

HUDSON YARDS

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Photo courtesy Joe Woolhead

Dubbed the single largest privately-owned development in the history of the United States, the new Hudson Yards project is the result of a dream team of developers, Related Companies and Oxford Properties. "Hudson Yards will probably be the ultimate destination for people coming to New York. As well as being in the heart of New York for the citizens of New York. It will have the best of culture, food, and shopping. Hudson Yards is attracting the great corporate tenants of the World. Together with the retail tenants who are bringing in the greatest chefs, fashion designers, and an assortment of other retailers. And when people look at Hudson Yards, in the future, they will say that someone was looking into the future when they were planning and designing the job," says Stephen M. Ross, Chairman & Founder of Related Companies via an online video at hudsonyardsnewyork.com.

"The development of Hudson Yards is one of the most impactful projects ever undertaken, and we are proud to be playing a role and lending our expertise in the creation of an entirely new neighborhood," says Tom Scarangelo, Chairman, and CEO of Thornton Tomasetti in a March 19, 2014 press release issued from Related/Oxford. Thornton Tomasetti is the engineering firm that designed the two remarkable platforms (Eastern and Western) that together will span across 13 acres of air space overhead 30 active Long Island Rail Road train tracks that feed into Penn Station on the lower west side of Manhattan.

Hudson Yards is a multi-use development where residents can live, work, and play. Related Companies calls the project, "Tomorrow's City, Today," for many good reasons as they have sought to please social, technological, and sustainable initiatives popular today for new urban planning. Not a concept entirely unfamiliar to native New Yorkers, Hudson Yards will also have a connective green space that is the glue that will hold the entire development together.

Developing property in an area that was once described by the *New York Times* as, "a mishmash of rail yards, tunnel ramps, and parking lots," to now a massive development is a no less than a heroic effort. As an October 2014 article in *Urban Land Magazine* detailed, the lower west side "was seen as the last frontier," says Lynne Sagalyn, a professor of real estate at Columbia University. "It's a huge district next to West Manhattan's mid-commercial district, so it's an area that's ripe for incremental growth."

The High Line Park's recent development is in part responsible for the spark of innovation now occurring at the Hudson Yards. While the new Whitney Museum will cap one end of the High Line, Hudson Yards will cap the other end. The entire Hudson Yards project will span across 26-28 acres of space with over 17 million square feet of office, residential, and retail space. A cluster of skyscrapers will surround the site with the "30 Hudson Yards" building taking the position as the second-tallest office building in New York City.

Related & Oxford expect 65,000 people to pass through and dwell within the new development each day. Kohn Pedersen Fox



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— HELENA E. WILLIAMS, LIRR PRESIDENT

Associates of New York City designed the master plan where there will also be a cultural shed for concerts and other civic events, a retail building, a school, and 14-acres of public outdoor park space. Tutor Perini serves as the General Contractor for the Hudson Yards; Thornton Tomasetti is the platform's structure engineer; Langan is the geotechnical and environmental engineer, and Arup is the life safety systems engineer for the platform. Numerous other notable architects, retailers, and even chefs have each had significant parts to play in the grand scheme of the entire project. The construction phases will ultimately span several years from 2013 – 2024.

The developers have taken care to research first-rate ideas concerning urban planning, aesthetics, structural engineering, technologies, and innovations and to incorporate these ideas as much as possible into the project designs. "Coach is doing an interesting thing with their space," says architectural critic and author James S. Russell in



Photo Courtesy of Tyson Reist

Urban Land Magazine, October 2014. Russell goes on to say that the atrium inside building 10 Hudson Yards provides “the sense of everybody working together.” This dramatic atrium converges Hudson Yards with the actual terminus of the High Line Park.

Engineers designed an eco-friendly trash compaction system for the site. Envac, a Swedish company, developed the trash disposal system where recyclable, food waste and regular trash will be sucked down separate pneumatic chutes to a central facility. Then, a dehydrator will shrink the waste to 20 percent of its original weight and volume.

THE PLATFORM DESIGN & CONSTRUCTION

Developing over train tracks is not a new concept for New York City. Urban planner Alexander Garvin proposed building over the Penn Station tracks in 1996 for the 2012 Summer Olympic Games bid, which was ultimately not granted. “I think the platform is fascinating,” Sagalyn says in *Urban Land Magazine*, October 2014. “As cities become [denser], it’s important to capture those kinds of sites—especially when they’re on top of transit. And if a profit-making developer shows that it can be done, and the huge cost of upfront infrastructure can be carried, that will make other people look at it as a case study and ask if it can be done in other places.”

“Building a platform of this size above such a busy rail yard is a marvel of engineering and project management. We greatly appreciate the effort that has gone into ensuring that the construction will have minimal impact on Long Island Rail Road (LIRR) train operations.” Helena E. Williams, LIRR President, said as reported in the Related/Oxford press release dated March 19, 2014.

Engineers planned 253 caissons for the platforms and buildings that are drilled at an average of 40 feet below the surface, with some bases as far as 80 feet below. In and amongst the 30 working train tracks, only 38% of the entire space was available for these foundational caissons. As such, numerous, complex computer models were developed to coordinate the drilling and truss-laying process.

Contractors brought prefabricated A-frame support columns onto the site into three parts where they were welded together piece by piece. These A-frame columns were used at the throat of the train station where tracks converged and a truss system was needed. J.F. Lomma’s 750-ton-capacity Manitowoc 18000 Crane was used to lift and place each 45-ton section of the A-frame columns. “The



Photo Courtesy of Geoff Butler



Photo courtesy of Dan Ross, Slingmax® Rigging Solutions

equalizer blocks were used to transition the column sections that came in, horizontally, on trucks to a vertical position to then be set into place on the ground. If an equalizer block was not used for this particular task, then two cranes would have been needed to get the job accomplished. The site and the staging area at the location are both too small to accommodate two working cranes,” says Jim Harkins, Product Advisor for I & I Sling/Slingmax.

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- JIM HARKINS, I & I SLING/SLINGMAX

As construction progresses, the workers at the site are continually reminded that safety precautions are essential. Unfortunately, in August of 2013, there was a crane accident that resulted in the death of a laborer as a consequence of a wire rope failure. A 160-ft-long lattice boom of a Manitowoc 4100 crawler crane crashed down. After an investigation, the wire rope was worn out, and there had not even been any load on the hook at the time the crane boom

crashed. Witnesses at the construction site had noticed the crane was making unusual noises, but none of these sounds were reported prior to the accident.

As development continues at Hudson Yards on these high towers and extraordinary platforms, many building and landscaping professionals marvel at the plans for the 4.5-acre public garden. Between the garden spaces above and the working rail yard below, there is a plenum space within the platform construction that varies in size from 18 inches to seven feet.

Within the plenum space, there will be large fans that constantly circulate air so that hot air from the trains below can escape through vents above. Tubes of glycol coolant are also embedded into structural concrete slabs that will further help to keep the public gardens’ plantings sufficiently cool. Landscape architects and engineers together designed the soils and roots, the water supply and storage, storm drainage and sewer lines to all be located within the plenum spaces. 225 trees and 28,000 plants will grace the public areas and serve the community similar to Central Park.

Jim Harkins visits Hudson Yards frequently in person since the early stages of the project. He comments a great deal about the sheer grand scale of the project and the amazing engineering feats that go along with Hudson Yards. Harkins says, “What impresses me most is how they figured out how to use space that was not available. If anything amazing like that is going to be done, it’s going to be done in New York City. And, this is where the best and the brightest will figure out how it’s going to be done.” ■