



Subject: East Bank – BBC Building Acoustic update
Meeting date: 30 July 2019
Report to: Investment Committee
Report of: Colin Naish, Executive Director of Construction

This report will be considered in private

Subject to the decision of the Committee under Item 13 on the agenda for this meeting, this report is exempt and is therefore not for publication to the public or press by virtue of Part 1, paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the financial or business affairs of any particular person (including the MDC holding that information).

1. SUMMARY

- 1.1. This report contains further exempt information relating to the acoustic review of A&M's RIBA Stage 3 design undertaken by Atkins on behalf of the LLDC and Arup on behalf of the BBC.
- 1.2. In general, the findings of the reviews are positive. Atkins' review found that, with the exception of the Practice and Quiet Rooms, all studios and rooms have been designed to meet the BBC's specification. Arup's review noted that in most cases the worst-case scenario had been modelled giving greater comfort to the rigorousness of the design.
- 1.3. As issues have been identified by Atkins or Arup during the course of their reviews, they had been shared with Buro Happold and they are being incorporated into the RIBA Stage 4 Design. These are set out in section 4 and 5.

2. RECOMMENDATIONS

2.1 The Committee is asked to:

- 2.1.1. **Note the findings from the reports from Atkins and Arup as set out in section 4 and 5.**
- 2.1.2. **Note that Atkins will undertake a further acoustic review of A&M's design information at the end of RIBA Stage 4.**

3. BACKGROUND

- 3.1. An action arising from 9 April 2019 Investment Committee requested that an acoustic review be commissioned on the RIBA Stage 3 design to provide assurance that the building had been designed in accordance with the BBC's specification referred to in Appendix 4 of the BBC Development Agreement.
- 3.2. LLDC instructed Atkins who are separately providing NEC supervisor and MEP commissioning services for Stratford Waterfront. The BBC also agreed they would have their consultants (Arup) review the design. Both parties agreed that

once the reports were completed they would be shared with each other as well as A&M's acoustic designers Buro Happold.

4. ATKINS FINDINGS

4.1. The areas of the building that Atkins reviewed are as follows:

- Studio 1;
- Studio 2;
- Studio 3;
- Guest Artist Room;
- Conductor Room;
- Workshops 1 and 2;
- Visualisation Rooms 1 and 2;
- Practice and Group Practice Rooms located on level 3; and
- Practice Rooms 3,4 and 5, Group Practice Room and the Quiet Room.

4.2. The key findings are:

- 4.2.1. The building envelope incident noise levels have been defined in the RIBA Stage 3 design and are deemed to be suitably robust.
- 4.2.2. The proposed opaque façade construction is capable of achieving the sound reduction performance required to comply with the criteria specified in the BBC's Generic Template (GT) specification for noise break-in due to external noise sources.
- 4.2.3. The proposed glazing construction in studio 1 may not be capable of achieving the sound reduction performance to comply with the GT specification for noise break-in due to external noise sources, however it has been jointly recognised by Buro Happold and Atkins that the sound insulation requirement is extensive.
- 4.2.4. The proposed construction is not capable of achieving the sound reduction performance required to comply with the GT specification for noise break-in due to external noise sources for the Quiet Room, but it is capable of achieving the criteria for the Group Practice Room.
- 4.2.5. The proposed construction is not capable of achieving the sound reduction performance required to comply with the GT specification for noise break-in due to external noise sources for the Practice Rooms 1, 2, 4 and 5, but it can achieve the criteria for Practice Room 3.
- 4.2.6. The issues detailed in 4.2.3-5 will be resolved through design development in the stage 4 design and will not require an amendment to the AfL.
- 4.2.7. There may be an element of over specification of the façade sound insulation due to the high external noise level assumed and this is an opportunity for value engineering to be incorporated into the Stage 4 design. The conservative assumption has resulted in a sound insulation requirement that is at the limit of obtainable representative test data. Elaboration on the acoustic model developed at RIBA Stage 2 will allow for a more in-depth review of assumptions leading to the derived building envelope incident noise levels.
- 4.2.8. The room to room acoustic separation is likely to be achieved for the studio and control room, excluding the studio-studio control room and studio-circulation adjacencies.

- 4.2.9. There may be an element of over specification in the box-in-box constructions, and this is opportunity for value engineering to be considered as part of the design development in Stage 4. It is recommended that a more detailed study into the transfer of acoustic energy between the critical adjacencies be carried out, to define the cumulative effect of structure borne and airborne components. Additionally, site mock-ups of different bearing and mass configurations would corroborate any theoretical modelling and provide deeper certainty into element performance and critical junctions.
- 4.2.10. The building services noise mitigation strategy is mostly acceptable in principal, but it should be further developed at RIBA Stage 4.
- 4.2.11. The Atkins report also included two additional chapters. The first, Acoustic Performance and Workmanship, provides guidance for the NEC Supervisor to assist them with identifying potential build defects, or poor-quality workmanship which could impact on the acoustic integrity of the construction.
- 4.2.12. The second, Acoustic Commissioning Strategy provides high level comments on suitable methodologies for testing the building shell upon Practical Completion. This was provided to Buro Happold to help them inform the commission specification that was included in the BBC Frame Package tender.

5. ARUP FINDINGS

- 5.1. The areas of the building that Arup reviewed are as follows:
 - Studio 1;
 - Studio 2;
 - Studio 3;
 - Practice Rooms;
 - Naturally Ventilated Spaces; and
 - Visualisation Rooms.
- 5.2. The key findings are as follows:
 - 5.2.1. The design to mitigate external noise ingress is based on conservative estimates of the external noise levels and assume that the whole façade is exposed to those worst-case noise levels. This should provide additional confidence that the internal noise levels will be achieved, and that external noise will not affect BBC operations in the acoustically critical spaces.
 - 5.2.2. The assessments of the internal sound insulation have been based on the background noise levels in each of the spaces, also as agreed with Arup during the design process. The report suggests that the background noise (GT) curves used for the analysis are in octaves but the third-octave band values have been used instead of the octave band values. This effectively adds 5 6dB to the acoustic requirements and therefore adds additional confidence that the internal requirements will be achieved.
 - 5.2.3. An area which Arup address which Atkins did not is the internal acoustics. This is because the internal acoustics of the performance spaces are the responsibility of Arup and therefore have not been discussed in the Buro Happold report. However, the underlying wall constructions have an impact on the room acoustics and so have been reviewed. In general, the heavy masonry constructions proposed to

achieve the sound insulation requirements provide little absorption at any frequency and therefore give a base for the Arup design which will enable reliable design of the fitout.

5.2.4. Notwithstanding this, there are several issues that have been raised with the design team and are being addressed within the RIBA Stage 4 design. The most pressing of which are:

- Alternative solution to radiant panels in the control rooms and workshops (and ideally the visualisation rooms);
- Clarification of the servicing strategy for Studio 1 in terms of duct and grille locations; and
- Reselection of resilient support to Studio 2 from 4Hz springs.

6. NEXT STEPS

- 6.1. Both studies were structured to allow the findings from each area of the building to reported to the client and designer as soon as they were made. This meant that any comment or concern was raised within sufficient time to allow them to be incorporated into the RIBA stage 4 design.
- 6.2. It is proposed that a similar study will be undertaken on the receipt of the RIBA Stage 4 Design to verify the issues raised by the two reports have been captured in the more developed design.

7. FINANCIAL IMPLICATIONS

- 7.1. The cost of Atkins undertaking the RIBA Stage 3 Review was £21,584.50. It is anticipated that review of the RIBA Stage 4 design information will cost a similar amount.

8. LEGAL IMPLICATIONS

- 8.1. None.

9. APPENDICES

- None

<p>List of Background Papers:</p> <p>None</p>
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