# CIRCA

LOS ANGELES, CA

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## LOS ANGELES, CA

Located across from the Staples Center in Los Angeles, CA, Circa will consist of two 35-story elliptical residential towers over an eight-story retail/parking podium, with two additional subterranean parking levels. The total height is 420 ft (128 m) for each tower. The residential towers will feature 648 luxury condominiums. The podium, which connects the two towers, will be decorated with large-scale electronic displays and integrated façade lighting to illuminate the urban landscape. The project will include an amenity level with a large deck, pools, gym, yoga studio, and test kitchen.

Circa is an outstanding blend of state-of-the-art engineering and attractive architecture. A key project objective was to move through design and into construction quickly. Cary Kopczynski & Company (CKC) developed a unique structural system that simplified the design and streamlined permitting; the Los Angeles Department of Building and Safety completed its review of foundations, substructure, and structural core just 10 months after CKC started work. Construction started in the spring of 2015 and is expected to finish in 2017.

The structure is being constructed of cast-in-place concrete with post-tensioned floor slabs to minimize internal columns for maximum openness. A combination of shear walls and ductile frames resist seismic and wind loads.

CKC used two-way, flat-plate PT slabs throughout the project, except at the amenity floor (Level 8) and ground-level slabs, which include areas of one-way PT and mild reinforcing. The tower/residential floors are 8-1/2 in. (216 mm) thick slabs with spans of 25 to 32 ft (7.6 to 9.8 m), and 8 ft (2.4 m) cantilever balconies. The parking levels are 8 in. (203 mm) thick slabs with the same spans. The tower floors were deliberately thickened by 1/2 in. (13 mm) to allow for drops at the transitions between occupied space and the balconies, and also to control deflections in areas of heavier loading and longer spans.

The ground-level slab is generally 12 in. (300 mm) thick, and the amenity floor varies from 12 to 16 in. (300 to 400 mm) thick as it slopes for drainage. Spans are similar to the tower.

### DUAL CORE

In response to demanding seismic requirements, CKC created a dual system core consisting of special reinforced concrete shear walls combined with special reinforced concrete moment frames that follow a weak-beam/strong-column design methodology. The shear walls provide primary stiffness, strength, and ductility. They are supplemented by the moment frames which create redundancy and enhance overall system ductility.

### POST-TENSIONED SLAB SHRINKAGE CONTROL

Three ft (0.9 m)closure strips were incorporated in the subterranean-level slabs at the perimeter basement walls to allow the slabs to shorten free of restraint prior to being connected. This allowed the contractor to shotcrete the walls prior to slab construction. Additional interior closure strips were also used in the subterranean and podium slabs for shrinkage control and stressing.

### REDUCED GRAVITY LOADS AND SEISMIC MASS

Post-tensioned flat-plate construction resulted in thinner concrete slabs and reduced mass, which decreased foundation sizes and lateral forces under seismic ground shaking. This also lowered the floor to floor height and, importantly, in this modern era of sustainability, reduced the building's carbon footprint.

### LONG FLOOR SPANS, OPEN SPACIOUS UNITS

The owner desired open, spacious units with minimal obstructions. The structural design for Circa effectively

used post-tensioned concrete to minimize internal columns, creating spans of up to 32 ft (9.8 m) throughout both towers. This resulted in highly desirable column-free interior space in the living units, as well as the lobby, retail, and parking areas. Further, post-tensioning was ideal for the large, irregularly shaped balconies, which cantilever in excess of 8 ft (2.4 m).

## ELIMINATION OF COLUMN TRANSFERS

Column transfers are often expensive and difficult to construct, and sometimes introduce undesirable seismic behavior. The use of a two-way post-tensioned slab system allowed for continuity of framing between the retail/parking podium and the residential levels above. This eliminated the need for transfer beams which would have otherwise been required to relocate interior columns as they pass through the parking levels.

**Owner:** LR 1220 Fig Investors Series, LLC, Los Angeles, CA
**Structural Engineer**: Cary Kopczynski & Company (CKC), Bellevue, WA
**Architect**: Harley Ellis Devereaux, Los Angeles, CA
**Contractor**: Lend Lease, Los Angeles, CA
**PT Supplier**: CMC Cable, Fontana, CA