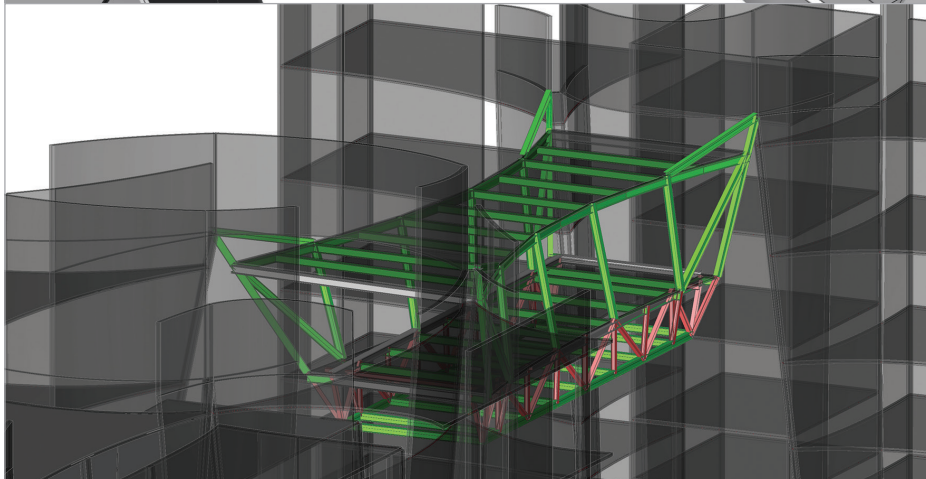
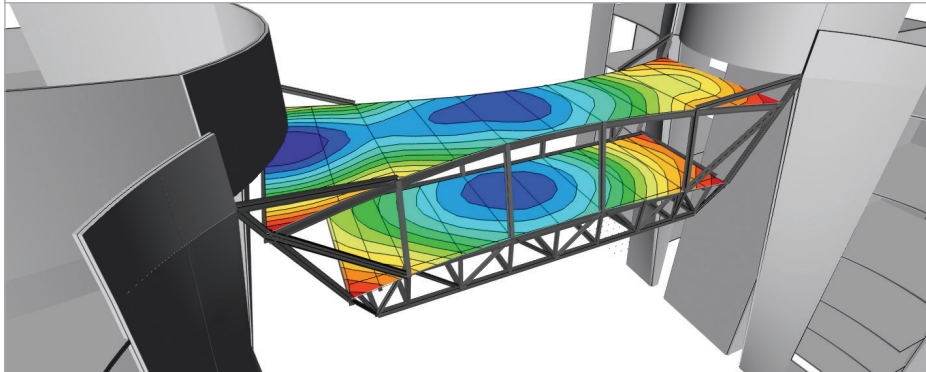
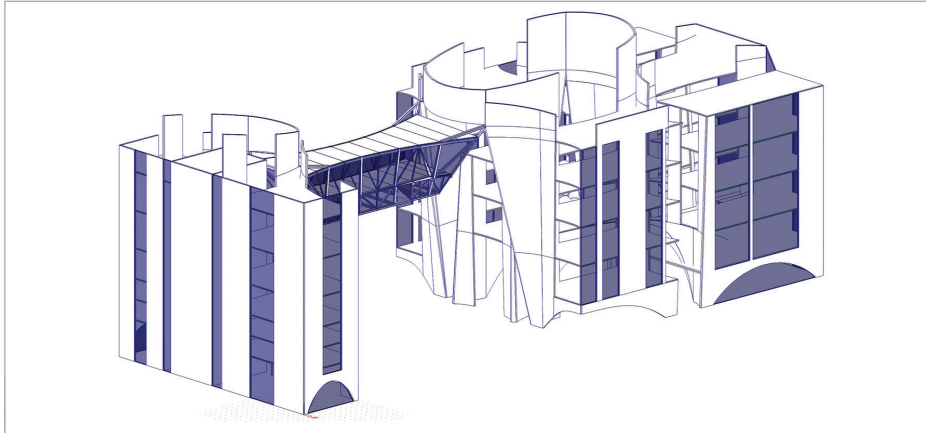


# National Music Centre - Calgary, Alberta, Canada



## Project Description

An international design competition sought to identify a unique design for Canada's National Music Centre that would link the historic past of Calgary's East Village with the innovations of the future.

As a result, the National Music Centre is an entirely new cultural institution dedicated to the music of Canada in all of its forms. It is at once museum, performance hall, interactive music education center, recording studio and broadcast center. Sited opposite the Stampede Grounds in Calgary's historic East Village, the new National Music Centre, along with the restored King Eddy Hotel, will catalyze the future redevelopment of the district.

## Key Structural Design Features

- Free form, 5 story concrete structure that utilizes nine towers to form the body. The towers serve as cores to resist the lateral load.
- Contemporary look features concrete walls clad in terra cotta rising in subtle curves. These curves merge, separate and interlace. Smaller concrete structures lean on each other and form understated arches, many of which don't touch the ground.
- Majority of exterior was architecturally exposed concrete, making concrete appearance and the reduction of cracking paramount.
- Combination of mat foundation and spread footings.
- Bridge spanning over 4th Street SE connecting the structure designed as a full story steel truss and included no similar connections.

## Project Challenges

The scale of the National Music Centre project and the intricacy of the architecture could have made it difficult and expensive to complete using traditional engineering workflows and software. Because of the scale of the project, complex architecture and mix of materials, KPFF encountered various design, analysis and workflow challenges.

One such design challenge was the requirement for the structure to not only perform adequately for strength, but also for the unique functional needs related to the acoustics of specific spaces. In addition, other spaces

held requirements for interior climate control in relation to the preservation of the museum's collections. These design challenges made direct collaboration with the architectural and interior design teams vital, in order to ensure that the structure performs effectively in all aspects of the design.

Also, in an attempt to streamline the project workflow, KPFF decided to utilize Scia Engineer because it allowed the engineers to directly leverage the architects Rhino 3D model into analysis. Within this process, Rhino 3D files were imported into Scia Engineer as VRML files.

After importing as VRML files, KPFF was able to choose to have Scia Engineer convert the VRML geometry into 1D or 2D members automatically, or bring the model in as reference geometry. In this case, because of the many doubly curved shell elements in the design, the model was brought in as a reference model. KPFF was able to use the tools in Scia Engineer's BIM toolbox to trace around and convert the Rhino3D model into a proper analytical model that was ready for loading, meshing and analysis.

Ultimately, the ability to leverage the architect's model into analysis saved KPFF tremendous time. The biggest advantage was the ability to make changes and turn the design back to the architect within a day. Without the quick turnaround that Scia Engineer allowed, the project design phase would have greatly extended and could have caused for difficulty in coordination.

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KPFF was founded in Seattle, Washington, in 1960 and since that time, the firm has grown in both size and stature. In addition, we have built a reputation as creative and innovative engineers who are focused on a high level of client service and excellence in everything we undertake. This strong tradition of client service and excellence is the primary reason that we have experienced significant growth in our professional practice over the last 50 years.

Today, KPFF Consulting Engineers is a multi-office, multi-discipline engineering firm that provides a wide variety of engineering services to the design and construction industry both in the United States and abroad. Services which are provided include structural engineering, civil engineering, construction management, project management, surveying and a variety of specialty engineering services. This significant broad-based experience provides us with the ability to solve the most difficult and challenging problems.

## Project information

Owner	Cantos Music Foundation
Architect	Allied Works Architecture, Portland, Ore
General Contractor	CANA Construction
Engineering Office	KPFF Consulting Engineers, Portland and Read Jones Christoffersen Consulting Engineers, Calgary
Location	Calgary, Alberta, Canada
Construction Period	02/2013 to 06/2015

## Short description | National Music Centre of Canada

The National Music Centre of Canada is a 135,000-square foot cultural institution dedicated to the music of Canada and located in Calgary's historic East Village. The design itself is free-form, using 9 towers to form the structures body. Additionally, the structure is built around the historical and condemned King Edward Hotel, which will be refurbished and reopened as part of the project. As a result of the project's scale and intricate architecture, Scia Engineer was utilized for its 3D modelling capability, advanced analysis and, most importantly, the software's ability to leverage the architect's model into analysis, allowing for streamlined collaboration between the architect and structural engineer.

