

MBDA 100 Quadrangle, Phase 3 Post-Completion Acoustics Report

Prepared for:

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December 2, 2010

**MBDA 100 Quadrangle,
Phase 3 Post-Completion Acoustics Report**

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Introduction

The Quadrangle had been tested for Reverberation Time by an Acoustics Consultancy in the past. However, details and results of the measurement were not available. While an effort had been clearly made to control the acoustics by incorporating acoustic design panels into the walls, it was thought that this was inadequate for low and mid frequencies. Details of the installation of these panels and their performance were also not available and therefore approximations of absorption coefficients across frequency range were made based on similar products. The acoustic issues were exacerbated by the fact that the ceiling is pitched glass which causes a significant amount of reflection as well as focussing of sound towards the centre of the room.

Due to the large size of the space, as well as the ratio of width to length of the room (almost 2:1), it was clear that low frequency modes (reinforced sound waves) are likely to be problematic. As previously stated, this was confirmed by subjective impressions in which the room sounded overly "boomy", particularly in response to male voices rather than female voices. It was therefore necessary that any additional absorption take low frequencies into account.

The recommendation from the consultants which carried out the previous testing is that the reverberation time should be reduced to 1.2 seconds. It is felt that this is an unrealistic expectation if the look of the space is not to be compromised. The aim was therefore to reduce the reverberation to 2 seconds, with an emphasis on reducing low frequency reverberation.

The suggested solution includes the use of stretched fabric ceiling sails and acoustic wall panelling.

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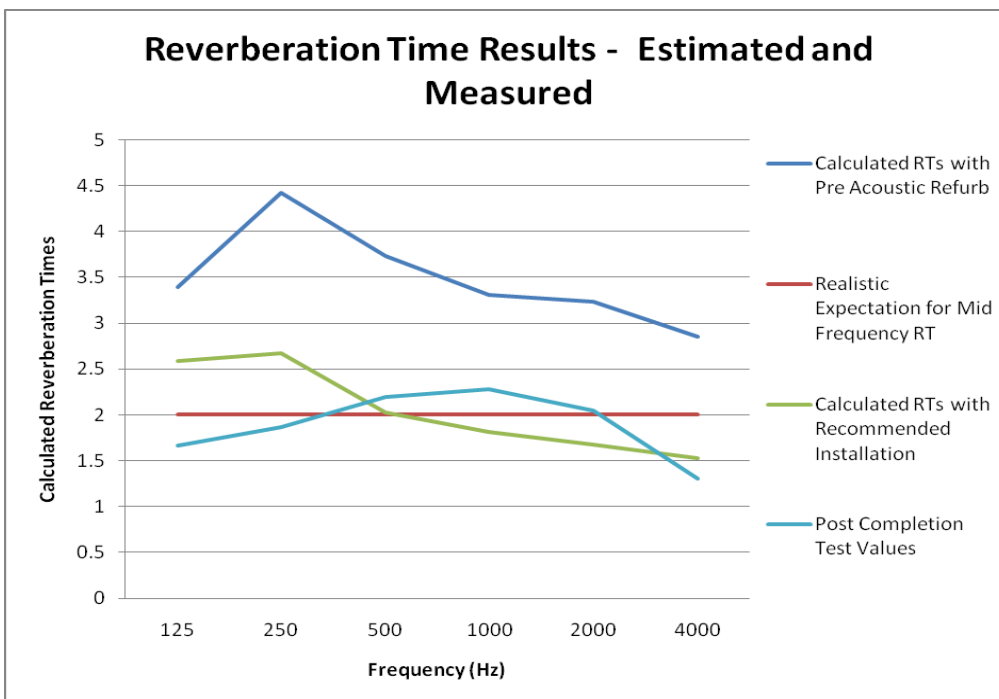
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Reverberation Analysis Results

The reverberation times at each of 6 frequency bands were calculated using measurements taken on completion of the project.

The objective stated on commissioning of works was to reduce mid frequency reverberation times (RT) below 2 seconds within the Quadrangle. Information on calculated and measured results is summarised in the graph below.



Our Post Completion Test Values show RT ranging between 1.3 to 2.25 seconds, providing an average RT of less than 1.9 seconds.

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MBDA has expressed satisfaction with the results achieved within this space. Speech is now intelligible across the room and the space can now fulfil its purpose.

The results of the solution are limited by the following factors:

- i. Panel size was reduced slightly for aesthetic reasons and to clear speaker brackets.
- ii. Data on the benefit of the sales as well as the performance of existing acoustic panels was not available and was therefore estimated in our original report.

David Barker
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