

HOTEL MARCEL

New Haven, CT

Zone 5



Hotel Marcel results from the historic preservation of the Pirelli building, an office and research building, originally designed by Marcel Breuer in 1969 at the gateway to New Haven, Connecticut. The iconic Brutalist structure has been transformed into a 165-room boutique hotel and conference center with over 9,000 sq ft of meeting space, branded within the Tapestry Collection by Hilton. It is the first hotel in the United States designed to meet EnerPHit or Passive House standards.

Opened in May 2022, Hotel Marcel creates a new model for sustainable hospitality through electrification, zero operational carbon and minimizing embodied carbon through adaptive re-use of an existing building.

Re-use of the building gives new life to a significant work of mid-century modern architecture as well as to the embodied carbon of a prominent steel and concrete structure dating back 50 years. Furthermore, the hotel strives to balance its energy production and consumption to minimize its use of the planet's resources.

The rectangular massing provides an efficient envelope, and existing deep-set large window apertures provides generous daylighting while reducing summertime solar gain. The design team supplemented these attributes with pioneering all-electric systems, including Power-Over-Ethernet shades and lights, and a renewable microgrid with battery storage to achieve an energy balance that uses no fossil fuels.

Over 1,000 photovoltaic panels are mounted on the roof and on canopies over the parking lot. Two glazed courtyards on the top floor replace the original mechanical wells and flood the adjacent conference space in natural light. Daylight penetrates further into the building at the center of the floorplates below with lightwells cut out from the courtyard floors, illuminating the guestrooms in the midsection of the upper floors. On the ground level, connected social spaces enjoy 3 contiguous uninterrupted walls of windows.

The concrete perimeter walls' sculptural pre-cast 'Mosaic' panels were air-sealed and coated with insulation while tight corners were lined with nanogel aerogel blanket to mitigate thermal bridging. New laminated triple-pane argon-filled laminated windows provide optimal acoustical and high-performance thermal barrier, allowing the hotel to meet Passive House criteria, but also provide what guests observed is the quietest hotel room they have stayed in.

Mitsubishi heating and cooling VRF units share energy by transferring the heat from spaces in cooling mode to those needing heating. Swegon Energy Recovery Ventilators exchange heat between the exhaust and fresh air, conditioning ventilation air with approximately 80% less energy. The Kone elevators recapture electricity with regenerative braking. The lighting and motorized shades use Power Over Ethernet with low voltage DC power. The hotel has no need for fossil fuels. Mitsubishi's Heat20 domestic water-heating system uses air-source heat-pumps and is the first such installation system in the United States. Solar energy is stored in a 1.5 mWh battery that provides emergency power, responds to utility demand and allows grid independent operations.

The hotel provides 12 Level 2 EV charging spaces and 12 level 3 Tesla super chargers and provides guests with an electric 14 passenger shuttle van. Guests can walk to a shoreline park, the "food truck paradise", and the Canal Dock Boat-house (a water-recreation hub and event venue).

Hotel Marcel is the closest hotel to Union Station, which is the 10th busiest Amtrak station in the United States and is also the closest hotel to Wooster Square (home to the best pizza in the country). Guests can also enjoy New Haven's extensive and varied bicycle network, including the Vision Trail, and East Coast Greenway, all of which border the property. The hotel is situated at the southern terminus of the Farmington Canal Heritage Trail, a walking and bicycle trail that leads 54 miles north - to the Massachusetts border and beyond.

As a hotel, providing a helpful and comfortable atmosphere for all guests and staff is paramount. This is ensured through measures embedded into the building systems, the design of spaces (up the very finishes that visitors lay eyes on and touch) as well as the in-house Fitness Center. The incoming ventilation air is filtered by high efficiency MERV-13

rated filters which reduces the quantity of airborne pollutants, such as allergens and mold spores, that are delivered to the building by the ventilation systems. All the finishes were selected to avoid harmful varnishes and coatings.

The new hotel has created over 50 well-paying jobs, and for employees, the majority of which are held by local minorities residents, a car is not required to get to work, since the hotel is serviced by the local bus and train network. Additionally, the air quality standards of the project ensure that these jobs are provided in a healthful environment. In particular, the kitchen is free of carbon monoxide, the presence of which in typical commercial kitchens is a pervasive yet largely unaddressed health issue for kitchen workers.

Many products including all case-goods were sourced from local CT sources and relied on unionized carpenters to frame and build out the new partitions and install millwork.

The building's electrical microgrid controller by Ageto monitors electric production, storage and consumption in real-time, allowing the building users to visualize and optimize the building's energy usage, based on the actual performance of the building.

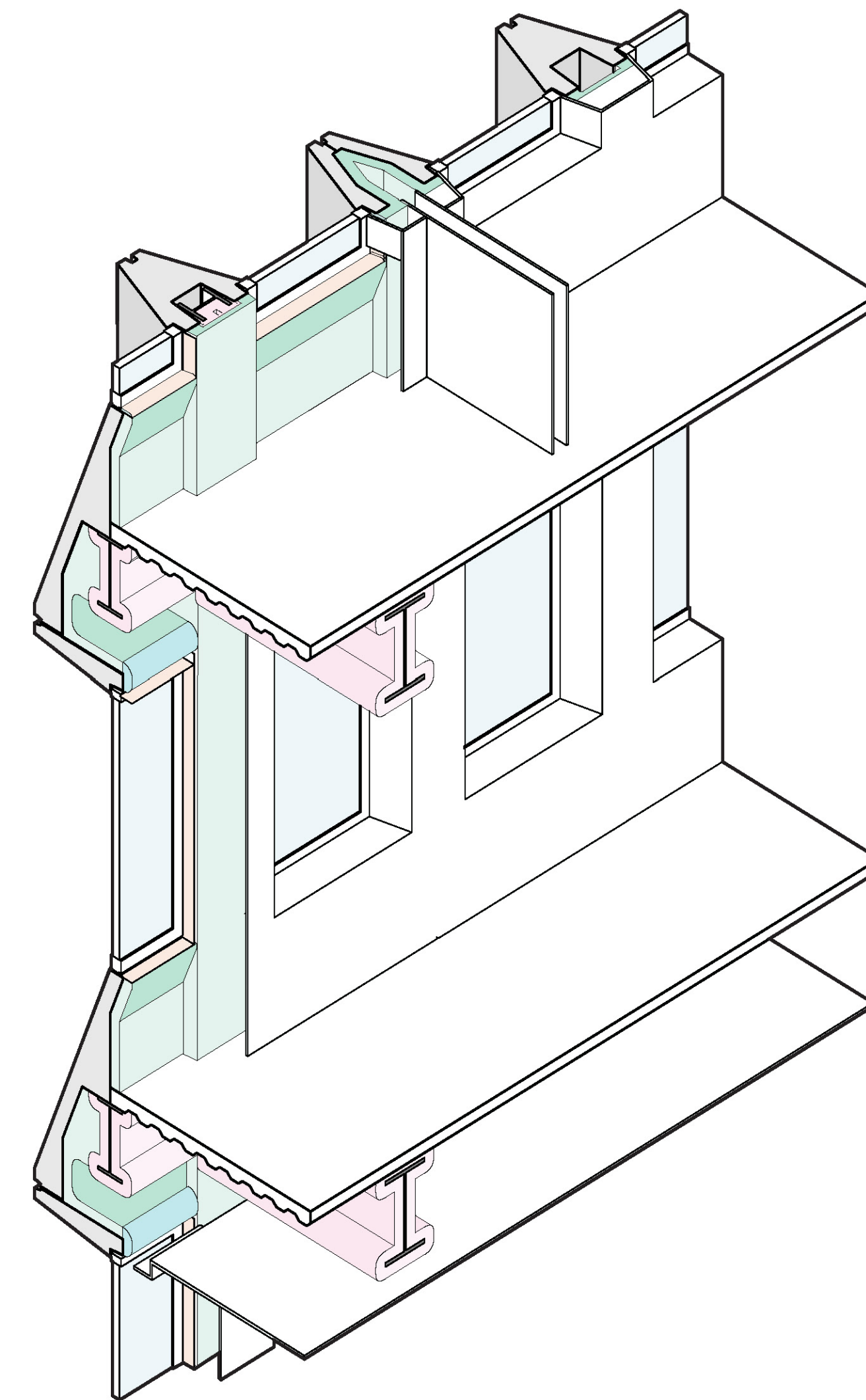
The hotel's microgrid control system receives digital input from the solar and battery system inverters and the main utility meter. Taking this information together, the microgrid tracks the system voltage, power, energy use, energy production, and even the remaining capacity of the batteries. This information is displayed on a dashboard that provides real-time and archived information for the end-user. This allows the user to compare hotel energy usage, energy provided by and to the utility, and on-site energy production for both the solar and battery systems for any specific time period up to 7 days.

This navigational tool captures overall effectiveness of energy saving measures, while the systems below operate with a minimum draw on power. It also offers an accessible teaching device, demonstrating how building consume and produce energy. Additional description of the implemented systems, those which nimbly consume the electric power stored in the batteries or catalyzed by the solar panels, is included below.

Heating and cooling for the facility is provided by Mitsubishi Variable Refrigerant Flow (VRF) air-source heat pumps with heat recovery capabilities as previously described. This VRF system was laid out to increase the energy sharing potential by simultaneously conditioning different building exposures. The commercial kitchen uses only electric and induction cooking appliances which enabled the use of a recirculating Type 1 grease laden vapor rated exhaust hoods. This Wells hood utilizes a self-contained 4-stage filtration process eliminating the need for a dedicated exhaust and make-up air system which results in a significant energy savings.

The domestic hot water for the facility is primarily produced by VRF air-source heat pumps. The VRF heat pumps used for heating of domestic hot water utilize Carbon Dioxide (CO2) as the refrigerant. Backup heating for the domestic water is provided by electric resistance water heaters. An ozone generating system was installed for the laundry washer machines to significantly reduce the amount of domestic hot water needed during washing cycles, and high-RPM extraction washing machines are used to reduce drying energy.

Hotel Marcel demonstrates that market rate real estate development projects can be designed to meet Passive House and EnerPHit Standards. The project was financed with investor equity and a conventional commercial loan from Liberty Bank, a regional bank headquartered in Middletown Connecticut. Additional financing was provided by a CPACE loan from the Connecticut Green Bank and Nuvene, and Bank of America's investment in State and Federal Historic Tax Credits as well as Federal Tax credits for Commercial Solar, Batteries and Microgrid. Energy efficiency incentives were provided by United Illuminating's Energy Conscious Blueprint Grant; Automated Demand/Response Incentives; Energy Storage Solutions Program - Active Dispatch Program; and Connecticut Electric Vehicle (EV) Charging Program; as well as ISO New England Active Demand Capacity Resource.

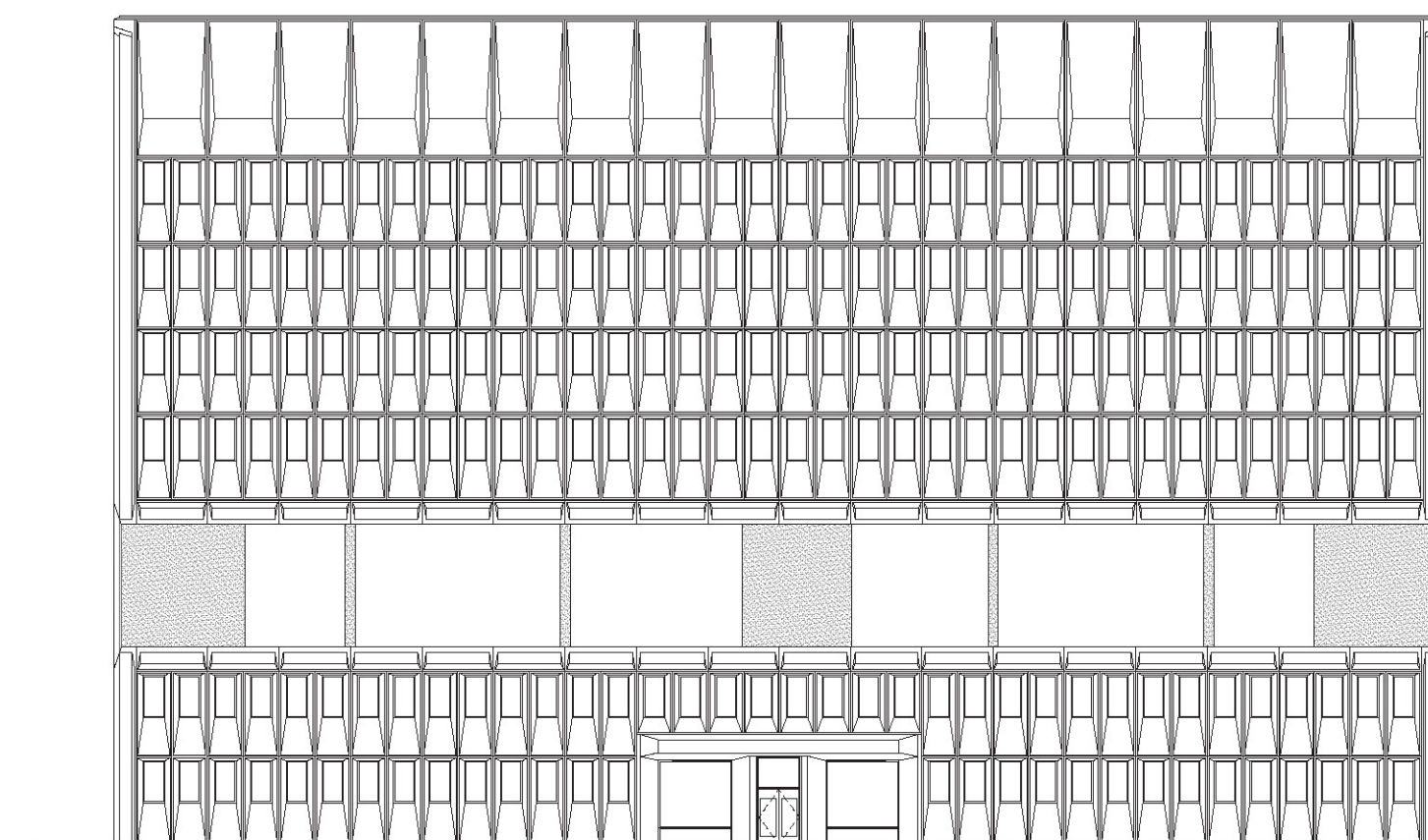
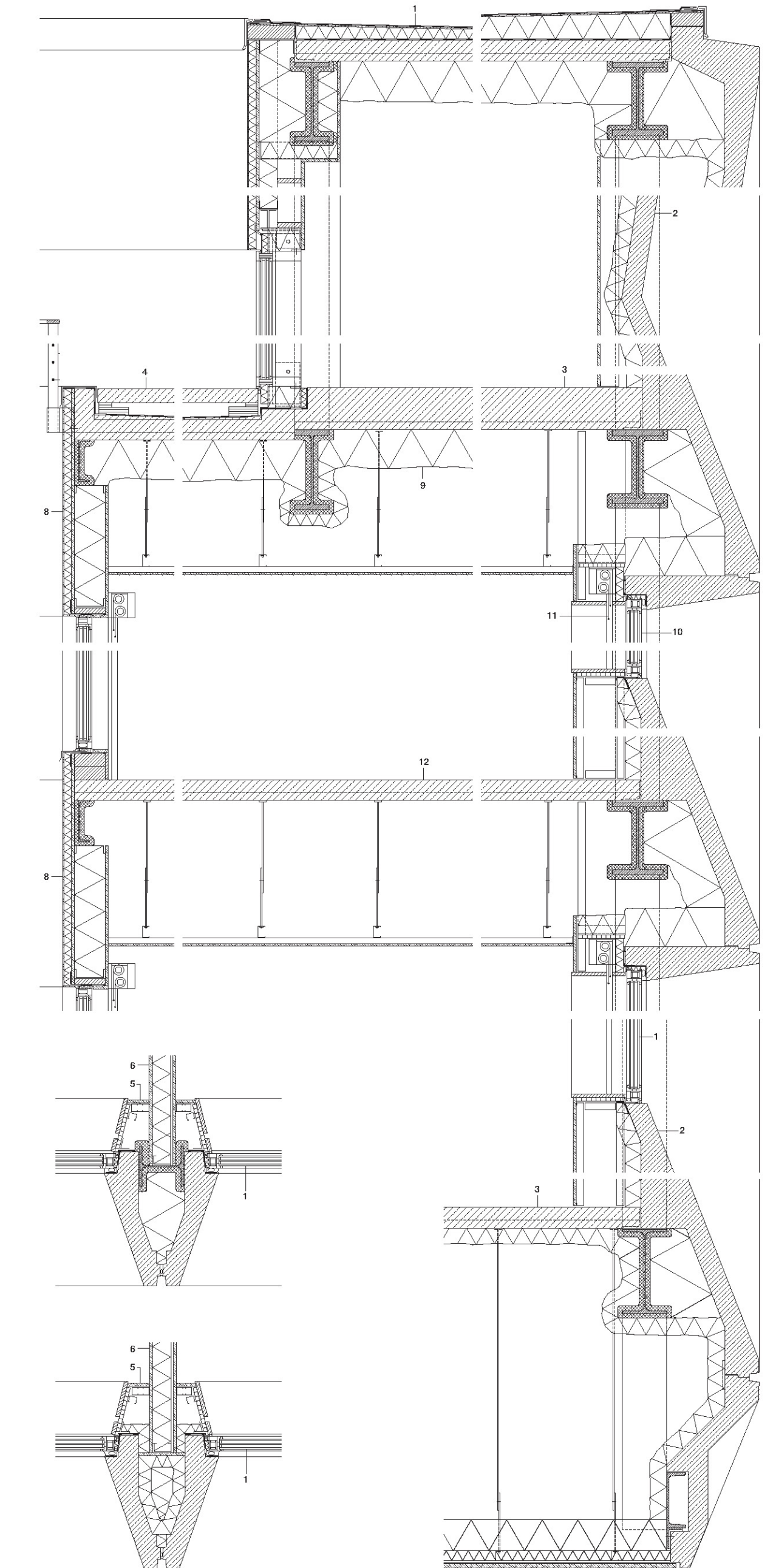


Plan and Section Detail Legend:

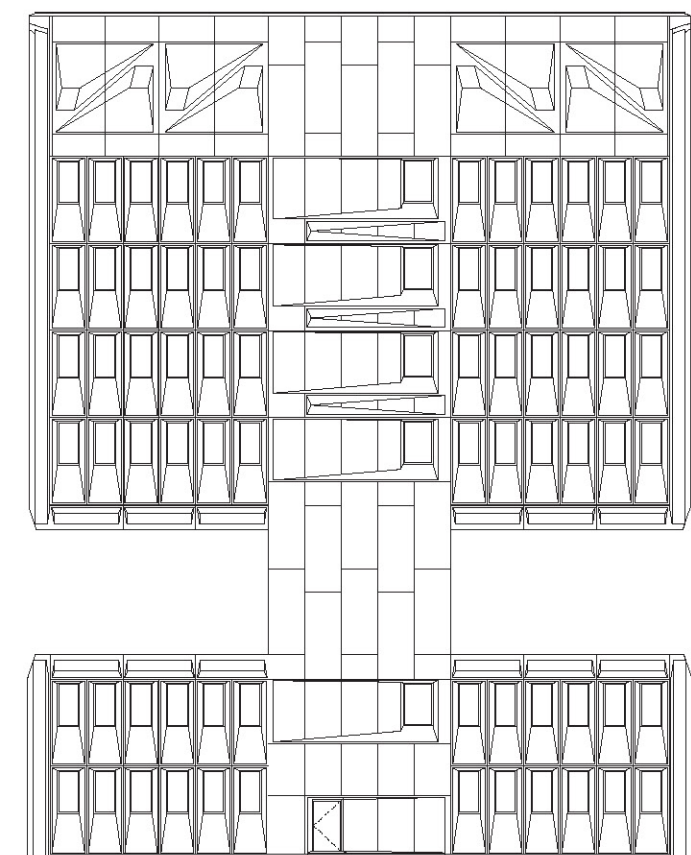
- Window: triple glazing in aluminum frame
- Wall construction:
 - 101 mm concrete facade element (existing)
 - min. 82 mm PUR closed-cell foam thermal insulation
 - 38 mm metal stud framing
 - 16 mm gypsum board
 - U = ca. 0.28 W/(m2K)
- 4th floor construction:
 - 108 mm reinforced concrete composite ceiling
 - min. 82 mm PUR closed-cell foam thermal insulation
 - suspended ceiling clearance
 - min. 152 mm mineral wool flock thermal insulation
 - min. 51 mm PUR closed-cell foam thermal insulation
 - metal stud framing (existing)
 - expanded metal (existing)
 - min. 25 mm exterior render (existing)
- Roof above 2nd floor construction:
 - 2-ply bituminous sealant layer
 - 6 mm fabric reinforced bituminous substrate panel
 - PIR thermal insulation to falls
 - vapor barrier
 - lightweight concrete to falls (existing)
 - 108 mm reinforced concrete composite ceiling (existing)
 - min. 200 mm PUR closed-cell foam thermal insulation
 - hung ceiling clearance
 - 12.5 mm gypsum board ceiling
- Interior Finish Partition:
 - 16 mm gypsum board
 - metal stud framing
 - Partition wall construction:
 - 16 mm gypsum board
 - metal stud framing
 - 92 mm inlaid mineral wool thermal insulation
 - cantled sheet metal, mounted horizontally for acoustic decoupling
 - 16 mm gypsum board

Facade Insulation Axon Legend:

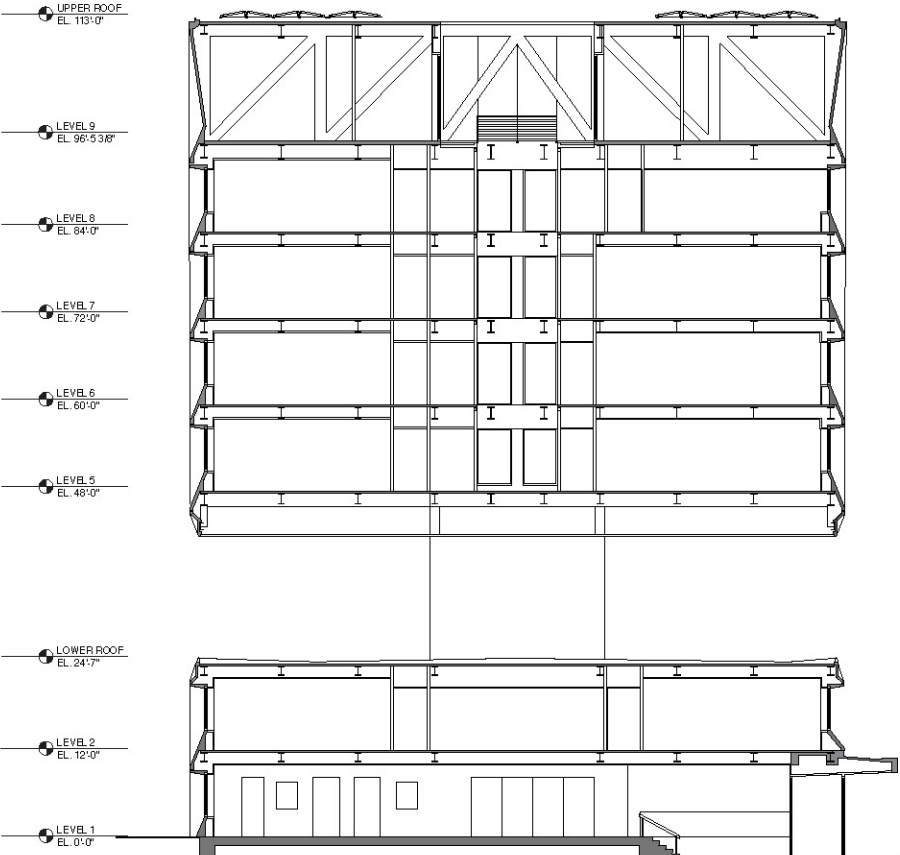
- Closed-cell Insulation Foam
- Open-cell Insulation Foam
- Aerogel Insulation
- Fireproofing Insulation



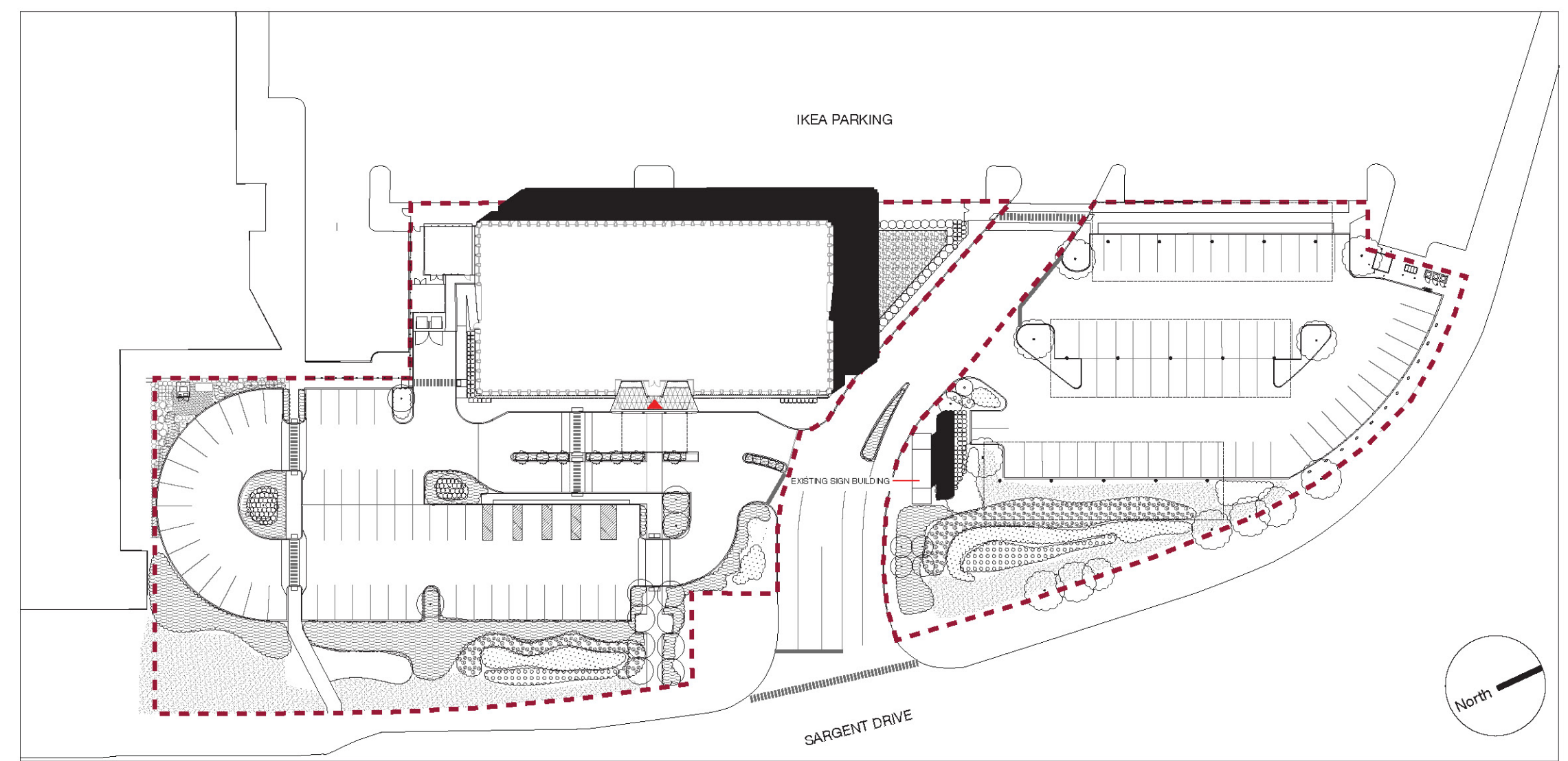
East Elevation



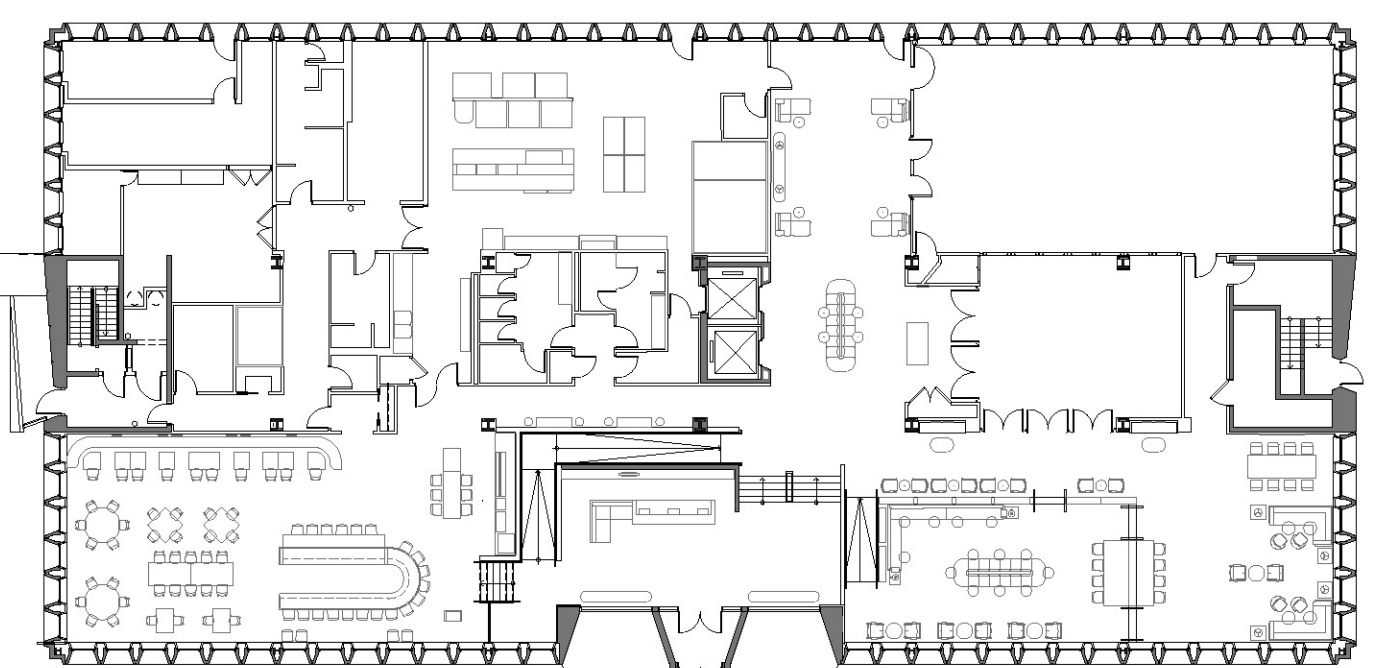
North Elevation



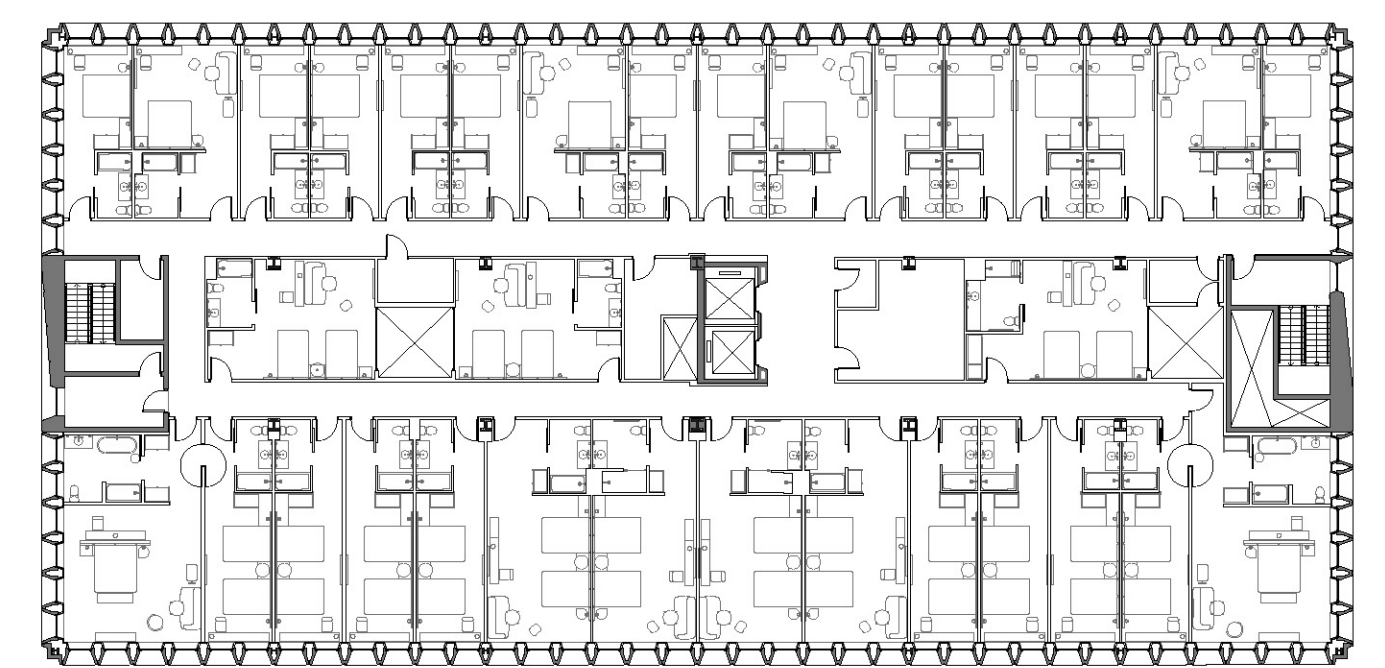
North-South Section



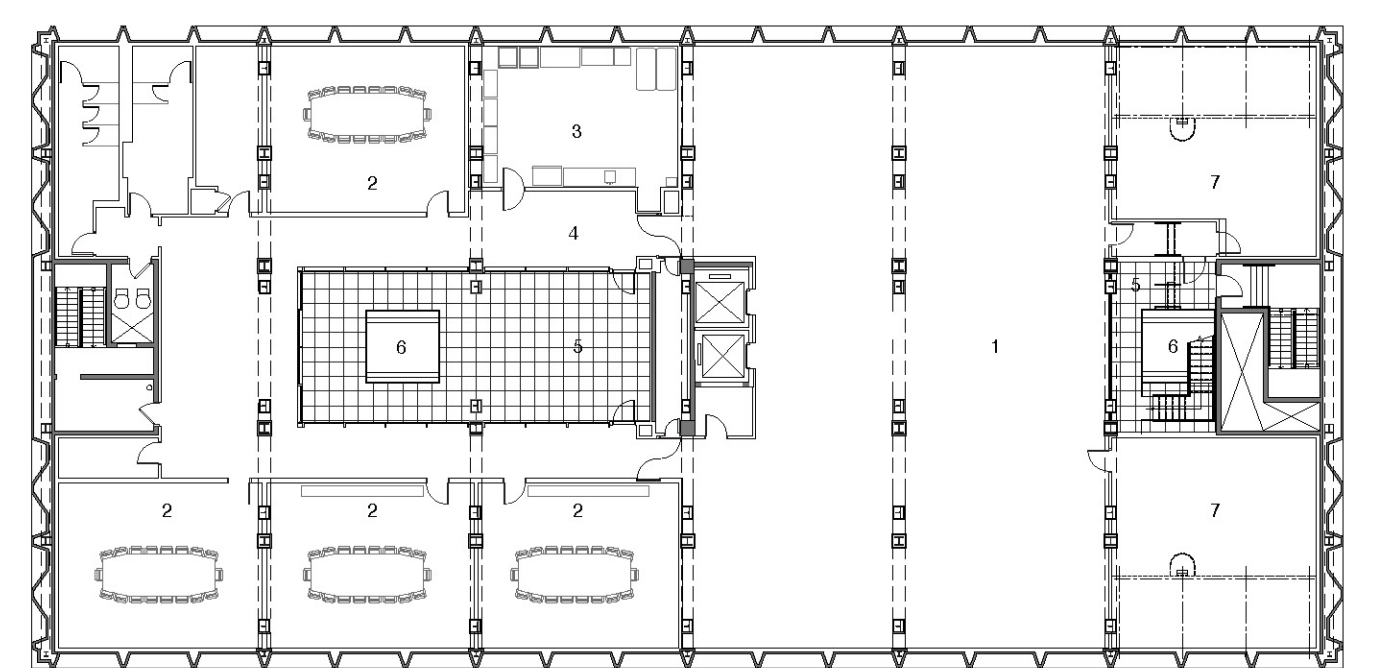
Site Plan



Entry Level Plan



Typical Guestroom Level Plan



Level 9 Conference Center Plan



Entrance View



Guestroom Window



Exterior View from the South East

Hotel Marcel – Project Narrative

Hotel Marcel results from the historic preservation of the Pirelli building, an office and research building, originally designed by Marcel Breuer in 1969 at the gateway to New Haven, Connecticut. The iconic Brutalist structure has been transformed into a 165-room boutique hotel and conference center with over 9,000 sf of meeting space, branded within the Tapestry Collection by Hilton. It is the first hotel in the United States designed to meet EnerPHit or Passive House standards.

Opened in May 2022, Hotel Marcel creates a new model for sustainable hospitality through electrification, zero operational carbon and minimizing embodied carbon through adaptive re-use of an existing building.

Re-use of the building gives new life to a significant work of mid-century modern architecture as well as to the embodied carbon of a prominent steel and concrete structure dating back 50 years. Furthermore, the hotel strives to balance its energy production and consumption to minimize its use of the planet's resources.

The rectangular massing provides an efficient envelope, and existing deep-set large window apertures provides generous daylighting while reducing summertime solar gain. The design team supplemented these attributes with pioneering all-electric systems, including Power-Over-Ethernet shades and lights, and a renewable microgrid with battery storage to achieve an energy balance that uses no fossil fuels.

Over 1,000 photovoltaic panels are mounted on the roof and on canopies over the parking lot. Two glazed courtyards on the top floor replace the original mechanical wells and flood the adjacent conference space in natural light. Daylight penetrates further into the building at the center of the floorplates below with lightwells cut out from the courtyard floors, illuminating the guestrooms in the midsection of the upper floors. On the ground level, connected social spaces enjoy 3 contiguous uninterrupted walls of windows.

The concrete perimeter walls' sculptural pre-cast 'Mosai' panels were air-sealed and coated with insulation while tight corners were lined with nanogel aerogel blanket to mitigate thermal bridging. New laminated triple-pane argon-filled laminated windows provide optimal acoustical and high-performance thermal barrier, allowing the hotel to meet Passive House criteria, but also provide what guests observed is the quietest hotel room they have stayed in.

Mitsubishi heating and cooling VRF units share energy by transferring the heat from spaces in cooling mode to those needing heating. Swegon Energy Recovery Ventilators exchange heat between the exhaust and fresh air, conditioning ventilation air with approximately 80% less energy. The Kone elevators recapture electricity with regenerative braking.

The lighting and motorized shades use Power Over Ethernet with low voltage DC power. The hotel has no need for fossil fuels. Mitsubishi's Heat2O domestic water-heating system uses air-source heat-pumps and is the first such installation system in the United States. Solar energy is stored in a 1.5 mWh battery that provides emergency power, responds to utility demand and allows grid independent operations.

The hotel provides 12 Level 2 EV charging spaces and 12 level 3 Tesla super chargers and provides guests with an electric 14 passenger shuttle van. Guests can walk to a shoreline park, the “food truck paradise”, and the Canal Dock Boathouse (a water-recreation hub and event venue).

Hotel Marcel is the closest hotel to Union Station, which is the 10th busiest Amtrak station in the United States and is also the closest hotel to Wooster Square (home to the best pizza in the country). Guests can also enjoy New Haven’s extensive and varied bicycle network, including the Vision Trail, and East Coast Greenway, all of which border the property. The hotel is situated at the southern terminus of the Farmington Canal Heritage Trail, a walking and bicycle trail that leads 54 miles north - to the Massachusetts border and beyond.

As a hotel, providing a healthful and comfortable atmosphere for all guests and staff is paramount. This is ensured through measures embedded into the building systems, the design of spaces (up the very finishes that visitors lay eyes on and touch) as well as the in-house Fitness Center. The incoming ventilation air is filtered by high efficiency MERV-13 rated filters which reduces the quantity of airborne pollutants, such as allergens and mold spores, that are delivered to the building by the ventilation systems. All the finishes were selected to avoid harmful varnishes and coatings.

The new hotel has created over 50 well-paying jobs, and for employees, the majority of which are held by local minorities residents, a car is not required to get to work, since the hotel is serviced by the local bus and train network. Additionally, the air quality standards of the project ensure that these jobs are provided in a healthful environment. In particular, the kitchen is free of carbon monoxide, the presence of which in typical commercial kitchens is a pervasive yet largely unaddressed health issue for kitchen workers.

Many products including all case-goods were sourced from local CT sources and relied on unionized carpenters to frame and build out the new partitions and install millwork.

The building’s electrical microgrid controller by Ageto monitors electric production, storage and consumption in real-time, allowing the building users to visualize and optimize the building’s energy usage, based on the actual performance of the building.

The hotel’s microgrid control system receives digital input from the solar and battery system inverters and the main utility meter. Taking this information together, the microgrid tracks the system voltage, power, energy use, energy production, and even the remaining capacity of the batteries. This information is displayed on a dashboard that provides real-time and archived information for the end-user. This allows the user to compare hotel energy usage, energy provided by and to the utility, and on-site energy production for both the solar and battery systems for any specific time period up to 7 days.

This navigational tool captures overall effectiveness of energy saving measures, while the systems below operate with a minimum draw on power. It also offers an accessible teaching device, demonstrating how building consume and produce energy. Additional description of the implemented systems, those which nimbly consume the electric power stored in the batteries or catalyzed by the solar panels, is included below.

Heating and cooling for the facility is provided by Mitsubishi Variable Refrigerant Flow (VRF) air-source heat pumps with heat recovery capabilities as previously described. This VRF system was laid out to increase the energy sharing potential by simultaneously conditioning different building exposures. The

commercial kitchen uses only electric and induction cooking appliances which enabled the use of a recirculating Type 1 grease laden vapor rated exhaust hoods. This Wells hood utilizes a self-contained 4-stage filtration process eliminating the need for a dedicated exhaust and make-up air system which results in a significant energy savings.

The domestic hot water for the facility is primarily produced by VRF air-source heat pumps. The VRF heat pumps used for heating of domestic hot water utilize Carbon Dioxide (CO₂) as the refrigerant. Backup heating for the domestic water is provided by electric resistance water heaters. An ozone generating system was installed for the laundry washer machines to significantly reduce the amount of domestic hot water needed during washing cycles, and high-RPM extraction washing machines are used to reduce drying energy.

Hotel Marcel demonstrates that market rate real estate development projects can be designed to meet Passive House and EnerPHit Standards. The project was financed with investor equity and a conventional commercial loan from Liberty Bank, a regional bank headquartered in Middletown Connecticut. Additional financing was provided by a CPACE loan from the Connecticut Green Bank and Nuvene, and Bank of America's investment in State and Federal Historic Tax Credits as well as Federal Tax credits for Commercial Solar, Batteries and Microgrid. Energy efficiency incentives were provided by United Illuminating's Energy Conscious Blueprint Grant; Automated Demand/Response Incentives; Energy Storage Solutions Program – Active Dispatch Program; and Connecticut Electric Vehicle (EV) Charging Program; as well as ISO New England Active Demand Capacity Resource.