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Polshek Partnership Architects creates buildings whose designs authentically express the progressive missions of cultural, academic and scientific institutions and demonstrate technical and artistic excellence. The studio's projects significantly contribute both to the cultural life of their communities and to the enhancement of their contexts. In addition to The Standard, New York, award-winning projects include the Rose Center for Earth and Space, William J. Clinton Presidential Center, Carnegie Hall Renovation and Expansion, Newseum, University of Michigan Biomedical Science Research Building, WGBH Public Broadcasting Headquarters. The 150-person studio is located in New York City.

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...re-cladding

"It might sometimes be excused by the need for insulation as much as fashion chasing, but it's still strange for so many buildings to be so heavily altered."

Opinion Piece by Owen Hatherley against the re-cladding of many European Post-War buildings. From 'Helpless tower are being buried alive, Building Design, September 10, 2009, p 9

"The building is a destination, both visually and experientially, realizing the client's conceptual goal to create a "living room for the neighborhood," a public place where hotel guests and pedestrians can co-mingle in a variety of spaces."

Designed by Todd Schliemann of Polshek Partnership Architects, The Standard, New York, is a new 204,500 square feet, 337-room hotel located in Manhattan's Meatpacking District, a vibrant neighborhood west of Greenwich Village on the City's Hudson River edge. The eighteen-story, concrete and glass structure defines the identity of the hotel and engages its urban context through contrast. The building straddles the High Line, an abandoned section of a 75-year-old elevated railroad line, which passes over the buildings of the district and is currently being developed as a new linear public park. The first section opened in June 2009.

Design Concept

Muscular, sculptural piers, whose forms clearly separate the building from the orthogonal street grid, raise the building 75 feet, allowing the horizontally-scaled industrial landscape to pass beneath it and natural light to penetrate to the street. The two slabs are "*hinged*" to further emphasize the building's distinction from the city's grid and its levitation above the neighborhood. The low-scale environment affords the building unusual visibility from all directions and unobstructed 360° views of the city from the building (see Figure 1).

The juxtaposition of the building's two primary exposed materials–poured-in-place, board-formed concrete and glass– reflects the character of New York City: the gritty quality of the concrete contrasts with the refinement of the glass. The concrete grid provides a delicate frame for the exceedingly transparent water-white glass, the two materials unified in the continuous plane of the curtain wall. This exterior wall breaks with the traditional architecture of hotels and in effect defines a new paradigm, replacing opacity with transparency, privacy with openness.

Figure 1. Design Collage © Polshek Partnership Architects

The hotel includes 337 guest rooms; a bar, restaurant and outdoor public plazas served by the hotel at the ground level; divisible banquet space on the third floor; health spa on the seventeenth floor; two clubs on the eighteenth floor; and an extensive roof deck.

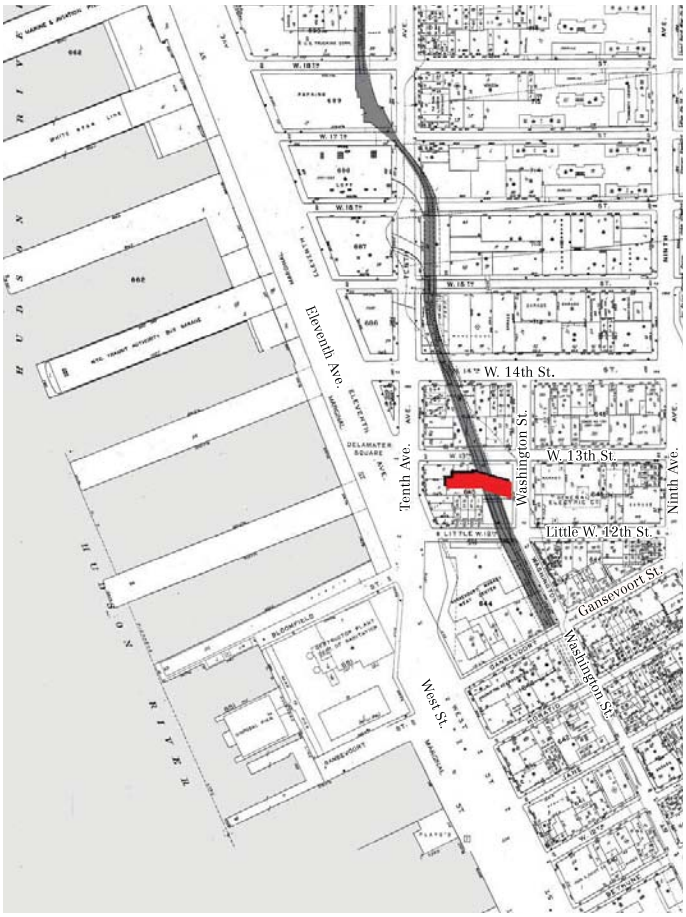


Figure2. Site Map © Polshek Partnership Architects

Figure 3. View from the South © Jeff Goldberg / ESTO for Polshek Partnership Architects

Urban Context

The Standard is located along Washington Street between West 13th Street and Little West 12th Street in the heart of the Meatpacking District, just north of the main entry to the High Line park at Gansevoort Street. Both the neighborhood and the High Line have seen significant changes over the years (see Figure 2).

The park is the transformation of an abandoned rail bed constructed in the early 1930's to isolate freight traffic from the street level. It meanders north from Gansevoort Street to West 34th Street, defining its own path as it cuts through and above the New York City Grid. In 1950, interstate trucking began to replace rail transportation, and in 1980, the last train ran on the High Line tracks.

Until the late 1990's, the neighborhoods along the High Line were neglected and used primarily for industry and storage warehouses.

Two-story 19th- and 20th-century industrial buildings and manufacturing lofts constitute the District, which currently supports a range of uses from meatpacking to high-end retail and restaurants. The completion of the first section of the High Line park has had a major impact on the current growth and activity in the area. An Open Ideas competition in 2003 introduced the idea of reclaiming the High Line; as the planning proceeded, neighborhoods along its length have seen significant residential and commercial development. The Standard, New York anchors activity near the southern terminus of the park (see Figure 3).

Zoning and Structural Constraints

The timing of construction and the regulations governing building over and under the High Line proved challenging. Careful negotiations with the New York City Economic Development Council (NYCEDC) were required to arrive at and confirm specific easements around the Highline for future maintenance as well as to allow the unlikely possibility that trains might run there again. The NYCEDC maintained the 30 foot easement above the High Line held by previous railway owner CSX Transportation Inc., the rail company that donated the High Line south of 30th Street to the City in 2005. Other easements were not fully established until building construction was underway: all non-demountable construction needed to be three feet from

Figure 4. Tower Erection above the Highline © Dominic Buenaventura / DeSimone

the High Line columns at the ground level and five feet from both the sides and the underside of the rail bed construction. An initial request by the NYCEDC for permanent access to the High Line pile caps from the basement level of the hotel had to be declined because the foundations needed to be waterproofed to the 100-year-flood level, which was roughly equal to the tops of the existing pile caps; no penetration in those foundation walls was permitted (see Figure 4).

The High Line, the L-shaped site and specifics of the applicable zoning regulations informed the massing of the building. Its profile is striking and singular, responding to the site's footprint: two slabs are hinged like a book that opens to the City. The owner's pro forma required that the site be built out to the maximum available FAR, but, with the High Line intersecting the site at an angle and overshadowing a significant portion of its area, opportunities to put down structure were limited. In addition, a 20 feet-deep rear yard setback on the south face of one of the legs of the "L" could be occupied only by a single story structure.

Architect and owner both agreed that a clean vertical volume was critical to the concept even though the sky-exposure plane suggested a stepped profile. Fortunately, tower regulations in the zoning resolution allowed that if a building occupies less than forty percent of the site and no floor is greater than a certain area within specified setbacks, the building volume may penetrate the sky-exposure plane. These allowable encroachments were weighed against the need to minimize the span over the High Line and a desire to create the maximum number of guestrooms ("*keys*") per floor. The signature kink between the east and west vertical slabs of the building is the architectural expression of these zoning, structural and planning constraints.

Construction

Adjacent to the Hudson River and outboard of Manhattan's historic shoreline, the site had poor soil conditions requiring a deep foundation system. The ground consisted of between eight and 24 feet of fill and former river bottom deposit soils overlaying medium dense to dense sand with varying amounts of silt and gravel atop mica schist bedrock. Bedrock exists at a depth of approximately seventy to ninety-five feet below existing street grades in the vicinity.

Drilled concrete caissons were used in lieu of driven steel H-piles to minimize vibration to the High Line structure. The proximity of ground water close to street level (ten feet below existing grade with the high waterline for the 100-year flood at four feet below grade) necessitated a heavily reinforced bathtub-type foundation, which required the accommodation of room-sized High Line pile-caps at the same level as the hotel basement. To strengthen the East Pier tower support, a reinforced and grouted 11-7/8" diameter drilled-in mini-caisson, which had a 0.582" wall thickness casing and was socketted eight feet in bedrock, was utilized to provide compression and uplift capacities of 300 tons and 150 tons. For support of the tower supercolumns, reinforced and grouted 9-5/8" diameter mini-piles with a cased upper portion, which penetrated the fill and former river deposit soils and soil-grout bond zone of approximately 45 feet, were used to provide a compression capacity of 100 tons. Within close proximity to the High Line columns, the mini-pile casings were extended down to the bedrock, and load was transferred within a rock socket to reduce the potential for adding new load to pile foundations supporting the High Line. Tie-down rock anchors were utilized in selected floor slab areas to provide additional uplift resistance against hydrostatic pressures in the event of a flood. The foundation system included 176 caissons, 62 mini-piles, 26 modified mini-piles socketted in rock near the High Line structure and four tie-down anchors. In the low-rise portion of the hotel, shallow foundations bearing in new compacted fill and a slab-on-grade floor were utilized.

Above the foundation on either side of the High Line, super-columns lift the upper tower portion of hotel over the new elevated park. The two acting columns to the east of the High Line are laterally braced and expressively combined to form a single five-feet-thick by fifty-feet-wide by 60 feet-tall exposed concrete pier which folds and angles out in response to the geometry of the High Line (see Figure 5).

Figure 5. East pier responding to the geometry of the High Line © Jeff Goldberg / ESTO for Polshek Partnership Architects

The massive East pier, articulated by a board-formed treatment and accentuated by doorway-sized formed penetrations, draws attention to the structural feat of supporting a mid-rise building above the High Line. The pier's thickness, however, presented concerns

Figure 6. Construction of 60' Tall Sloping Wall © Dominic Buenaventura / DeSimone

Figure 7. 114' Truss Spanning the Highline © Craig Tracy / DeSimone

for excess weight and thermal cracking. To address these concerns, large styrofoam tube voids were introduced into the pier's interior at strategic locations to reduce the volume and weight of the concrete and crack inducers were placed between the tubes and the formwork. Additionally, excessively high temperatures can adversely affect the long-term strength of concrete, the heat of hydration was closely monitored during curing.

Performing New York City controlled inspections for the rebar and concrete placement in the 60 feet-tall wall proved challenging for the consulting engineers, and supporting the wet concrete in sloping formwork walls required exceptional effort (see Figure 6). Heavily strapped single-sided forms allowed most rebar placement to be viewed as the forms were erected. Pockets left in the rebar centers allowed the concrete pumps to reach the wall bottom during the pour. These pockets facilitated concrete placement and were completed by ironworkers with the final pieces of reinforcing as the concrete rose upwards.

For logistical reasons, which fortuitously eliminated the appearance of horizontal cold joints, the East Pier was cast in a single sixteen-hour pour. The mix was developed as a highly flowable 10"-10.5" slump concrete requiring only very minimal vibration, and the formwork design was correspondingly strengthened to resist the high, long-term pressure.

To clear the easement 30 feet above the elevated rail bed, a transfer structure was required to span over 90 feet between exposed concrete super columns and the East Pier (see Figure 7). The owner of the rail bed would not allow shoring from the High Line's historic structure, and the erection of post-tensioned concrete transfer girders would have been difficult for the concrete form-work designers and erectors and prohibitively expensive. Instead, two 65 ksi steel trusses support the eastern half of the hotel tower. A multi-step, cantilevered shoring procedure was employed to install the two-piece trusses. The top chords of the trusses are embedded in a 37 inches deep concrete transfer slab, creating a large double-tee profile. The composite action greatly reduced steel tonnage and optimized the efforts and efficiency of both materials.

In the west, two concrete transfer beams, which rest on core shear walls, and five columns support the tower and define an exterior terrace at the High Line park level. The sculptural quality of the columns derives from their dramatic profiles, which transition from six-feet by two-feet to two-feet by six-feet over their 35 feet length. As with the East Pier, these columns are board-formed on two sides, and each was poured in a single lift. By eliminating the use of cladding at the large columns and the East Pier, usage of energy-intensive exterior materials and supports was reduced. In addition, the mix design for this portion of the concrete incorporated a 25 to 30 percent slag (GGBFS), a byproduct of iron and steel smelting. Slag replaces a portion of the cement, which is a huge greenhouse gas emitter.

...tuned liquid dampers

"When strong winds cause the building to vibrate, the motion of the water interferes with the motion of the building, reducing its amplitude. In this way, tuned liquid dampers are much like tuned mass dampers, but they are simpler and therefore usually less costly to install and maintain."

Nick Isymov, Ph. D., a consulting director at the Western Ontario Boundary Layer Wind Tunnel Laboratory, discussing the differences between tuned liquid damper and tuned mass dampers. From 'Tuned Liquid Damper Tops Chicago Hotel' Civil Engineer, August 2009, pp 26-27

Figure 8a+b. Typical Hotel room © Nikolas Koenig for Hotels AB

Use of slag and other pozzolans also helps divert these industrial byproducts from landfill and aids the strength and weatherability of the cured concrete.

Finally, atop the east and west transfer structures are 15 stories of flat-plate construction, including fourteen hotel room floors and, at the top, a club floor with a swimming pool. Blending an economy of means with an appropriately robust expression for the building, much of the flat-plate concrete frame is extended and expressed on the tower exterior. Exposed concrete columns at the outside corners of the towers had to be flush with the outside face of the curtain wall, which required detailed analysis, thorough inspection and careful construction to maintain proper connection between the floor slab and columns. The juxtaposition of the building's two primary materials – poured-in-place, board-formed concrete and a water-white glass – reflects the simultaneously gritty and refined character of New York City while opening a dialogue on structure, materials and scale with the High Line.

Program / Open Concept

Distinct from the main structure of the building, the hotel includes other programmatic spaces beneath the High Line, including a bar, restaurant and meeting spaces. To accommodate the client's desire that this structure reflect the historic feel of the neighborhood, reclaimed brick, steel frame windows and a metal canopy similar to the existing Meatpacking plants and other warehouse buildings were utilized. The language of these spaces contrasts greatly with the rest of the building. The structure at this portion of the building consists of steel frame with slab-on-grade foundations. In some instances, concrete plank was used as the roof construction in order to minimize the depth and maintain the High Line easement clearances.

The building is a destination, both visually and experientially, realizing the client's conceptual goal to create a "living room for the neighborhood," a public place where hotel guests and pedestrians can co-mingle in a variety of spaces. Ground floor square footage was sacrificed in order to provide an open air public plaza with picnic tables, and the bar, restaurant and beer garden on the ground level, which are open to the public, help reinforce this sense of community. The meeting room and terrace at the level of the High Line are used as event spaces.

The synergy between public and private is reinforced in the building's formal and material qualities. The crisp, clear ultra-transparent glass skin unifies inside and outside. In each room, floor-to-ceiling glass metaphorically expands the space into the City, allowing the City to become a defining feature of every guest's experience at the hotel (see Figure 8a+b). From the street, the permeability of the glass expresses accessibility, openness and invitation.

Conclusion

Heralded as the kind of straightforward, thoughtfully conceived building that is all too rare in the City today, The Standard, New York, with its unobstructed views and creative engineering straddling the High Line, has become a landmark in the ever-changing Meatpacking District and newly activated city fabric of the West Village (see Figure 9). ■

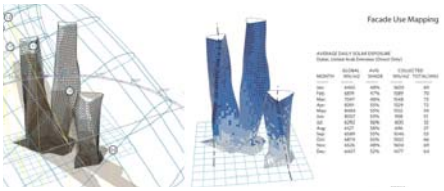
Editor's Note: To further discuss this topic with the author, please join our CTBUH Skyscraper Group at **http://LinkedIn.ctbuh.org**

Figure 9. Standard Hotel, New York ©Jeff Goldberg / ESTO for Polshek Partnership Architects

Letters to the Editor

The Council would like to hear your thoughts and opinions on the papers published in the Journal and CTBUH activities generally. Please send your letters to **journal@ctbuh.org**

Vertical Farming



We read with interest the papers on Vertical Farming by Despommier & Ellingsen and Wilson, and are delighted that the CTBUH journal is providing a sounding board for some of the pertinent issues that beset high density built environments - not least population increase and the need to feed the mouths of an additional 2 billion people that will be walking the face of the Earth by 2050. We would venture that there are some points on both an ecological and social point of view that are worth considering to further the discourse into such a topic.

Whilst the idea of having vertical farms breathing a new lease of life into existing inner city buildings is a both appealing and intriguing, it does provide significant socio economic challenges. The comparison with the vertical farm concept to the Royal Victoria Hospital, which pioneered a living mechanical architectural system, which addressed social, societal, political, biological, and individual needs is applauded for aspiring to a new breed of buildings inspired by the natural processes within an organism. However, just as organisms interact with their environment, so the vertical farms should provide the diversity and robustness to the wider urban landscape in order to prevent them becoming monofunctional islands within a city. In order to avoid the compartmentalization of the city into horizontally defined land use components that may run the risk of creating 'dead spots' at street level, perhaps consideration could be given to creating a sense of social interaction and co-presence through the resplendent generators of activity that usually form part of richness of successful streetscapes.

Just as the tall building typology is increasingly being defined as a vertical extrapolation of the city in its embracing of an almost 24 hour culture through a diverse mix of use, perhaps the vertical farm can similarly embrace a multiplicity of function to reinforce its integration within the city and to avoid socio-economic risks of mono-functional land use planning. Given that the tall building typology is the product of a balancing act between land shortage, increasing land prices and power as well as identity and expression of the individual, corporation, or country, the balancing of the vertical farm within the mixed use tall building could be an interesting development by dedicating small portions of future tall buildings with their own urban farm components? This would create a strong sense of public ownership and would further mitigate against the impacts of transporting food. With the plethora of roof top garden schemes that are increasingly becoming prevalent to combat heat island effect, the opportunity to consider the roof top and the sky garden for farming in addition to recreation, health/well being and education could be contemplated. This could then also provide an opportunity for the sustenance of the immediate community and help generate income for retail on the ground which will help support the vibrancy needed at street level.

Yours sincerely

Jason Pomeroy
Broadway Malyan Asia Pte Ltd

CTBUH 2009 Chicago Conference

It was a pleasure to attend the recent 2009 Chicago Conference '*Evolution of the Skyscraper: new challenges in a world of climate change and recession*'. Reviewing the large number of participants, which were in excess of 600 from 35 countries, the event seemed to have more of a flavour of a CTBUH World Congress than a regional conference. The fact that there was a single, focussed presentation track (as opposed to three simultaneous tracks as in the Dubai World Congress in 2008) allowed participants to concentrate on the same topics. This provided for better exchanges during the audience question periods, which were at the end of each session. Also, the Illinois Institute of Technology campus, where the conference was held, provided no distractions like a swimming pool or other immediate '*place of escape*'. This helped a great deal in that the participants could concentrate on the numerous presentations and networking opportunities at hand!

Many thanks,

Georges Binder
BUILDINGS & DATA s.a.

40 years of the CTBUH: Reflections

All of my CTBUH activities have been most interesting and enjoyable from the first year I became active (1999 in Kuala Lumpur-where I met Dr. Beedle for the first time) to the most recent activities in Dubai in 2008 and currently with the Fire Safety Task Group. The Council has collected a vast amount of very special and knowledgeable members and individuals. I have been honored to have worked with these individuals and with the dedicated CTBUH staff.

Probably my most memorable event was at the October 2001 meeting '*Task Force on Tall Buildings: The Future*' in Chicago. I think the public perception at that time was that high-rise construction was at the end of the road as a result of the events of September 11th, 2001. The group, under Chairman Ron Klemencic's leadership, really set a tone to move that perception in other directions. We found some plusses, as to what worked on September 11th, and began to identify areas that could use another look. The roll out of the '*Building Safety Assessment and Building Safety Enhancement Guidebook*' the following year and the ' *Emergency Evacuation: Elevator Systems Guideline*' in 2004 are two examples of those ideas.

Many provisions that have been included in the myriad NFPA codes and standards of the last 7 years or so, which address life safety, first responder safety and building safety, can be traced back to some of the CTBUH initiatives that were identified and undertaken at that October 2001 meeting.

Robert Solomon, PE
NFPA

Editor's Note: To find out more about the '*Building Safety Assessment and Enhancement Guidebook*' and the ' *Emergency Evacuation: Elevator Systems Guideline*' visit:
http://books.ctbuh.org