

Royal Ontario Museum Renaissance Expansion

Acoustic Precision Within an Architectural Icon

VISION

Integrate acoustic performance within a complex museum expansion while addressing vibration from adjacent transit infrastructure.

PARTNERSHIP

Support the design team with acoustic input aligned to architectural ambition and structural complexity.

VALUE-ADD

Targeted vibration isolation and acoustic design that protect exhibit environments and visitor experience.

DESIGN ARCHITECT
Studio Daniel Libeskind

EXECUTIVE ARCHITECT
B+H Architects

ACOUSTICS
Trinity Consultants Canada

The Renaissance ROM expansion was a \$270 million project that transformed the Royal Ontario Museum into the largest museum in Canada. Its centrepiece, the Michael Lee-Chin Crystal, is a bold addition designed by Studio Daniel Libeskind and realised with B+H Architects as executive architect. Comprising five interlocking, self-supporting prismatic structures clad in champagne-coloured anodised aluminium, the Crystal added 100,000 square feet of new exhibition space, a new entrance and lobby, and three restaurants at street level. Ten galleries in the historic ROM building were also renovated as part of the programme. Trinity Consultants Canada provided acoustic consulting services across the expansion.

The museum's position at one of downtown Toronto's most prominent intersections, Bloor Street West and Avenue Road, places it directly above TTC rapid transit infrastructure. Museum Station on Line 1 (Yonge-University) has its main entrance at the museum's threshold, and the St. George station on Line 2 (Bloor-Danforth) is steps away. Ground-borne vibration from subway operations runs beneath and around the building, presenting a persistent source of potential interference for exhibit environments and visitor experience. Reconciling the acoustic requirements of a world-class museum with the structural and spatial complexity of Libeskind's unconventional geometry defined the scope of our team's work.

VISION

The Renaissance ROM expansion set out to redefine the museum as a civic and cultural landmark for Toronto. Established in 1912, the ROM had grown through several additions, but the \$270 million Renaissance ROM project marked its most ambitious transformation. At its heart was the Michael Lee-Chin Crystal, Studio Daniel Libeskind's addition of five interlocking prismatic forms extending from the historic building's north and west faces. Alongside the Crystal's 100,000 square feet of new exhibition space, entrance, lobby, retail, and restaurants, the project renovated ten galleries within the existing building. Completed in 2007, it established the ROM as the largest museum in Canada.

The architectural ambition of the Crystal set the terms for every discipline on the project. Libeskind's five prismatic structures have no parallel walls, with all panels inclined on one or two planes, producing a building with no conventional acoustic geometry. Exhibition spaces within the Crystal needed to host everything from permanent collections to large-scale travelling exhibitions, while maintaining conditions that protect both visitors and the artefacts on display. At the same time, the museum's location above TTC infrastructure made ground-borne vibration a design constraint from the outset.

PARTNERSHIP

Our team worked within a design structure led by B+H Architects as executive architect, with Studio Daniel Libeskind as design architect. The Crystal was one of the most structurally complex construction projects in North America at the time, its five self-supporting prismatic forms sitting adjacent to but structurally independent of the historic ROM building, connected only by bridges. That independence had acoustic implications: the Crystal's structure behaved differently from the existing masonry building with respect to vibration transmission, requiring its own assessment.

Acoustic input spanned multiple building systems and space types simultaneously, from new gallery spaces within the Crystal to renovated galleries, lobby and circulation areas, restaurant and retail spaces, and the museum's interface with its urban context. Coordinating recommendations across that range, within a design process driven by an internationally recognised architectural vision, required close work with B+H Architects to weave performance criteria into the design from the outset. The renovation work added a further layer of coordination, as interventions within the heritage structure required sensitivity to its existing acoustic conditions and physical fabric.

VALUE-ADD

The most concentrated area of acoustic work was vibration isolation from the adjacent TTC subway. The Blockbuster Gallery, host to the museum's large-scale travelling exhibitions, sits close to subway operations and required vibration control commensurate with the sensitivities of the collection and a major cultural institution. Our team designed a floating floor system, isolating the floor structure from the surrounding building to interrupt ground-borne vibration before it could reach the exhibit environment. This involved measurement and analysis of existing conditions to establish isolation criteria and inform the floating floor specification.

Across the gallery programme, acoustic design addressed sound isolation between spaces, mechanical noise control, and interior acoustic treatments appropriate to each space type. Museum galleries present particular acoustic demands: they must be quiet enough to support focused engagement with exhibits, manage the ambient noise generated by visitor activity, and avoid conditions that cause speech to carry intrusively between adjacent spaces. The inclined, non-parallel surfaces of the Crystal's exhibition volumes introduced acoustic behaviour that required careful analysis, as angled walls and ceilings distribute sound energy differently from conventional rectilinear rooms. Our team developed interior treatment recommendations to support appropriate reverberation conditions within each gallery while remaining compatible with the architectural intent. The construction phase added a further dimension to the acoustic scope. With museum operations continuing in parts of the existing building, our team assessed the acoustic impacts of construction activity on occupied areas and provided guidance to protect the visitor experience during the build. This covered both airborne noise and ground-borne vibration, both capable of affecting galleries and collection storage adjacent to the Crystal's construction zone.

ABOUT TRINITY CONSULTANTS

Trinity Consultants, a leading global environmental consulting firm, provides services and solutions in the EHS Regulatory Compliance, Built Environment, Life Sciences, and Water & Ecology markets. Founded in 1974, Trinity has the technical expertise, industry depth, and capabilities to help clients achieve their goals across the natural and built environments.