

## 487 KEAP STREET, BROOKLYN

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<b>Project:</b>	Fifty-one (51) Multi-Family Residential at 487 Keap Street, Brooklyn, NY
<b>Description:</b>	Substantial Rehabilitation and addition to an existing manufacturing building into fifty-one (51) market rate rental units. The project falls under the Special Downtown Brooklyn Zoning District and has a total gross area of 567,495 Square Feet.
<b>Features:</b>	(9) studios, (21) one-bedroom units and (19) two-bedroom units, a finished cellar that included building storage, bicycle storage room, laundry room, a recreation room and mechanical rooms. The landscaped main roof terrace is used by the tenants and the building is provided with on-site parking.
<b>Structural Innovation:</b>	Insulated Concrete form (ICF) walls and floors and radiant floor system in all cellars and master bathrooms.
<b>Size:</b>	56,495 Square Feet Gross Area
<b>Completion:</b>	2013
<b>Cost:</b>	\$7,200,000.00 (Construction Hard Cost)

### Project Description:

487 Keap Street in Williamsburg, Brooklyn off the BQE was originally a factory building on the verge of being demolished. Our office in collaboration with the structural engineering firm Severud Associates was able to provide an extension rehabilitation to the existing brick exterior walls and the interior floor structural and finished systems. The 5-story manufacturing building was converted into a 6-story, fifty-one (51) unit market rate apartment rental building with the new addition of a sixth floor.

The lot contained an existing 5 story manufacturing building fronting Keap Street, with a one story addition extending to the rear property line that was non-compliant. The one story addition was demolished with this existing floor area transferred into a one story addition on top of the 5th floor. The building was non-complying with regards to F.A.R. and coverage but no was no increase in the floor area or degree of non-compliance.



EXISTING SOUTH-EAST BUILDING FAÇADE ALONG KEAP STREET BEFORE CONSTRUCTION



VIEW OF COMPLETED SOUTH-EAST BUILDING FAÇADE ALONG KEAP STREET

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The completed project included residential amenities such as private and public roof terraces, a bike room, recreation room, laundry facilities and on-site parking. The existing heavy timber beams and columns with their Y-braces were restored and exposed as a design element within the apartments. This project required extensive structural redesign and reinforcement to facilitate the addition of the sixth floor.



EXISTING NORTH-EAST BUILDING FAÇADE ALONG KEAP STREET BEFORE CONSTRUCTION



VIEW OF COMPLETED NORTH-EAST BUILDING FAÇADE ALONG KEAP STREET

### Structural Challenges:

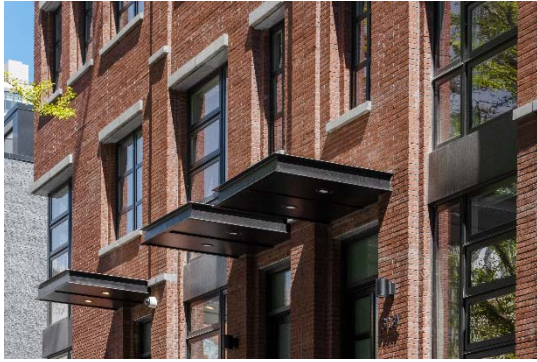
The buildings existing brick masonry façade was structural unstable and heavily deteriorated. The entire 5<sup>th</sup> floor columns and walls were completely removed due to structural damage. New steel columns and steel gage frame system for the exterior was used to lighten the building in order to complete the building transformation. The existing North and West exterior walls were removed down to the 4<sup>th</sup> floor and replaced with CMU and structural steel framing. These facades were finished with Sto Premier Next system with a water and dirt repellent Lotusan natural finish



PARTIAL VIEW OF STATE STREET LOOKING NORTH



PARTIAL ENTRANCE



PARTIAL VIEW OF TOWNHOUSE ENTRANCES LOOKING WEST



PARTIAL VIEW OF THE CORNER TOWNHOUSE LOOKING NORTH EAST

## Design Features and Achievements:

The atypical larger corner townhouse at 311 State Street has a private front yard and a private 2 car garage which is a luxury in New York City. The garage leads to a kid's playroom from where ones grocery shopping can be dropped off in the kitchen on the floor above via sweeping wide stainless steel and wood spiral staircase.



VIEW OF PRIVATE GARAGE OF 311 STATE STREET TOWNHOUSE FROM HOYT STREET



PARTIAL VIEW OF 311 STATE STREET CORNER TOWNHOUSE LOOKING NORTH EAST



STAINLESS STEEL SPIRAL STAIR CONNECTING TO KITCHEN ABOVE

The spacious luxurious kitchen is flooded with sunlight and opens onto a beautiful private roof terrace above the garage through a custom made bi-fold 12 foot wide opening aluminum door manufactured by 'Origin'. The door has been engineered to such high standards that it is one of the select few doors of its kind to pass Florida's rigorous High Velocity Hurricane Zone (HVHZ) testing standards without sacrificing thermal performance.



VIEW OF KITCHEN LOOKING TOWARDS THE LIVING ROOM



VIEW OF KITCHEN FROM THE PRIVATE TERRACE

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The master suite at 311 has a featured skylight and a state of the art spa like bathroom. All the guest bedrooms on the 3<sup>rd</sup> floor have in suite bathrooms. The penthouse floor is designed as a relaxing sunroom that boasts two private terraces and a wet bar. All the bathrooms and kitchen finishes were chosen for their durability and elegance of design. The finished basement houses a wine cellar, a laundry room, plenty of storage and above slab STEP Warmfloor Radiant heating system.



MASTER SUITE WITH SKYLIGHT ABOVE



MASTER SUITE BATHROOM SPA



PENTHOUSE FLOOR SUNROOM

The north façade or rear of each building is designed with StoTherm ci Lotusan EIFS system by Sto Corp. This exterior wall cladding system is the perfect complement to the structural Insulated Concrete Form (ICF) system this used. It is with this combination that provides superior air and weather tightness along with unparalleled thermal performance and durability. The EIFS system also provides an additional layer of continuous exterior insulation and air/moisture barrier. The Lotusan finish is a super-hydrophobic coating, which incorporates Lotus-Effect Technology. This technology provides a high water-repellent surface similar to that of the lotus leaf, which aids in keeping the building clean and free of city dirt and grim.



NORTH FAÇADE WITH EIFS SYSTEM



OUTDOOR DECK OFF KICTHEN LEADING TO BACK YARD

The eight (8) typical townhouses are designed with a private, beautifully landscaped entrance front yard and a rear yard. The lower unit is a duplex with a recreation room at the lower level. The spacious eat-in kitchens open up to an outdoor deck through wide French doors. The deck leads to the rear landscaped back yard located on the lower level. The penthouse floor opens out onto two private terraces on the north and south side of each building, via large double French doors. The floor finish of the penthouse continues onto the terraces creating an extension of the space from the inside to the outside. The finished basements of these units also have the STEP Warmfloor Radiant heating system.

### Structural Innovation:

New York City has very stringent Building and Energy Code requirements and this provided a challenge to design and accommodate nine (9) market rate townhouses within a narrow 141'-8 3/4" property width. We seized on the opportunity to design 6" thick exterior and interior Insulated Concrete Form (ICF) system party walls to allow for a comfortable overall width to each townhouse. The ICF wall system by 'Polycrete USA' enabled larger than normal window openings and floor to ceiling windows at the corner of the 311 building. ICF provided a significantly tighter envelope with reduced water and air infiltration. The floor construction was designed using INSUL-DECK's ICF floor system, which provided airtightness, insulation, thermal mass, and additional strength of the structure to the overall design. The excellent airborne sound absorption properties of INSUL-DECK floors helps to quiet the indoor environment by reducing noise transmission. The use of both systems promotes a temperature steady environment, that is simply not feasible in traditional construction or by using ICF construction for the exterior walls only.

Working from the construction documents, Polycrete USA created a complete ICF wall kit, with all door and window openings as well as exact wall heights and corners which were custom pre-cut in their factory. Blocks were numbered / labelled and course by course installation plans were supplied that included exact layout drawings and measurements along with detailed 3D renderings that showed each block and opening in the entire project. PolycreteUSA and Insuldeck technical teams coordinated their systems with Design AIDD's drawings to ensure perfect compatibility and a smooth installation process.



POLYCRETE USA ICF WALL SYSTEM



INSULDECK ICF FLOORING SYSTEM



POLYCRETE USA ICF WALL SYSTEM



INSULDECK ICF FLOORING SYSTEM

### Sustainable Design Features:

The buildings sustainable and green features incorporates common passive house and LEED principles. The building envelope system complies with stringent 2016 New York City Energy Conservation Code requirements the Envelope Compliance Certificate showed that the envelope design was 28% better than the code requirements. The sustainable building design features used below, reduced the carbon footprint of the building significantly:

- **Use of ICF (Insulated Concrete Form) exterior wall and floor structural systems**

An ICF wall system can save the owners up to 40% in heating and cooling costs. The Polycrete USA and the INSUL-DECK insulated concrete forms created a solid concrete structural system, which unites vertical and horizontal continuous high R-value insulation that enhances energy-efficiency and makes it ideal for a variety building construction types. The systems provide a building with a higher insulation value, sound control and thermal mass and enabled the design of large window openings. Using ICF for the wall systems resulted in a significantly tighter envelope with reduced water and air infiltration, which promotes a temperature steady environment.

Design AIDD chose Polycrete over other ICF systems, because the Polycrete system uses steel wire mesh inside each foam insulation panel which allows for a more concrete to be poured in each block, eliminates breakage and deforming when the concrete is poured, as opposed to plastic inside the blocks used by other manufactures. In addition, hinged steel crosssties don't impede the flow of concrete, are much stronger than plastic crosssties and fold flat for shipping.

- **Regional Construction Material**

The majority of the building products were manufactured regionally (within a radius of 500 miles), thereby reducing the environmental impacts resulting from their transportation and supporting the local economy. The exterior natural face brick used is a prime example of materials manufactured and supplied within this radius.

- **Low E Windows**

All the windows and glazing used exceed the NYS Energy Conservation Code minimum requirement for U and SHGC values. For the casement windows the values are U - 0.33 and SHGC - 0.24 for the fixed windows the values are U - 0.29 and SHGC - 0.33.

- **Variable Refrigerant Flow (VRF) Mechanical systems**

Variable Refrigerant Flow (VRF) systems are all-electric and use heat pumps to engineer space heating and cooling to building spaces. They are capable of serving multiple zones in a building, each with different heating and cooling requirements. The VRF systems have the ability to modulate the amount of refrigerant sent to each zone in accordance with conditioning requirements thus offering comfort on demand. Energy efficient and easy to design, install, and maintain, a VRF system at the time of the project design had one of the lowest life cycle cost of any system on the market then. A VRF system provides exceptional dehumidification and temperature control by rapidly adapting to changing loads. In contrast, conventional HVAC systems deliver air or water and operate on a full-on or full-off schedule.

- **STEP Warm Radiant floor in the cellar**

Since a finished Cellar floor tends to be cold year round, we installed insulation below the slab on grade and added the STEP Warmfloor system above the slab. The Warmfloor system is a durable, thin, flexible semi-conductive polymer heating element that operates on low-voltage, AC / DC. It is self-regulating and cannot overheat. The nature of the polymer material automatically reduces or increases its heat output to adjust to the temperature changes; this means that when the ambient temperature increases, the electrical resistance increases; and the consumption of electricity decreases. The heating elements are low-power consumption and maintenance free, thereby saving money. Radiant heat does not blow allergens, which helps alleviate contagions in the air which effects those with allergies and asthma.