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At Winthrop Center project, they're digging deep so a tower can rise

Max Jungreis

The Winthrop Square tower will soon rise in this cramped lot tucked among the high-rises of the Financial District. It will be the neighborhood's tallest building and Boston's fourth-tallest overall. DAVID L. RYAN/GLOBE STAFF/GLOBE STAFF

It's the wee hours in Quebec, and an 18-wheel truck loaded with a massive steel support fires up its engine. The driver needs to cross the border into the United States just as dawn breaks, because federal law requires that such massive shipments take place only during daylight hours. Then he has to navigate the hundreds of miles to Boston and arrive at a time when the roads are, hopefully, not clogged by commuters.

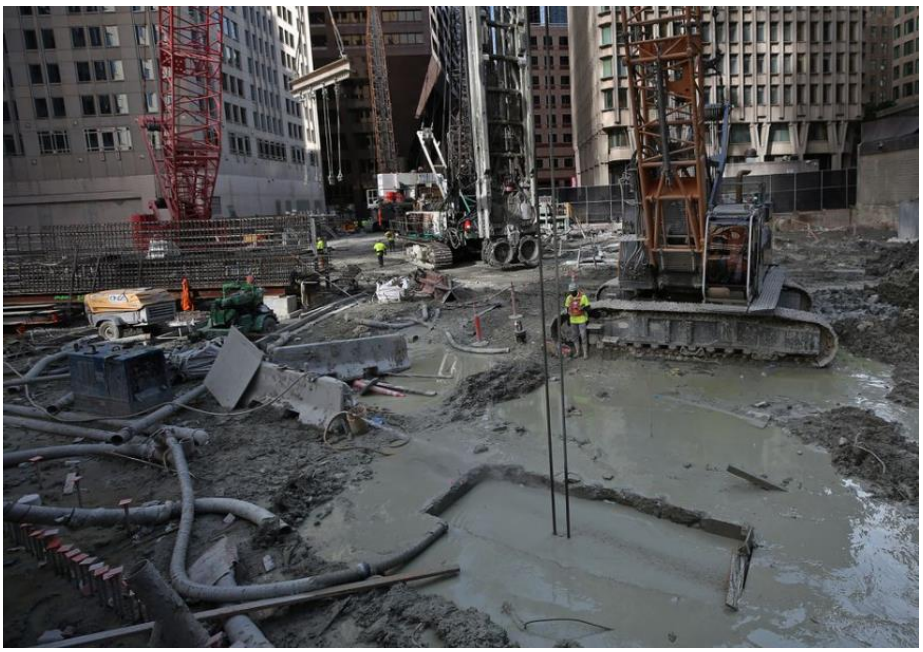
Once it reaches the city, the 25-ton support will be assembled outside of downtown, a process that can last into the night. Then it will be put back on a truck for a short trip to the Financial District — the precise time dictated by commuter traffic and MBTA bus schedules — before finally being dropped off at a cramped, T-shaped lot between high-rises on Devonshire Street, to become part of the Winthrop Center.

This scene is just one of the high-stakes logistical dances that developers contend with daily as they build the skyscraper.

"Every site provides a unique set of challenges," said John Newhall of Suffolk Construction, the project's general contractor, "and we have that here."

The building will feature two connected glass-and-concrete spires atop a long, airy "connector" lobby designed to be a public meeting place and appealing pathway between Downtown Crossing and South Station.

The structure will meet a LEED Platinum standard of energy efficiency and sustainability, a certification that denotes an environmentally conscious design. The office portion alone will become the world's largest space with a so-called Passive House rating, meaning it will use less energy and emit vastly fewer carbon emissions than similarly sized structures. The structure will be clad with triple-glazed windows to seal off the internal environment, helping create the precise temperature control necessary to achieve the standard.



Mud and water among the machines at the Winthrop Square construction site.

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"It's unusual to do in the commercial office sector," said Kathy MacNeil of Millenium Partners, the project's developer. "A lot of universities and dormitories are Passive House. But we were challenged because we want to have great views."

Building something this ambitious in the heart of downtown has required the builders to take extraordinary steps to avoid disrupting the flow of daily life, including the weekday comings and goings of thousands of Financial District workers.

Before they could even begin to lay the foundations, workers in 2017 had to test the soil underneath the site. The problem was that the old Winthrop Square garage still occupied the lot. Rather than demolish the crumbling structure — adding time to a testing process that already takes months — they elected to take the unusual step of reinforcing the building and hoisting a drill rig onto its roof. They drilled straight down several times through the building's four levels, floor slabs and all, to reach the soil below.

When finished, the Wintrhop Square tower will be 691 feet, downtown Boston's tallest building and the city's fourth-tallest. DAVID L. RYAN/GLOBE STAFF/GLOBE STAFF

"Got a lot of smiles from people when you were trying to pull permits for it," Newhall recalled.

When the time came to take down the garage, Suffolk decided not to deal with the hassle of razing it and trucking the remains out of the city. Instead, the company smashed the garage to bits, pulverizing it into pieces that were six inches or less. Fill was brought in to create a flatter surface for the machines that now tower over the site, mixing with the detritus to create a slurry of gray mud that this time of year seemingly coats everything at the site, caking on clothing, windows, and vehicle treads.

The project is now nearing the end of its foundation phase. Workers are digging trenches that range from 80 feet to more than 170 feet deep. They'll accommodate the foundation of the building's outer wall. Up to 35 trucks visit the site daily to remove the hundreds of cubic yards of dirt displaced by the excavation. Yet another dance happens as the diggers navigate the tight space with other teams already working onthe project's next phase.

"We try to share space and work around each other," said Ann Marie Long, who operates digging equipment. "So while one team is excavating, the other team is pouring and filling the foundation."

Soon, a huge concrete floor slab will be poured over a giant metal cage built from the supports trucked in from Canada. After that, workers will excavate underneath the slab to construct the basement, even as they build the first few floors above. It's a timesaving method called up-down construction.

"That's pretty much it," Long said of the project's current phase. "We dig a hole and we fill it."