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The Complex Path to Simple Elegance: The Story of 432 Park Avenue



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Macklowe Properties was founded by Harry Macklowe nearly 50 years ago. Mr. Macklowe's contributions to Manhattan's skyline have totaled over 13 million square feet and range from 432 Park Avenue, to the Metropolitan Tower on West 57th Street, to the General Motors Building and the flagship Apple Store on the building's Fifth Avenue Plaza known for its signature 32' glass cube that is included on the American Institute of Architect's list of America's favorite architectural structures. He is presently developing residential condominiums and retail at the landmarked One Wall Street, and 200 East 59th Street, and recently completed the residential condominium conversions of 737 Park Avenue and 150 East 72nd Street.

Abstract

This paper chronicles the development and design of 432 Park Avenue, New York, which, is the tallest residential building in the Western Hemisphere, and one of the world's most luxurious. The extraordinary building is deceptively simple in appearance, when in fact it is the culmination of years of intensive optimization under challenging financial, engineering, and regulatory constraints.

Keywords: 432 Park Avenue; New York; Real Estate; Residential; Skyscraper

Introduction

The opportunity to develop a project like 432 Park Avenue (see Figure 1) comes but once in a lifetime, if at all. This is a project that single-handedly redefines the luxury market in New York and the skyline at the same time. While some of its neighbors broadcast through their architecture the extreme contortions of property rights, engineering and development acumen that went into creating them, 432 Park Avenue is an essay in logic and cool reserve, even as it offers the most jaw-dropping views and interior spaces available on the market. This paper describes some of the incredible achievements that took place in order to achieve a design that is so timeless, elegant and deceptively simple.

As-of-Right on the Site

The site of 432 Park Avenue is in a prime area of Midtown along Park Avenue between 56th and 57th streets, just a few blocks southeast of Central Park. The bulk of the site was occupied by the former Drake Hotel, which dated from 1926. In order to develop a viable property on this site, it was necessary to consider how the zoning of the site, and the positioning of the site among a forest of other tall buildings, would permit the ceiling heights and the views that would be necessary to make the project financially viable.

The site is located in two zoning districts –C5-2.5 and C5-3, which dictated that, if the building were built to the street edge, it would need a series of setbacks as it progressed upwards. Left to a conventional interpretation, this would have dictated a building that started with a low, wide base and a large footprint that would have made a difficult layout for residential apartments (and essentially eliminated the ability to provide a view), then quickly tapered to a point as it rose above its neighbors. This also meant floor plates near the top that would be too thin to support marketable units.

In order to develop the shape, a very experienced and adept architect's office was needed. The developers went through proposals from many talented architects, but only one was able to solve the essential problem of form – Rafael Viñoly Architects. In addition to great and visionary leadership, the firm had also invested well in young people with an aptitude for complex computer programs. So it was that the team was able to build design software based on a concept called "Waldrum Points."

In essence, the software imposes parabolic lines from every conceivable view point of the site, which allow a much more creative interpretation of the setback requirements, preserving the intent of the code – to provide a reasonable amount of sky exposure against a reasonable building mass – while diverging from a typically clumsy, and financially unviable interpretation of the "letter of the law."

It surprises many that the form resulting from a sophisticated application of 21st-century parabolic modeling software is the purest form in geometry – the square. But this was the conclusion that allowed the project to go forward.

The project was to be located at the center of the block, such that it belonged neither to 56th nor 57th streets, instead providing frontages optimized to both conditions. By starting well back from the street edge, the code allowed a building of up to 1,500 feet (457 meters) in height. Ultimately the project did not quite reach this height, but its 15:1 aspect ratio and its location in the center of Manhattan makes it truly unmistakable on the horizon.

This building is built “as of right” in accordance with regulations, meaning that no trade-offs of air rights with adjoining or discontinuous properties were necessary. In essence, the compromise was to have a smaller floor size in order to have a very tall building. No civic or administrative approvals were required beyond adhering to the regulation. This may seem arcane to some, but in fact it was essential to the shape and ultimate survival of the project.

But some very clever design was necessary to make it work.

The Architecture

Once it became clear that the plan of the building would be a perfect square, the design began to take shape. Inspired by the gridded household products designed by the Austrian architect Joseph Hoffman and redolent of a Sol Le Witt sculpture, the six-window grid became a defining feature of the building, and was to play a vital role in its structural performance and apartment-layout flexibility.

The 432 Park Avenue tower has 96 stories measuring 93 feet square (804 square meters), each with six 100-square-foot (9.3-square-meter) windows per face. The tower’s condominium units range from a 1,789 square-foot (166 square-meter) two-bedroom, two and a half bath, to a 8,255 square-foot (768 square-meter), six-bedroom, seven and a half bath penthouse. When it topped out in October 2014 at 1,396 feet (425.5 meters), 432 Park Avenue became the second-tallest building in New York City by roof height, surpassing One World Trade Center by 28 feet (8.5 meters), as well as the tallest residential building in the Western Hemisphere.

Of course, it was impossible to offer luxury apartments in this location without offering spectacular views. The team took incredible care to document what the view would be like from every floor, from every angle, using a set of drones with panoramic cameras attached, taking photos that were then incorporated into the renderings of each floor (see Figure 2).

The bonuses available in the code drove the location of the building and its height. There is a public plaza provided along the 56th Street edge, adjoined by a private semi-circular driveway (see Figure 3), while the 57th Street facade is completed to the sidewalk and committed to retail use. Another small building occupies the southeast corner of the site, containing retail on the lower two floors, and, behind the continuation of the curtain wall facade, is topped by the tower’s chiller plant. Both retail developments were undertaken as part of the obligation under code to complete the street wall, such that the mass and height of the tower, set further back in the block, would not be overwhelming.



Figure 1. View from southeast



Figure 2. Window



Figure 3. Semicircular driveway

This move also had the effect of freeing up program in the lower portions of the building, which would not be afforded the sweeping views necessary to offer multi-million-dollar units. The first residential floor is located at 341 feet (103.9 meters above grade). After looking at a range of mixed uses, it was decided to devote the bottom quarter of the building, up to the 29th floor, to retail, mechanical rooms, building offices, staff housing, and the vast array of amenities that would also be required to attract this segment of the market.

Comprising 30,000 square feet (2,787 square meters), these include three double-height floors, with ceilings up to 28 feet (8.5 meters) beginning approximately 93 feet (30.4 meters) above the ground. A full floor is dedicated to entertaining, with a lounge, private restaurant and adjacent outdoor terrace for dining and events. Above is a 75-foot (23-meter) indoor swimming pool spa and fitness center (see Figure 4) with sauna, steam, and massage rooms, library, lounge (see Figure 5), screening room and

performance venue, conference rooms and children's playroom. In-suite catering, concierge, 24-hour doorman and valet parking services are provided as well.

Interiors

Designed by Deborah Berke Partners, the interiors of the building are focused on offering uncompromised column-free layouts. The gracious spaces blend modern design with the grandeur of Park Avenue pre-war residences, while emphasizing the framing of the views in every room. The "big story" of this building, and one of the aspects that most heartily contributes to its integrity, is that the strongest exterior feature – the window grid – is also the strongest interior feature. The 10-foot (3-meter) square openings create a series of small places within the large interiors of the apartments, which can act as window seats from which to observe the city, each with a slightly different view. Most residences feature private elevator landings and a gracious entrance gallery, in addition to oversized kitchens with center islands (see Figure 6).

Elegant touches, such as the 1,200-pound (544-kg) solid cubic-marble vanity, freestanding bathtubs, double master bathrooms, and windowed marble breakfast bars (see Figure 7) in the kitchens are included. Oak flooring with herringbone patterns nods to the classic Park Avenue apartments of yesteryear. But even this is in deference to the greatest interior feature of the building – the stunning views over the city. A relatively light touch is also taken in common areas. The residential lobby has limestone and wood paneling, redolent with subtle elegance. The pool area is faced in travertine, with a limited amount of extraneous material that would distract from the greatest feature – light streaming in and hitting the water. Even though a minimalist approach was selected for the design, great care was taken to achieve the proper effect, including full-scale modeling of window frames with calibrated views, the lobby space and even elevator cab interiors.

Structure

This section on structure is provided in order to allow the paper to be digestible; it is not provided because "structure" is a separate subject – particularly at 432 Park Avenue. It is rare that structure and architecture are so deeply integrated in



Figure 4. Fitness Center



Figure 5. Lounge



Figure 6. Kitchen



Figure 7. Kitchen breakfast bar

a modern building; this is perhaps one of the biggest contributors to the purity and overall appeal of the 432 Park Avenue design. The gridded window scheme, which of course affords tremendous views in all directions, also forms the exoskeleton of the building, bearing the vertical loads, such that no interior columns are required between the elevator core's shear walls and the facade of the building. This means that a full 30 feet (9 meters) of perimeter all around the core is available to be configured in any way the client would like. For clients paying thousands of dollars per square foot, this is an added incentive.

This also had implications in the vertical dimension – a 15-foot, 6-inch (4.72-meter) floor-to-floor height meant that there was a cushion of 3 feet (762 mm) to accommodate almost any kind of services deviation that would be necessary to accommodate a bespoke kitchen or bathroom design and still maintain a 12-foot, 6-inch (3.81-meter) finished ceiling height.

Though the exterior visual, interior layout, and structural implications of a continuous grid were evident, it was not desirable from an aesthetic nor wind-resistance viewpoint to simply layer each floor with six windows, uninterrupted from bottom to top.

The taller and thinner a structure is, the more susceptible it is to oscillations driven by wind. Additionally, when buildings have sharp, 90-degree corners, a phenomenon of “vortex shedding” can develop, in which rotating air masses develop on the leeward side of the building, providing additional suction force that can cause unpleasant



Figure 8. Living Room



Figure 9. Bedroom

accelerations. One major design move brought the building well into the zone of safety and comfort, while a subsequent investigation provided additional assurances.

As much as this building is about squares, in one critical area curves play a vital role – though these will not be obvious to most tenants or observers. If a continuously extruded square building was impractical, the architects determined that stacking six independent buildings on top of each other, with two-story air gaps between, would not only allow wind to pass through and reduce loads on the building, but would subtly break up the monotony of the grid with interruptions at pleasing intervals. The core remains solid from top to bottom, but its walls are curved in plan, within the open-air grid made by the continuation of the facade. The viewer can discern that these interstitial floors, which contain mechanical equipment and little else, are somehow different, but not to the point that it distracts from the overall purity and discipline of the design.

Although there is a great deal of science involved, judging the real-life implications of wind forces in tall buildings actually requires more than just calculations. In the case of 432 Park Avenue, the team went to extra lengths to determine how wind would affect the building. A scale model of the building was subjected to numerous tests in a wind tunnel, which afforded an excess of comfort about safety. But the perception of movement is almost entirely subjective, and it would clearly be very important to occupiers of higher floors that the commanding views did not come with movements that would make them uncomfortable.

To simulate this experience, the team turned to a different kind of virtual-reality laboratory, one that was built to train pilots of large, ocean-going ships. The full-scale “bridge” of the ship is placed on hydraulic pistons that simulate the pitch and roll of the sea, while a 360-degree projection screen surrounds the enclosure. Replacing conventional ship instrumentation with a furnished dining room (including a

chandelier), and substituting the drone-photographed images of Manhattan for the roiling ocean, the design team was able to provide a real sense of what an 8- or 10-milli-g force actually feels like in a building with large square windows. The feedback from the “passengers” of the simulator actually resulted in several adjustments to the interior design that would compensate for the sensation of movement experienced as part of the building’s sway, including the details of floor slabs as they met the window frames.

Feedback

432 Park Avenue has won praise from highly esteemed colleagues, even before it is finished. Paul Goldberger wrote a wonderful article for *Vanity Fair* extolling the influences of this building. Charles Gwathmey, Richard Meier, and other leading lights contributed valuable commentary on the development team’s design decisions.



Figure 10. View from Central Park



Figure 11. Restaurant dining Room



Figure 12. Bathroom

The project team executed an international public relations program that was carefully calculated. They knew they were planning a building that was going to be widely reported in the media, and that it was either going to be loved, or it was going to be hated. There is no denying the building's purity, and it has a tremendous amount of integrity to it. This inarguable logic seems to have quieted any detractors.

Then, there is praise from the true constituency of any skyscraper – from citizens who are otherwise unaffiliated with the project, who constantly send in unsolicited photos. Even the website Curbed.com ran a story featuring photographs submitted by their readers showing images of 432 Park taken from New Jersey to JFK Airport, and everywhere in between.

Conclusion

The 432 Park Avenue project has come to life at an auspicious time for skyscrapers in New York. In some ways it embodies the “tall and thin” trend of new residential towers. While it has those characteristics in common with some of its peers, in many other ways it is an outlier. The devotion to quality, the design, engineering and planning discipline, and the commitment to achieving a highly flexible model that still feels luxurious has resulted in an outstanding contemporary project that will stand the test of time.



Figure 13. View South towards One World Trade Center and The Empire State Building



Figure 14. View South during dusk