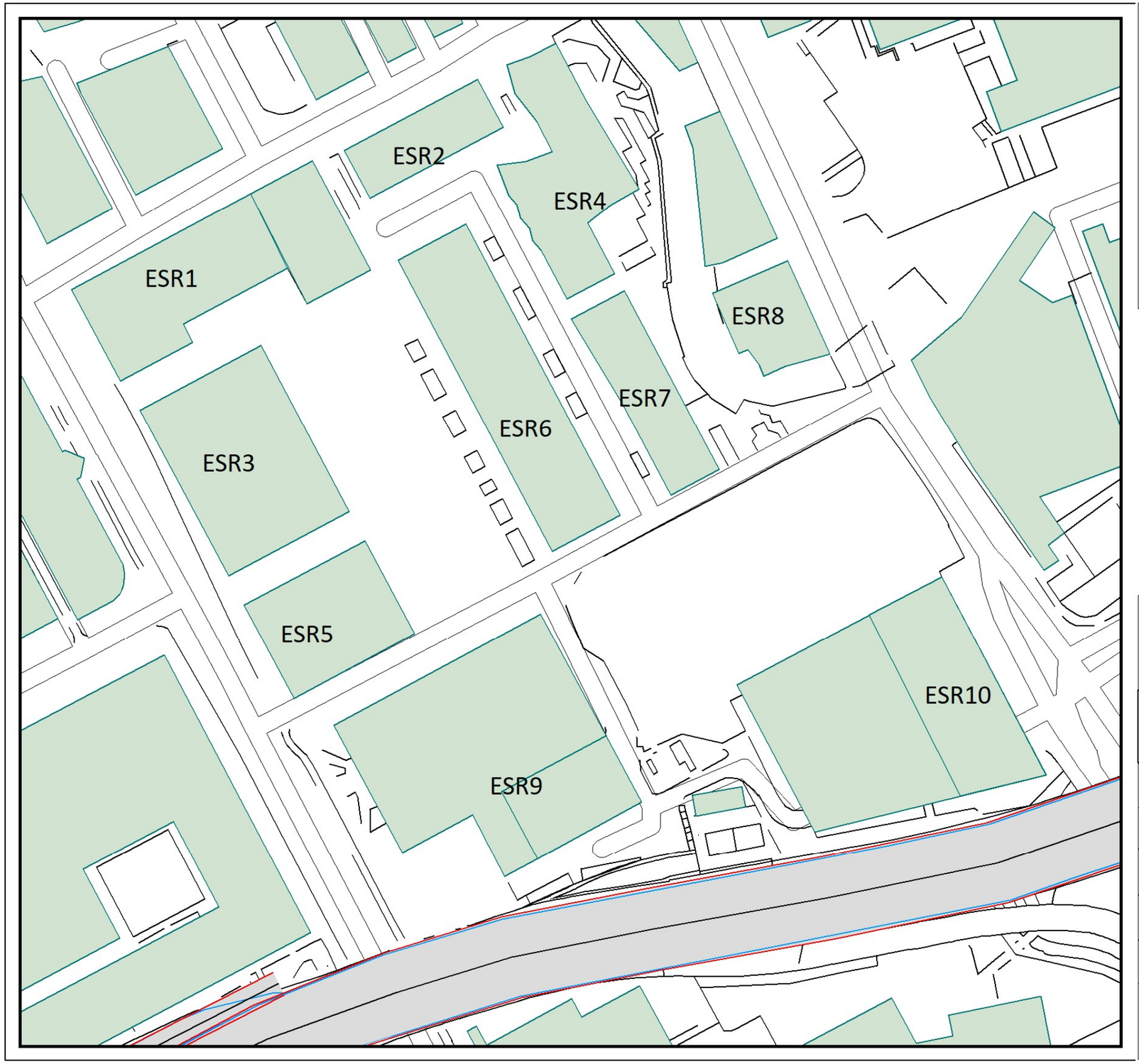
Client:
STACK (Manchester) Limited

Project:
STACK Manchester

DRG No:
Figure 1

Title:
Noise Monitoring Location Plan

TETRA TECH



Key

Existing Building

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Drawn by	Checked by	Approved by
R Calvert		

Client:
STACK (Manchester) Limited

Project:
STACK Manchester

DRG No:
Figure 2

Title:
Sensitive Receptor Plan

TETRA TECH



Key

- Basemap
- Loudspeaker Position
- Crowd Noise
- Main building
- Noise Barrier

Notes
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Project:
STACK Manchester

DRG No:
Figure 3

Title:
Site Arrangement Plan

TETRA TECH



Key

- Basemap
- Monitoring Location
- Industrial Building
- Point source
- Industrial building; Room
- Area
- Road
- Road axis

Daytime Noise Levels (dB $L_{Aeq, T}$)

	<= 40
40 <	<= 45
45 <	<= 50
50 <	<= 55
55 <	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	

Notes
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Drawn by	Checked by	Approved by
R Calvert		

Client:
STACK (Manchester) Limited

Project:
STACK Manchester

DRG No:
Figure 4

Title:
Daytime Noise Levels from Proposed Operations
Ground Floor