

MODULAR CONSTRUCTION IN MULTI-FAMILY HOUSING

A SMARTER, FASTER CONSTRUCTION SOLUTION



Presenters



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RISE Modular
CEO/Founder



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DJR Architecture
CEO/Founder/Principal



Rise Modular



- Headquartered in Minneapolis
- Privately-owned, full-volumetric modular construction manufacturer
- State-of-the-art 150,000-square-foot manufacturing facility in Owatonna, Minnesota.
- Specializes in multi-story commercial modular construction and manufacturing including
 - multi-family housing
 - student housing
 - senior housing
 - hotel
 - assisted living projects
- Serves the Central United States or approximately a 750-mile radius of Minnesota

DJR Architecture



- A multi-disciplinary design practice specializing in architecture, interior design and urban planning
- Practice began in 1985 working with neighbors in the Phillips community to create affordable housing and urban design initiatives to encourage development
- Since then, the firm has grown into a design leader in areas including:
 - Mixed-use and commercial development
 - Housing
 - Retail
 - Hospitality
- Our designs are created as part of a specific local context within larger societal, economical and ecological systems
- We strive to complement client goals with neighborhood and community desires



What is Offsite or Modular Construction?



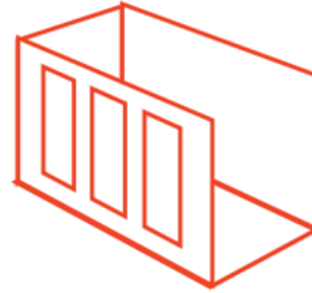
Typology 1: Components

On the side of the spectrum with low off-site work, Typology 1 includes many conventional site-built structures, so long as they include some prefabricated product such as roofing, flooring, or glazing systems.



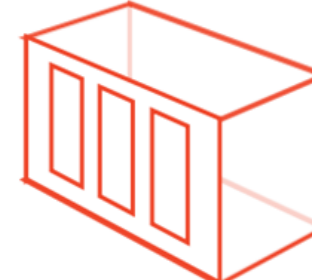
Typology 2: Panelized

Projects in the panelized typology are approximately **60% complete offsite** and use non-volumetric modular such as floors, roofs, and interior and exterior walls.



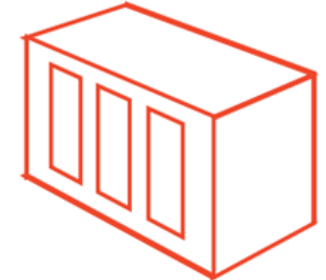
Typology 3: Hybrid

Hybrid projects are a mix of typology 2 and typology 4. Projects in the hybrid typology are made of volumetric modules but are not fully enclosed. Manufacturers may have removed interior walls or ceilings to eliminate superfluous panels.



Typology 4: Volumetric

This typology defines the most common projects – three-dimensional modules **80% to 90% complete off-site**. Modules arrive on-site without interior or exterior finished.



Typology 5: Complete

Projects in this typology are also delivered to site as a volumetric module, though in this case the modules are almost complete (90 to 95%) when they arrive on site. These projects require virtually no on-site construction before occupancy.

What benefits can modular construction deliver?

- **SPEED TO MARKET**
20 to 50% reduction in construction schedule
- **CONSISTENT QUALITY**
Construction in climate-controlled environment
- **COST SAVINGS**
10 to 20% reduction in construction costs
- **LESS DISRUPTIVE WORKSITES**
Construction period shorter and quieter

Exhibit F
Estimated timeline changes



Traditional schedule versus modular schedule

Example apartment project

Duration, months



Traditional construction

Offsite using 3D volumetric

Planning and design

Foundations

Onsite construction

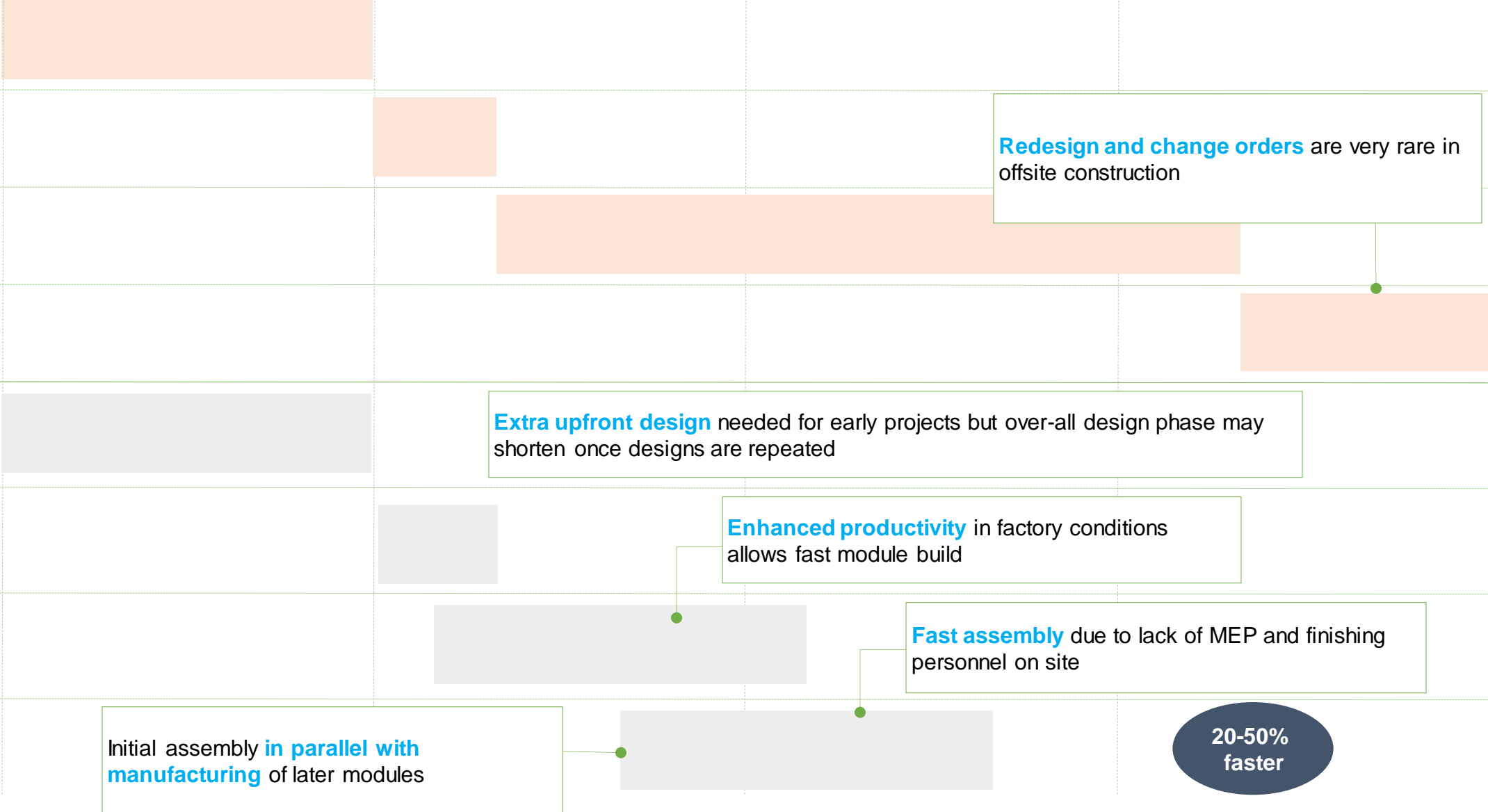
Construction over-run¹

Design and planning

Foundations

Offsite manufacturing

Onsite installation



Redesign and change orders are very rare in offsite construction

Extra upfront design needed for early projects but over-all design phase may shorten once designs are repeated

Enhanced productivity in factory conditions allows fast module build

Fast assembly due to lack of MEP and finishing personnel on site

Initial assembly in parallel with manufacturing of later modules

20-50% faster

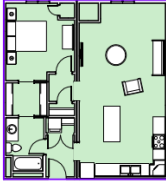
¹ Over-runs of 25% - 50% of projected construction duration are common

Modular Design Sample Layout

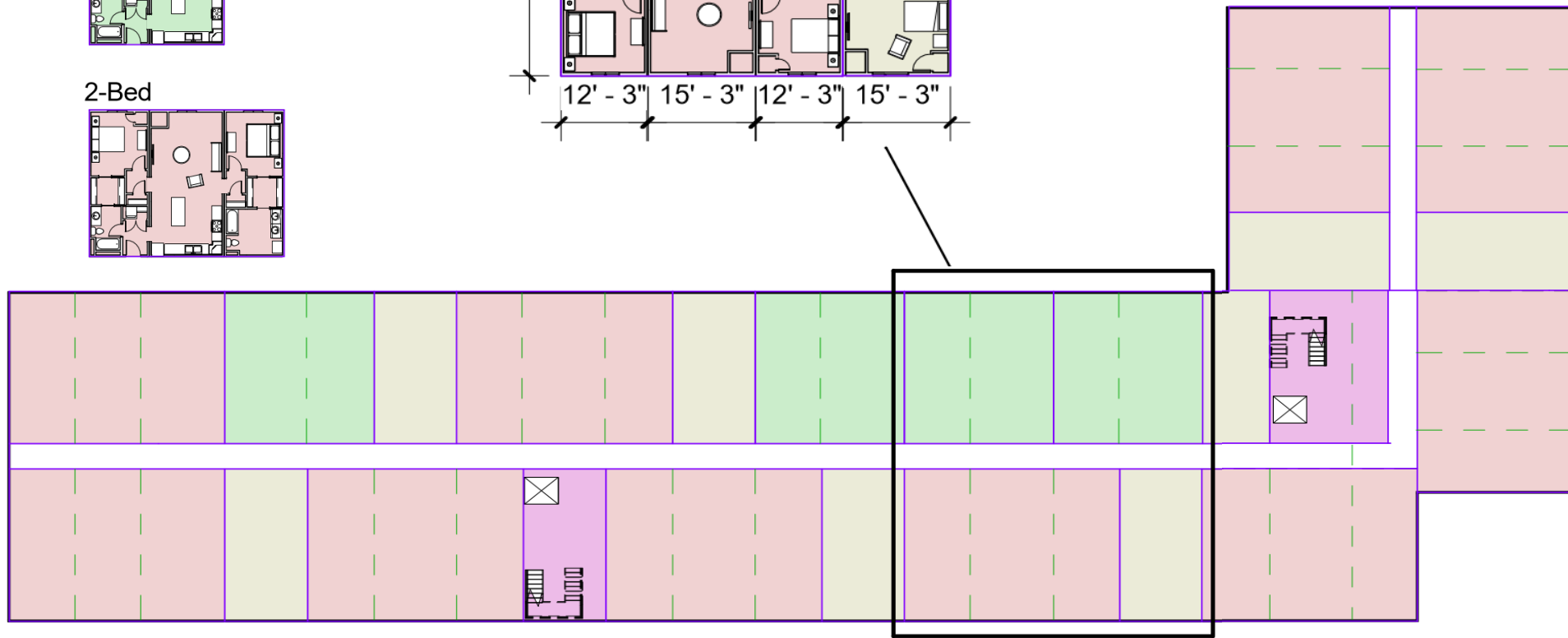
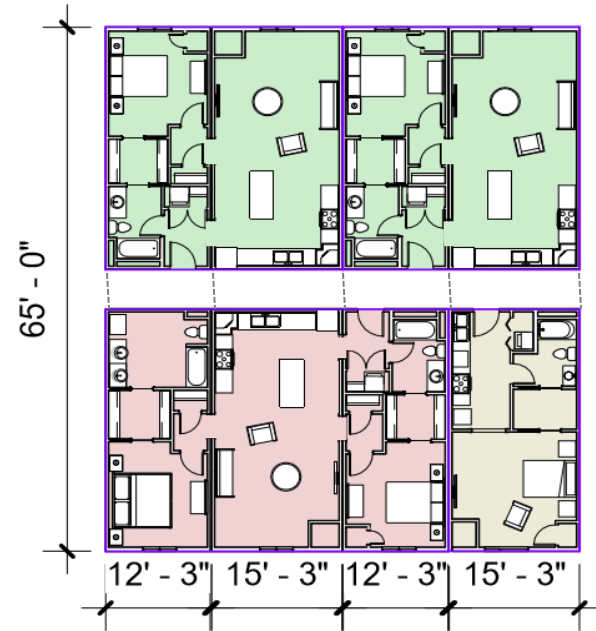
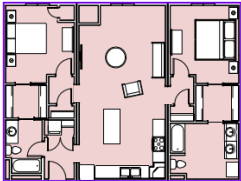
Studio



1-Bed



2-Bed



This illustration provides an example of the endless possibilities for design and layout.

Defining room types and organizing them by module size allows incredible flexibility in configuring space requirements that best meet programming intentions.

Schedule Enhanced Solutions

Traditional Construction

Raw materials, along with some prefabricated parts, are delivered to a development site for traditional on-site construction



% Reduction in Build Time

Offsite Construction

Component Manufacture (“Panelization”)

Open Wall Panels

Closed Wall Panels

Raw materials are delivered to an offsite facility where they are assembled into section panels that are then delivered to the development site and joined together

Delivered to development site as merely open stud walls



5-10%

Delivered to development site with insulation and sheathing completed



10-15%

Full Structure Manufacture (“Volumetric Modular”)

Raw materials are delivered to an offsite facility where an assembly line process produces full volumetric modules that comprise near complete hotel or housing units with full kitchen and bathroom finishes, electrical, plumbing, HVAC, paint, fixtures and, in some cases, FF&E



20-50%

Modular Solutions for Different Construction Types

STEEL MODULAR

Type I and II, non-combustible modular solutions are used for multi-family projects taller than 85 feet in height



SANDWICH PANEL

SIP modular construction is being used in areas that have extreme climates and/or seismic activity



WOOD SOLUTION

Type III, IV and V modular construction is used for residential and multi-family projects under 85 feet in height



Steel Modular

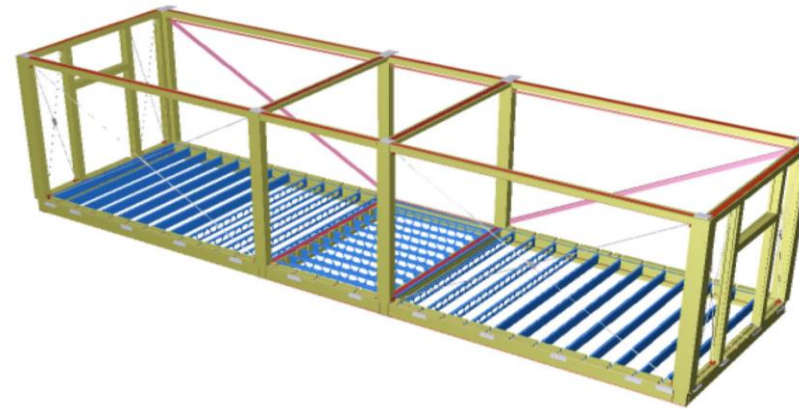


Steel Modular



Type I and II Non-Combustible Steel Modular Construction

- Light-gauge steel modular construction is a non-combustible solution for fire protection.
- Works as a bridge for heights greater than seven stories.
- High level of quality control through off-site manufacturing process.
- Main sectors of application include private and public housing, apartments and mixed-use buildings, education and student residences, medical facilities and hotels.



SIPS “Sandwich” Modular



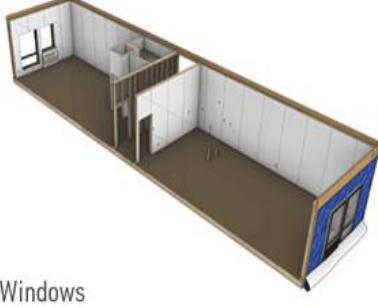
- Insulating foam core sandwiched between two structural facings, which is typically oriented strand board or OSB
- Exceptional thermal performance, especially when OSB is replaced by concrete board
- Panels can be manufactured and shipped to the site, reducing labor and energy costs

Wood Modular



How Full Volumetric Wood-frame Modular Comes Together

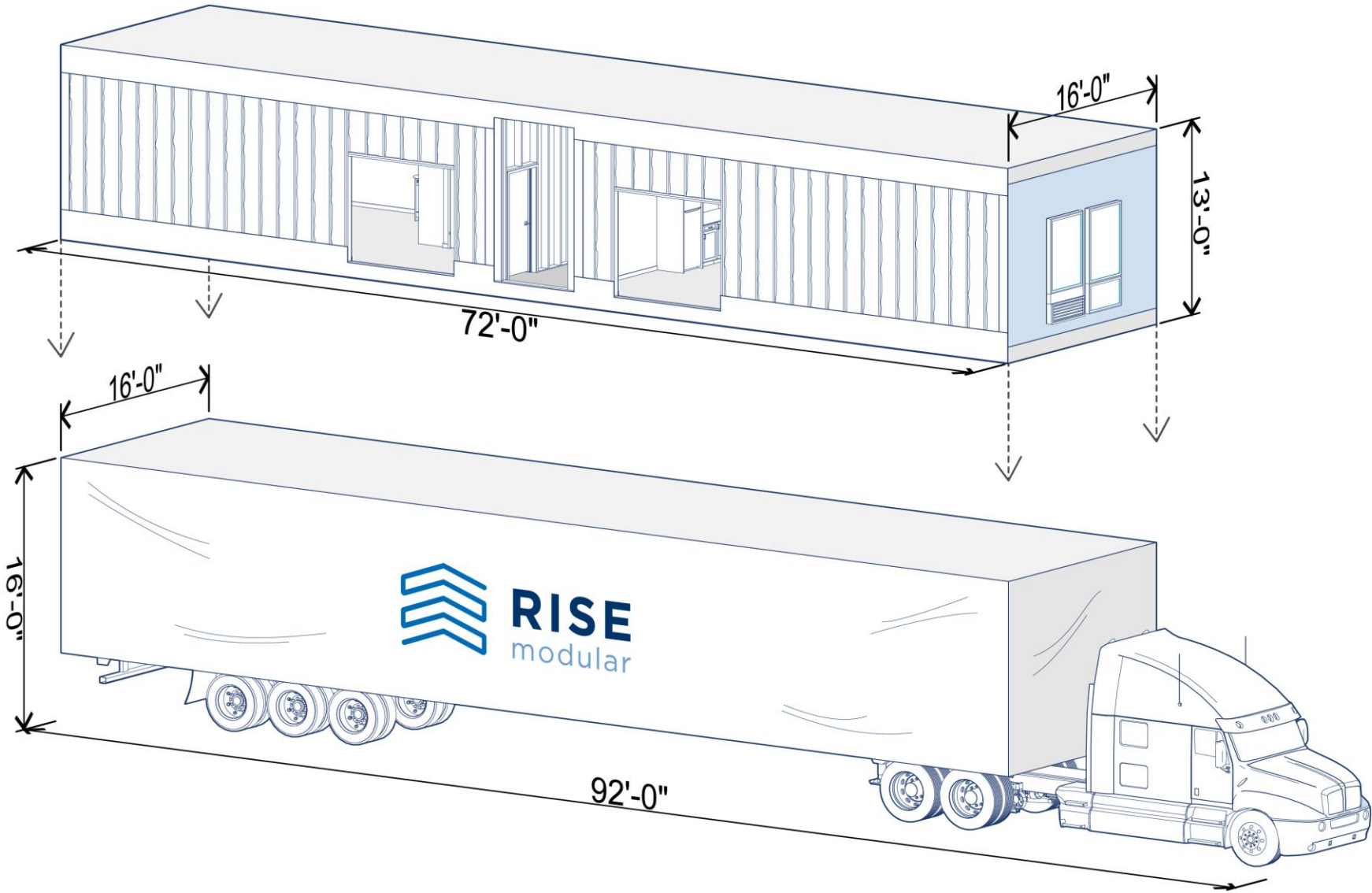
Full Volumetric Modular Process



Climate-controlled Environment



Module Transport Dimensional Considerations



Twin Cities Wood-frame Modular Projects



MOD42

3 stories | 30 Units | Urban-infill | 5-day mod set



The Alvera

7 stories | 192 Units | Urban-infill | Exterior mural
102 semi-automated parking stalls

Twin Cities Wood-frame Modular Projects



St. Michael Apartments

3 stories | 82 Units | Ex-urban

First phase of a master-planned development



Stinson Apartments

3 stories | 38 Units | 46 parking stalls

Inner-ring suburb

Twin Cities Wood-frame Modular Projects in the Pipeline



Pentagon Village Apartments

6 stories | 202 Units | Inner-ring suburb
Part of a master-planned redevelopment



Glenwood Avenue Apartments

7 stories | 127 Units | Transit-oriented development
Opportunity Zone | Mixed-use development

Modular for Affordable Housing...what's ahead

Modular is an ideal fit for Affordable Housing

- High-quality construction can meet all required design & engineering standards
- High potential for shorter construction timelines and lower costs

Minnesota Housing RFP

- While a public RFP, the selection team provided a preference for innovative construction practice that would demonstrate cost and/or time savings

Minneapolis PHA scattered-site project

- Modular design selected in head-to-head competition
- 4-percent-tax-credit project to begin construction in 2022

Replicable Prototype Workshop

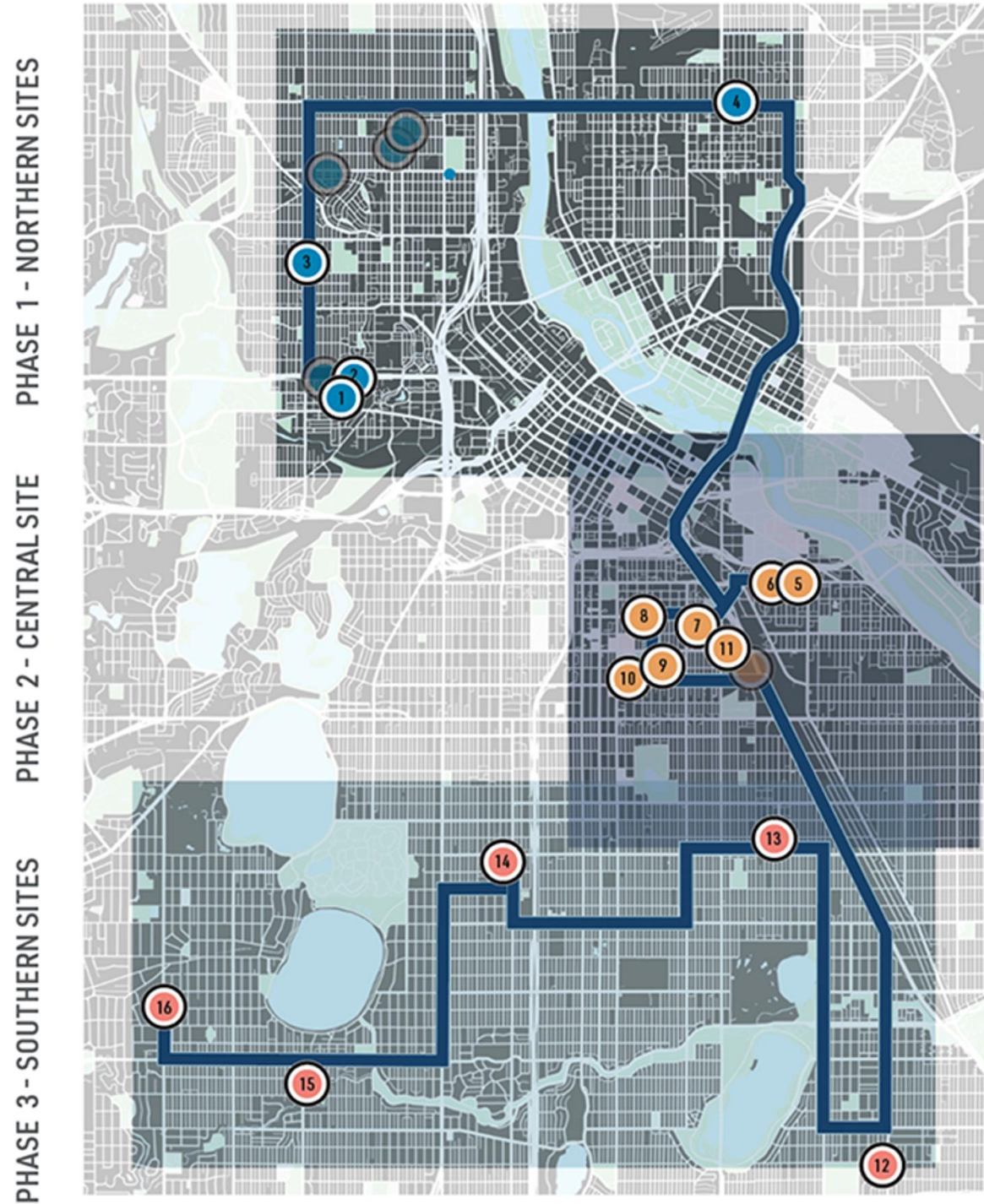
- Goal – Develop a replicable design to increase cost savings for affordable

Itasca Project

- Housing Innovations work group recommendations in Q1

Minneapolis Public Housing Authority (MPHA) Modular Affordable Housing on 16 Scattered Sites

Scattered Sites Strategy



Minneapolis Public Housing Authority (MPHA) Modular Affordable Housing on 16 Scattered Sites

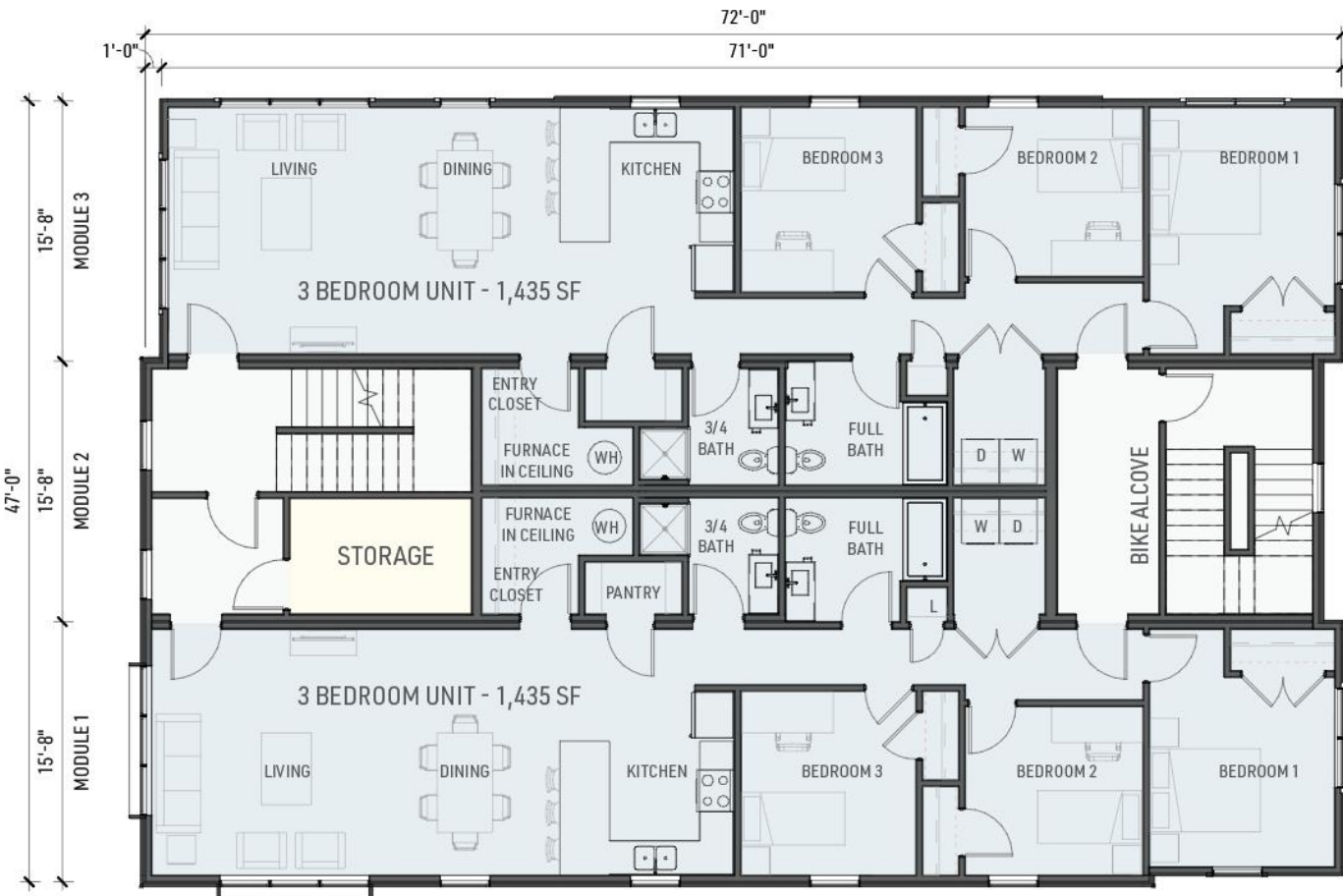


MPHA Scattered-site Development

2 and 3 stories | 84 Units | Urban infill | 3 phases

2- and 3-bedroom units for families

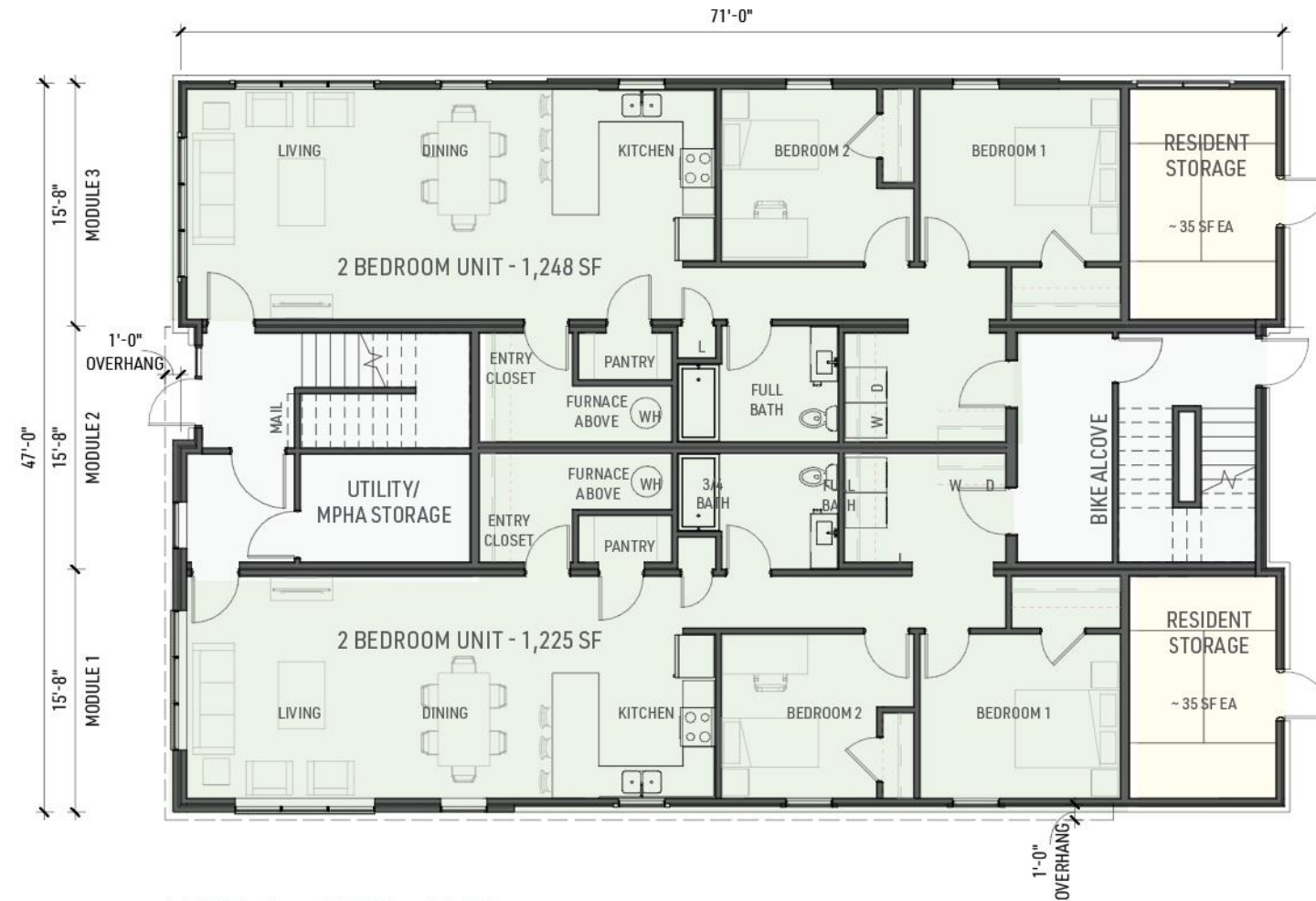
Minneapolis Public Housing Authority (MPHA) Modular Affordable Housing on 16 Scattered Sites



LEVELS 2 & 3 - 3/32" = 1'-0"

BUILDING DATA

LEVEL 1	3,328 SF	UNIT MIX	
LEVEL 2	3,394 SF	2 BR UNITS	2 UNITS
LEVEL 3	3,394 SF	3 BR UNITS	4 UNITS
OVERALL BUILDING	10,116 SF	TOTAL	6 UNITS



LEVEL 1 - 3/32" = 1'-0"

NOTES

- Storage at level 2 & 3 available for owner or residents depending on MPHA needs.
- Bike storage provided at on grade resident storage, and at Bike Alcove.
- Level 1 units meet MN Accessibility Type A requirements for accessibility.
- Screening at water heater can be provided at request of MPHA.
- Units designed to MHFA design standards.
- Building will be built above a crawl space.

Alvera – Design Process





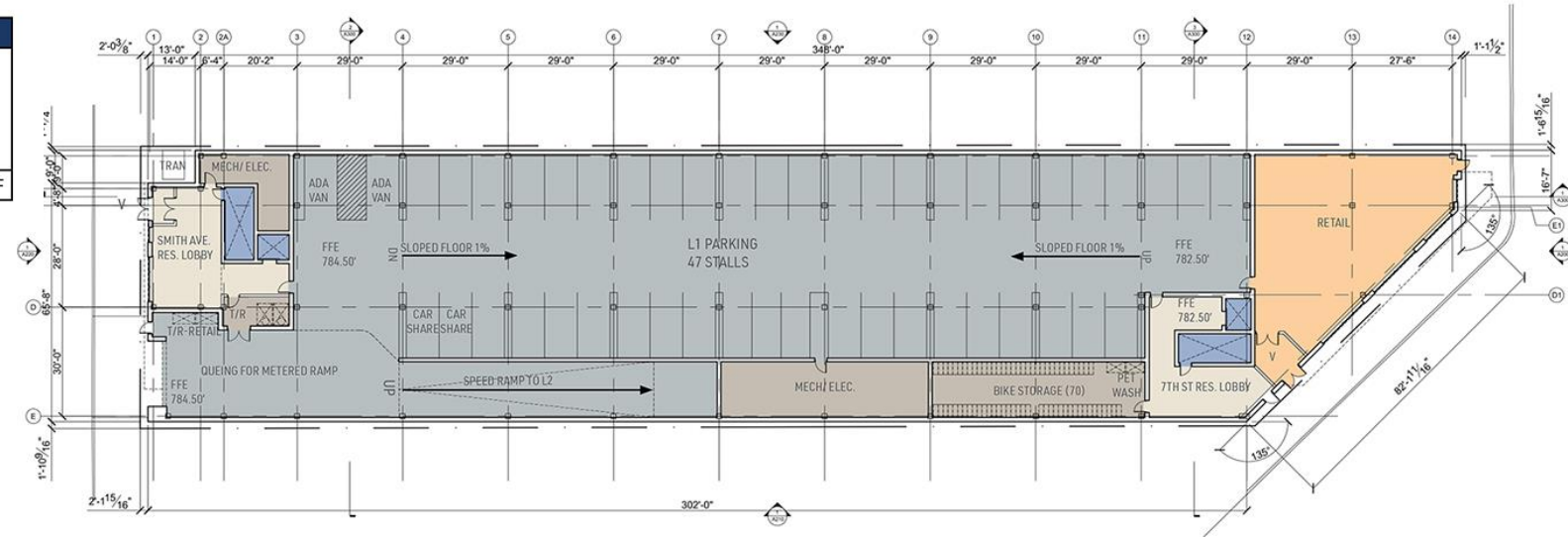
- Alvera is the tallest and largest modular building in the state standing at 85-feet tall
- Five stories of modular wood construction over two stories of concrete construction
- Largest mechanized car stacking system in the region with 102 semi-automated stalls
- High-density development with 193 units on 0.61 acres (316 units/acre)
- Nationally recognized muralist was commissioned to create a large-scale installation on the building which benefits the neighborhood as well as patients at nearby hospitals
- Project is significant in providing a solution to attainable housing as well as visually transforming and engaging the neighborhood

Alvera – Typical Floor Plans

LEVEL 1 SUMMARY

Parking - 17,568 sf
 Core - 622 sf
 Common - 1,672 sf
 BOH - 2,639 sf
 Retail - 2,499 sf

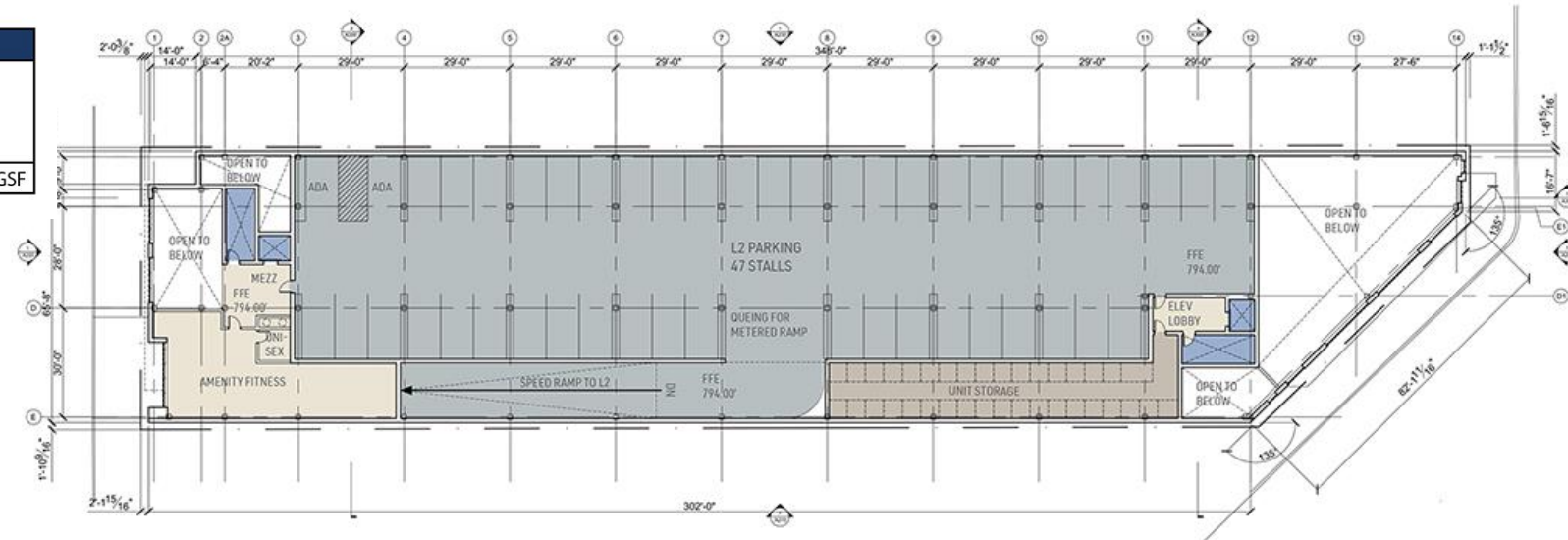
Total- 25,000 GSF



LEVEL 2 SUMMARY

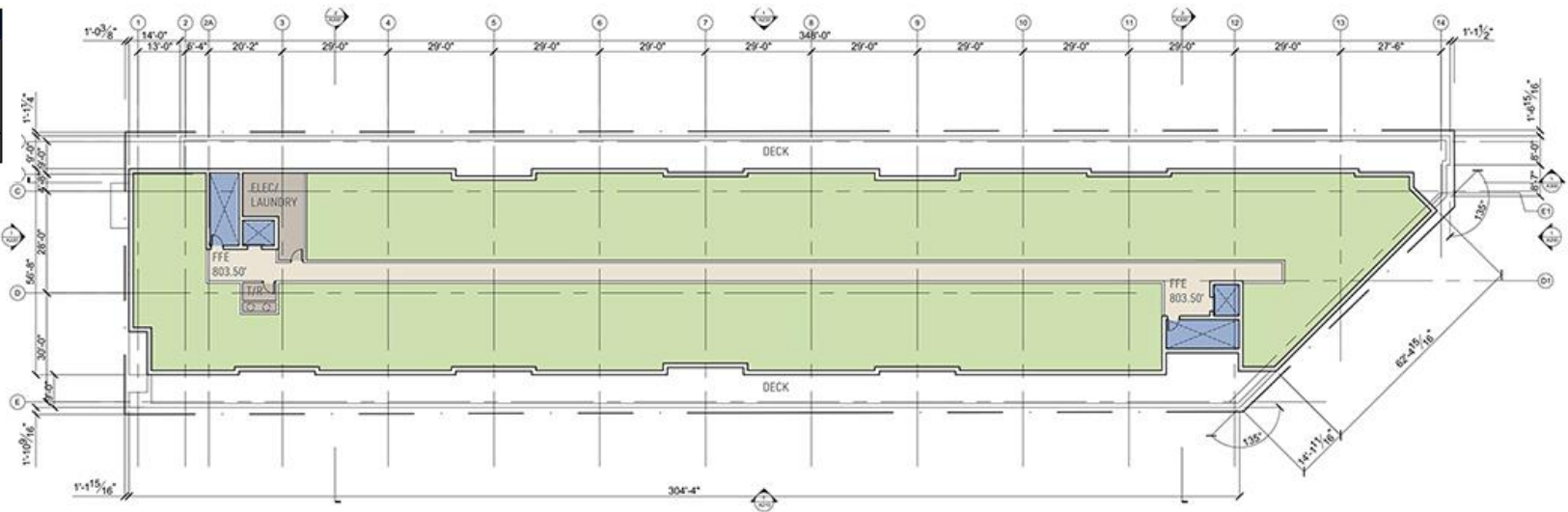
Parking - 165,597 sf
 Core - 622 sf
 Common - 2,149 sf
 BOH - 1754 sf

Total- 21,163 GSF

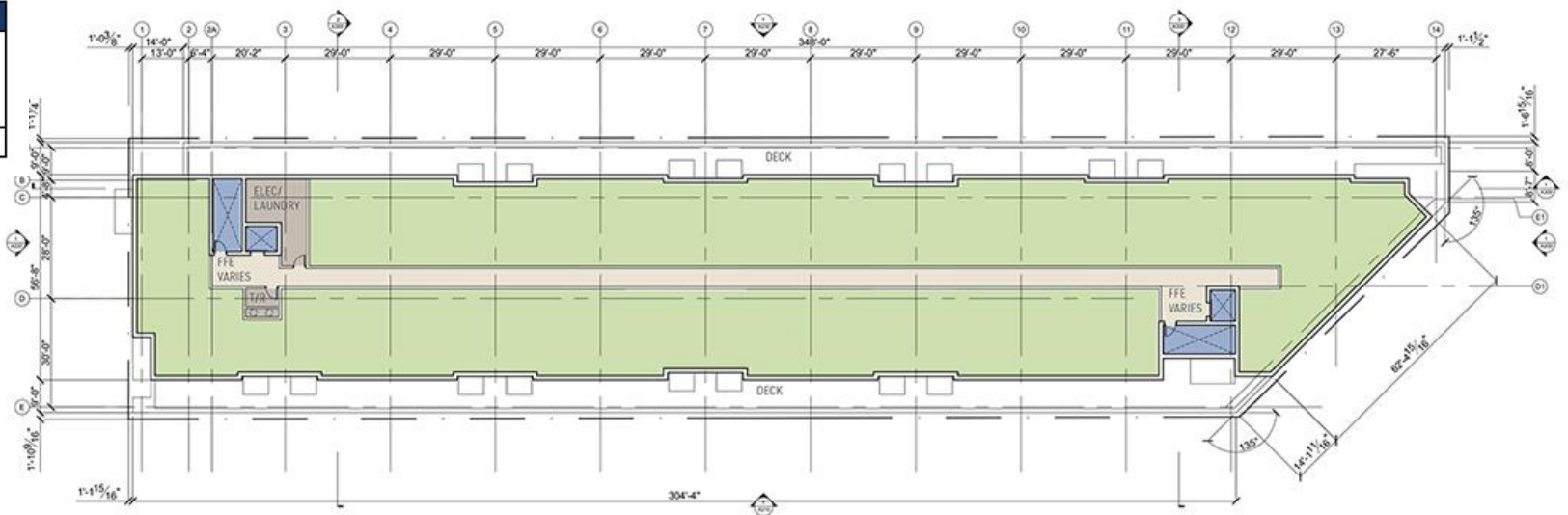


Alvera – Typical Floor Plans

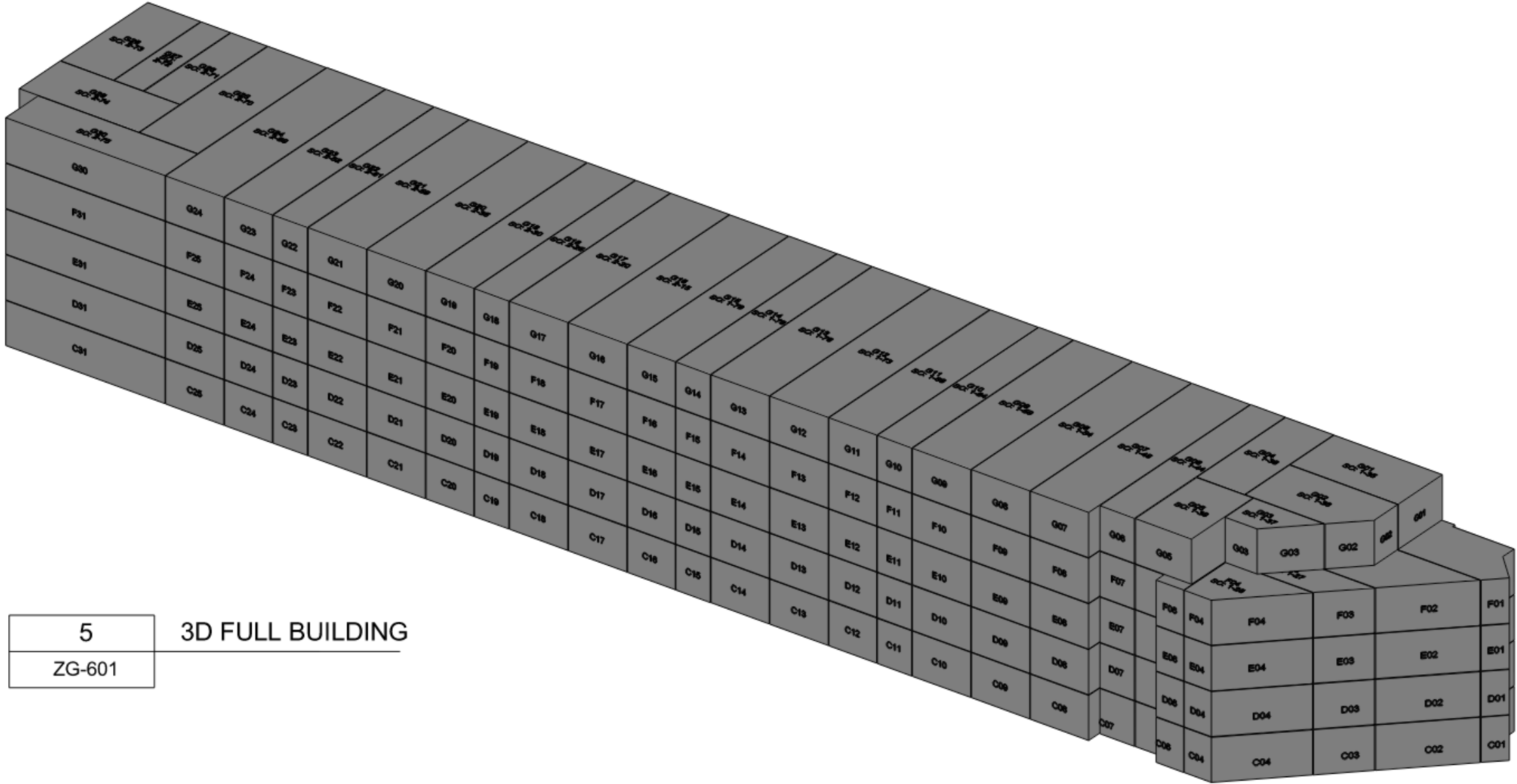
LEVEL 3 SUMMARY	
Residential - 15,934 sf	Total- 18,809 GSF
Core - 622 sf	
Common - 1,851 sf	
BOH - 402 sf	



LEVEL 4-6 SUMMARY	
Residential - 15,934 sf	Total- 18,809 GSF
Core - 622 sf	
Common - 1,851 sf	
BOH - 402 sf	



ALVERA: St. Paul - 192 Unit Market Rate – MOD Layout & Setting Sequence



5	3D FULL BUILDING
ZG-601	

Building Exterior: Pre and Post Skin









Alvera – Mod Stack Time Lapse



The Alvera (St. Paul, MN)

Alvera



Alvera

