Prefab/Modular Construction

The primary benefit of prefab or modular construction methods is our obligation to our workers and the community to perform work safely and sustainably. Improved quality, shortened schedules, and cost savings are added benefits.

Prefab/Modular Approach

The tenets of prefabrication and modularization subscribe to the concepts of Lean and LEED by eliminating waste, improving processes and using green methods. In addition, Lend Lease’s expertise and dedication to cutting-edge BIM techniques enables a project’s prefab/modular plans by allowing all stakeholders to clearly understand the plan before enacting it.

We conduct detailed evaluations to determine best value solutions for every component of a project, whether that entails prefabricating or modularizing certain components or traditionally constructing the components (“stick built”). Items we have most commonly found to be best suited to prefab/modular are those that are repetitive in nature, including bathrooms, doors and hardware, medical headwalls and corridor MEP rack systems.

The advantages of prefab/modular means and methods are numerous:

- **Improved Safety**
  - Less cluttered factory conditions
  - Work at minimized height
  - Controlled conditions

- **Improved Quality**
  - Temperature and humidity controlled environment
  - Experienced craftsmen who enjoy the safe, controlled environment

- **Improved Schedule**
  - Controlled weather conditions in off-site locations
  - Predecessor activities such as building dry in, not required to do finish work
  - Reduced man-hours for fast-paced projects

- **Improved Cost**
  - Controlled labor costs – units can be constructed in states with lower labor costs
  - Minimizes waste – units are extensively planned
  - Cost and schedule savings plus workmanship increase with the repetition of prefab or modular components

Lend Lease has a cross functional team devoted specifically to advising project teams on prefab/modular construction possibilities and innovations. The team meets monthly to share ideas and experiences, discuss the latest trends and maintain Lend Lease’s industry leadership position in prefab/modular execution.

**Topic Definitions**

- **Prefab** construction simply means fabricating portions of the building at a factory so that construction consists mainly of assembling standardized parts. This could be as simple as doors already hung in their frames or as complex as MEP racks.

- **Modular** refers to components organized in self-contained units or sections manufactured in a factory and then shipped to the site where they are installed. This typically takes the form of bathroom pods, kitchenettes, etc.

- “**Stick built**” refers to traditional construction where each building component is individually constructed on site.

- “**Construction off site**” is a term used when building components are assembled in an offsite location, such as a subcontractor’s warehouse. Technically, these components can be prefab or modular depending on the extent of the prefabrication.

- “**Construction manufacturing**” refers to factory assembly of modular units such as bathroom pods, where skilled workers in a warehouse construct numerous modular units.
Prefabrication
Exterior Façade with Integrated Balconies
Contact Howard Hobbs with Questions about this Project

ZINC – 22 Water Street Residences
Cambridge, Massachusetts
ZINC is a 15-story, 531,900 sf luxury apartment building featuring 392 residential units and 351 parking spaces. Tenant amenities include a fitness facility, roof garden, community spaces, covered parking, a coffee shop and a multi-purpose hiking/biking trail adjacent to the property. The building features unique, energy efficient thermal break systems throughout, qualifying it to surpass the latest 'Stretch Energy Code' which makes it the most energy efficient panelized façade built to date.

The primary reason prefabrication was determined to be the best option for the exterior façade was that each floor plate is 31,500 sf with 1,250 lf of exterior façade, twice the traditional ratio of an ideal building façade-to-square-footage ratio. Moreover, the complexity of the cement panel color scheme strengthened the case for using a modular alternative, as did enhancements in project safety, logistics, quality control, budget and schedule.

Panelized Wall Components
Each panel is typically 25’6” x 9’8”. The panels span from column-to-column and floor-to-floor, similar in nature to a concrete precast panel. The panelized façade includes interior light-gauge framing to receive drywall; air and vapor barrier; insulation; cement panels; windows; sliders and balconies. The most unique feature of this system is the integrated balcony, as they are not part of the superstructure, but the panelized façade panel. This integrated balcony has not previously been used with precast or panelized façade.

Schedule / Logistics
Field erection of a panelized façade takes one third of the time of conventional stick-built construction and much less real estate, thereby allowing for easier management of site logistics, as it can be installed inside the very tight space between the building and the property line.

Lend Lease’s previous experience with panelized façade systems allowed us to streamline the design and collaborate with the Owner’s design team and trades to create a schedule savings of six months and save over $1 Million from the project budget.

Safety
Façade trades frequently represent the highest rates of incident per hour worked. In order to counter this, the panelized method conducts 90% of the labor in a fabrication facility where inclement weather is eliminated as a threat to safety.

Challenges
A major challenge of this project was that the façade square footage, at 170,000 sf, is twice the aspect ratio of a traditional façade to floor space ratio, thereby requiring more time during design, coordination and construction. Furthermore, the design complexity of the color scheme, along with making sure that 600 panels were weather-tight in an area with harsh winters, was challenging due to limited schedule and space constraints.
Winthrop-University Hospital – New Research Building
Mineola, New York

Winthrop-University Hospital is a leader in diabetes research and with the addition of their new $80 Million, 140,000 sf Research Building they ensured their legacy in the education and understanding of the disease. Lend Lease, collaborating with selected design-assist partners including contractors and design consultants, worked through overall constructability, cost savings and schedule challenges.

Prefabication was determined to be the best option for the exterior facade from a safety, logistics, quality control and schedule standpoint.

Logistics
It was determined early, during the design-assist process, that the project would use a prefabricated panelized exterior facade, which allowed full detailing and coordination of the exterior slab edge and early release of design drawings.

The project site was very confined with only a 2-3’ setback from the property line in some spots. Eliminating the scaffolding from part of the building and working in set phases was critical towards allowing the project to flow around the building.

Quality Control
The prefabricated panels were assembled in a climate controlled facility, which allowed for quality control during fabrication.

Safety
The façade was 50% stone, which typically would have required masons to work from scaffolding. With the panelized method, including stone façade panels, no scaffolding was required as the wall sections were put into place by a crane.

Schedule
The use of prefabricated wall sections provided a three-month schedule savings.

Challenges
The overall façade was very complicated, requiring three separate components: curtain wall, metal panel rain screen system and a limestone rain screen system which included fixed windows, while the curtain wall system included an exterior sun screen.

The project included over 60 different panel configurations; a typical prefabricated building of similar height and size may have only 30. This required additional detailing and coordination, but was accomplished in the same timeframe to meet the schedule.

During design, a new and improved method of jointing/sealing the panels was introduced to the project’s design team.