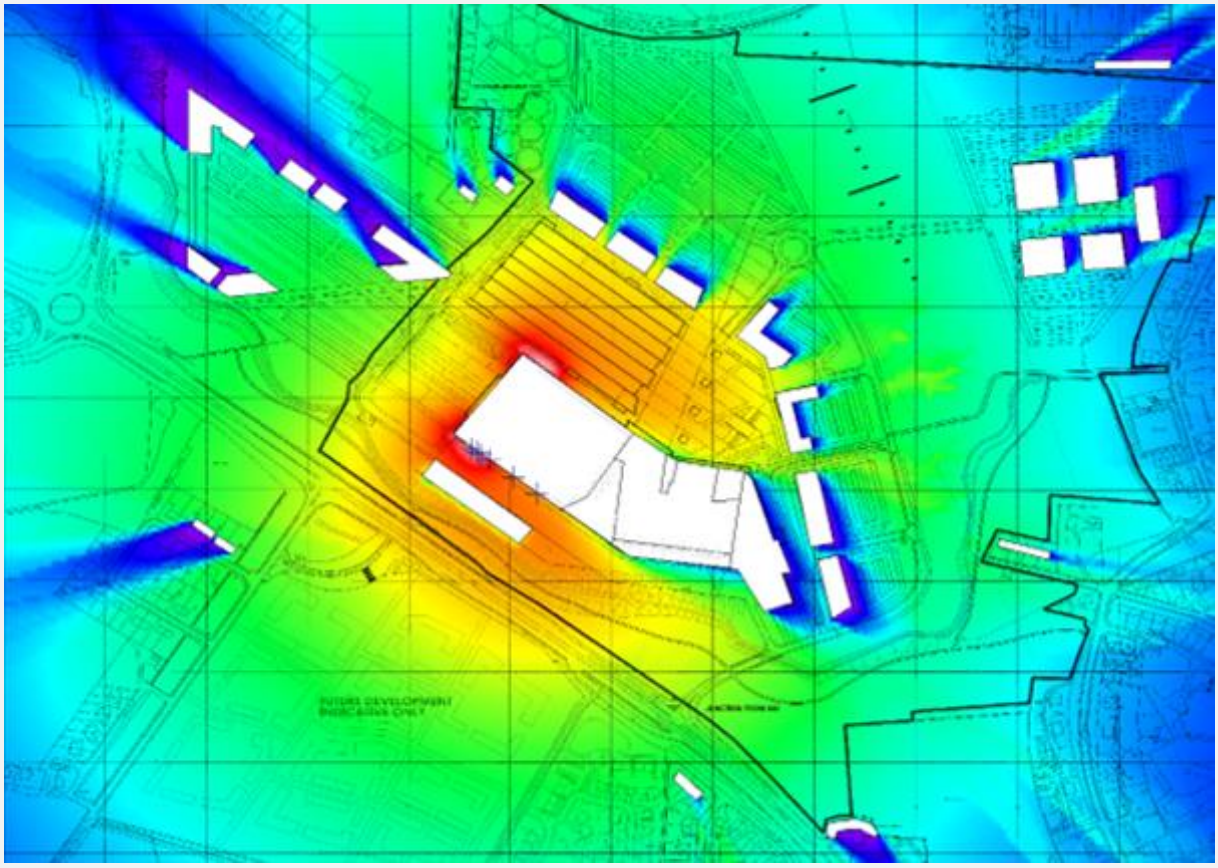
The Exhibition Centre Aberdeen

Complete	Area	Clients	Architects
2019	UK Scotland	Henry Boot Developments	Sasan Bell (Design)
		Robertson Construction Group	Keppie Design (Delivery)

TECA is the largest new entertainment complex in Europe. The £333m world-class facility provides a 15,000 capacity arena, exhibition and conference space, two hotels and an energy centre. Located on the site of the former Rowett Institute, TECA provides four times the exhibition space of the previous AECC. Sandy Brown were engaged in 2014 and provided full acoustic consultancy services on the project. This included supporting the project through the planning process and the detailed design, construction and commissioning of all the buildings on the site.

The site is directly under the flight path to and from the main runway at Aberdeen Airport, and aircraft noise is a significant source affecting the entire site and surrounding areas. Early in the design, Sandy Brown undertook detailed noise surveys at the site and prepared noise impact assessments in support of the planning applications. This included input to the Environmental Statement for the site.

As well as aircraft noise, the assessment included the noise impact of music breakout from the main entertainment spaces, new roads, road changes, car parks, loading bays, and the new energy centre. Detailed computer noise modelling was undertaken.



Computer model of amplified music egress from the arena ©Sandy Brown Associates

Key issues were aircraft noise ingress to the arena and conference halls and breakout of amplified music noise from concerts. The arena and main conference halls have a built-up standing seam roof construction incorporating heavy boards in the build-up. The walls comprise an outer cladding layer and a heavy triple-boarded inner lining, separated by a large airspace containing the structural columns. Due to the complex shape of the arena building, different solutions had to be adopted for different roof and high-level wall areas. Vehicle access doors are high performance double roller doors.

Although it is combined into one building, the Hilton hotel has a separate structure from the arena and conference centre, and this ensures the hotel is not affected by structureborne amplified music noise.

The conference centre includes a variety of sized halls. These can be subdivided by moveable partitions, and the largest conference halls are designed to allow amplified music concerts.

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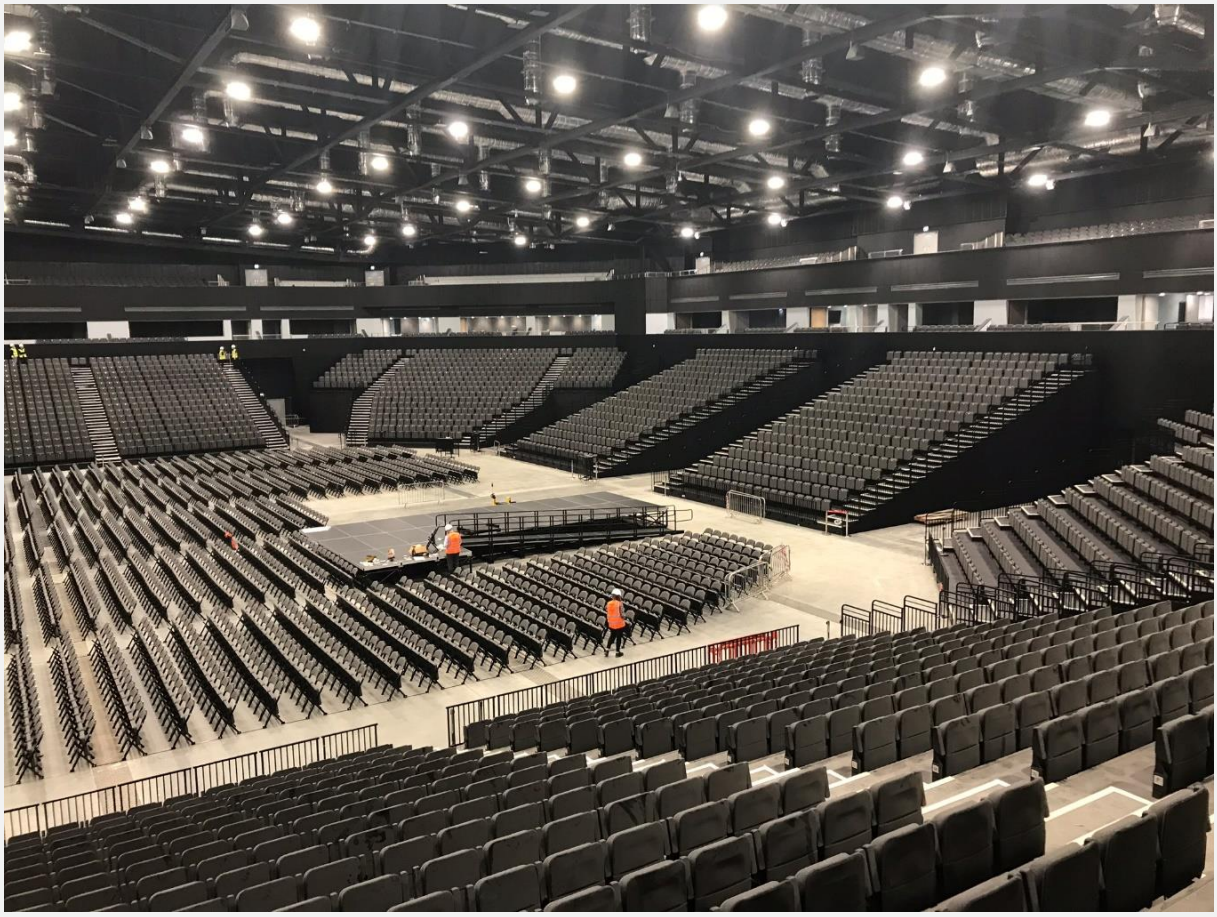
During the design stages, we highlighted the need for significant areas of sound absorbent treatment to control reverberation in the arena and conference halls, and undertook computer modelling of various early design options.



Because of the high aircraft noise levels, both hotels are fully mechanically ventilated with non-opening windows to guestrooms. They have concrete roofs and the facades have high performance double-glazed windows to control aircraft noise ingress.

Internally, the Hilton hotel has composite concrete floors and twin-frame drywall partitions between bedrooms to provide the high sound insulation required by the Hilton Brand standards. The ground floor ceilings are enhanced to provide a very high level of sound insulation between ground floor areas such as kitchens and meeting rooms to the bedrooms on first floor above.

The Aloft hotel is constructed from a light gauge steel framing system with composite concrete floor slabs. Drywall partitions between bedrooms incorporate resilient bars to provide high sound insulation.

The Aloft brand's interior design called for an exposed concrete soffit at ground floor but also for high sound insulation between ground floor and bedrooms directly above, so the first-floor slab is enhanced to meet these requirements.

The team at Sandy Brown worked with the contractor throughout construction to develop the detailed designs of all the buildings, and carried out site inspections and early mock-up acoustic tests to ensure the required standards would be achieved.

A comprehensive programme of acoustic commissioning testing was undertaken to check for compliance with the project requirements, including the brand standards for both hotels. The testing included the sound insulation of walls, floors, and moveable partitions, building services noise levels, aircraft noise ingress and acoustic quality in spaces.

As part of the commissioning, a large arena sound system was used to simulate worst-case amplified music levels in the arena and main conference halls and the noise levels were confirmed to meet the criteria at all nearby dwellings.