The 60-story 1072 West Peachtree is Atlanta's tallest high-rise since 1992.

Pinnacle on Peachtree

Atlanta's new 60-story tower soars into the skyline.

By Susendar Muthukumar, PhD, SE, and Daniel Traub, SE

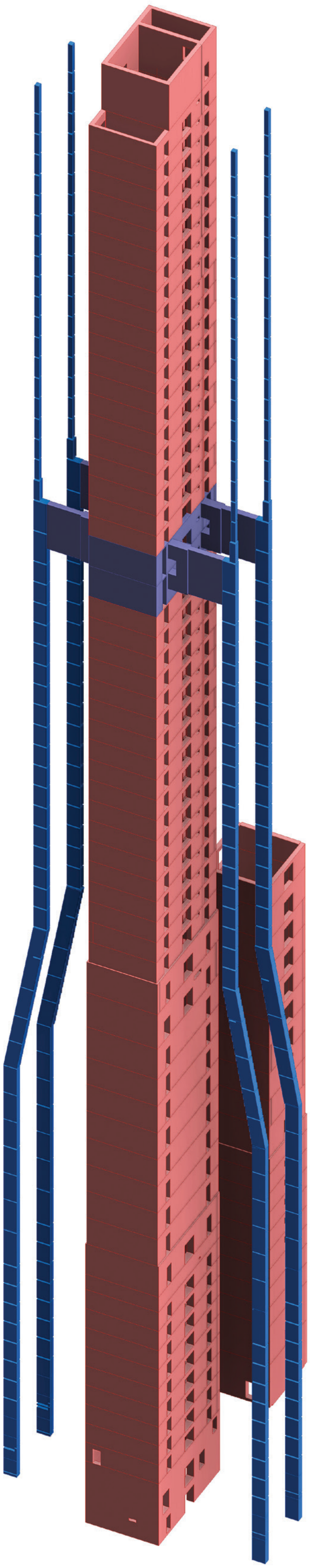
1072 West Peachtree located in Midtown, Atlanta, at the southwest corner of West Peachtree and 12th Street, is the latest addition to the city skyline. Developer Rockefeller Group partnered with TVS Architects, Walter P Moore Structural Engineers, and Turner Construction to design the 60-story mixed use tower. The 1-million-square-feet building vertically integrates 224,000 square feet of Class-A office spaces, 6,300 square feet of retail, eight levels of parking with 729 spaces, 357 luxury apartments and world class amenities. The skyscraper, at an architectural height of 749 feet, is Atlanta's fifth tallest building and the latest constructed in the last 30 years. The primary structural system consists of a cast-in-place concrete frame with concrete shear wall cores enclosed by a glass and precast facade and topped with a steel crown.

From the outset, the project team pursued a holistic design approach, integrating wind engineering, structural optimization, and interdisciplinary coordination to deliver an elevated level of occupancy, a high-performing building, and an efficient design. This article describes design and construction challenges that were unique to this building, including column layout transitions, temperature monitoring in the mat foundations, concrete outrigger detailing, occupant comfort performance, field monitoring for column shortening, and coordination with MEP systems.

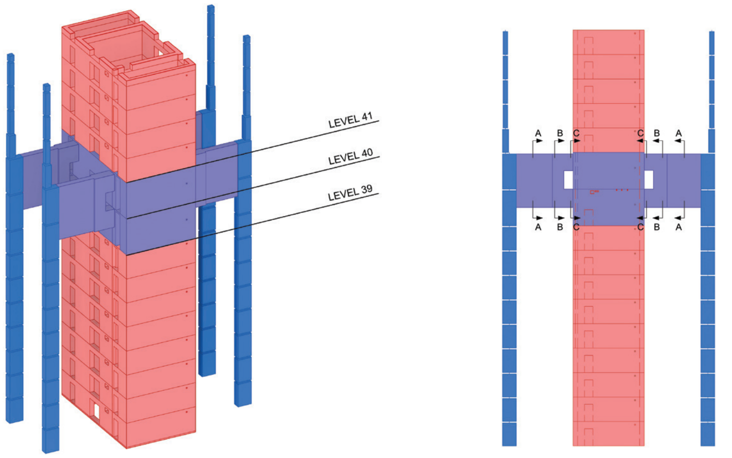
Structural Overview

The floor framing systems were selected for varying functional occupancies throughout the building. The ground-floor retail, amenity at levels 10 and 20, and the office floors on levels 11 to 19 utilize reinforced concrete slabs framing to mild pan-formed beams and post-tensioned girders. This system provides flexibility for future tenant modifications and accommodates slab elevation changes using a mild steel slab instead of having post-tensioning everywhere. The parking and residential levels consist of two-way post-tensioned slabs that maximized floor to floor height while leaving the slab soffits visible, as part of the architectural aesthetic. Column layouts were coordinated with architectural and functional requirements. To transition between differing column layouts at the residential and office levels, sloped columns over five levels were introduced to accommodate the larger office bay spacing. Similarly, bay spacing transitions between office and parking levels were achieved using 60-inch wide x 96-inch deep post-tensioned transfer girders, which were strategically located within an amenity level to minimize structural and architectural impacts. The transfer beams supported 10 floor levels with column loads of 1,900 kips magnitude transferred. Steel framing above the roof conceals mechanical equipment and elevator machine rooms, while also supporting the building maintenance (window washing) system. Level 20 features an expansive 2,400-square-foot pool with a 4-foot depth that required 18- to 24-inch-deep mildly reinforced concrete slabs framing to 5-feet-deep concrete beams, typically on a 30-foot grid.

The site included one level below grade basement and was constrained by adjacent roadways and existing buildings. The top of slab at the basement level was 14 feet to 18 feet below ground surface. A permanent cantilevered retention system was provided consisting of cantilevered soldier piles with embedded steel H-piles, typically spaced at 6 feet on center. A reinforced concrete shotcrete wall was installed over the lagging to serve as the permanent basement wall system. Field verification and survey measurements were critical in locating the retention system, requiring adjustments during construction to maintain alignment within the property line.

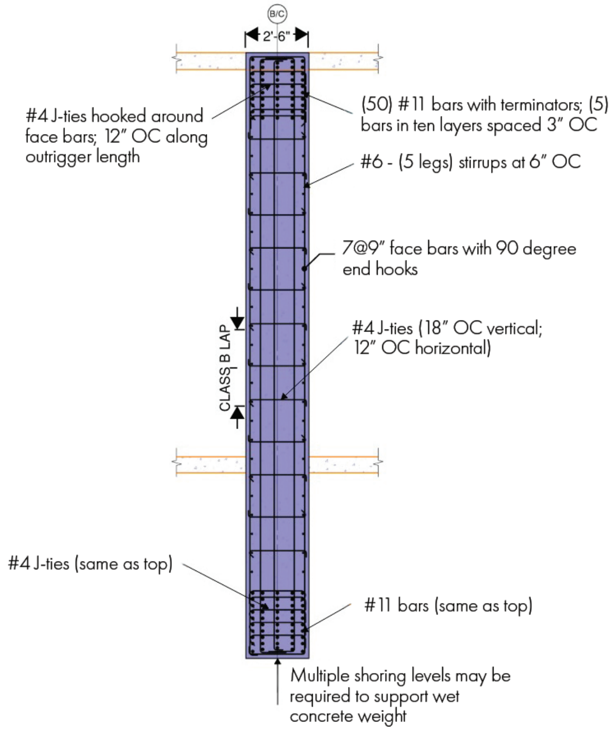


Shown is the reinforced concrete shear wall and outrigger lateral system.



(Left) The concrete outrigger system enhanced lateral performance with door openings for access. (Right) The outrigger elevation is shown with section locations.

At Right/Opposite Page: Three outrigger sections with design reinforcement are illustrated.



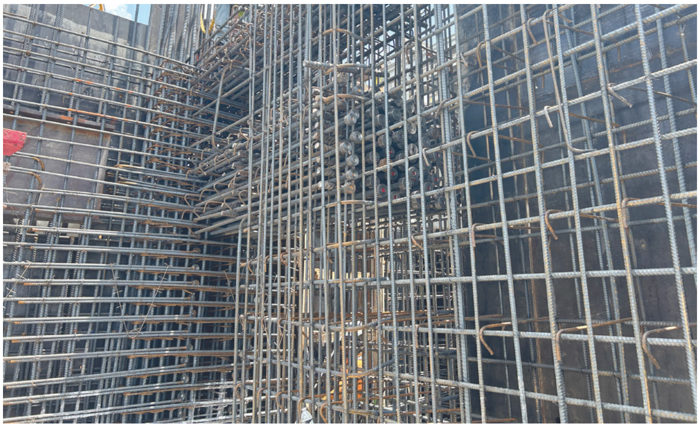
The geotechnical recommendations were to support the building on a deep foundation system bearing on rock, which was encountered in the borings at depths ranging from 16 feet to 53 feet below the existing ground surface. Drilled piers with diameters ranging from 3 feet to 8 feet were utilized with 5-foot to 10-foot socket extensions provided to resist uplift. The tower columns were founded on individual piers. The north and south shear wall cores were supported on 11-foot and 9-foot-thick foundation mats to better distribute the significant overturning demands from the shear walls. Soil-structure interaction was considered to ensure uniform settlement and to provide adequate system stiffness.

Temperature monitoring in mass concrete was a key consideration for the mat foundations. Notes were included in the structural drawings outlining contractor responsibilities for temperature control and location of thermocouples. Sixteen thermocouple locations were identified on the foundation plan for each of the two pier supported mat foundations. At each location, a set of four thermocouples was installed throughout the depth of the foundation to monitor differential temperatures during curing. The Contractor submitted a thermal control plan outlining the monitoring procedures and mitigation measures to address differential temperature conditions. During the foundation pours, the Contractor implemented the necessary precautions to ensure that the concrete placement temperature remained below 95F, the maximum curing temperature did not exceed 160F, and the temperature differential between any two monitored points did not exceed 60F.

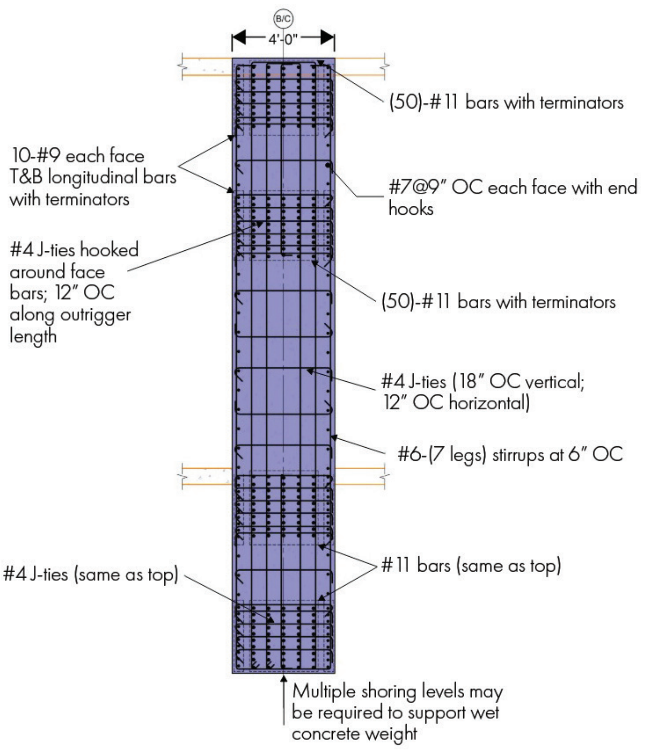
Lateral System

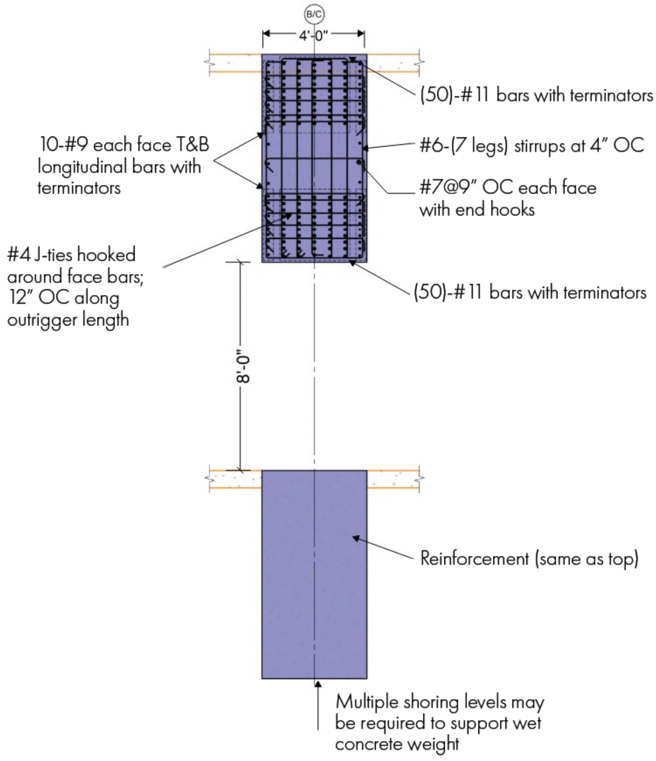
The building's reinforced concrete shear walls interconnect with coupling beams for lateral resistance. The north core extends the full height of the building with wall thickness ranging from 24 inches to 39 inches. The south core extends up to level 20 with 24-inch and 30-inch-thick concrete walls. Over 400 coupling beams placed above door openings link the shear walls and offer higher overturning resistance to wind loads. In 18% of the coupling beams, steel sections embedded in the concrete ensure optimal lateral performance at the more heavily loaded locations. A 24-foot-deep outrigger system was positioned at approximately two-thirds of the building height to further enhance lateral performance by redistributing overturning forces to perimeter super columns. This strategy allowed the core wall thickness to contribute to the project goals of increasing usable floor area without compromising performance.

The shear walls were constructed with a high-strength 10,000 psi concrete mix at the lower levels that transitioned to 8,000 psi and 5,000 psi at the upper levels. The modulus of elasticity (MoE) of the concrete mix is a significant contributor toward building stiffness, helps control drift, and enhances occupant comfort under serviceability wind loads. Factors affecting MoE include type of rock, porosity,



Rebar placement at the outrigger sections as seen in the field.





texture, hardness, water content, and mineralogy. An enhanced modulus of elasticity was specified for the project with minimum values of 6,500 ksi and 5,800 ksi for the 10 ksi and 8 ksi concrete. The project team collaborated with local concrete suppliers to obtain aggregates sourced from outside the Atlanta area, which were then batch-tested to ensure conformance with performance requirements.

Wind Tunnel & Performance Criteria

Based on building height and slenderness, performance during service level wind loads is an important aspect of structural design. A wind tunnel study was performed by RWDI wind engineering consultants based on structural dynamic properties supplied by Walter P Moore. RWDI employed the High Frequency Force Balance (HFFB) technique in conjunction with the most recent Atlanta-area wind climate model to better understand wind pressures, dynamic response characteristics, and vortex shedding effects. Damping ratios of 2% and 1.5% were used for strength and serviceability, based on building type and height. Wind tunnel results highlighted a strong crosswind building response that aligned with the wind climate directionality. Loads from the wind tunnel study were incorporated directly into the structural design, allowing for refinement of member sizes and lateral force distribution while reducing wall reinforcement for the project.

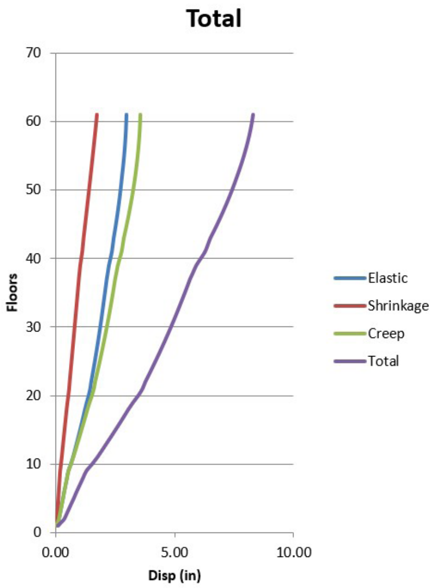
Wind-induced accelerations at the top occupied floor were evaluated for compliance with the International Organization for Standardization (ISO) residential criteria. The predicted wind accelerations for the 1-year and 10-year return periods were 11 milli-g and 18 milli-g. Because these accelerations are within the corresponding ISO criteria, the building motions were deemed acceptable for occupant comfort. Torsional velocities were also estimated at the top occupied floor and observed to be well within the criteria for the 1-year and 10-year return periods.

Vertical Compensation

Relative differential column shortening is a significant consideration during design, especially for buildings over 40 stories tall. When left unaddressed, differential column shortening can cause cladding distress, affect partitions and architectural finishes, and produce uneven floors, resulting in disputes and unanticipated tenant costs. The biggest contributors to differential shortening include elastic shortening, shrinkage, and creep, with shrinkage being the largest contributor and creep being the most variable. A common rule of thumb for column shortening is 1 inch for each 80 feet of height.

In this project, long-term time-dependent behavior of the concrete structure, including shrinkage and creep of vertical elements, was evaluated based on a differential shortening analysis with results incorporated into both the design and construction sequencing. The tower perimeter columns were expected to shorten more than the core walls. To obtain level floors at the end of construction, the contractor needed to compensate for the differential shortening. The design team developed a column compensation schedule, wherein designated top of concrete elevations are matched during construction. The schedule outlined amounts by which the columns needed to be super-elevated.

The shortening of the walls and columns were monitored during construction to corroborate analysis results. The design team outlined a surveying program on the drawings with recommended survey locations and schedule for field elevation measurements. Some of the specific requirements included the contractor engaging the services of a licensed surveyor, setting up differential shortening preconstruction meetings, and submitting survey reports within seven days from the time of measurement. The field elevations were required to be reported based on surveys to be taken from a fixed, off-site benchmark. The project team then processed the surveyed column offsets with respect to the column cores to ensure acceptable tolerance (span/360). Differential



Typical column shortening estimate is shown. Notes in the design drawings said to outline expected shortening of the structural system.

shortening also impacts other trades, including the cladding consultant and MEP contractor for pipe support system attachments. The vertical pipes were designed to provide shortening, and the structure was reviewed for any increased loading that may occur. Notes were included in the design drawings to outline expected shortening of the structural system on this project. The relative shortening for the core wall was estimated at 1⁄16 inch per floor and the total perimeter column shortening per floor was anticipated to range from 1⁄8 inch to 3⁄16 inch per floor.

Integrated Coordination

The coordinated design required close integration across all disciplines. Coordination meetings facilitated a holistic design approach, allowing the team to align structural systems with architectural, mechanical, and construction requirements. A key coordination effort involved the interface between the concrete core and MEP systems. Designated wall zones were established to allow piping to pass through the core walls while maintaining structural integrity. Additionally, coupling beam detailing was developed to allow routing of ducts and conduits beneath and, where feasible, through these elements without compromising performance. This integration reduced conflicts during construction and enabled a more efficient and streamlined building system.

Conclusion

1072 West Peachtree shows how a well-integrated design approach can provide an efficient, constructable, and performance-driven design. The structural system combined high strength concrete cores with outrigger action and wind-tunnel-informed design optimization. This approach delivered a high-rise system that met strength, serviceability, and occupant comfort requirements while aligning with project budget.

Enhanced analysis methods including wind tunnel testing and time-dependent deformation studies were instrumental in refining the design and ensuring occupant comfort,

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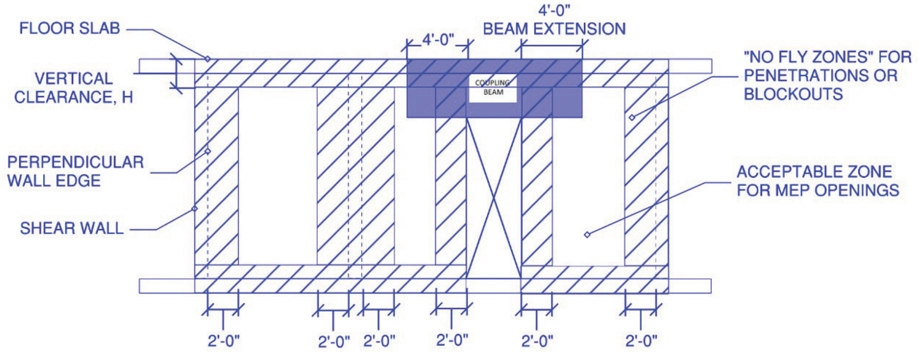
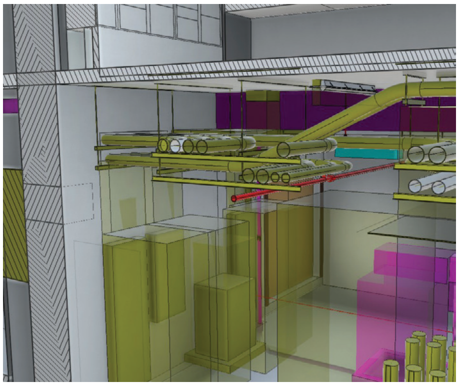


This detail reflects the coordination to locate penetrations at shear walls.



Designated wall zones were established to allowing piping to pass through, like these conduit penetrations at shear wall.

long-term serviceability. Coordination of structural systems detailing, from transfer elements and sloped columns to foundation design and thermal control measures, addressed the unique challenges posed by the building's height, mixed-use program, and site conditions.

Proactive coordination across disciplines enabled design integration of structural, architectural, and MEP systems, minimizing conflicts and enhancing overall building performance. Construction-phase strategies such as column shortening compensation and field monitoring further ensured floor levelness and adequate attachments of façade and piping support systems.

As urban environments continue to densify, 1072 West Peachtree serves as a model for delivering tall buildings that are efficient, resilient, and responsive to modern demands. The project stands as a high-performing addition to the Atlanta skyline, illustrating how innovation, technical rigor, and collaboration can elevate both building performance and occupant experience.

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