MAGNUSSON KLEMENCIC ASSOCIATES

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MKA'S PERELMAN PERFORMING ARTS CENTER WINS SEAOI AWARD FOR MOST INNOVATIVE STRUCTURE

CHICAGO, July 2, 2024—Magnusson Klemencic Associates (MKA) is pleased to announce The Structural Engineers Association of Illinois (SEAOI) selected Perelman Performing Arts Center in New York City as this year's Juror's Favorite/Most Innovative Structure. The top honor in SEAOI's annual Excellence in Structural Engineering Awards, the award was presented to MKA for their role as Lead Structural Engineer on the project during the organization's 45th Annual Awards Celebration on June 13 in Chicago, Illinois. The Perelman Performing Arts Center—known as PAC NYC—completes the master vision for the 9/11 Memorial Grounds and was designed in collaboration with Design Architect REX and Architect of Record Davis Brody Bond – a Page/ Company. It opened in September 2023.

MKA's structural design for the 129,000-square-foot PAC NYC may look incredibly humble or even simple from the outside as a solemn marble cube against the city's skyline, but at night the cube's glowing form hints at the intricacy hidden within—a world-class performance venue with a one-of-a-kind, immensely complex structural system capable of machine-like transformation.

The structure performs engineering "gymnastics," setting new benchmarks for transformable, reconfigurable, and flexible performance spaces:

- The three main theaters and two adjoining "scene docks" can be reconfigured/coupled/de-coupled into unheard-of 11 theater volumes and 60-plus configurations!
- Balconies roll in/out, seating platforms rise/drop to create raked/flat seating, moveable/removable ceiling rigging raises/lowers, and walls appear/disappear—seamlessly transforming into many arrangements, from intimate 100-person black-box spaces to 1,000-person concerts.
- Four retractable, acoustically isolated, and gigantic "guillotine" doors separating the three theaters—the first of their kind for a performing arts venue at this scale and for this application—make PAC NYC's flexibility possible.

The building utilized existing foundations designed for a previous iteration of the design by a different team—foundations for a wholly different-sized building! To accommodate the preexisting below-grade structure, MKA came up with a unique mapping diagram, the "red dot diagram," which identified existing support locations and their load-carrying capacities (the bigger the dot identified the greater the capacity) and revealed 60% of the available capacity fell outside PAC NYC's new footprint. MKA identified seven "workable" load-bearing support points form this map by combining the capacity of multiple areas with unique below-grade "interventions"—a customized solution that allowed the engineers to connect seven support points to seven above-grade "super columns" (~20x heavier than typical building columns). These seven super columns alone support the entire above-grade PAC NYC superstructure. MKA essentially designed the entire building from the "bottom-up" instead of the standard "top-down" fitting structure to foundations.

Additionally, the project's construction threaded through four subterranean levels of operating infrastructure, including trains, subways, and loading docks, all of which generated noise and vibration that had to be mitigated given the building's function as a performance venue with world-class acoustics. The three principal theaters "float" inside the marble exterior to address these immense vibration and noise

concerns. The floating theaters are structurally independent and acoustically isolated from each other, the building itself, and the infrastructure below.

The project also demanded rigorous anti-terrorism blast resistance without compromising the architectural design integrity/beauty.

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Magnusson Klemencic Associates (MKA) is an award-winning structural and civil engineering firm founded in 1920 with offices in Seattle, Washington, and Chicago, Illinois. Serving clients worldwide, MKA has worked on projects in 48 states and 61 countries. MKA's passion is creating structural systems for buildings of all shapes, sizes, and complexities, and civil site and infrastructure designs for architectural projects.

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