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GLOBAL ACADEMY UTC

ACOUSTIC PLANNING SUPPORT REPORT

Client: Portakabin Group

Report Author:


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Director

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Appendix A Site Noise Survey

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1.0 Introduction

- 1.1 Applied Acoustic Design have been appointed to provide acoustic design advice for the proposed Global Academy UTC.
- 1.2 The results of a site noise survey undertaken at the site have been used to assess the performance of the proposed development in relation to Building Regulations acoustic performance standards, required to be achieved for all new school buildings and prevailing Local Authority planning policy.

2.0 Site Description

- 2.1 The Global Academy UTC is to be located on the site of the Old Vinyl Factory on Blythe Road Hayes, Middlesex. The site is affected by road traffic noise from Blythe road and rail traffic noise from the multi-rail track to the north of the site, which includes the main line from Paddington Station. The railway line includes local and fast intercity trains as well as freight services.
- 2.2 The nearest existing residential properties to the proposed development are located to the north on Blythe Road. There is, however, residential development included in the masterplan for the whole site proposed to be located to the south of the Academy site.
- 2.3 Appendix A provides the details of the site noise surveys.

3.0 Internal Noise Level Criteria

- 3.1 Building Bulletin 93 sets out internal noise requirements for school accommodation. The criteria for accommodation relevant to this scheme are set out below. Some room designations in the scheme do not have a direct BB93 category. In these cases the nearest relevant BB93 room types have been adopted.

Table 1 : Indoor Ambient Noise Criteria

Room Name	BB93 Category	Indoor Ambient Noise Criterion $L_{Aeq,T}$
Music Tech, Recording Teaching	Music Classroom	35 dB
Light Recording, Live Music Studio, Drum/Voice Booth, Radio Studio, TV Studio	Recording Studio	30 dB
Audio Control Room, TV Control, Production Booth	Control Room not for Recording	35 dB
Practice Room	Practice Room	35 dB
Theatre	Assembly Hall/Multi-Purpose Hall	35 dB
Science Lab/Studio	Science Lab	40 dB
Internal Learning, Learning Base	General teaching	35 dB
Seminar	Seminar	35 dB
Media Hub, Art & Design, Electronic NGI	ICT, Art, Electronics/Control	40 dB
Dining	Dining Room	45 dB
LRC	Library Resource Area	40 dB
Pulse	Atrium	45 dB
Sports Hall	Sports Hall	40 dB
Office, Meeting/Board Room, Workroom, Reception, Sick Bay,	Admin/Office	40 dB

- 3.2 The above criteria relate to the total ambient noise from both external noise intrusion and any mechanical ventilation systems serving each space. External noise intrusion is discussed in section 4.0 below. External noise intrusion will be controlled to a level below the criteria set out above to take account of contributions of noise from mechanical services. Control of noise to the appropriate criteria will be achieved through a combination of equipment selection, attenuation and control of airflow velocity.

4.0 External Noise Intrusion

- 4.1 An environmental noise survey has been conducted at the site. Both attended and long term unattended noise measurements have been undertaken. The site is subject to road traffic noise from Blythe Road to the north and to railway noise from the multi-track railway line to the south. Blythe Road is a narrow one way street as it passes the site, with parking on both sides. Traffic flow is relatively slow but does include goods vehicles. The railway tracks carry a mixture of slow, fast and freight rail traffic. A typical 30 min period includes the passage of 8 slow, 4 fast and 4 freight trains. Appendix A provides details of the site noise surveys.
- 4.2 The noise survey data gathered from site has been analysed and corrections applied for distance from measurement location. Outlined below are the predicted façade incident noise levels applicable to the 2 main façades of the building.

Table 2 : Façade Incident Noise Levels

Façade	Incident Noise Level, $L_{Aeq,T}$, 30 min
North – Blythe Rd (road traffic)	60 dB
South – (railway)	58 dB

- 4.3 No teaching or specialist areas within the development rely on opening windows to form any part of the ventilation strategy so that windows can remain closed. This is also required in order to contain the potentially high levels of internal noise generated within music and studios areas and maintain sound insulation between adjacent rooms. The sound insulation for the glazing to the specialist areas will require particular specification but should be achievable using proprietary double glazing systems which include acoustic laminated glass. For studios which have a box-in-box construction the internal leaf will contain a secondary glazed window in order to maintain the isolation and provide the necessary sound insulation for both noise break-in and break-out.
- 4.4 The Atrium is to have natural ventilation using ducted inlet vents in the façade which pass over the perimeter accommodation into the atrium. Cross-flow is then provided via opening lights in the roof. Attenuation will be provided to the inlet air as appropriate. Open roof lights would be expected to provide a reduction of external noise of at least 18 dBA due to the large volume of the space.
- 4.5 The roof to the traditional element of the building is proposed to be concrete. This will not, therefore, present any issues with respect to noise ingress. The roof to the modular element of the building will require a plasterboard lining to the underside of the roof panel to teaching rooms in order to provide sufficient sound insulation to teaching spaces.
- 4.6 BB93 requires the control of rain noise to a particular criterion under certain rainfall conditions as defined by ISO 140-18. The concrete roof to the traditional build element of the building will easily achieve the required criterion for all spaces on the top floor. Calculations have been completed for the modular roof assuming an insulated steel

composite panel based on rain noise data supplied by Kingspan for a similar make-up. With a suspended acoustic ceiling alone beneath the roof panel, the rain noise criterion is exceeded by up to 5dB. Although this is not excessive, it has been determined that the roof build-up will require a plasterboard lining to the underside of the roof panel to control external noise ingress and to provide mitigation of flanking sound transmission. With this lining included the rain noise criterion is expected to be achieved. The Atrium is to include 4 large double glazed roof lights. Calculations have been completed using rain noise data for double glazing for the total proposed area of the roof lights. Assuming the remainder of the roof is concrete, the rain noise criterion for the Atrium is predicted to be easily achieved.

- 4.7 Appendix B presents acoustic strategy mark-up drawings which include specifications for the external façade and windows sound insulation requirements along with indicative constructional build-up requirements.

5.0 Plant Noise Limits

- 5.1 Noise from mechanical plant serving the new building should be limited to protect the amenity of neighbouring residential properties as well as the building development itself. Noise limits at residential properties are set in accordance with guidance set by the Local Authority.
- 5.2 Noise emission from any new mechanical services plant should be controlled to minimise the likelihood of complaints and as set by local authority policy. This condition should prevail over the period of proposed operation of all plant. Hillingdon Borough Council Supplementary Planning Guidance on noise states the following:

British Standard 4142:1997 gives advice on measuring and assessing the noise from machinery or plant, and is relevant if surrounding residential areas might be affected. Developments with a BS4142 assessment of marginal significance or above would not ordinarily be permitted. Consequently, the development should be controlled such that the rating level of the noise from the proposed development determined according to BS4142 is at least 5 dB below the background noise level $L_{A90,T}$. Ideally, the assessment of noise should give a positive indication that complaints are unlikely

A condition to this effect is likely to be imposed on this development.

- 5.3 Appendix A presents the results of a background noise survey conducted at the site. Minimum background noise levels occurring during the daytime, evening and night have been determined and are summarised in the table below (bank holidays have been excluded from this assessment). These are summarised below along with the resulting limiting plant noise criteria based on Hillingdon Borough council policy.

Table 3 : Measured Background Noise Levels

Period	Typical Background Noise Level $L_{A90,15min}$
Daytime, 07:00 to 19:00	47 dB
Evening, 19:00 to 23:00	45 dB
Night, 23:00 to 07:00	40 dB

- 5.4 Therefore noise from mechanical plant serving the new building should not exceed the levels set out below at the nearest affected residential properties.

Table 4 : Limiting Mechanical Services Plant Noise Criteria

Period	Plant Noise Limits at Residential Properties
Daytime, 07:00 to 19:00	42 dBA
Evening, 19:00 to 23:00	40 dBA
Night, 23:00 to 07:00	35 dBA

- 5.5 The nearest existing residential properties are those on the opposite side of Blythe Road comprising three storey apartments. There is outline planning permission to develop new mixed use buildings including residential on the site to the south of the proposed UTC. These are proposed to be significantly taller than the UTC building and as such will look down on the roof top plant. Preliminary indications are that attenuation in the form of an acoustic kit will be required to the large heat pump condensers on the roof. The smaller condensers serving the IT Hubs may not require any attenuation. The scheme for the control of plant noise emission will be developed to comply with planning requirements.

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Appendix A Site

Noise Surveys



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A.0 Noise Survey Details

A.1 Instrumentation:

- Manual measurements – Bruel & Kjaer type 2260 sound level meter.
- Automated measurements – Larson Davis Type 812 sound level meter

The instruments were calibrated before and after the survey with the appropriate calibrator; no significant calibration drift was recorded.

A.2 Locations

Manual Measurements were taken at locations representing points on the façades of the proposed building.

Automated noise measurements were taken close to the site boundary with Blythe Road. Measurement locations are indicated in Figure 1.

A.3 Period:

Manual measurements were conducted on the 1st and 7th April 2015. Background noise measurements were carried out continuously between 10:15 on the 1st of April to 15:15 on the 7th of April 2015.

A.4 Weather:

Weather conditions during the attended noise survey were dry and warm with a light westerly breeze.

A.5 Site Noise Characteristics:

Noise levels at the site were dominated by road traffic on Blythe Road to the north and railway noise from the multi-track railway line to the south which includes a mixture of train types including freight.

A.6 Surveyors:

PRJ Mansfield MIOA
H Akil MIOA

Figure 1: Site Location and Noise Survey Measurement Positions

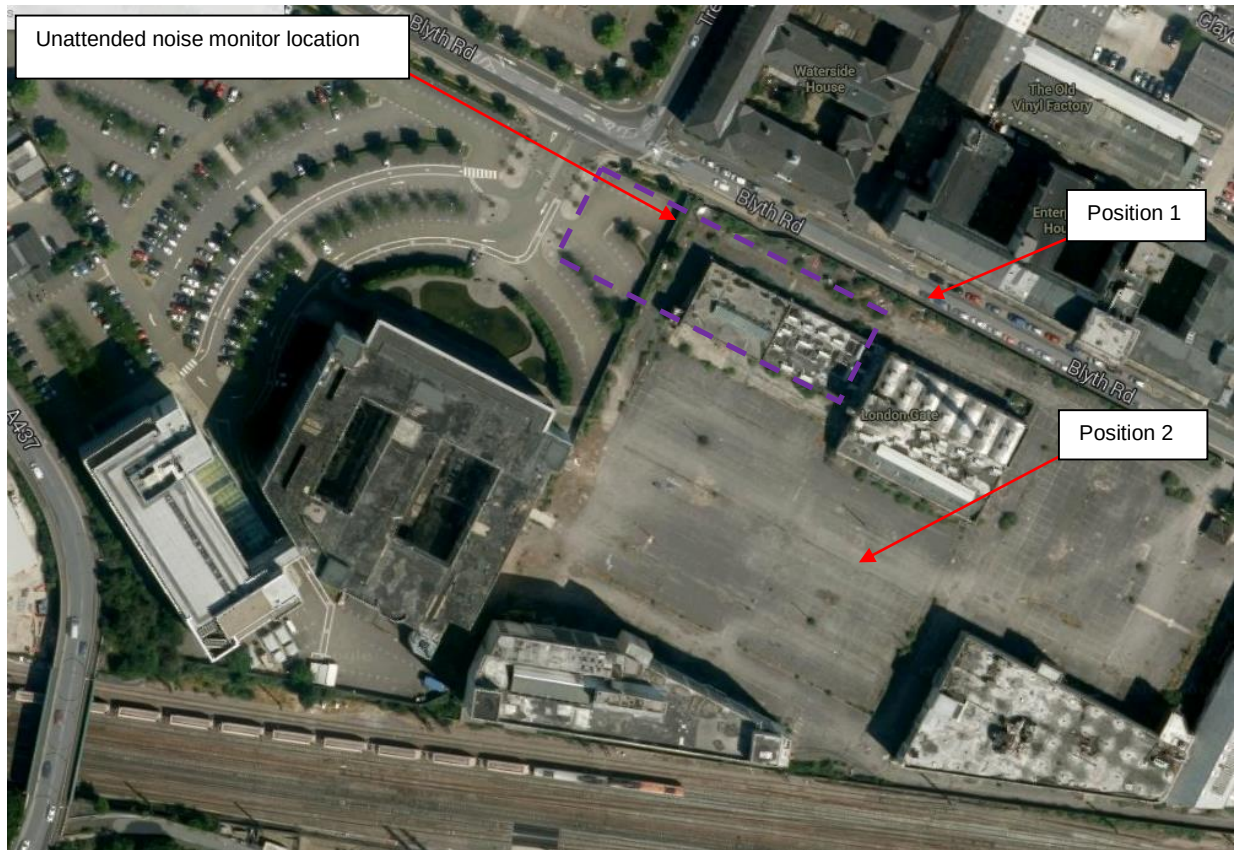
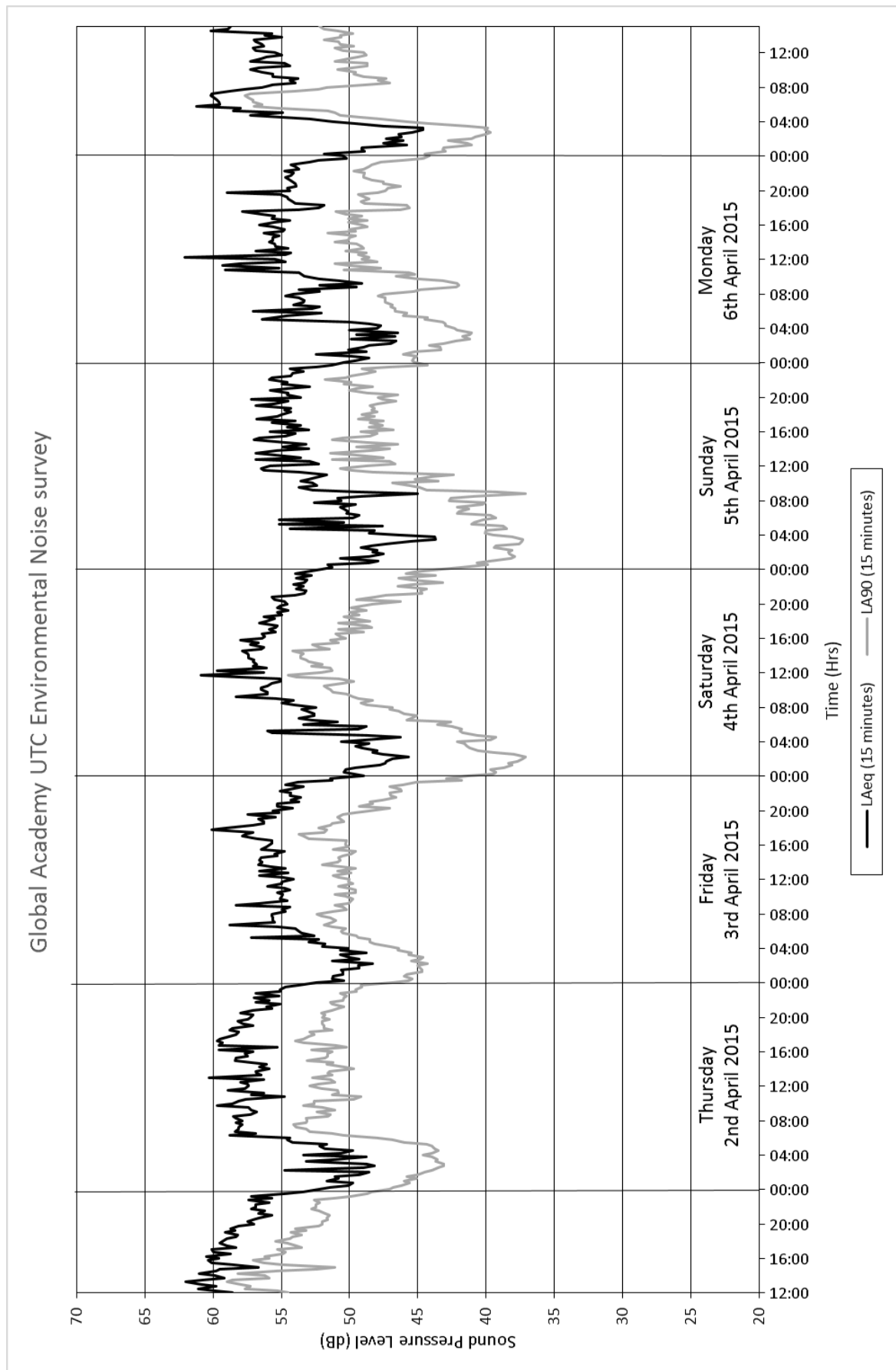


Figure 2 Environmental Noise Survey Results



Appendix B

Acoustic Strategy Mark-up Plans



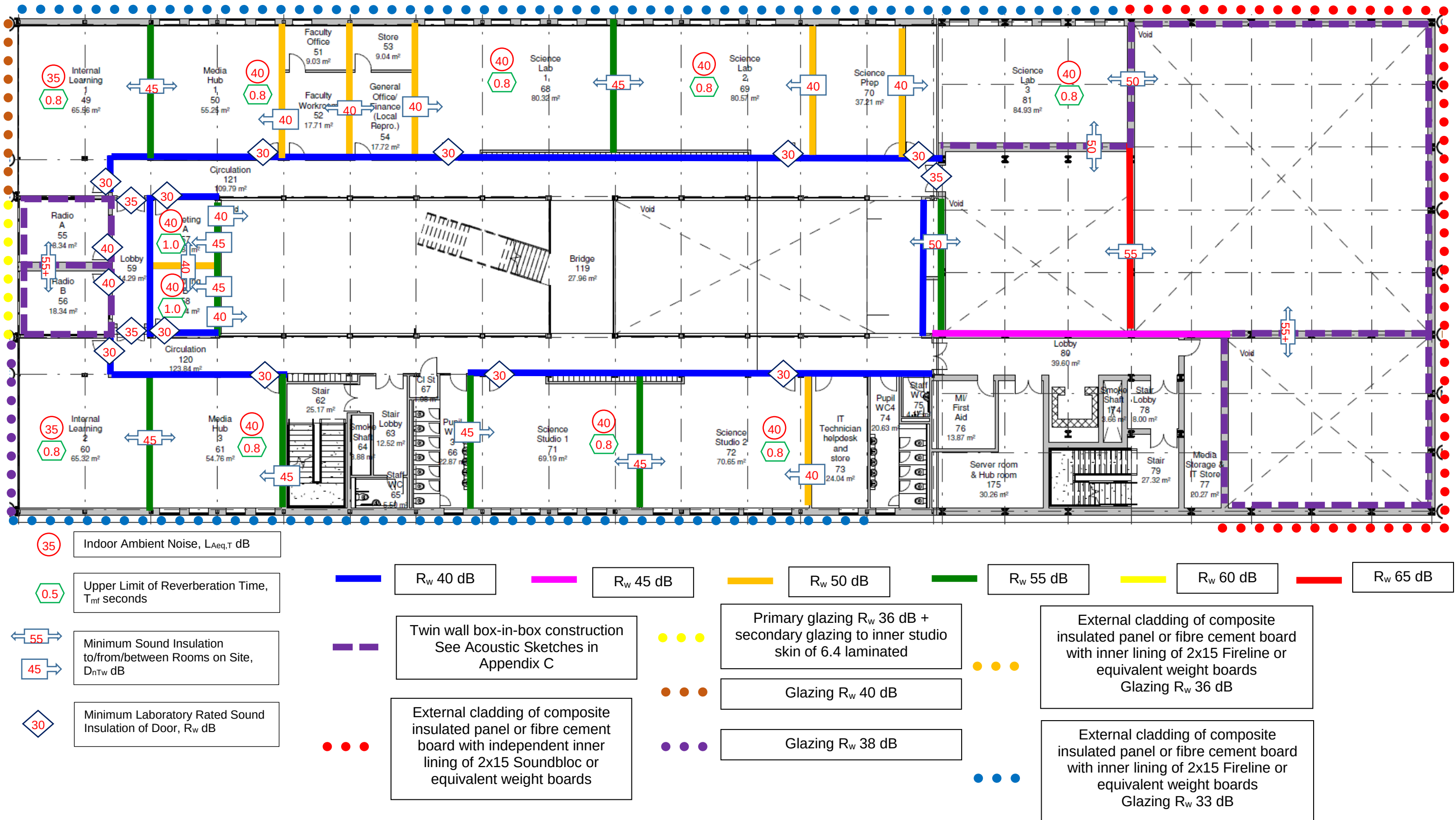
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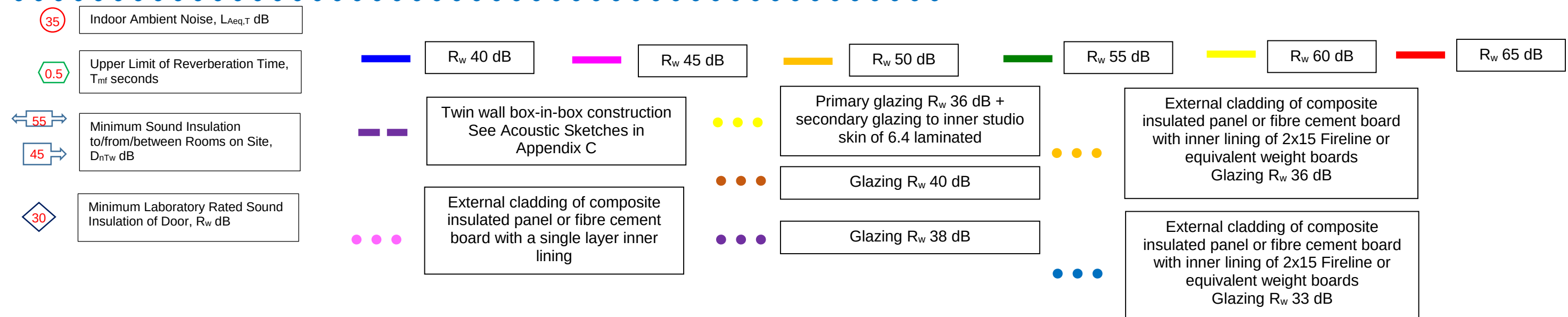
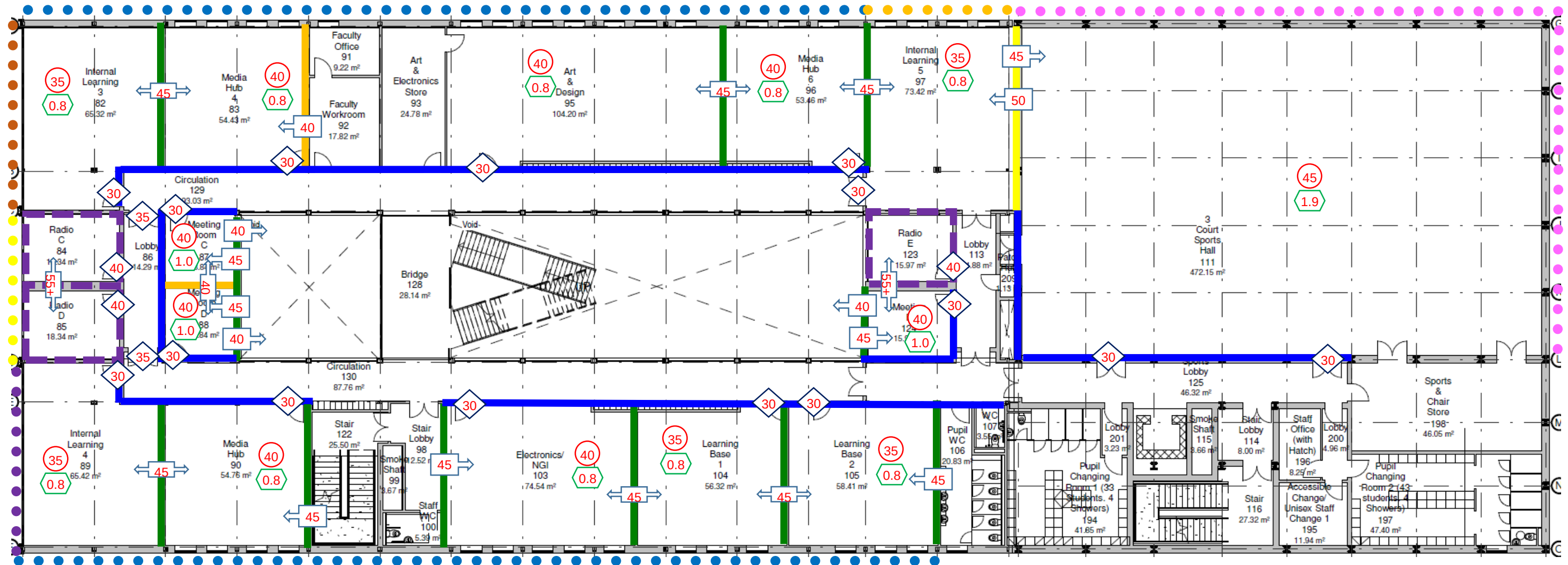
The floor plan illustrates the layout of the first floor, featuring a central corridor system and various functional areas. Key rooms include the Kitchen (56.91 m²), Music Tech Classroom (35, 1.0), Recording Teaching Space (35, 0.5), Light Recording Room (30, 0.5), Recording Audio Control Room (35, 0.5), Practice Rooms (12, 1.2; 13, 0.5; 14, 0.5; 15, 0.5; 16, 0.5; 17, 0.5; 18, 0.5; 19, 0.5; 20, 0.5; 21, 0.5; 22, 0.5; 23, 0.5; 24, 0.5; 25, 0.5; 26, 0.5; 27, 0.5; 28, 0.5; 29, 0.5; 30, 0.5; 31, 0.5; 32, 0.5; 33, 0.5; 34, 0.5; 35, 0.5; 36, 0.5; 37, 0.5; 38, 0.5; 39, 0.5; 40, 0.5; 41, 0.5; 42, 0.5; 43, 0.5; 44, 0.5; 45, 0.5; 46, 0.5; 47, 0.5; 48, 0.5; 49, 0.5; 50, 0.5; 51, 0.5; 52, 0.5; 53, 0.5; 54, 0.5; 55, 0.5; 56, 0.5; 57, 0.5; 58, 0.5; 59, 0.5; 60, 0.5; 61, 0.5; 62, 0.5; 63, 0.5; 64, 0.5; 65, 0.5; 66, 0.5; 67, 0.5; 68, 0.5; 69, 0.5; 70, 0.5; 71, 0.5; 72, 0.5; 73, 0.5; 74, 0.5; 75, 0.5; 76, 0.5; 77, 0.5; 78, 0.5; 79, 0.5; 80, 0.5; 81, 0.5; 82, 0.5; 83, 0.5; 84, 0.5; 85, 0.5; 86, 0.5; 87, 0.5; 88, 0.5; 89, 0.5; 90, 0.5; 91, 0.5; 92, 0.5; 93, 0.5; 94, 0.5; 95, 0.5; 96, 0.5; 97, 0.5; 98, 0.5; 99, 0.5; 100, 0.5; 101, 0.5; 102, 0.5; 103, 0.5; 104, 0.5; 105, 0.5; 106, 0.5; 107, 0.5; 108, 0.5; 109, 0.5; 110, 0.5; 111, 0.5; 112, 0.5; 113, 0.5; 114, 0.5; 115, 0.5; 116, 0.5; 117, 0.5; 118, 0.5; 119, 0.5; 120, 0.5; 121, 0.5; 122, 0.5; 123, 0.5; 124, 0.5; 125, 0.5; 126, 0.5; 127, 0.5; 128, 0.5; 129, 0.5; 130, 0.5; 131, 0.5; 132, 0.5; 133, 0.5; 134, 0.5; 135, 0.5; 136, 0.5; 137, 0.5; 138, 0.5; 139, 0.5; 140, 0.5; 141, 0.5; 142, 0.5; 143, 0.5; 144, 0.5; 145, 0.5; 146, 0.5; 147, 0.5; 148, 0.5; 149, 0.5; 150, 0.5; 151, 0.5; 152, 0.5; 153, 0.5; 154, 0.5; 155, 0.5; 156, 0.5; 157, 0.5; 158, 0.5; 159, 0.5; 160, 0.5; 161, 0.5; 162, 0.5; 163, 0.5; 164, 0.5; 165, 0.5; 166, 0.5; 167, 0.5; 168, 0.5; 169, 0.5; 170, 0.5; 171, 0.5; 172, 0.5; 173, 0.5; 174, 0.5; 175, 0.5; 176, 0.5; 177, 0.5; 178, 0.5; 179, 0.5; 180, 0.5; 181, 0.5; 182, 0.5; 183, 0.5; 184, 0.5; 185, 0.5; 186, 0.5; 187, 0.5; 188, 0.5; 189, 0.5; 190, 0.5; 191, 0.5; 192, 0.5; 193, 0.5; 194, 0.5; 195, 0.5; 196, 0.5; 197, 0.5; 198, 0.5; 199, 0.5; 200, 0.5; 201, 0.5; 202, 0.5; 203, 0.5; 204, 0.5; 205, 0.5; 206, 0.5; 207, 0.5; 208, 0.5; 209, 0.5; 210, 0.5; 211, 0.5; 212, 0.5; 213, 0.5; 214, 0.5; 215, 0.5; 216, 0.5; 217, 0.5; 218, 0.5; 219, 0.5; 220, 0.5; 221, 0.5; 222, 0.5; 223, 0.5; 224, 0.5; 225, 0.5; 226, 0.5; 227, 0.5; 228, 0.5; 229, 0.5; 230, 0.5; 231, 0.5; 232, 0.5; 233, 0.5; 234, 0.5; 235, 0.5; 236, 0.5; 237, 0.5; 238, 0.5; 239, 0.5; 240, 0.5; 241, 0.5; 242, 0.5; 243, 0.5; 244, 0.5; 245, 0.5; 246, 0.5; 247, 0.5; 248, 0.5; 249, 0.5; 250, 0.5; 251, 0.5; 252, 0.5; 253, 0.5; 254, 0.5; 255, 0.5; 256, 0.5; 257, 0.5; 258, 0.5; 259, 0.5; 260, 0.5; 261, 0.5; 262, 0.5; 263, 0.5; 264, 0.5; 265, 0.5; 266, 0.5; 267, 0.5; 268, 0.5; 269, 0.5; 270, 0.5; 271, 0.5; 272, 0.5; 273, 0.5; 274, 0.5; 275, 0.5; 276, 0.5; 277, 0.5; 278, 0.5; 279, 0.5; 280, 0.5; 281, 0.5; 282, 0.5; 283, 0.5; 284, 0.5; 285, 0.5; 286, 0.5; 287, 0.5; 288, 0.5; 289, 0.5; 290, 0.5; 291, 0.5; 292, 0.5; 293, 0.5; 294, 0.5; 295, 0.5; 296, 0.5; 297, 0.5; 298, 0.5; 299, 0.5; 300, 0.5; 301, 0.5; 302, 0.5; 303, 0.5; 304, 0.5; 305, 0.5; 306, 0.5; 307, 0.5; 308, 0.5; 309, 0.5; 310, 0.5; 311, 0.5; 312, 0.5; 313, 0.5; 314, 0.5; 315, 0.5; 316, 0.5; 317, 0.5; 318, 0.5; 319, 0.5; 320, 0.5; 321, 0.5; 322, 0.5; 323, 0.5; 324, 0.5; 325, 0.5; 326, 0.5; 327, 0.5; 328, 0.5; 329, 0.5; 330, 0.5; 331, 0.5; 332, 0.5; 333, 0.5; 334, 0.5; 335, 0.5; 336, 0.5; 337, 0.5; 338, 0.5; 339, 0.5; 340, 0.5; 341, 0.5; 342, 0.5; 343, 0.5; 344, 0.5; 345, 0.5; 346, 0.5; 347, 0.5; 348, 0.5; 349, 0.5; 350, 0.5; 351, 0.5; 352, 0.5; 353, 0.5; 354, 0.5; 355, 0.5; 356, 0.5; 357, 0.5; 358, 0.5; 359, 0.5; 360, 0.5; 361, 0.5; 362, 0.5; 363, 0.5; 364, 0.5; 365, 0.5; 366, 0.5; 367, 0.5; 368, 0.5; 369, 0.5; 370, 0.5; 371, 0.5; 372, 0.5; 373, 0.5; 374, 0.5; 375, 0.5; 376, 0.5; 377, 0.5; 378, 0.5; 379, 0.5; 380, 0.5; 381, 0.5; 382, 0.5; 383, 0.5; 384, 0.5; 385, 0.5; 386, 0.5; 387, 0.5; 388, 0.5; 389, 0.5; 390, 0.5; 391, 0.5; 392, 0.5; 393, 0.5; 394, 0.5; 395, 0.5; 396, 0.5; 397, 0.5; 398, 0.5; 399, 0.5; 400, 0.5; 401, 0.5; 402, 0.5; 403, 0.5; 404, 0.5; 405, 0.5; 406, 0.5; 407, 0.5; 408

External cladding of composite insulated panel or fibre cement board with inner lining of 2x15 Fireline or equivalent weight boards
Glazing R_w 33 dB

First Floor Acoustic Mark-up



Second Floor Acoustic Mark-up



Third Floor Acoustic Mark-up

