

Offsite Wood Solutions for Schools

Credits: 1.0 AIA/CES HSW LUs, 1.0 PHD credit, 0.10 ICC credit

MASS TIMBER+SM
OFFSITE CONSTRUCTION CONFERENCE

PRODUCED BY



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Peter Rose
Peter Rose + Partners,
IDCUBED



WoodWorks | The Wood Products Council

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Course Description

This session will provide a comprehensive overview of off-site construction applications for academic buildings and K-12 schools. Participants will learn how wood products such as cross-laminated timber (CLT) and glued-laminated timber (glulam) are reshaping how educational spaces are designed and constructed, along with how off-site construction lends to their advantages. The session will also address key considerations such as fire safety, structural performance, and code compliance. Real-world examples and implementation strategies will provide attendees with insights into how conventional wood framing and mass timber can support project goals related to sustainability, aesthetics, and occupant well-being in educational settings.

Learning Objectives

1. Identify the primary types of mass timber systems—such as cross-laminated timber (CLT) and glued-laminated timber (glulam)—and their structural applications in academic and K-12 school buildings.
2. Explain the key construction methods and sequencing strategies used in mass timber projects, including their impact on construction timelines, site logistics, and labor efficiency.
3. Evaluate the performance benefits of mass timber in educational environments, including fire resistance, acoustic performance, biophilic design qualities, and indoor environmental quality.
4. Assess how mass timber construction contributes to sustainability goals through reduced embodied carbon, renewable material use, and alignment with green building certifications and standards.



BUILT FAST. *Designed to last.*

Prefabricated Mass Timber Education Buildings

DAVE BECK
Executive VP



Disclaimer: This presentation was developed by a third party and is not funded by WoodWorks or the Softwood Lumber Board.

The logo for GRAHAM, featuring the word "GRAHAM" in a bold, red, italicized sans-serif font, with a black underline.

We Build to Improve Lives.
General Contractor delivering mass timber buildings since 2018.



Mass Timber Structure Builders
Design-Assist
Manufacturer Selection and Management
Receipt and Laydown
Mass Timber Erection



Built Fast. Designed to Last.
Prefabricate mass timber education buildings since 2021.

XL Construction

33

Years in Business

600+

Employees in North Cal

1 Million +

Square Footage of Mass timber Installed

31

Mass Timber Buildings

2018

Delivering Mass Timber Since

100+

Industry Awards

Mass Timber Expertise



School Building Needs



**California
DSA Precheck Permitting
(Over The Counter)**



Travis Unified School District Golden West Middle School Expansion

Fairfield, CA

TimberQuest Buildings:

Four 1-Story Building

Project Duration:

Complete

Programming:

Middle School classrooms,
a teacher workroom, and
restrooms



Interior Photos



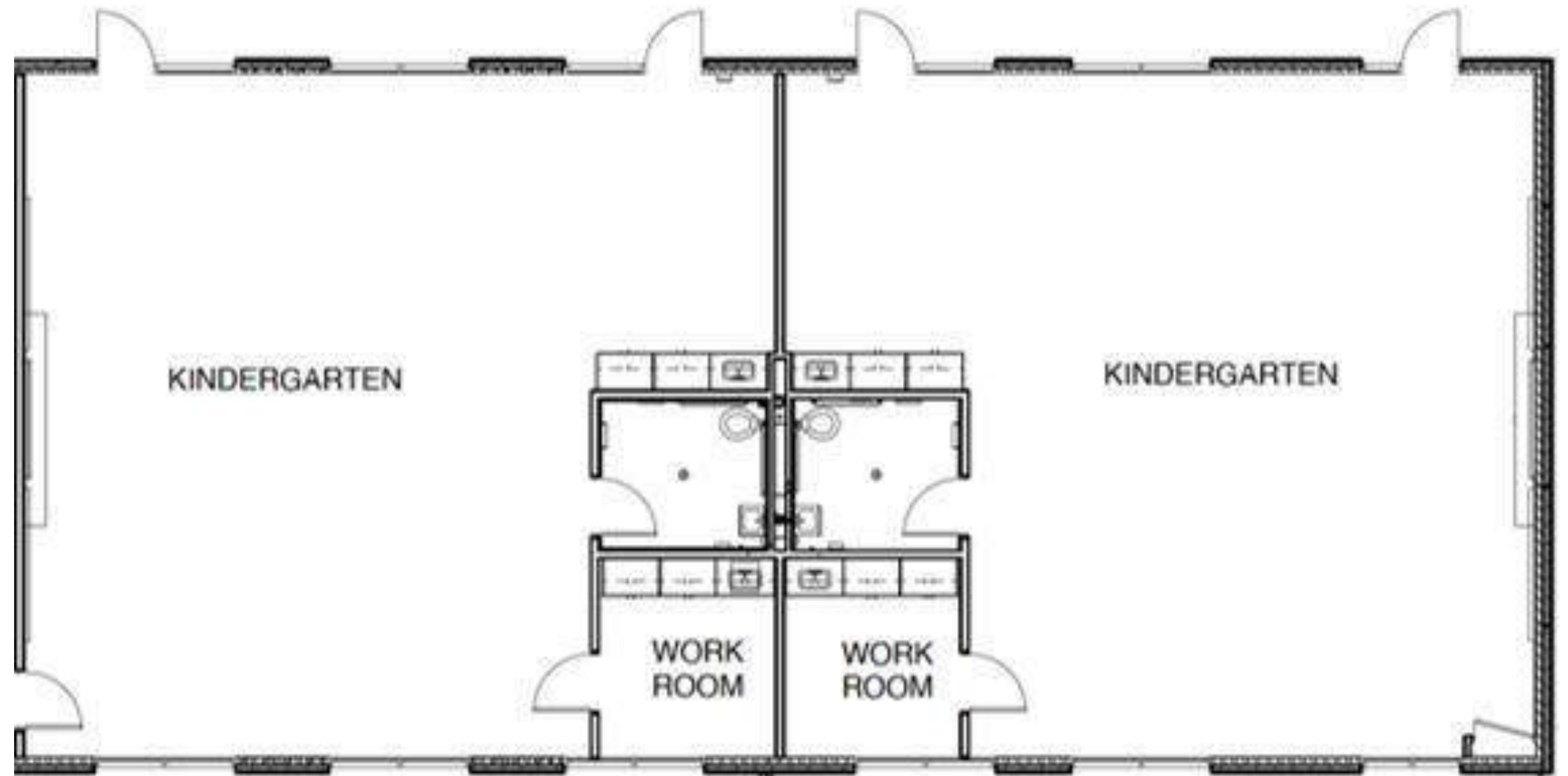
1-Story Flexible interiors included in DSA PC

Classroom | Program Expansion

- Standard Classroom
- Large Classroom
- Breakout
- TK/Kindergarten
- Admin. Offices/Conference Space
- Science
- Restrooms (3 layouts)

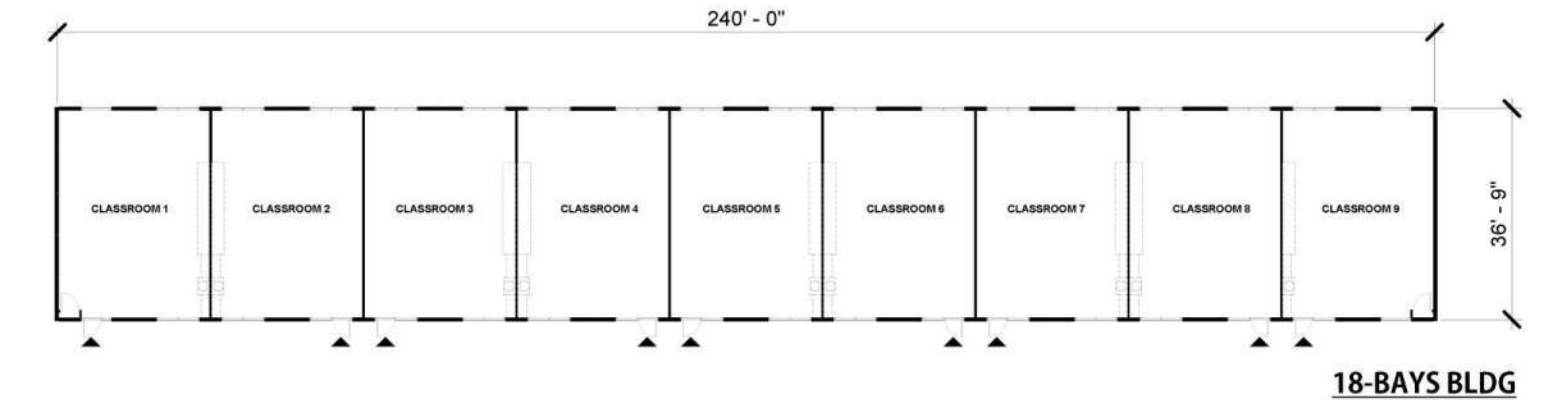
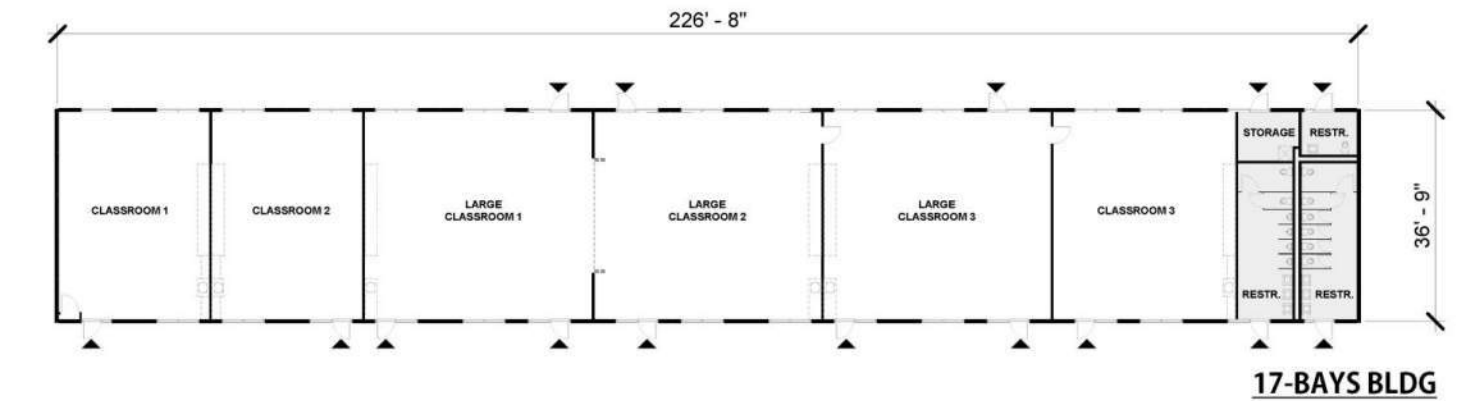
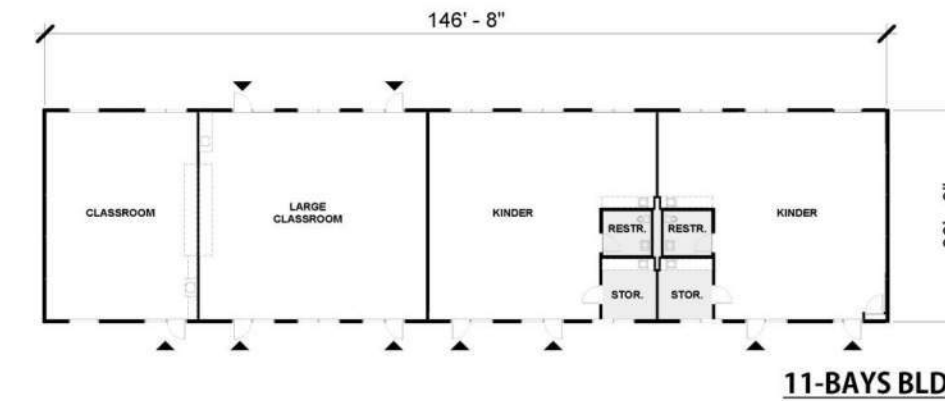
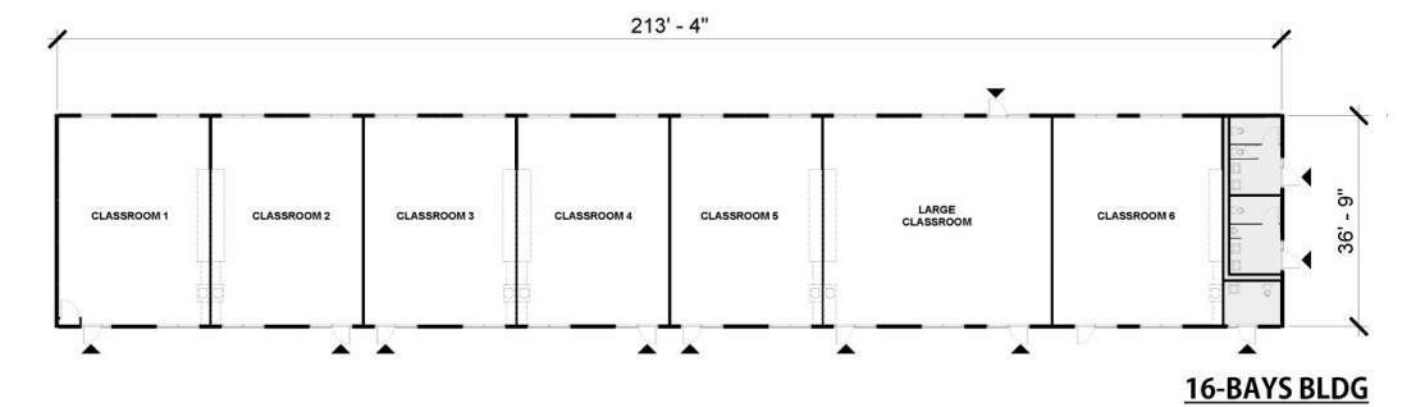
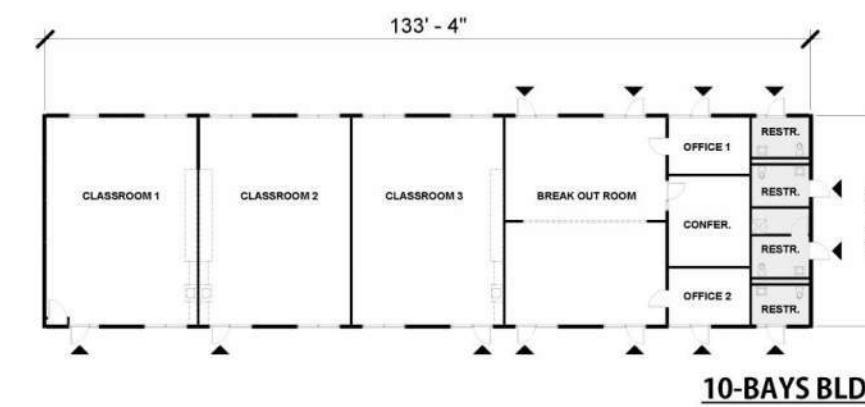
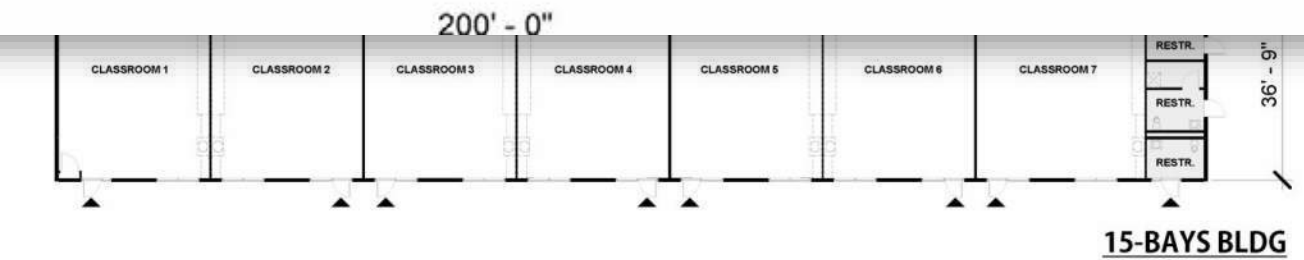
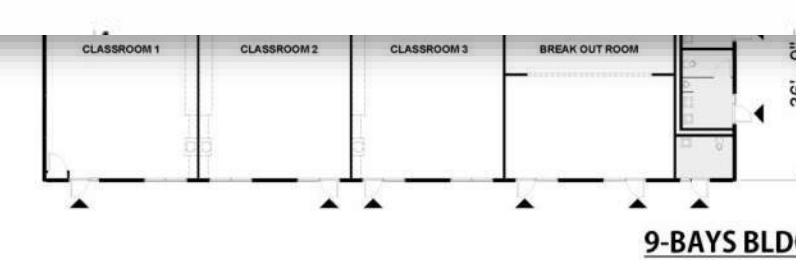
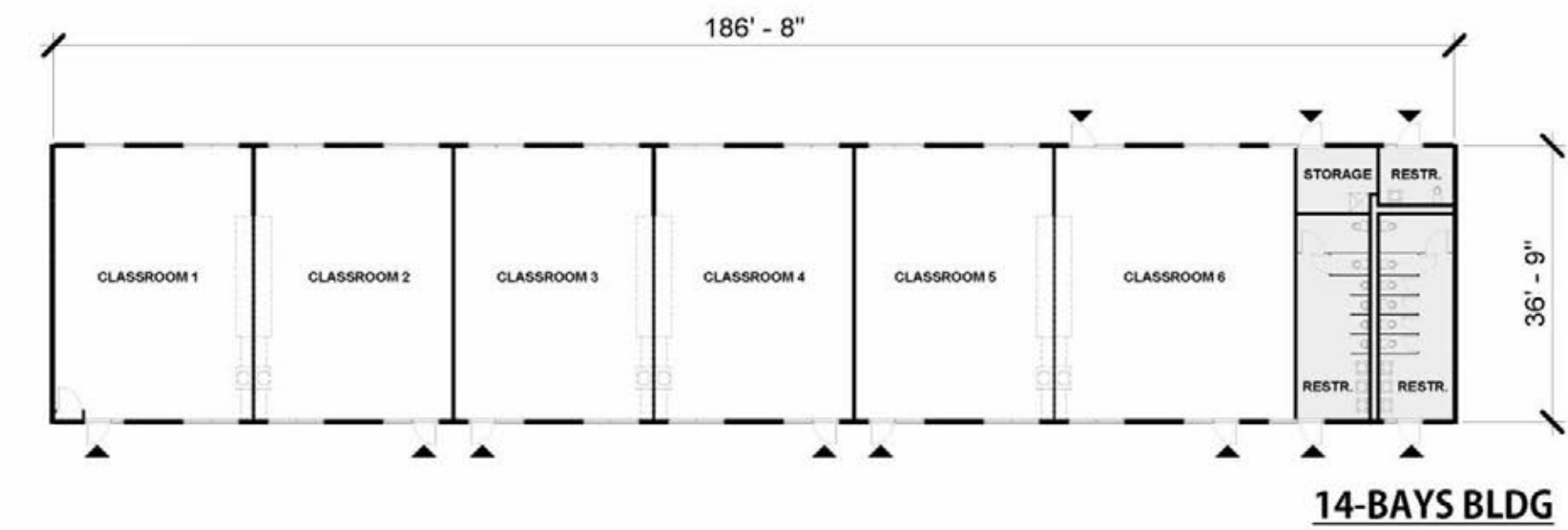
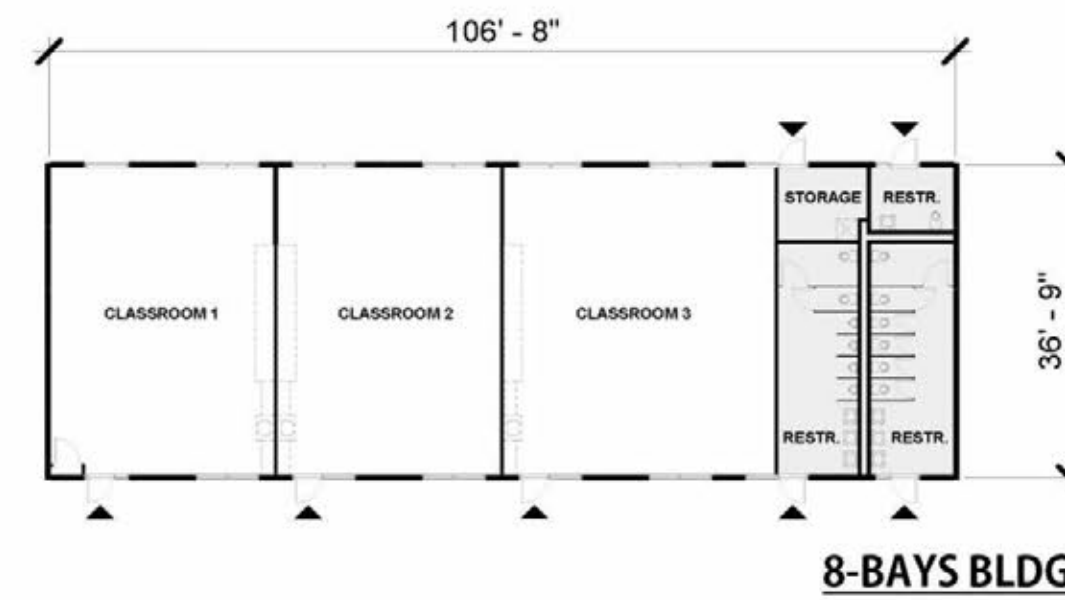
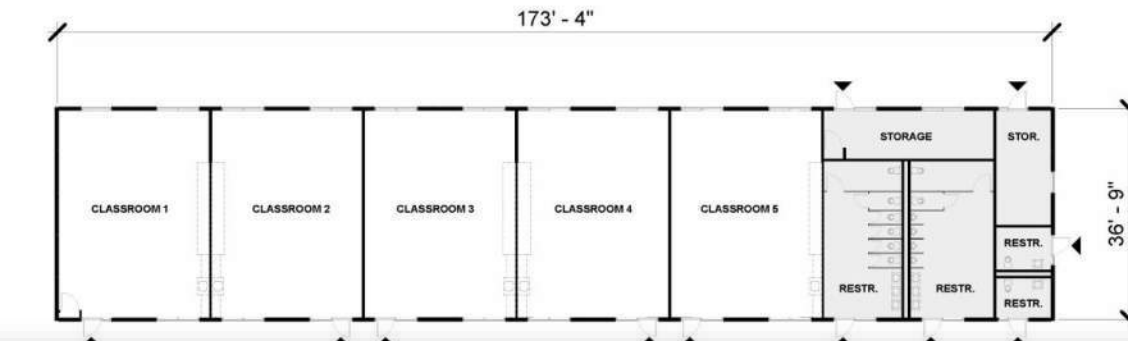
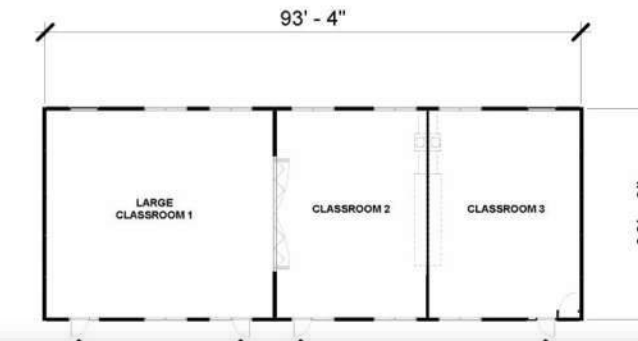
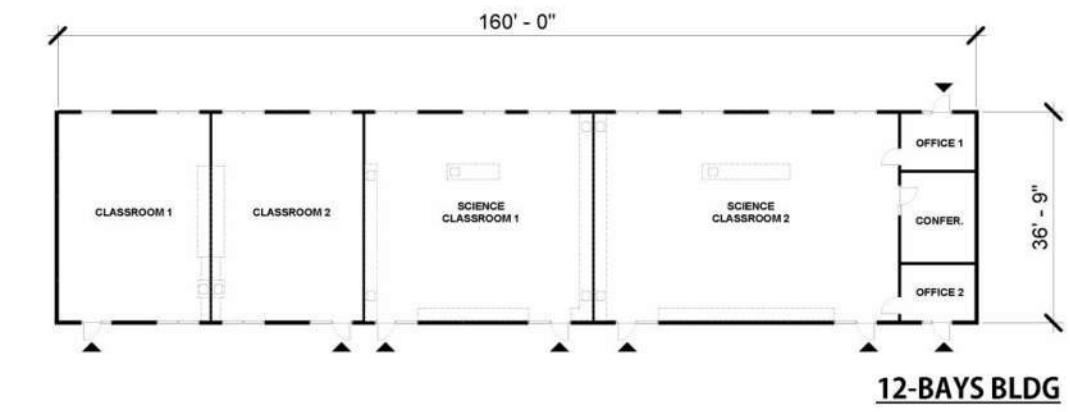
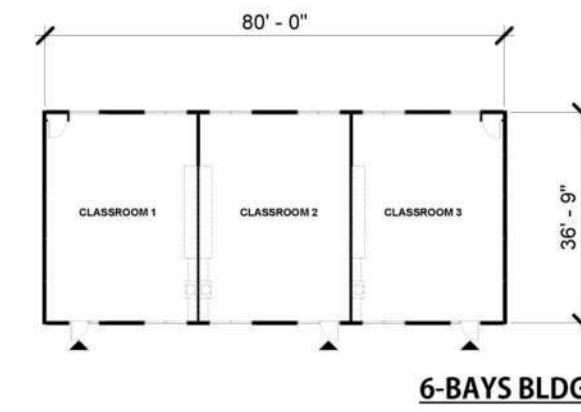
Transitional Kindergarten

- Title 5 Compliant
- Permanent construction
- Exceeds 1,350 s.f.
- Restrooms within classrooms
- Wet area sink



1-Story PC Layout Options

- 13 typologies
- 4 restroom configurations
- Classroom sizes in 500 s.f. increments
- Maximum shear wall spacing (8) bays / 4,000 s.f.



Prefabricated Kit of Parts - Cleverly Designed to Integrate MEP Systems



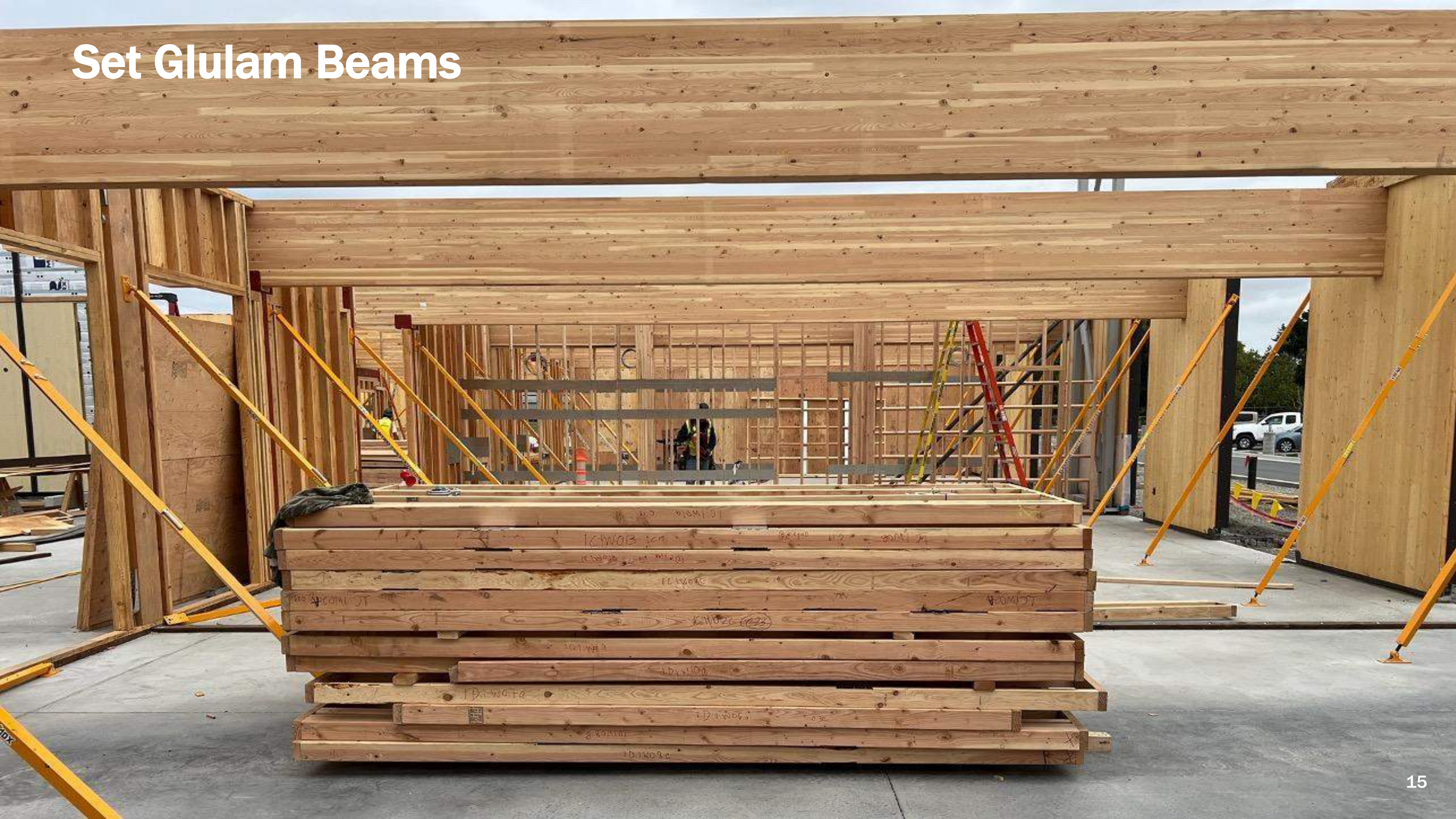
Shipped: Flat Pack



Erect CLT Prefabricated Walls First



Set Glulam Beams



Install CLT Panels



Integrated MEP Raceways



Bulkhead Connecting Walls to Ceiling



Prefabricated Ductwork



Glulam Penetrations for Fire Mains



Exterior Skin



Prefabricated Storefront Inserted Between CLT Wall Panels



Integrated CLT Overhangs



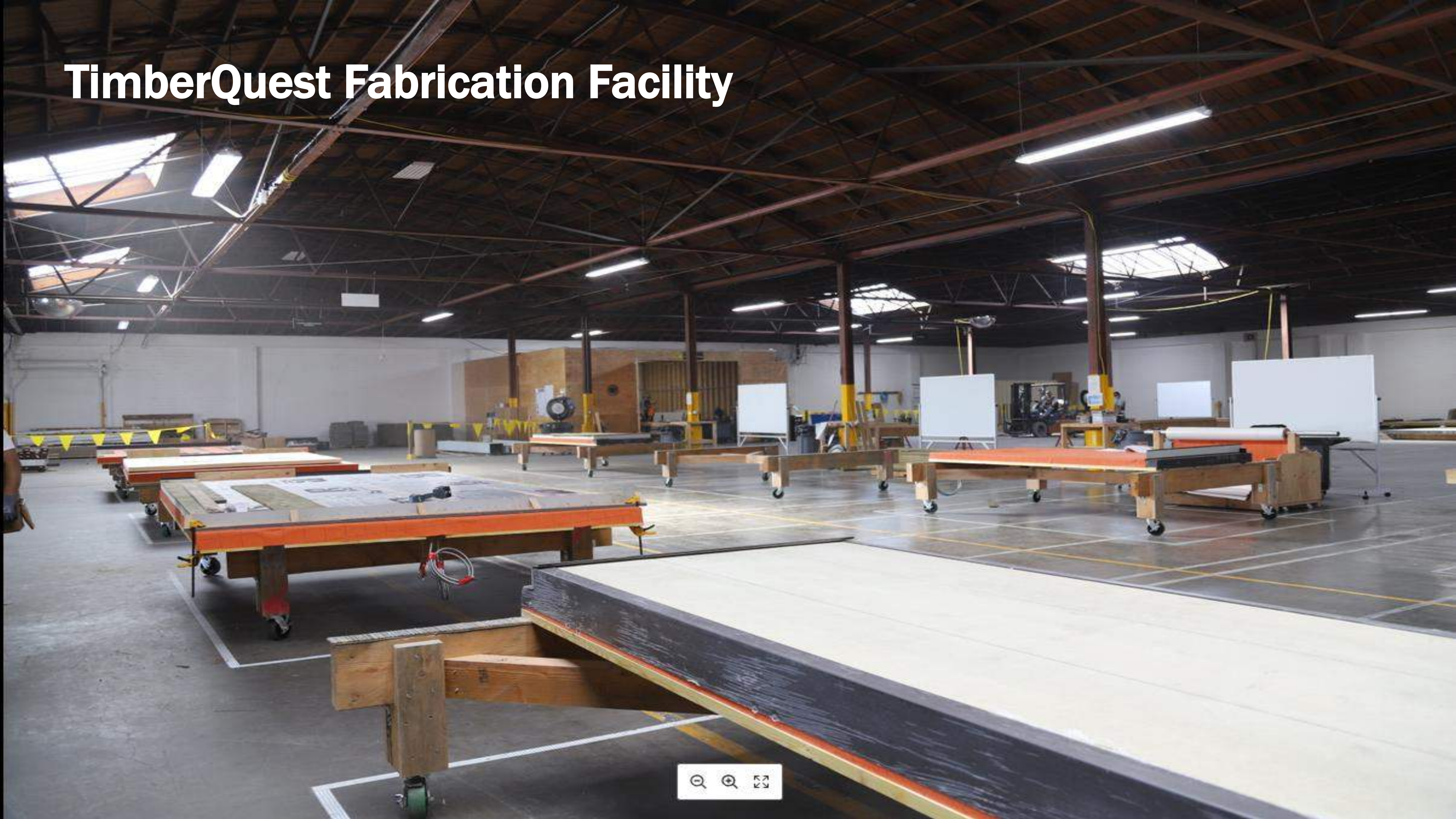
Prefabricated Steel Canopies



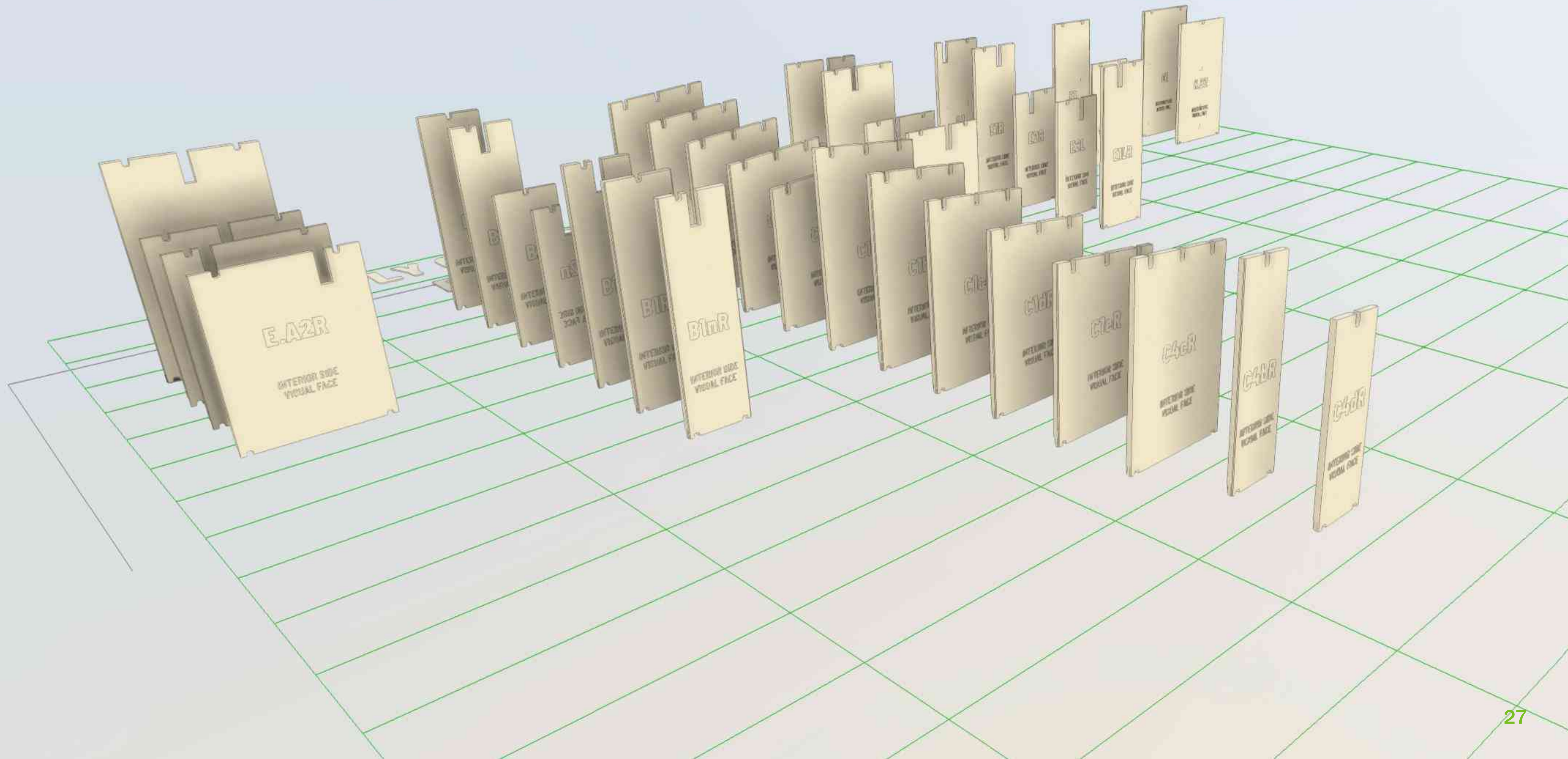
Prefabricated Roof Screens



TimberQuest Fabrication Facility

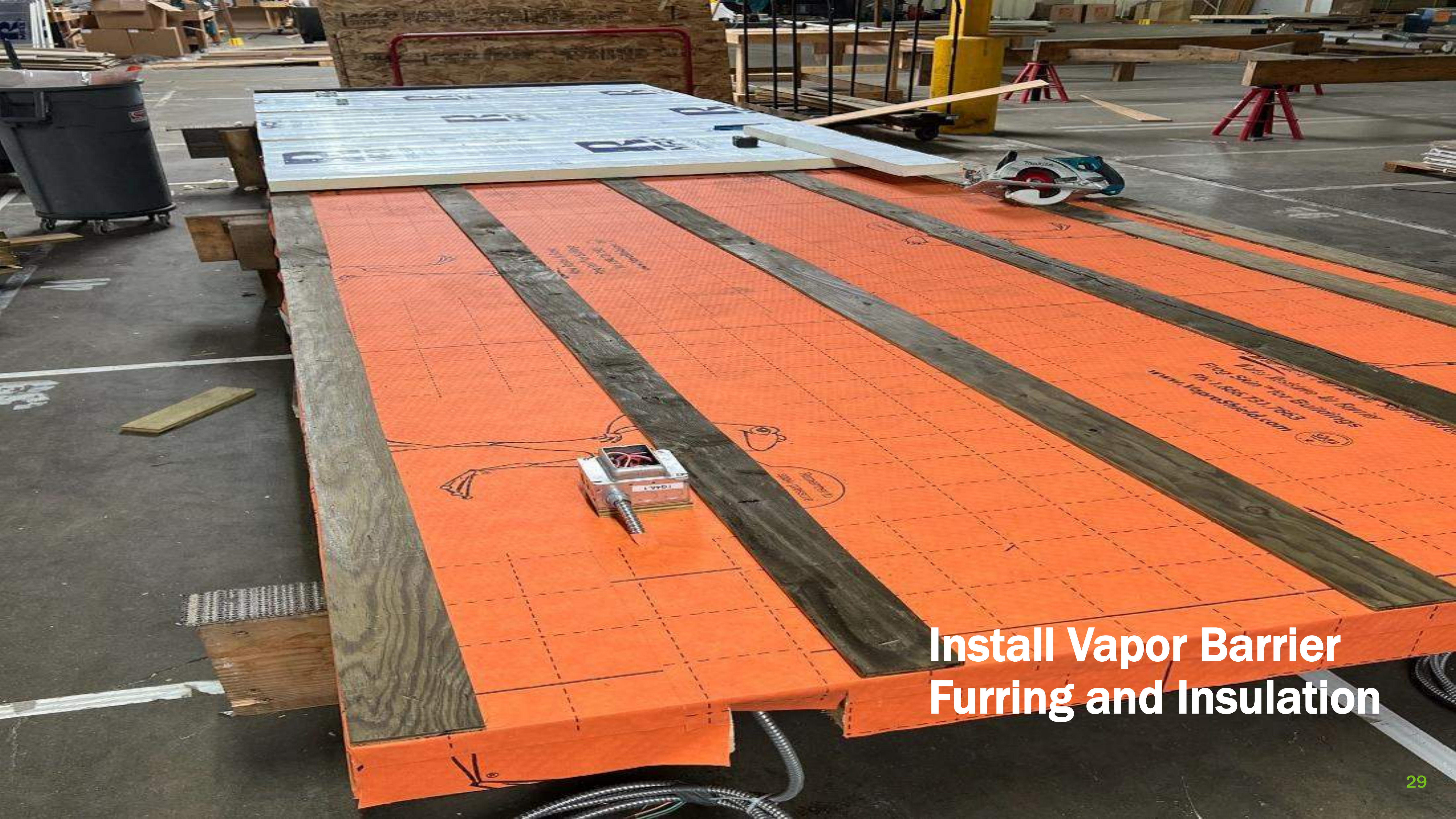


Panel Kit of Parts



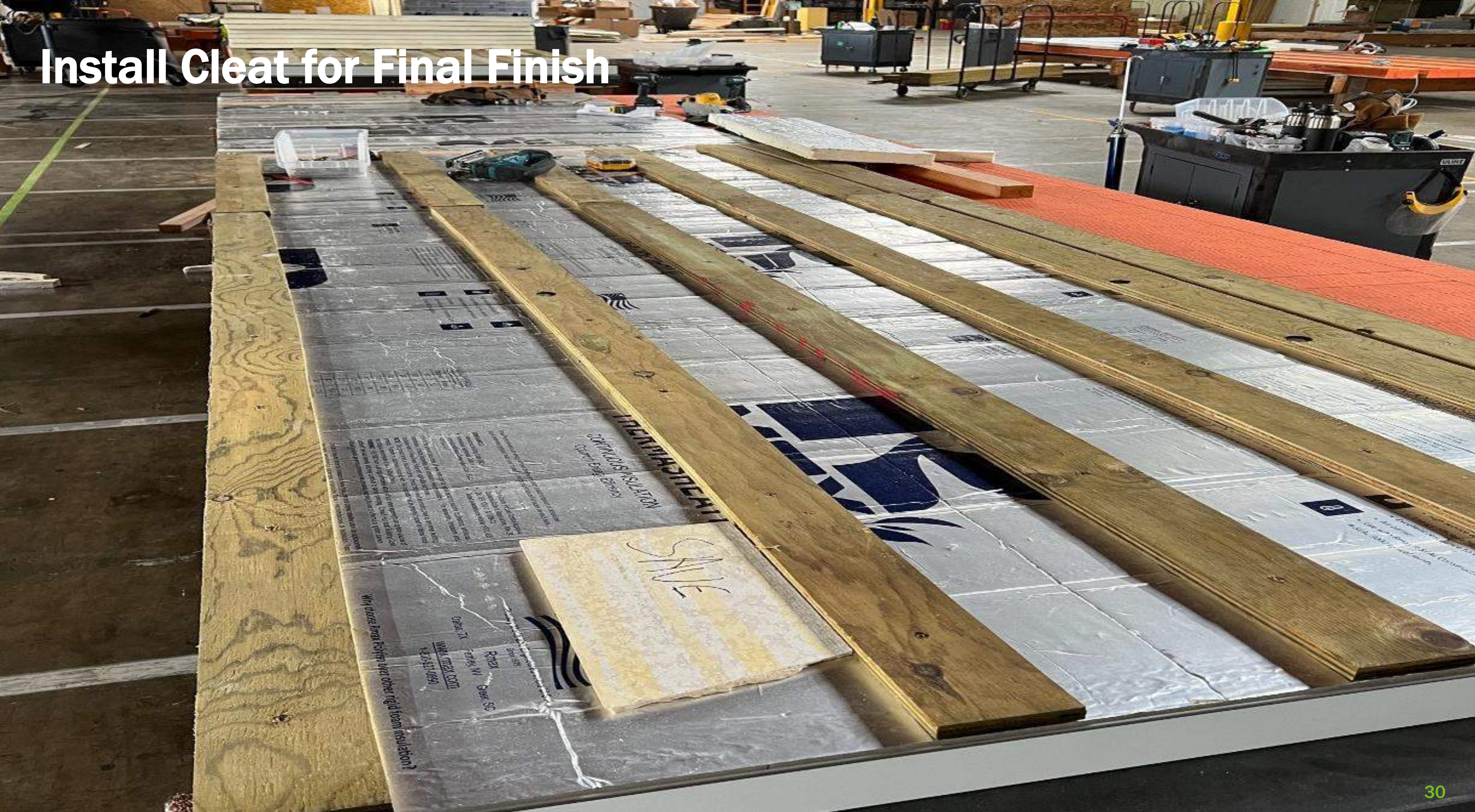
Install Base Angle and Sheathing





**Install Vapor Barrier
Furring and Insulation**

Install Cleat for Final Finish



Install Final Skin Product



Prefabricate Interior Walls



Benefits



50% Faster and at a lower cost than traditional construction



75+ Year permanent building



DSA Pre-check approved options



PLA Compliant. Build with Union labor.



Limited disruption to your school and community



Sustainable – Energy efficient, low carbon, less waste, solar ready



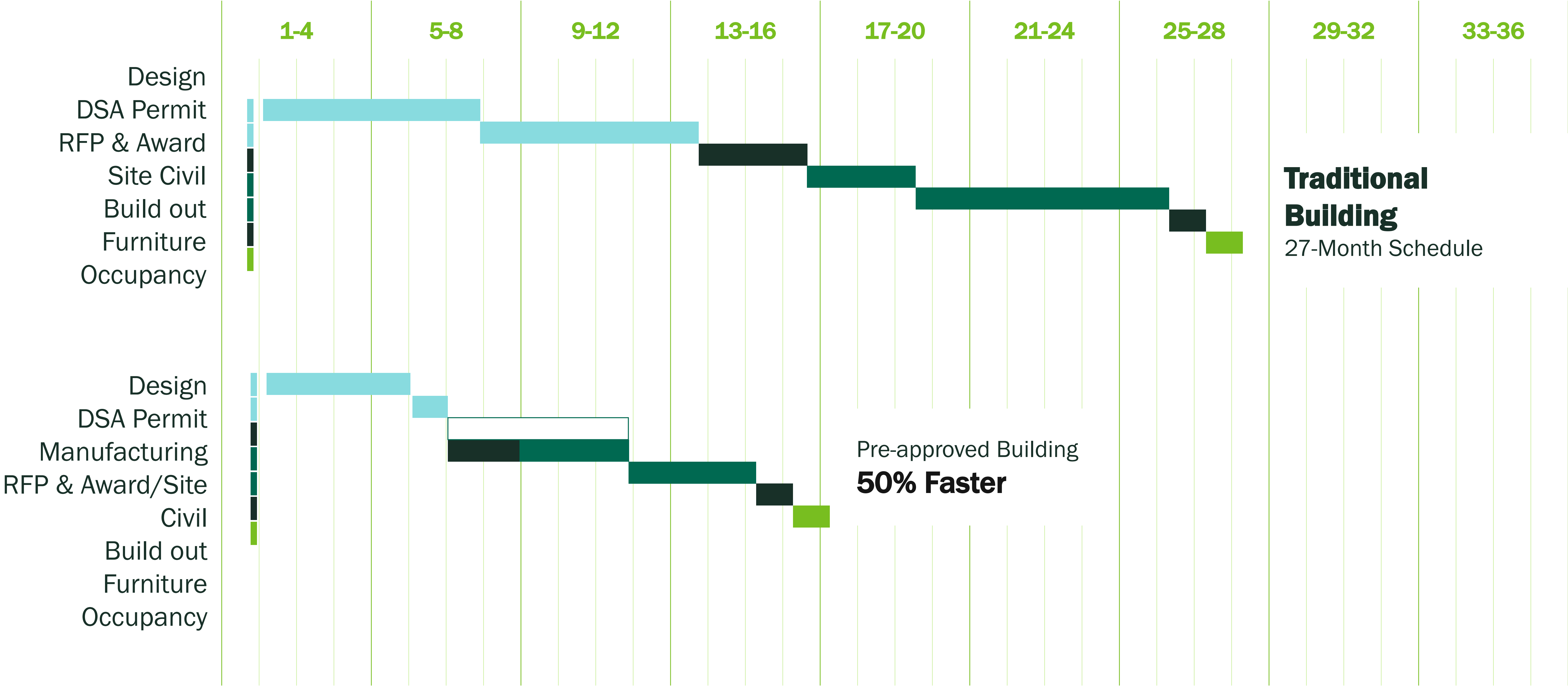
Flexible design



Benefits of biophilia | A superior learning environment

Schedule Benefits

Building Design and Construction Schedule



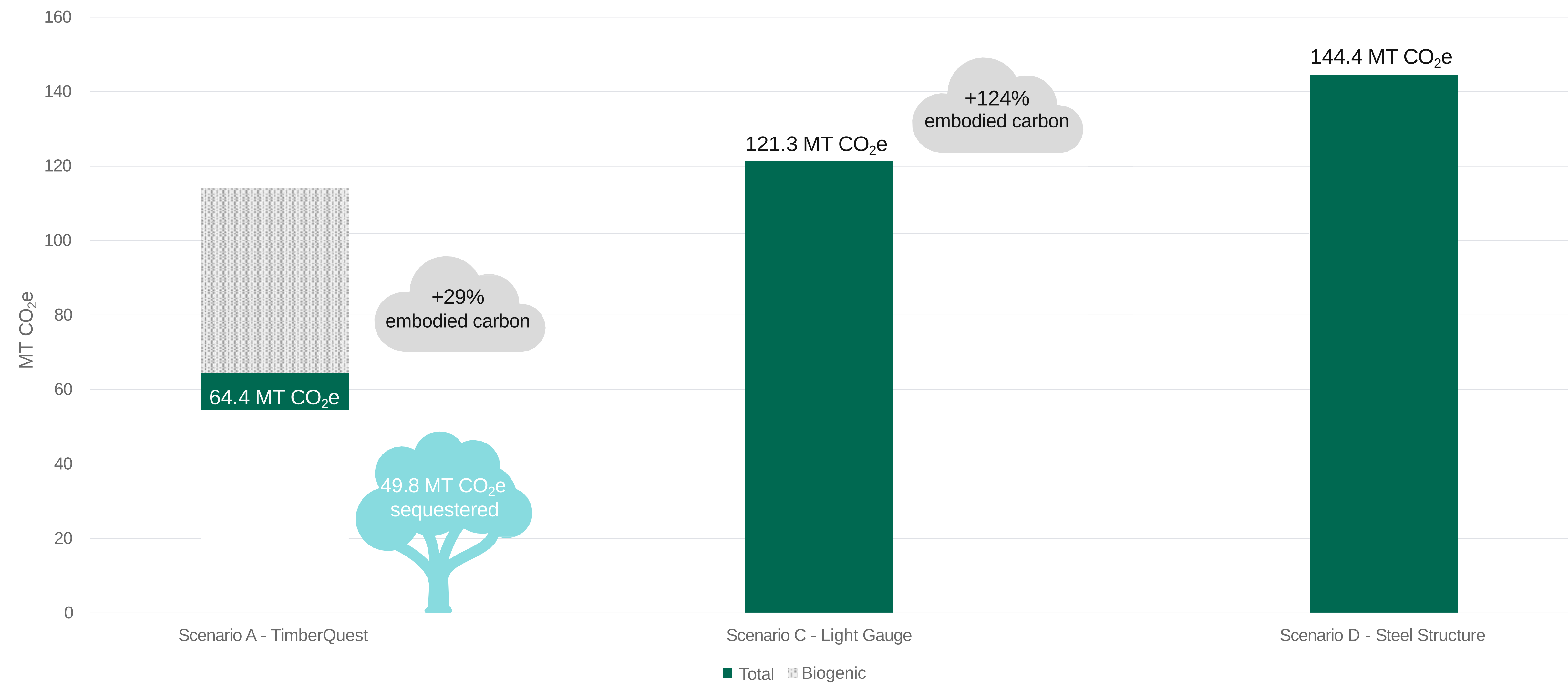


Sustainable Attributes

- ✓ Exceeds Title 24 standards by 35-60%
- ✓ A minimum of 45% less carbon than steel & concrete
- ✓ Built with responsibly sourced wood
- ✓ Solar ready
- ✓ All electric
- ✓ CHPS Ready / LEED Silver + / LBC
- ✓ Reduced waste
- ✓ Biophilic design for user well-being

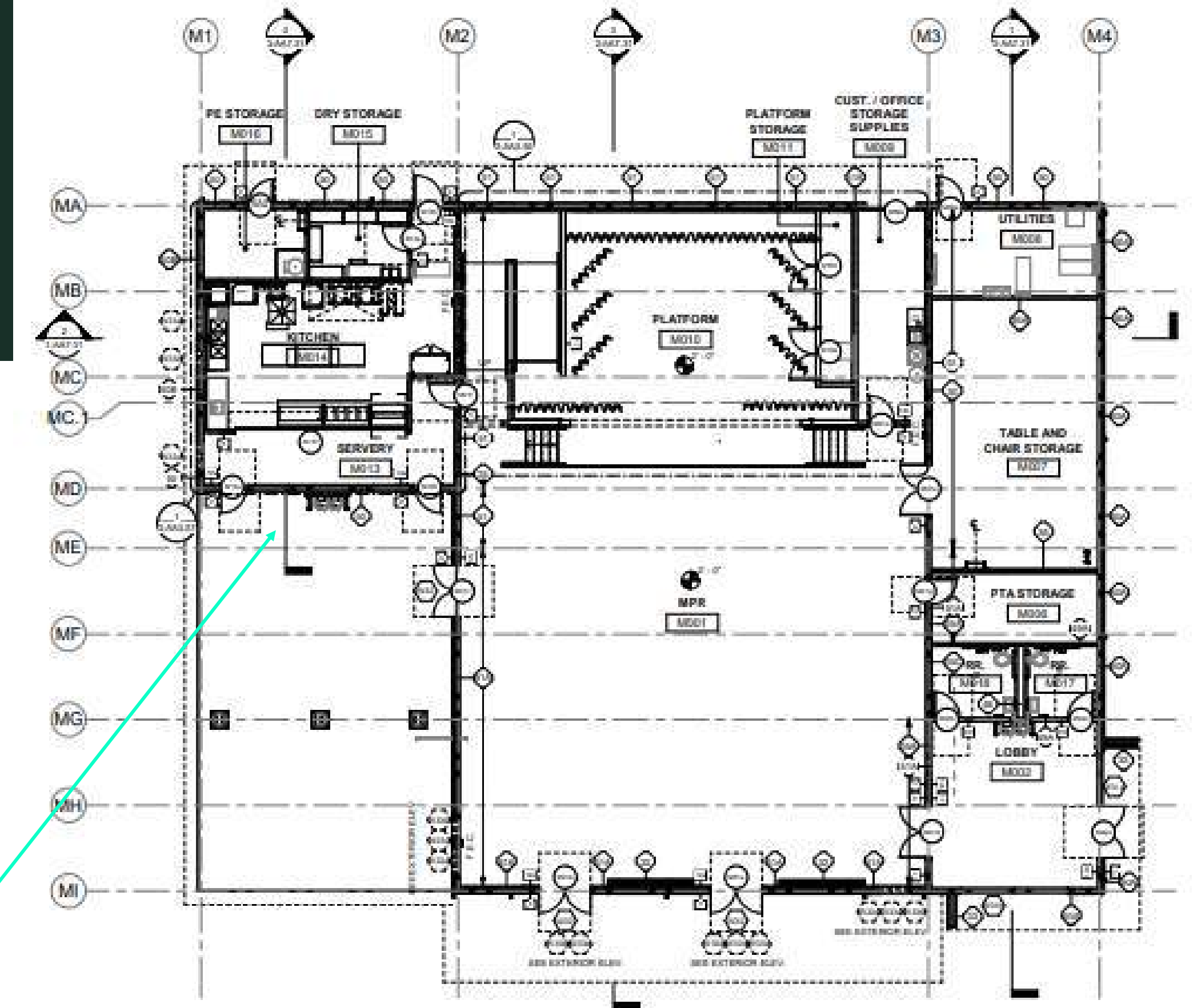
Embodied Carbon Analysis

55% Reduction Compared to Steel Structures



Gym | Multi-Purpose Rm

- Utilizes same Kit-of-Parts design, No DSA Pre-check
- Flexible interiors – weight room, locker room, kitchen, servery, etc.



2-Story Features

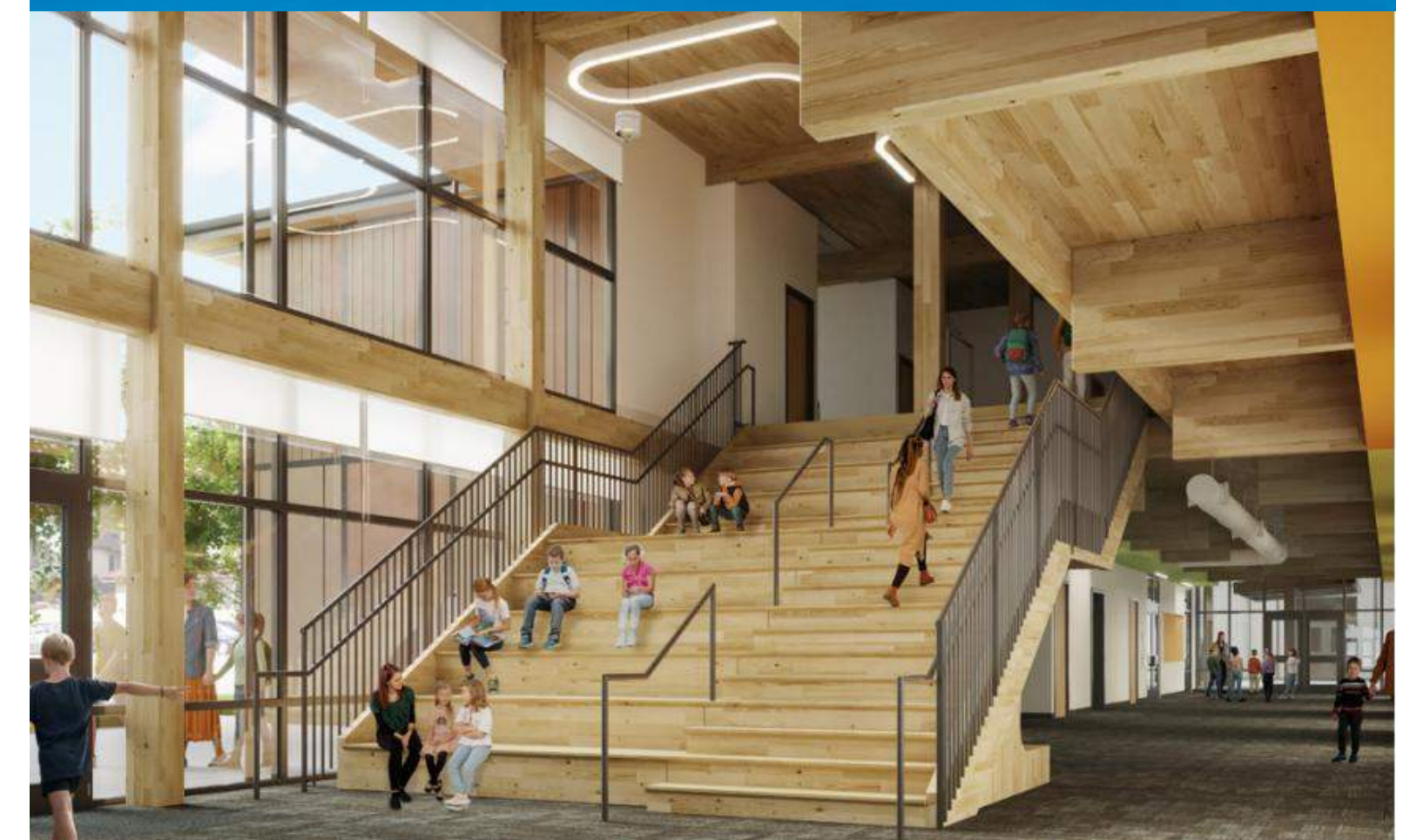
- Utilizes same Kit-of-Parts Template design; **No DSA Pre-Check**
- Celebrates exposed wood structure inside where desired
- Flexible interior program space



2 Story Single Sided, Exterior Corridor



2 Story Double Sided, Interior Corridor



TIMBERQUEST

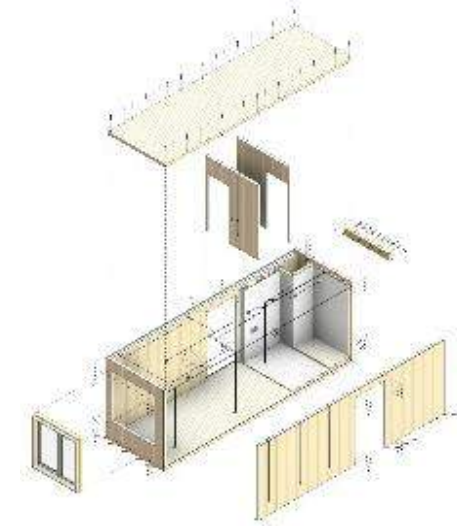
Thank You

*This concludes The American Institute of Architects
Continuing Education Systems Course.*



MODULAR MASS TIMBER

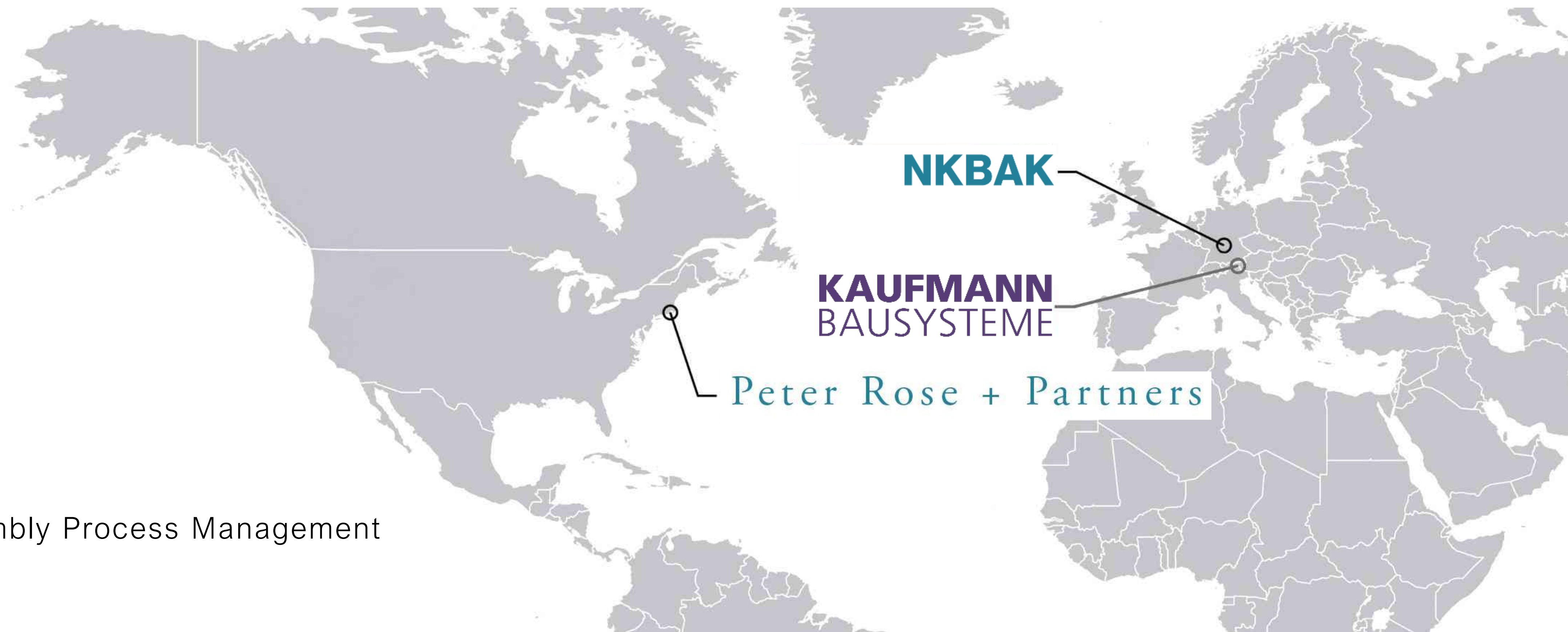
Bringing construction into the
digital / robotic era



INTEGRATED DESIGN CUBED

MODULAR MASS TIMBER

- Building Design
- Module Design
- Timber Component Design
- Other Component Design
- Supply Chain Management
- Module and Building Assembly Process Management



NKBK

**KAUFMANN
BAUSYSTEME**

Peter Rose + Partners

MODULAR MASS TIMBER KEY ELEMENTS

Mass Timber



MODULAR MASS TIMBER KEY ELEMENTS

Mass Timber – Robotically Fabricated



MODULAR MASS TIMBER KEY ELEMENTS

Mass Timber Modules



MODULAR MASS TIMBER KEY ELEMENTS

Mass Timber Modules



MODULAR MASS TIMBER KEY ELEMENTS

Modular Mass Timber Buildings



MODULAR MASS TIMBER KEY ELEMENTS

An Integrated Team

IDCUBED



Peter Rose, AIA, FRAIC
IDCUBED Co-Founder

Peter Rose + Partners
Founding Principal

Harvard GSD
Professor



Andreas Krawczyk
IDCUBED Co-Founder

NKBAK
Founding Principal



Christian Kaufmann
IDCUBED Partner

Kaufmann Bausysteme (KBS)
Founding Principal

FABRICATORS



Todd Thesing
Fabrication Partner

Highline Partners
Co-Founder



Rob McRae
Fabrication Partner

Highline Partners
Co-Founder



Stani Iordanova
IDCUBED Senior Director

Peter Rose + Partners
Principal



Christopher Flass
IDCUBED Project Director

Peter Rose + Partners
Principal



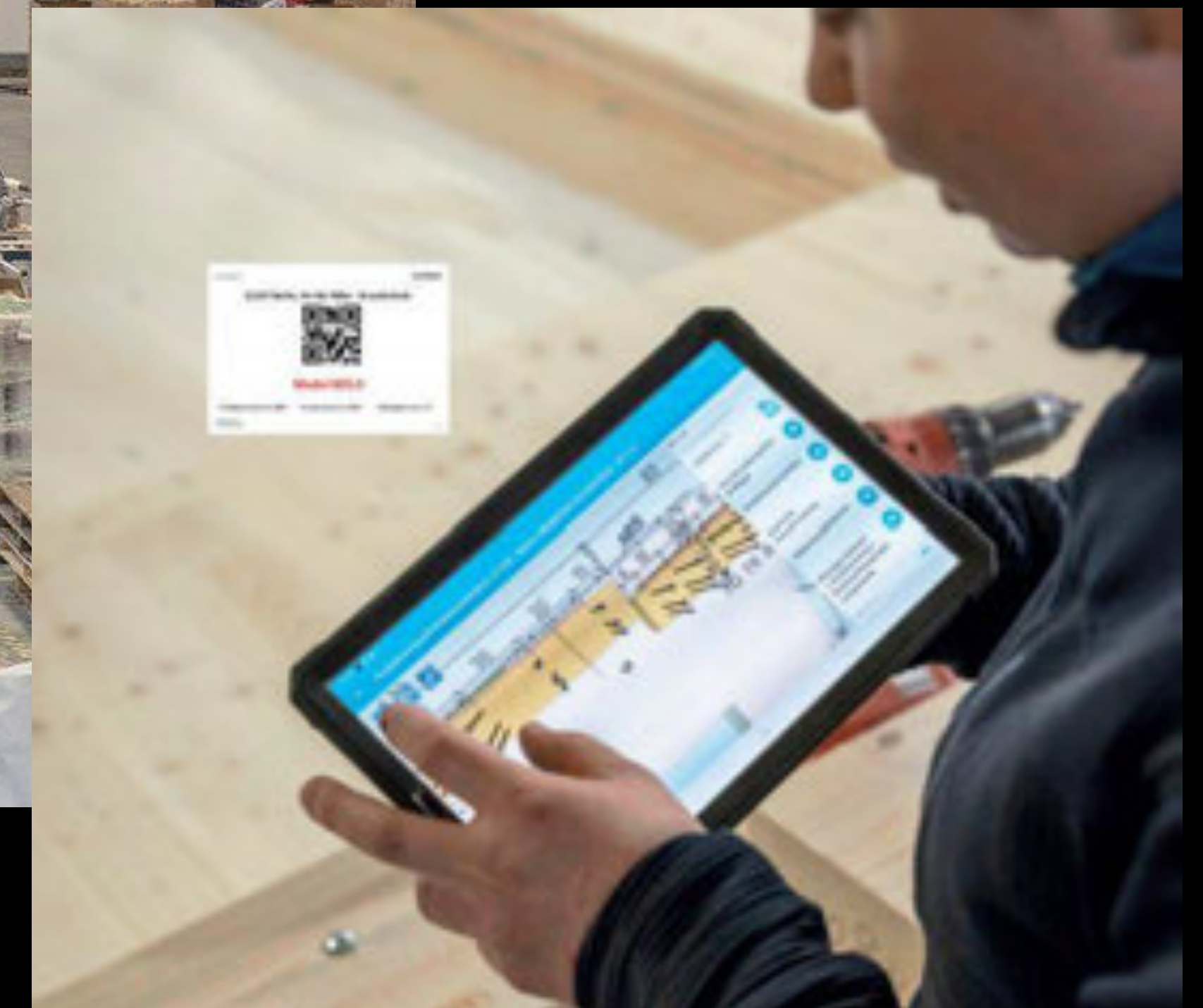
Justin Cook
IDCUBED Co-founder

RISD Center for Complexity
Founding Director

An integrated team of highly skilled architects and fabricators, *in constant communication*, designing and directing every aspect of the process.

MODULAR MASS TIMBER KEY ELEMENTS

Software



Supply chain and module assembly managed remotely by our software.

MODULAR MASS TIMBER OUTLINE

- 1. BENEFITS** many
- 2. PROJECTS** what we do
- 3. PROCESS** how it works
- 4. RESEARCH** how we got here

MODULAR MASS TIMBER BENEFITS

SIMPLY BETTER

AS COMPARED TO
CONVENTIONAL
CONSTRUCTION
PROCESSES

MODULAR MASS TIMBER BENEFITS

SIMPLY BETTER

QUICKER

AS MUCH AS 50% SHORTER
CONSTRUCTION TIMES

MODULAR MASS TIMBER **BENEFITS**

SIMPLY BETTER

QUICKER

LOWER IN COST

EVERY COMPLETED PROJECT
LESS IN COST
THAN COMPARABLES

MODULAR MASS TIMBER **BENEFITS**

SIMPLY BETTER

QUICKER

LOWER IN COST

PREDICTABLE

EVERY PROJECT
(MORE THAN 40)
ON TIME, ON BUDGET

MODULAR MASS TIMBER **BENEFITS**

SIMPLY BETTER

QUICKER

LOWER IN COST

PREDICTABLE

VERY HIGH QUALITY

CLOSE TO DEFECT-FREE

MODULAR MASS TIMBER **BENEFITS**

SIMPLY BETTER

QUICKER

LOWER IN COST

PREDICTABLE

VERY HIGH QUALITY

AN AGILE PROCESS

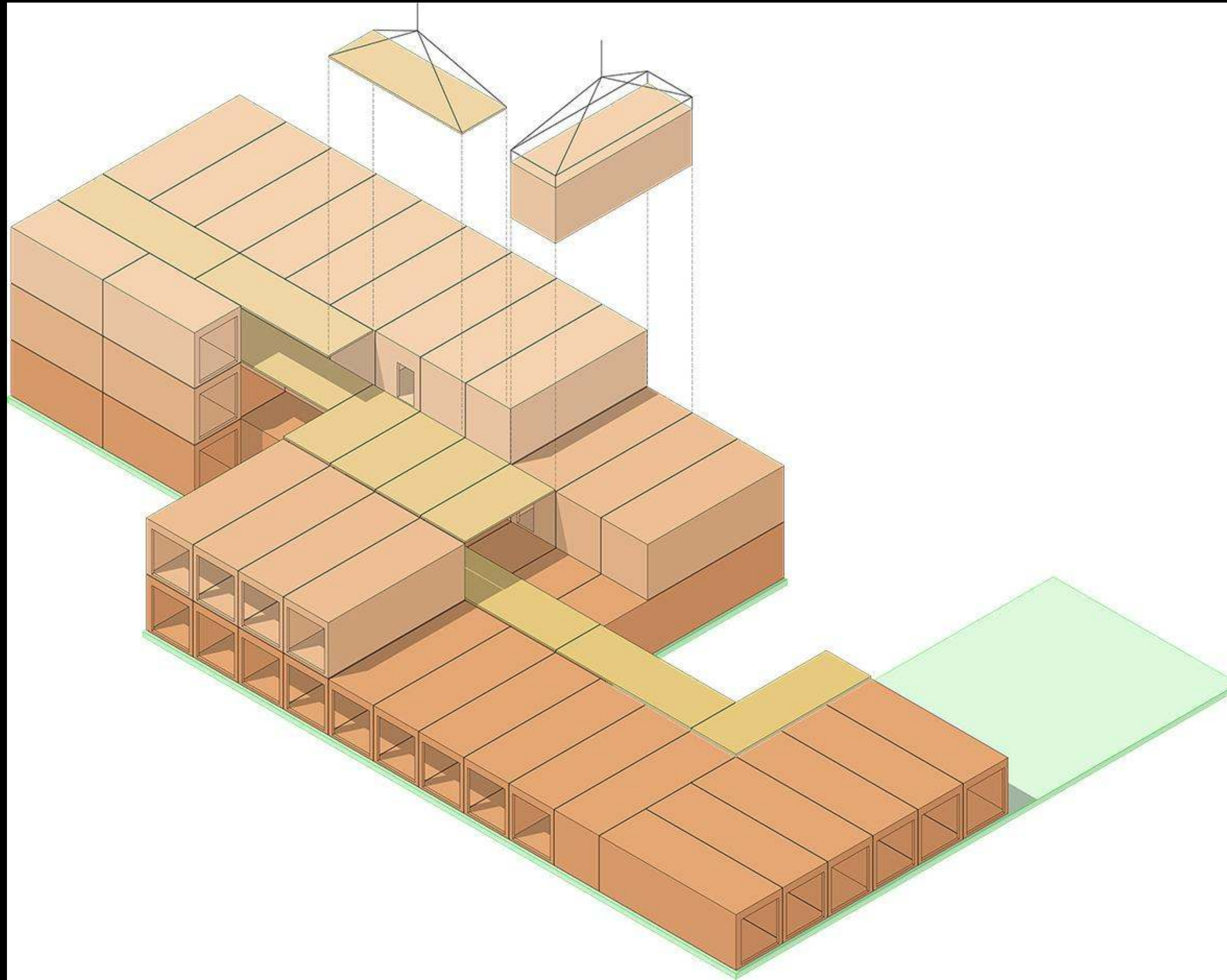
FOR A WIDE RANGE OF
PROGRAMS AND SCALES

MODULAR MASS TIMBER SCHOOL PROJECTS

EUROPEAN SCHOOL FRANKFURT 2014 - 2015



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS

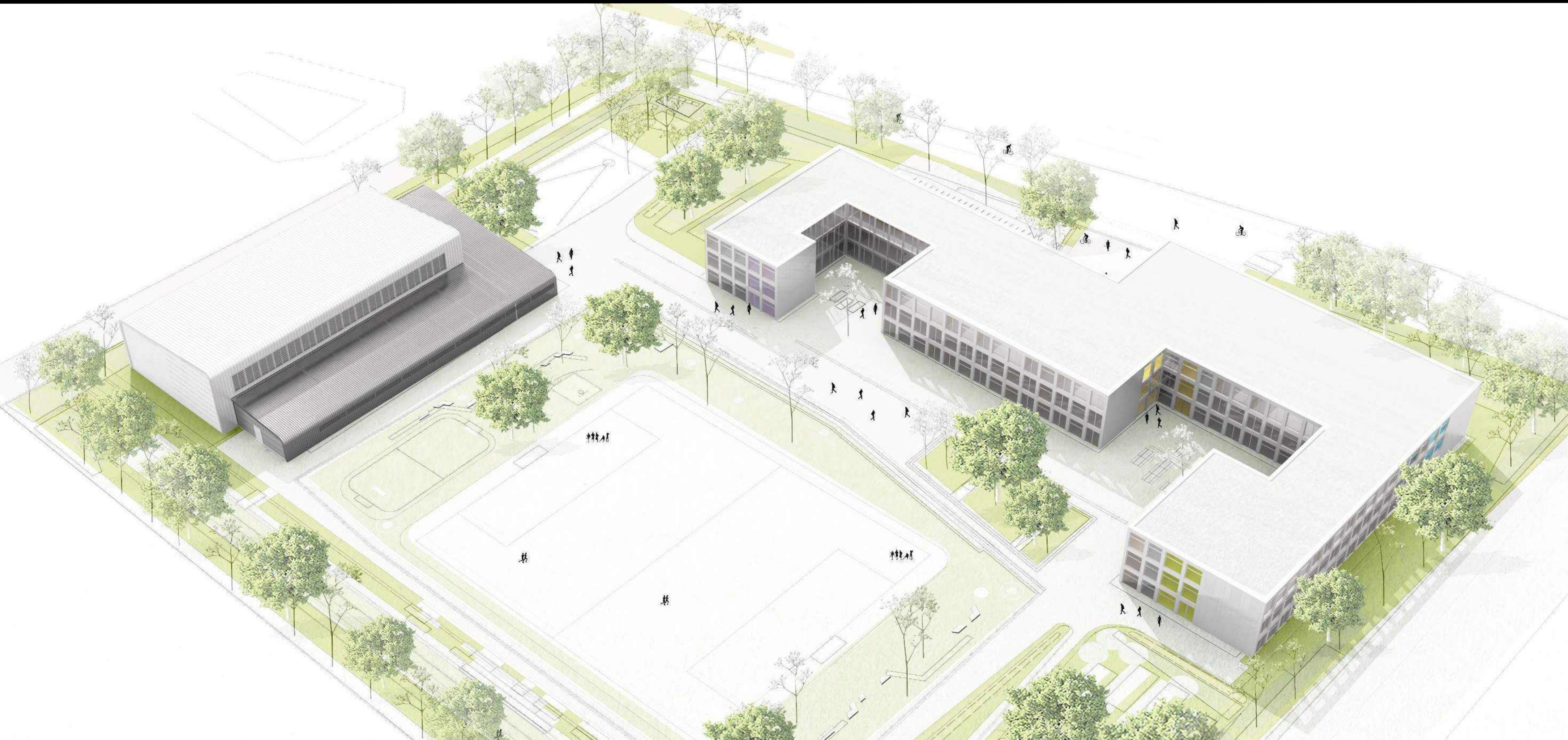


MODULAR MASS TIMBER SCHOOL PROJECTS



SECONDARY SCHOOL BERLIN
2017 - 2019

MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS

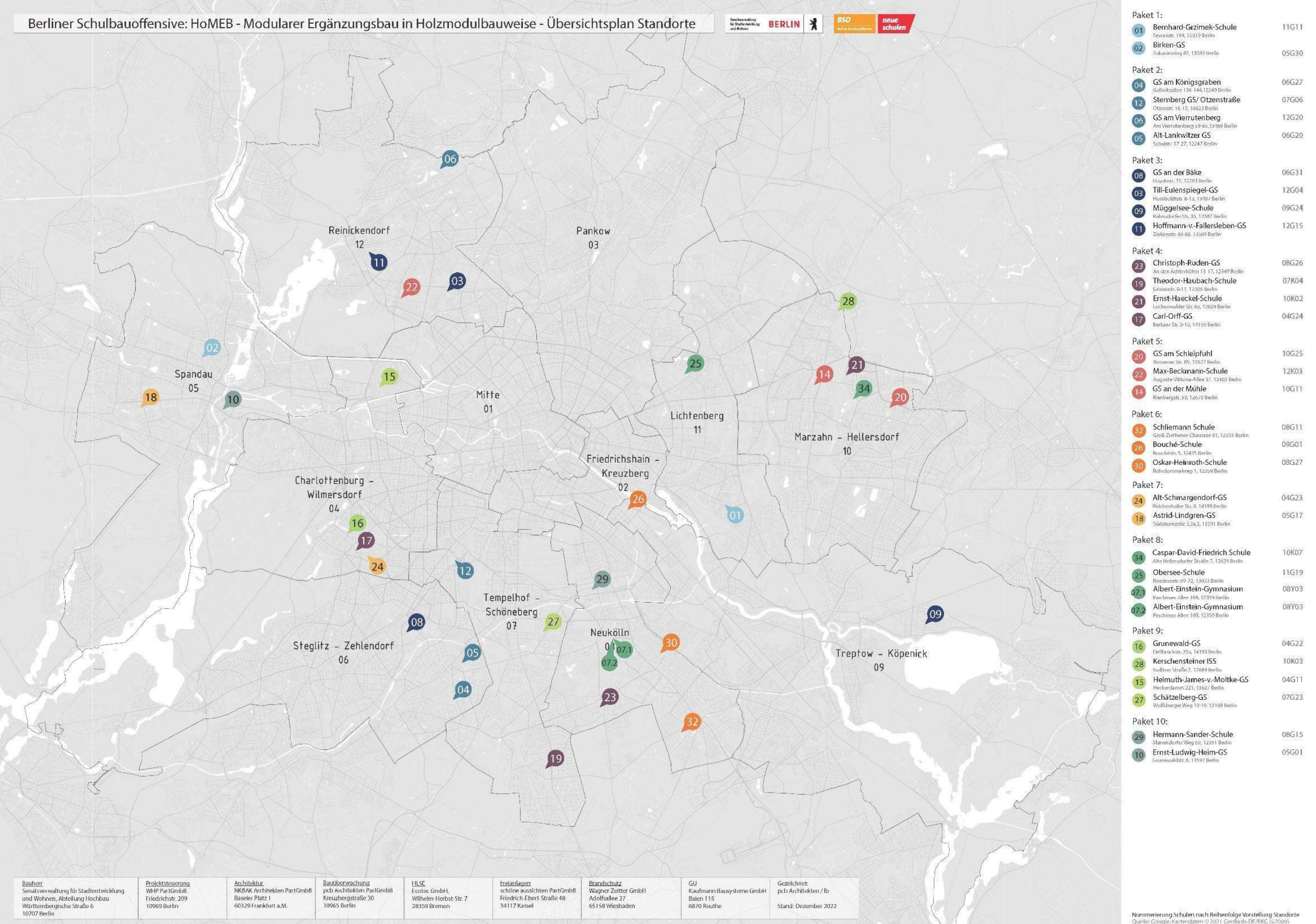


MODULAR MASS TIMBER SCHOOL PROJECTS

MODULAR EXTENSION SCHOOLS BERLIN 2021 - 2026



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS

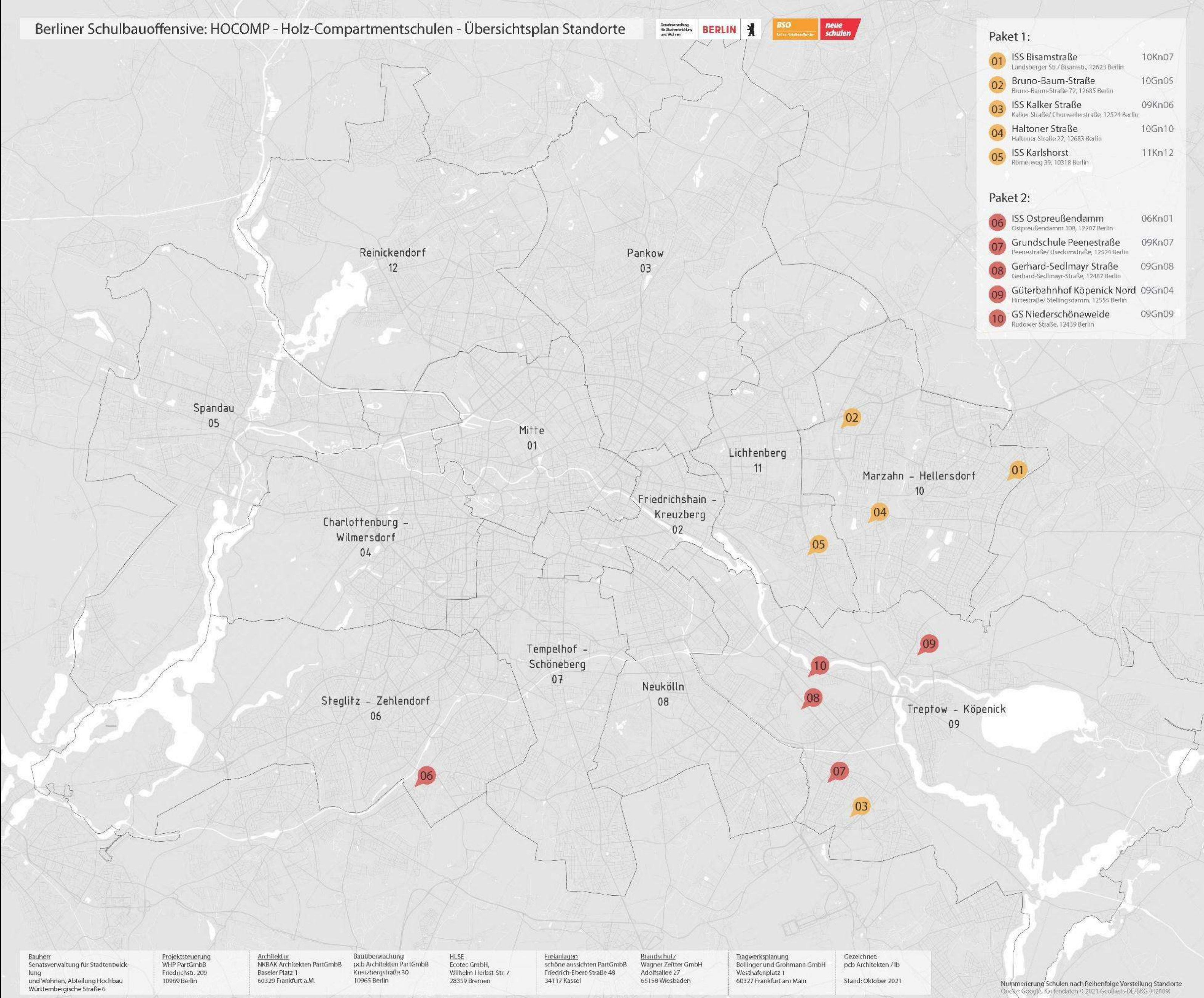


MODULAR MASS TIMBER SCHOOL PROJECTS

WOODEN COMPARTMENT SCHOOLS BERLIN 2023 - 2028



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER SCHOOL PROJECTS



MODULAR MASS TIMBER PROCESS (3 STAGES)

1. INTEGRATED DESIGN OF EVERYTHING

2. MODULE ASSEMBLY

3. BUILDING ASSEMBLY

MODULAR MASS TIMBER PROCESS (3 STAGES)

1. INTEGRATED DESIGN OF EVERYTHING

2. MODULE ASSEMBLY

3. BUILDING ASSEMBLY

By an integrated team.

MODULAR MASS TIMBER PROCESS (3 STAGES)

An Integrated Team

An integrated team of highly skilled architects and fabricators, *in constant communication*, designing and directing every aspect of the process –

buildings, modules, components, sub-assemblies, the supply chain, and the entire assembly process.

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1. Integrated Design Of Everything

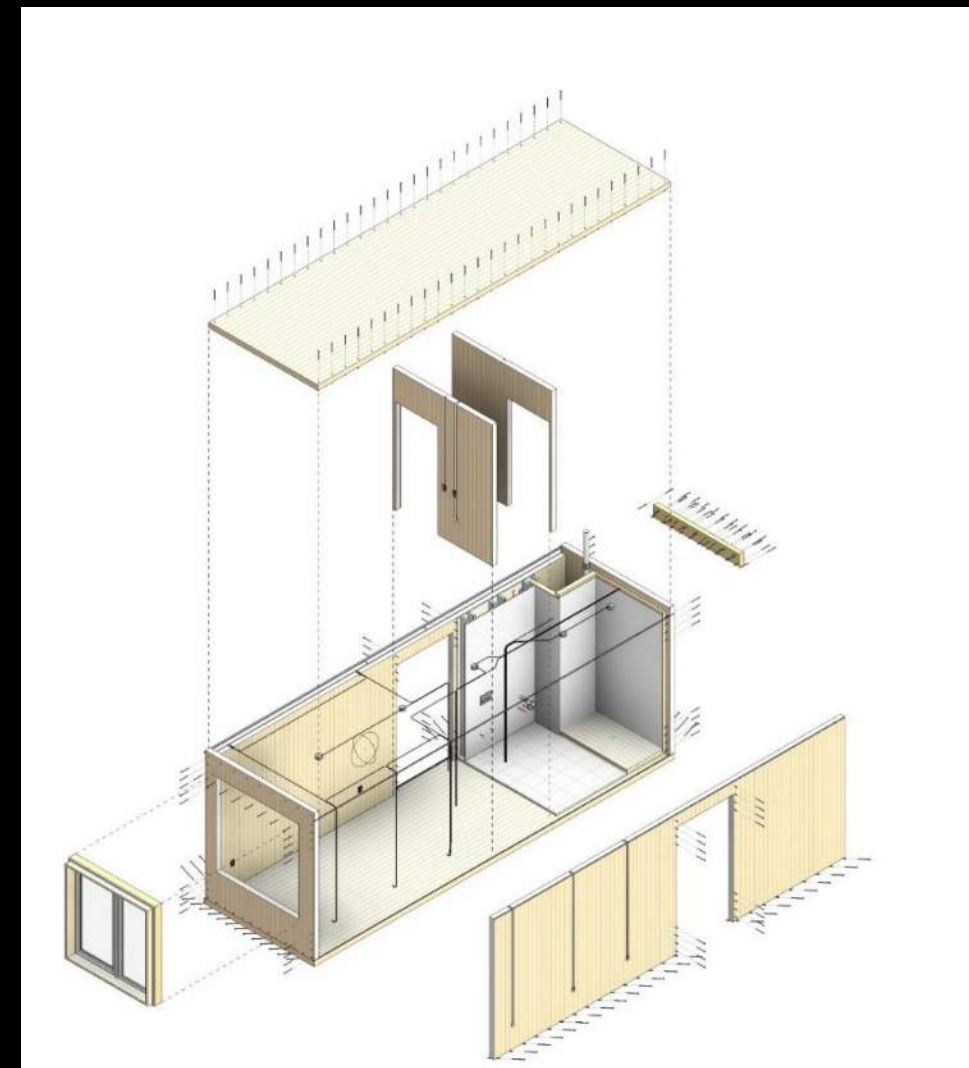
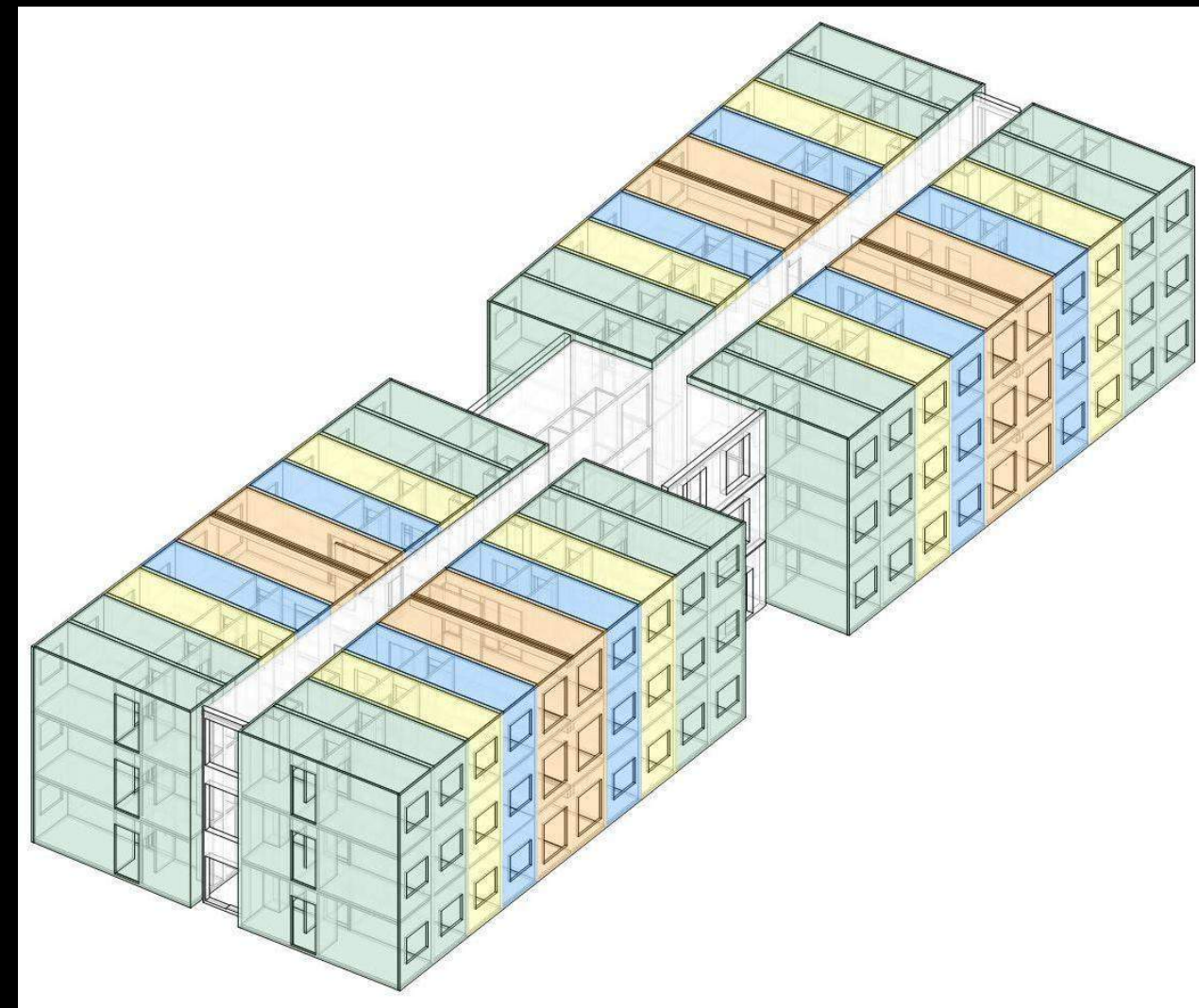
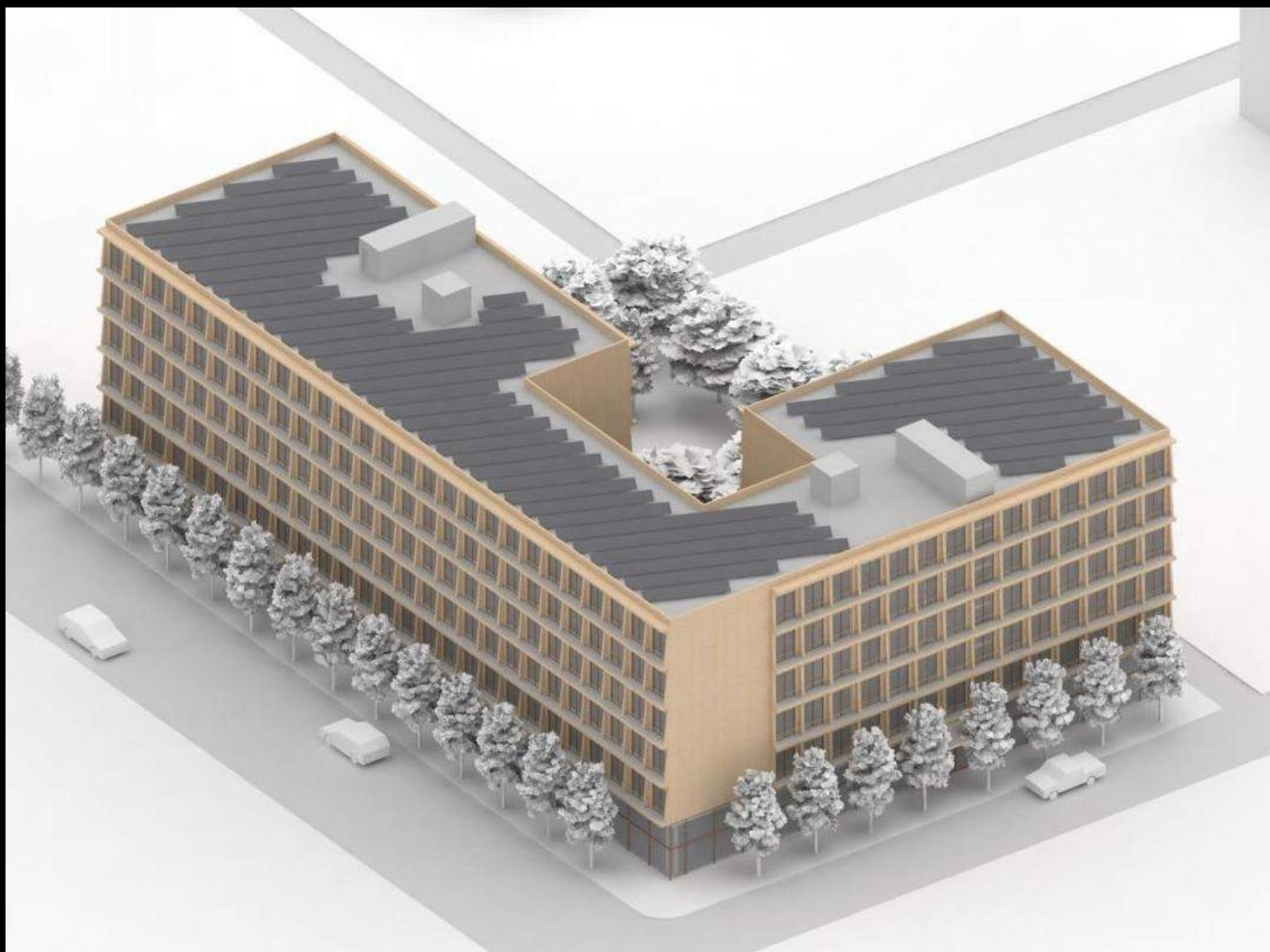
Buildings

Modules

Timber and Other Components

Supply Chain

Assembly Process



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1. Integrated Design Of Everything

Buildings

Modules

Timber and Other Components

Supply Chain

Assembly Process

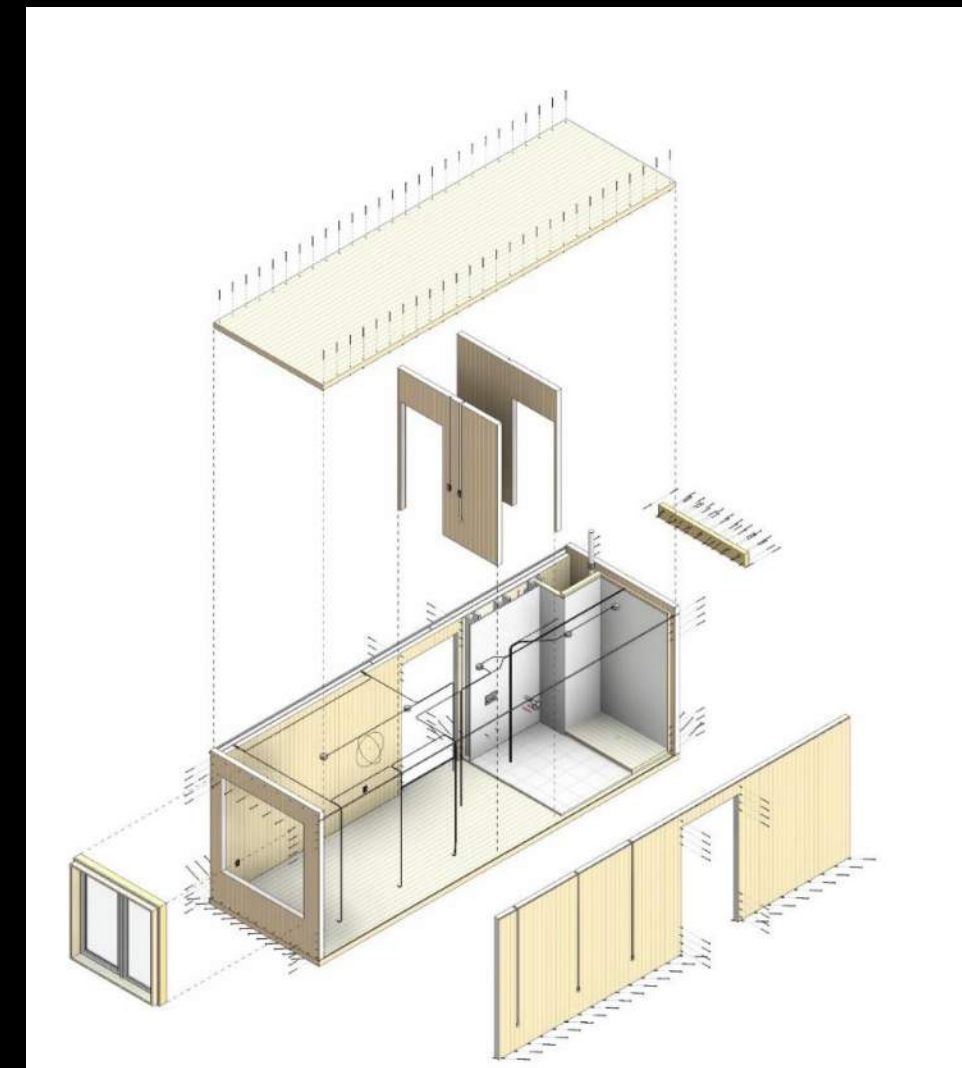
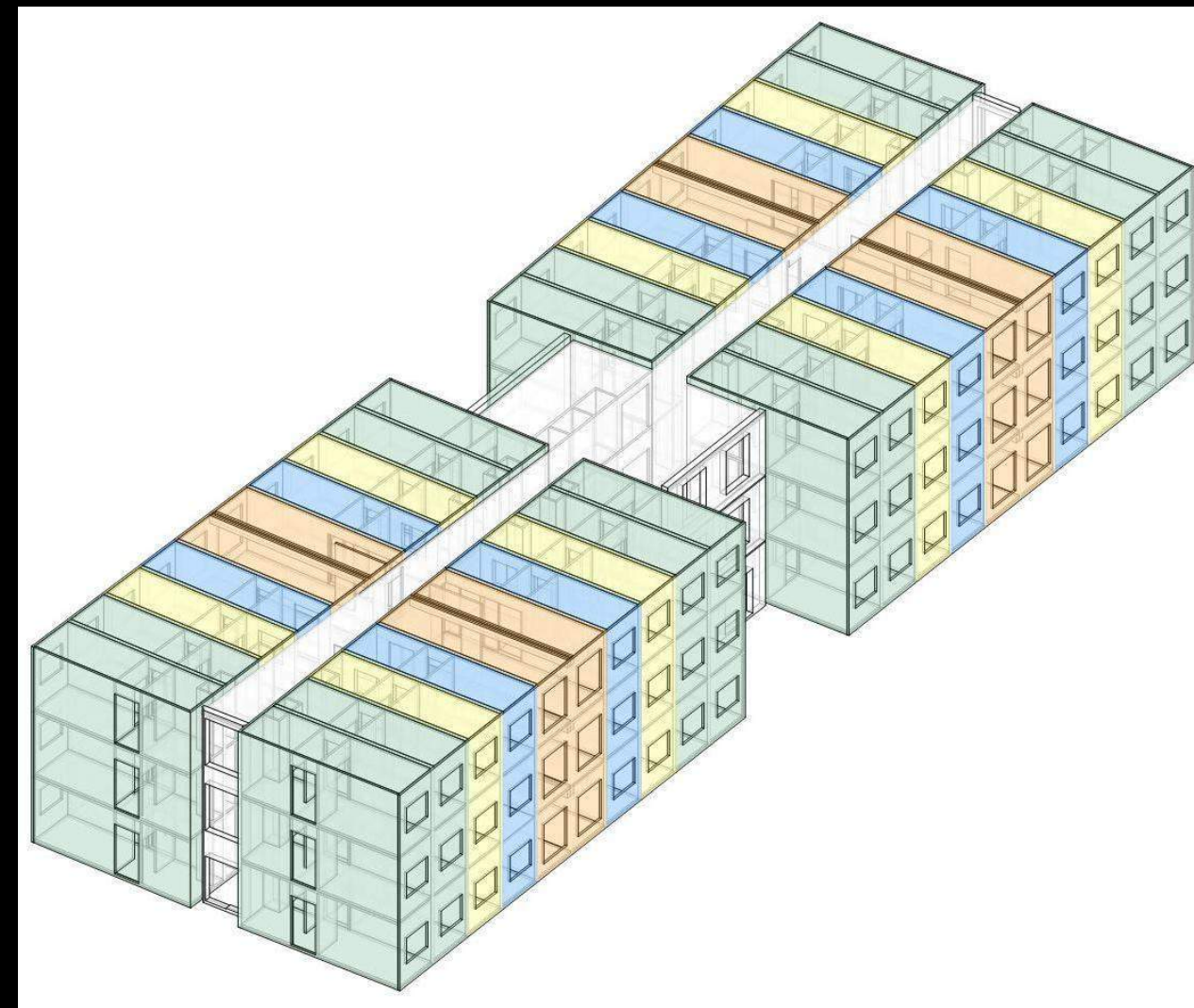
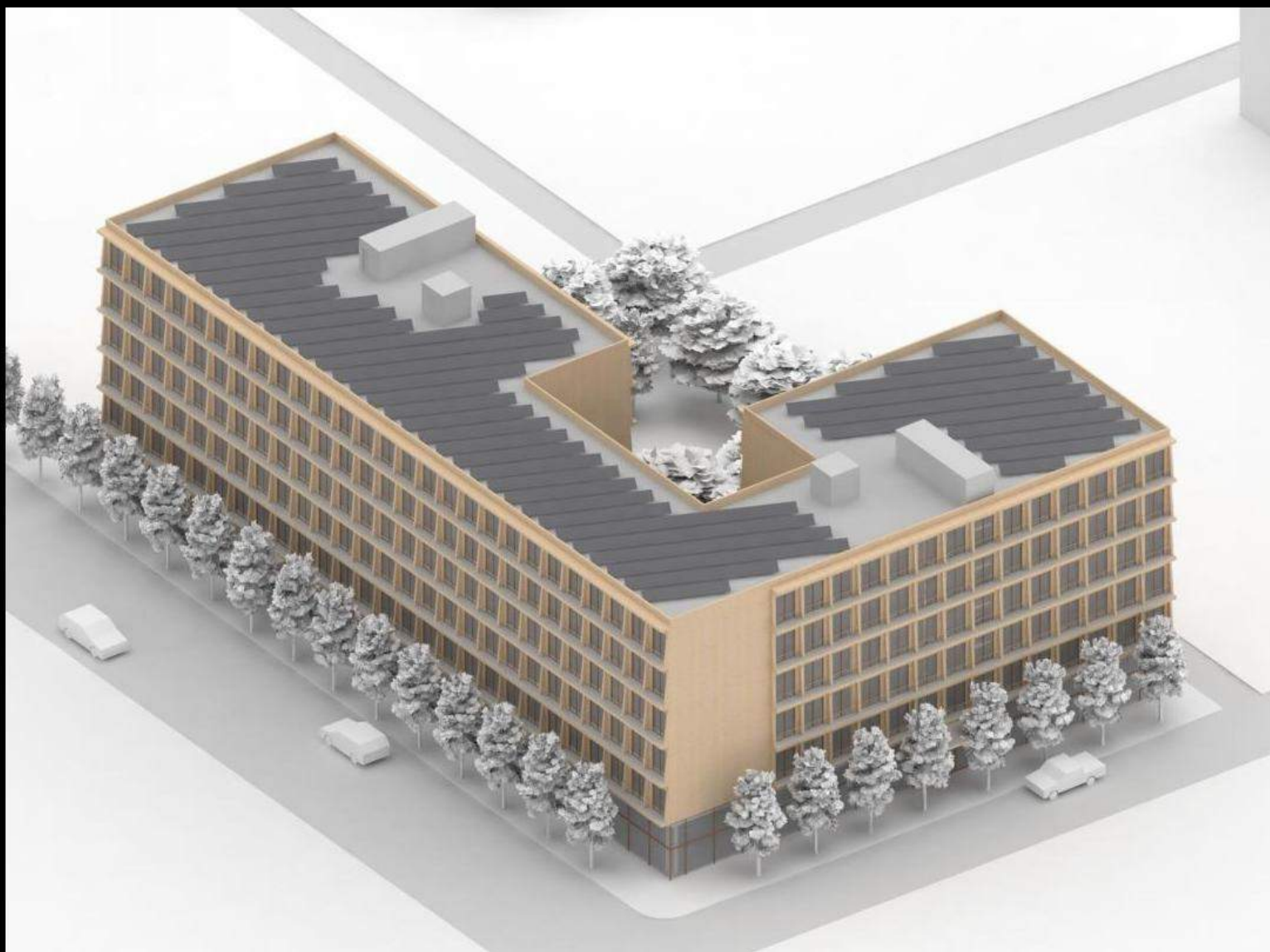
KEY OBJECTIVES:

very good buildings

modules - very easy to assemble

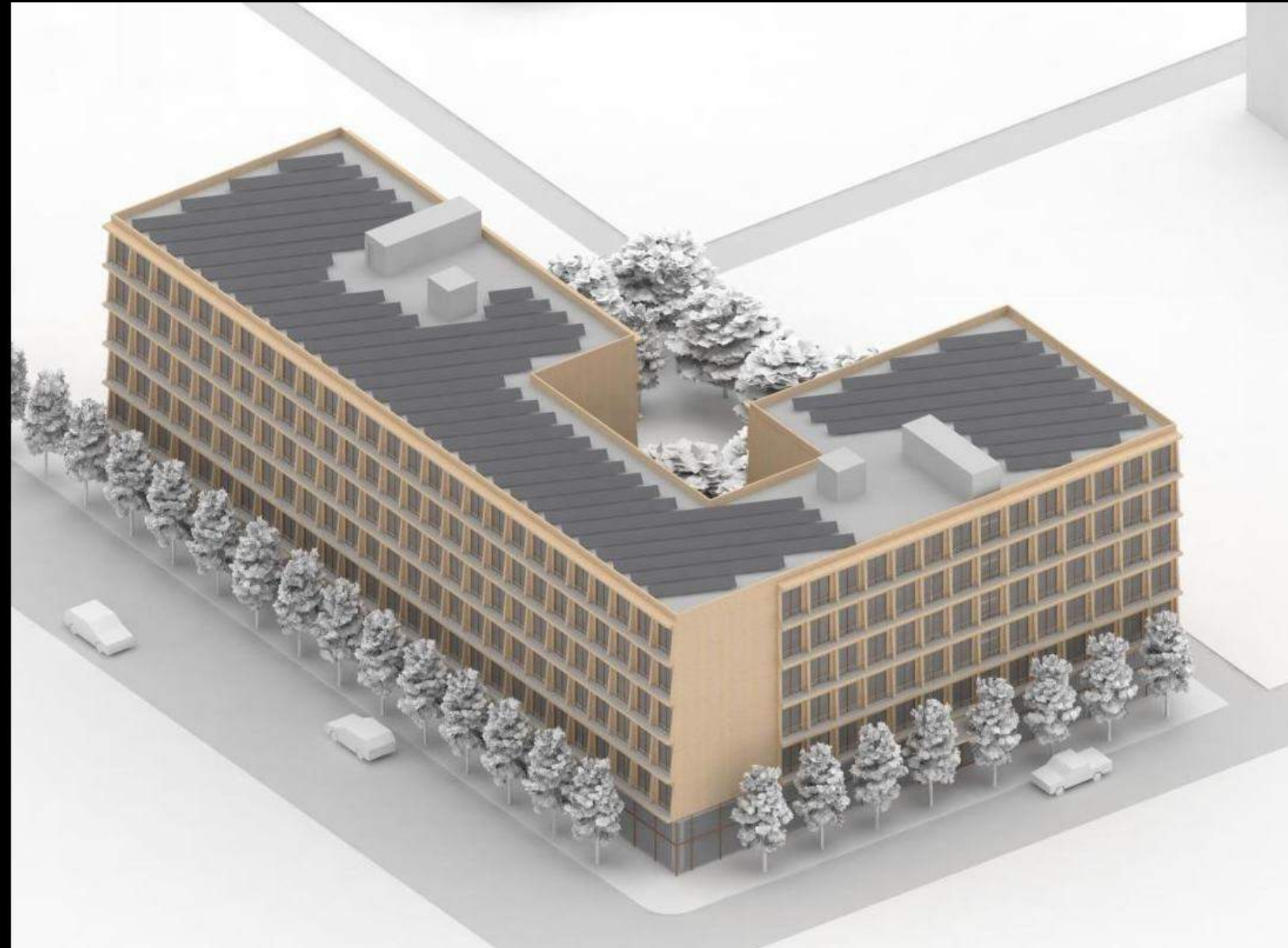
buildings - very easy to assemble

constant improvement



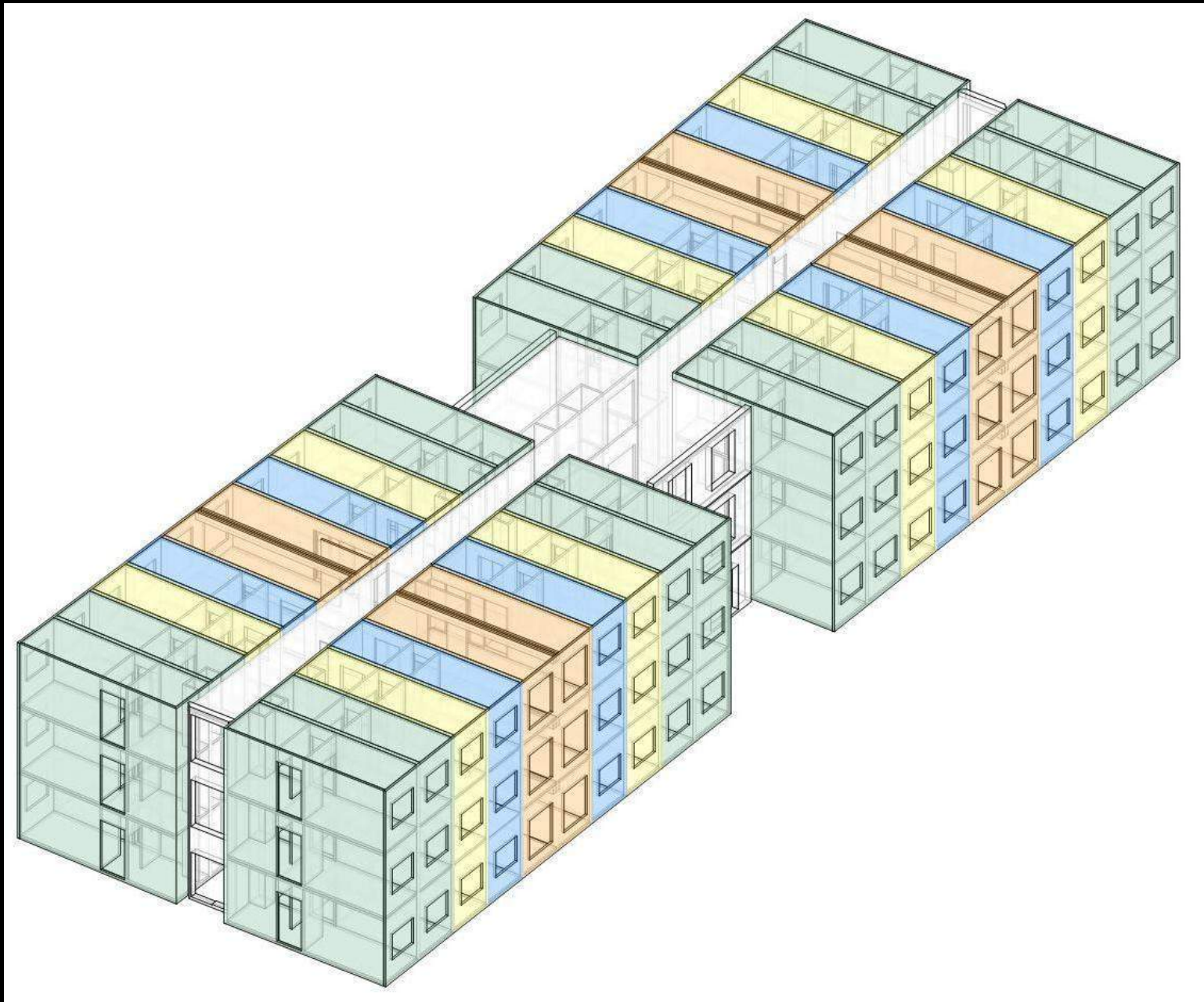
MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1: Integrated Design of Everything - Buildings



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1: Integrated Design of Everything: Modules



MODULE C : Bedroom + Pantry/Mudroom

FLOOR/CEILING
3 lam / 0.3' thick

LONG WALLS
3 lam / 0.3' thick

END WALLS
4 lam / 0.4' thick

INTERIOR WALLS
3 lam / 0.3' thick

001: 25' - 10" x 7' - 4" x 2

011: 25' - 10" x 10' - 6" (with 4' - 0" opening)

012: 25' - 10" x 8' - 5" (with two 4' - 0" openings)

021: 8' - 0" x 10' - 6" (with 4' - 0" x 7' - 8" opening)

022: 8' - 0" x 10' - 6"

031: 7' - 4" x 9' - 6" (with 4' - 0" x 7' - 8" opening)

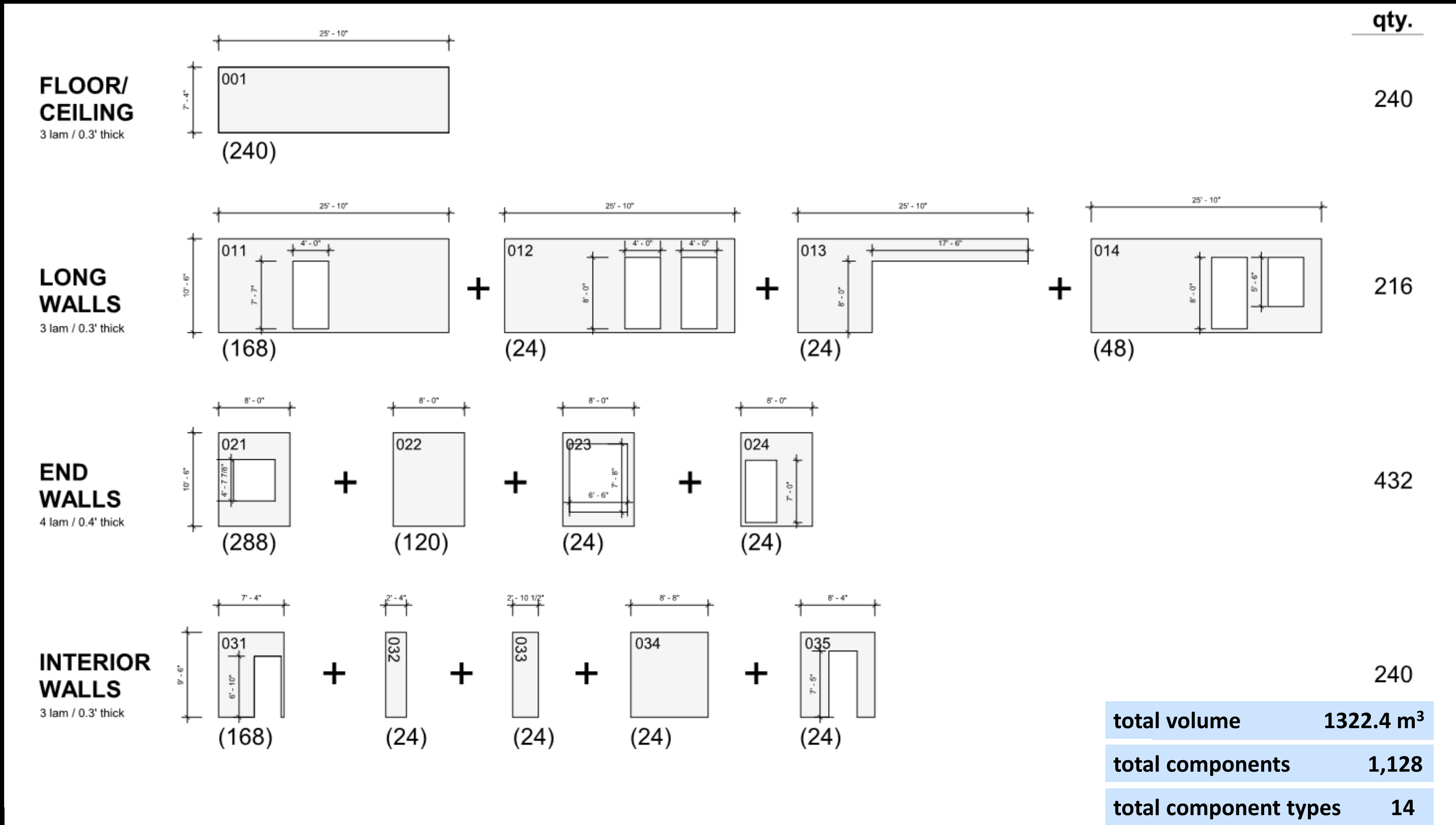
034: 8' - 8" x 9' - 6"

	m ³
FLOOR/CEILING	3.2
LONG WALLS	4.6
END WALLS	1.9
INTERIOR WALLS	1.29
total volume	11.02 m³
total components	7

Modules designed to meet the specific needs of each project. A wide range of sizes, configurations, shapes is possible.

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1: Integrated Design of Everything: Timber Components

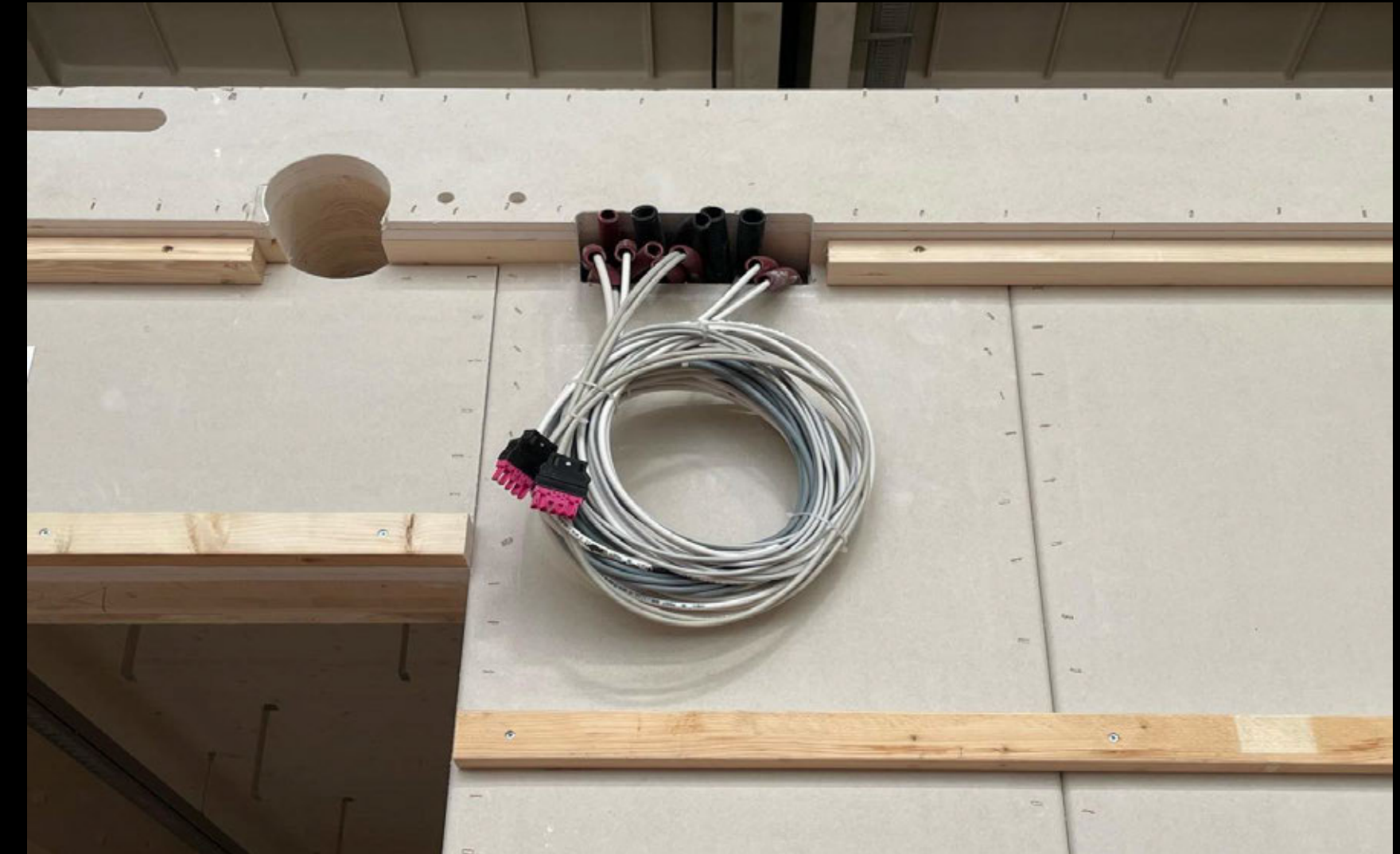
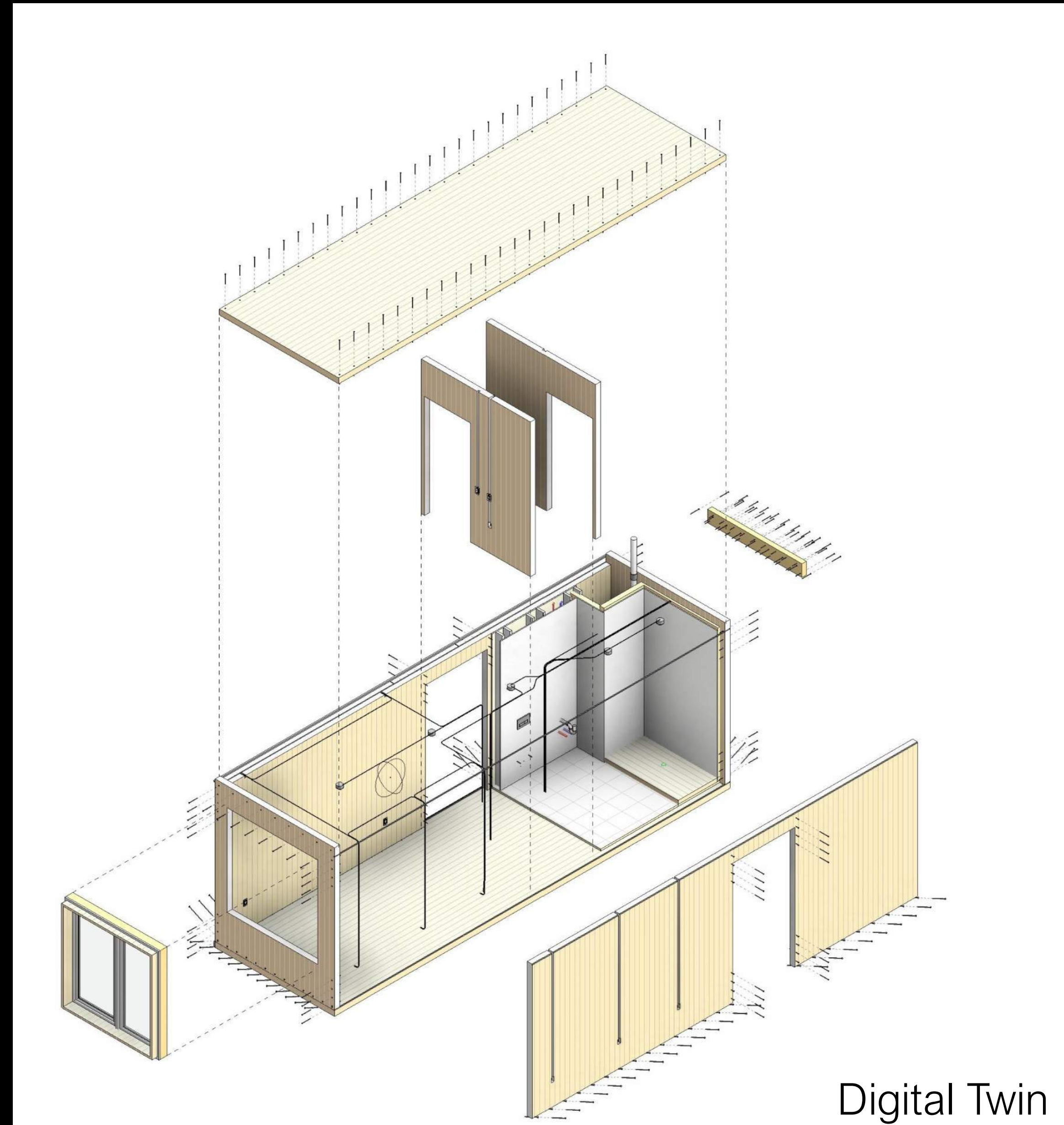


Robotically Fabricated

By Multiple Suppliers

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1: Integrated Design of Everything: Other Components



MODULAR MASS TIMBER PROCESS (3 STAGES)

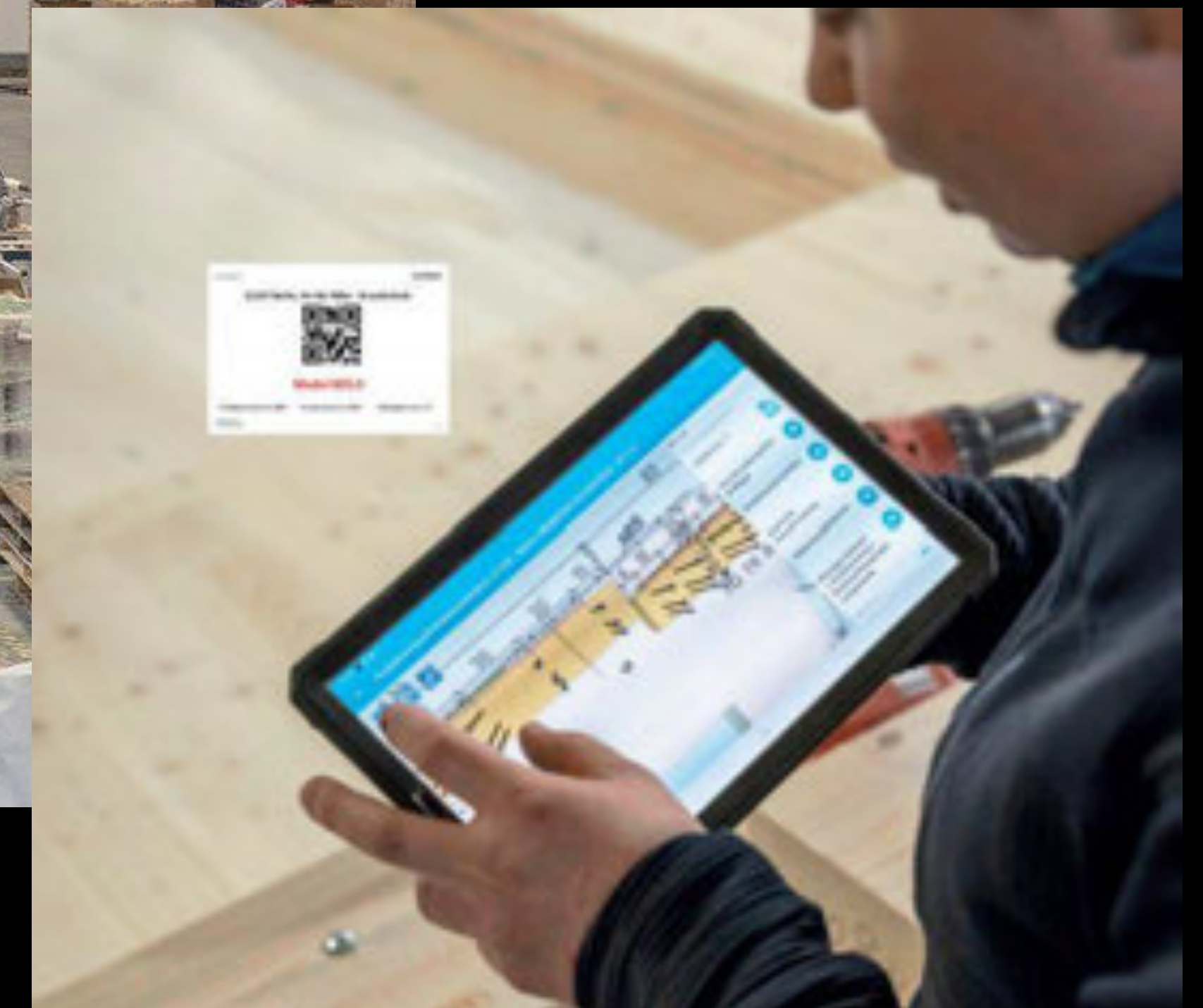
Stage 1: Integrated Design of Everything: Supply Chain



NOTHING MISSING, DAMAGED, LATE, EXTRA.

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1: Integrated Design of Everything: Assembly Process



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1. INTEGRATED DESIGN OF EVERYTHING

Stage 2. MODULE ASSEMBLY

Directed – on tablets –
by proprietary software.

Supply chain also
managed by proprietary
software.

Supply chain and module
assembly are **managed
remotely**.



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly: Software-directed



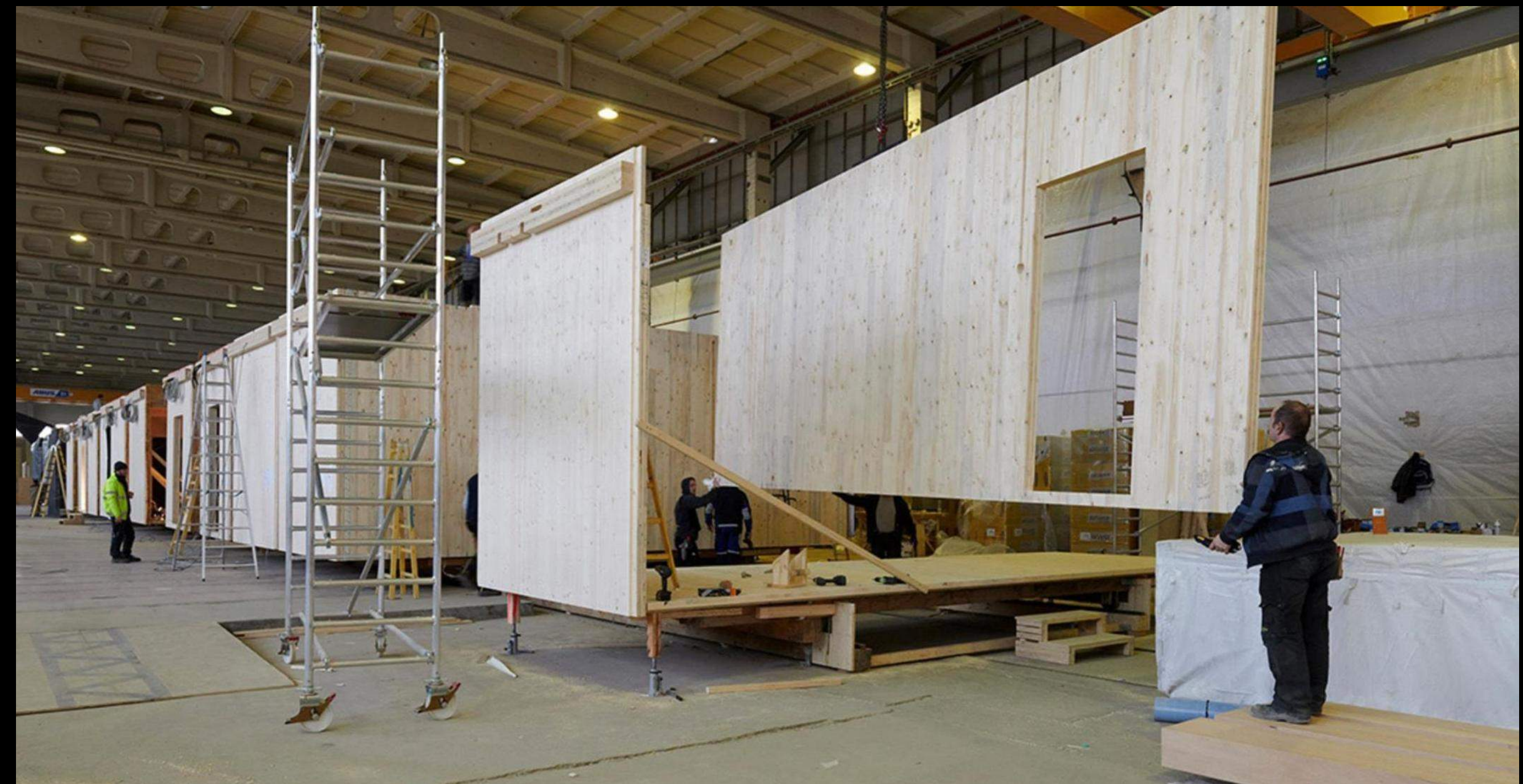
Instructions For Every Task

On A Tablet

At Every Module Station

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly



Assembly Hall, not a Factory **Rented, not Owned** **A Crane, no Robots**

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly



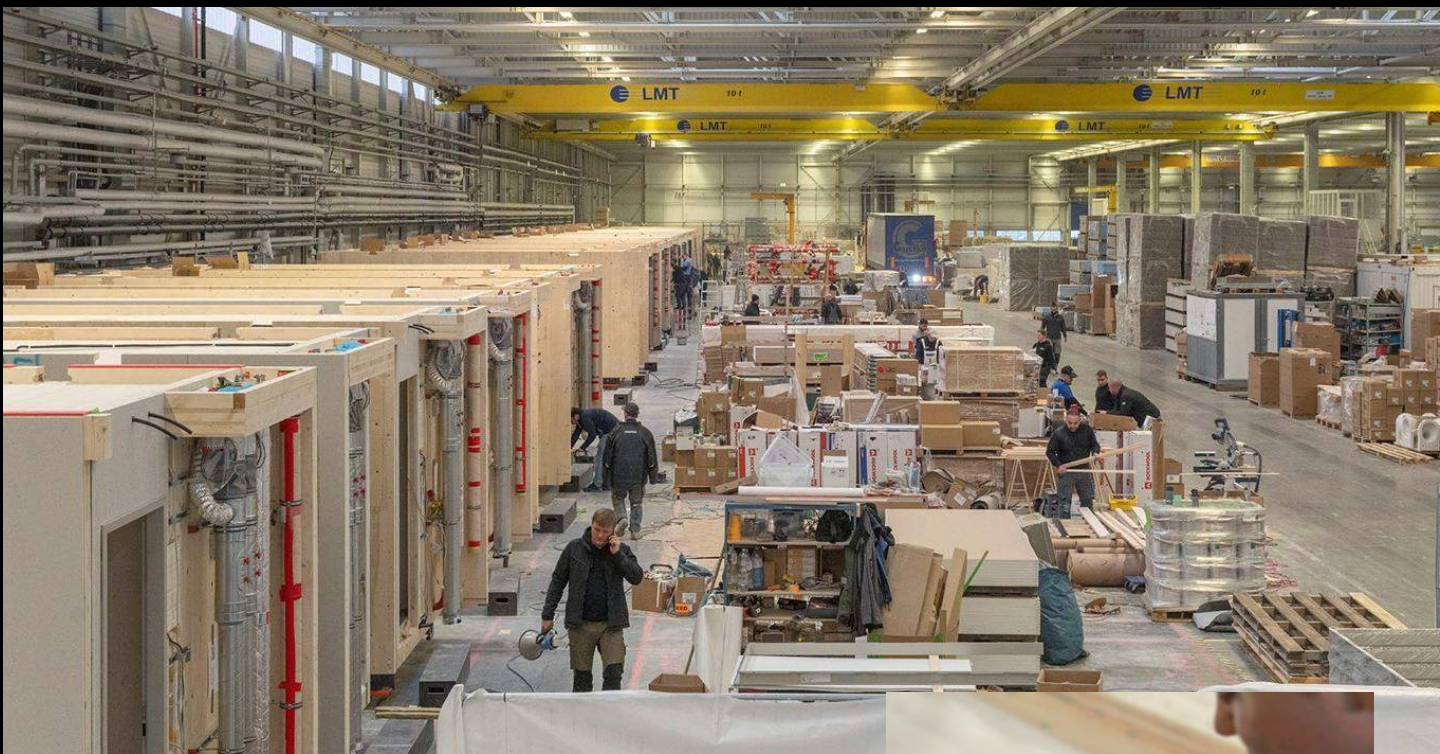
Worker Friendly

Builder Friendly

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly:
Software-directed, remotely

KBS Headquarters
Reuthe, Austria



Assembly Hall 2
Rostock



Assembly Hall 1
Berlin



Module Assembly

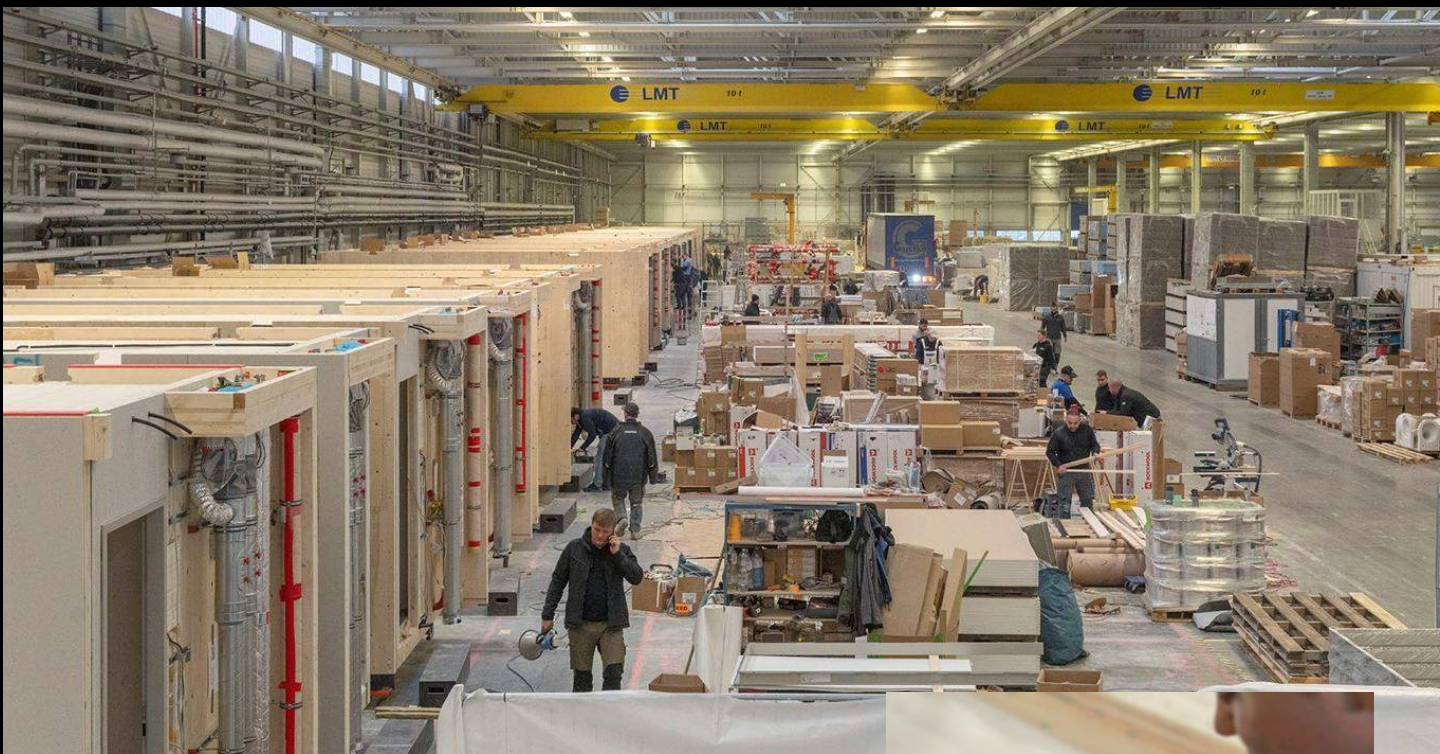
Remotely Managed

From KBS HQ

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly:
Software-directed, remotely

KBS Headquarters
Reuthe, Austria



Assembly Hall 2
Rostock



Assembly Hall 1
Berlin

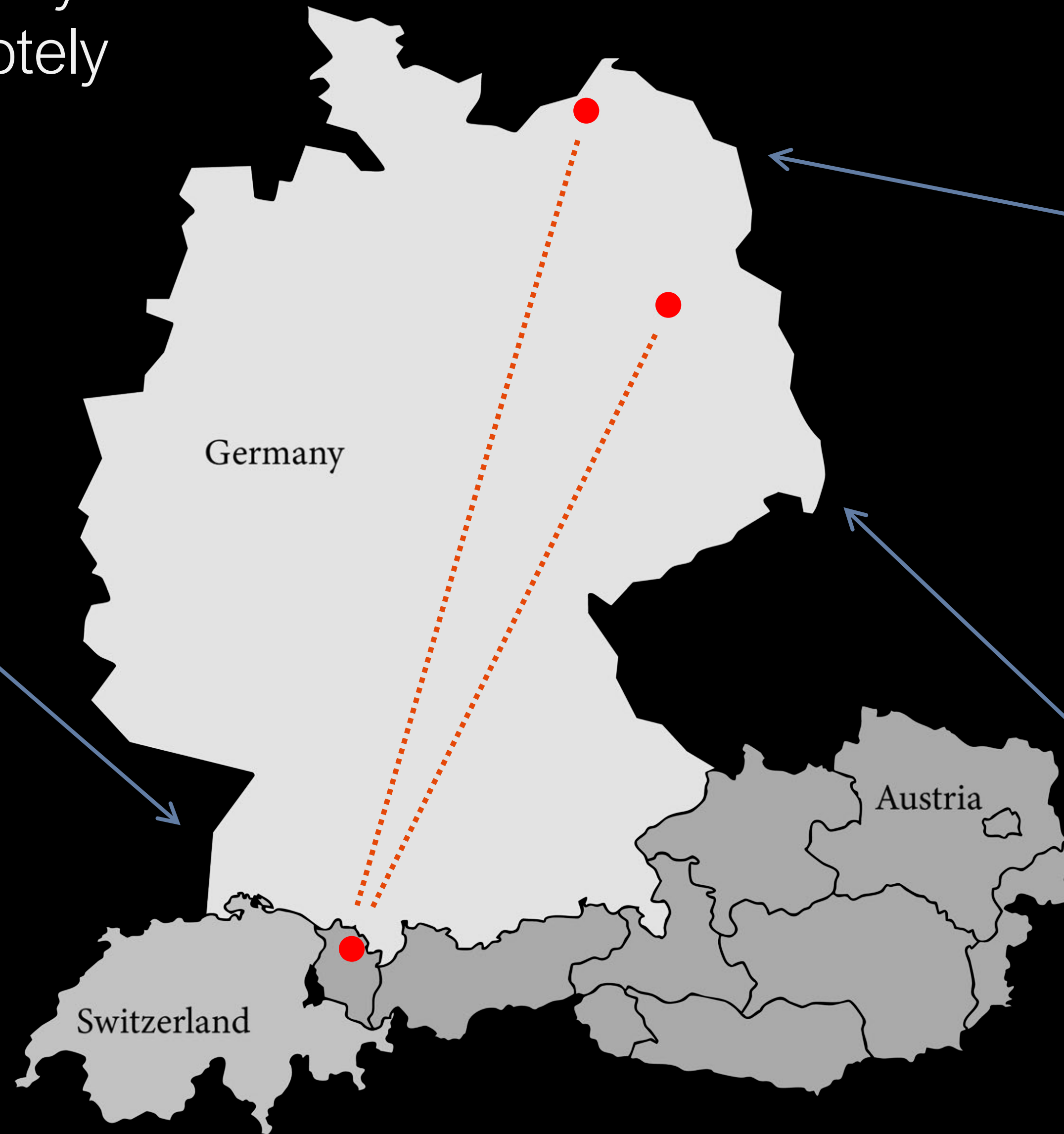


Using software to direct, record, and monitor everything in real time from KBS HQ.

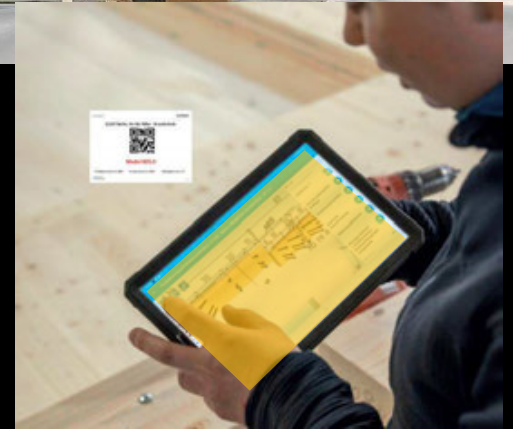
MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly:
Software-directed, remotely

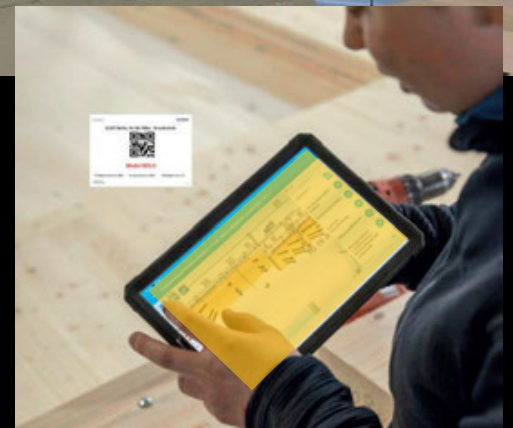
KBS Headquarters
Reuthe, Austria



Assembly Hall 2
Rostock



Assembly Hall 1
Berlin



Using **software** to direct, record, and monitor everything in real time from KBS HQ.
Anything wrong is fixed immediately.

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 2: Module Assembly:
Software-directed, remotely



KBS Headquarters
Reuthe, Austria



IDCUBED and Assembly Halls
Anywhere in North America

MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 1. INTEGRATED DESIGN OF EVERYTHING

Stage 2. MODULE ASSEMBLY

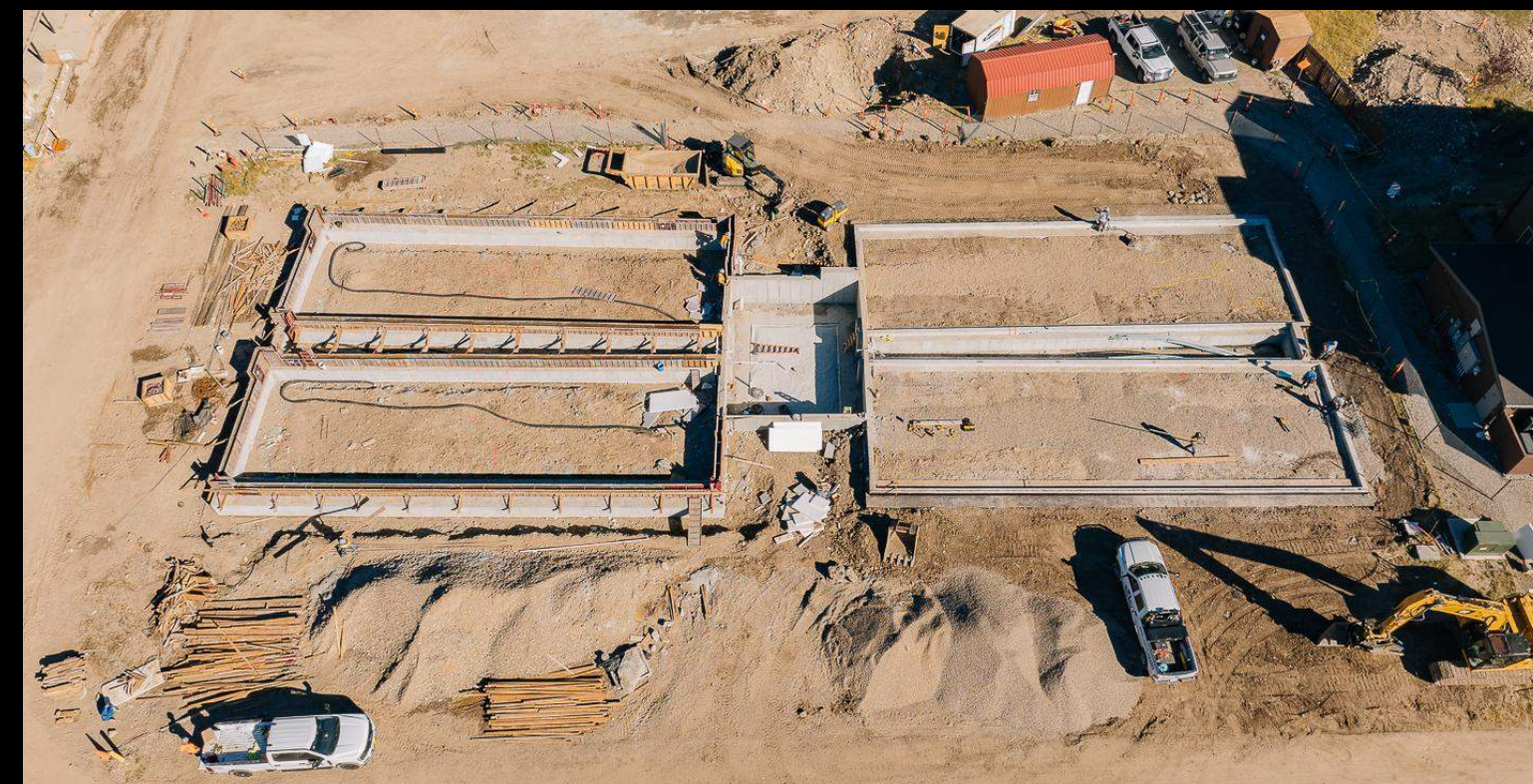
Stage 3. BUILDING ASSEMBLY

Sitework

Setting of modules

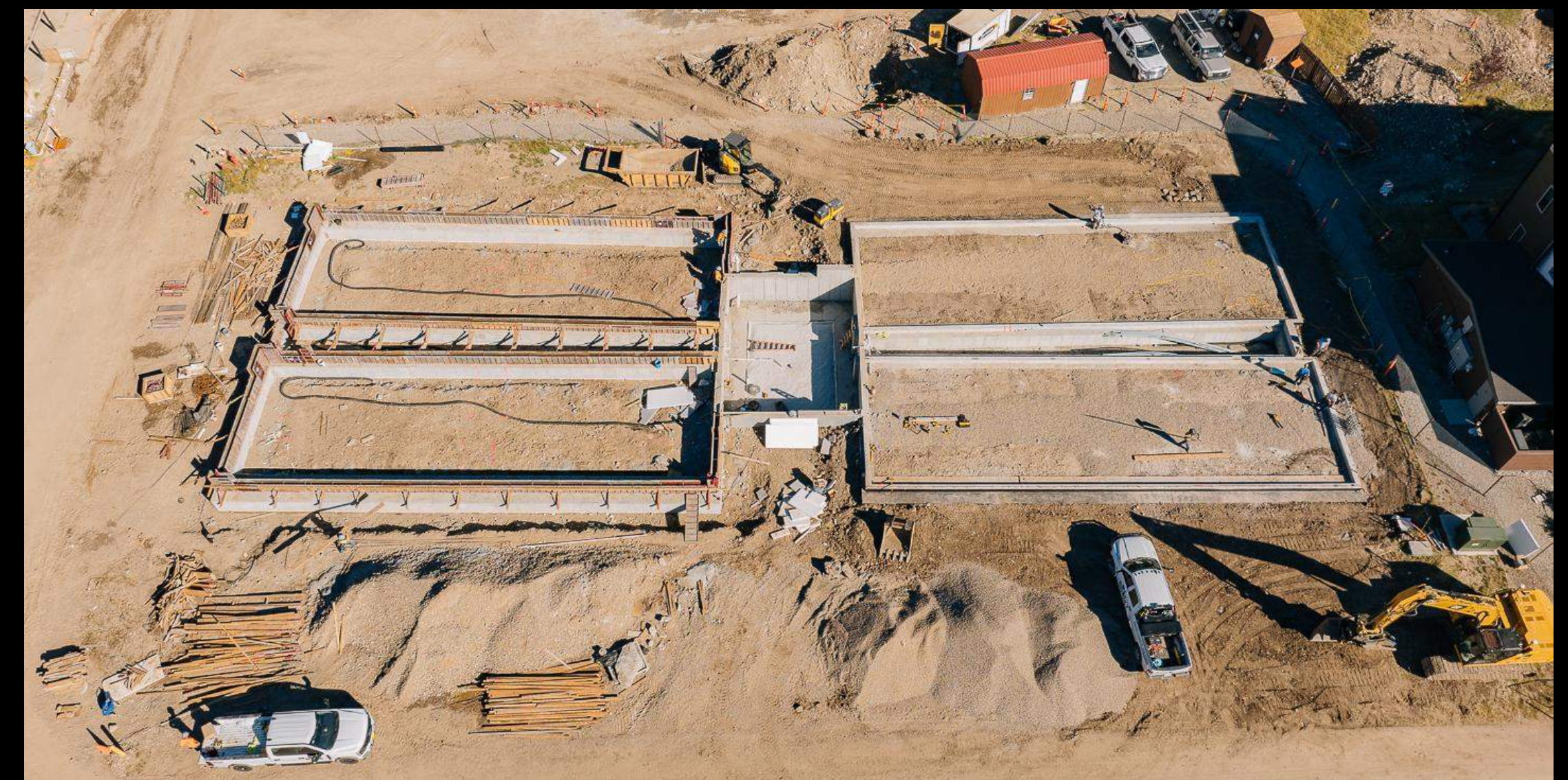
Facade / Roof

Hook-ups



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 3: Building Assembly: Sitework



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 3: Building Assembly: Setting of Modules



MODULAR MASS TIMBER PROCESS (3 STAGES)

Stage 3: Building Assembly: Hook-ups



MODULAR MASS TIMBER PROCESS (3 STAGES)

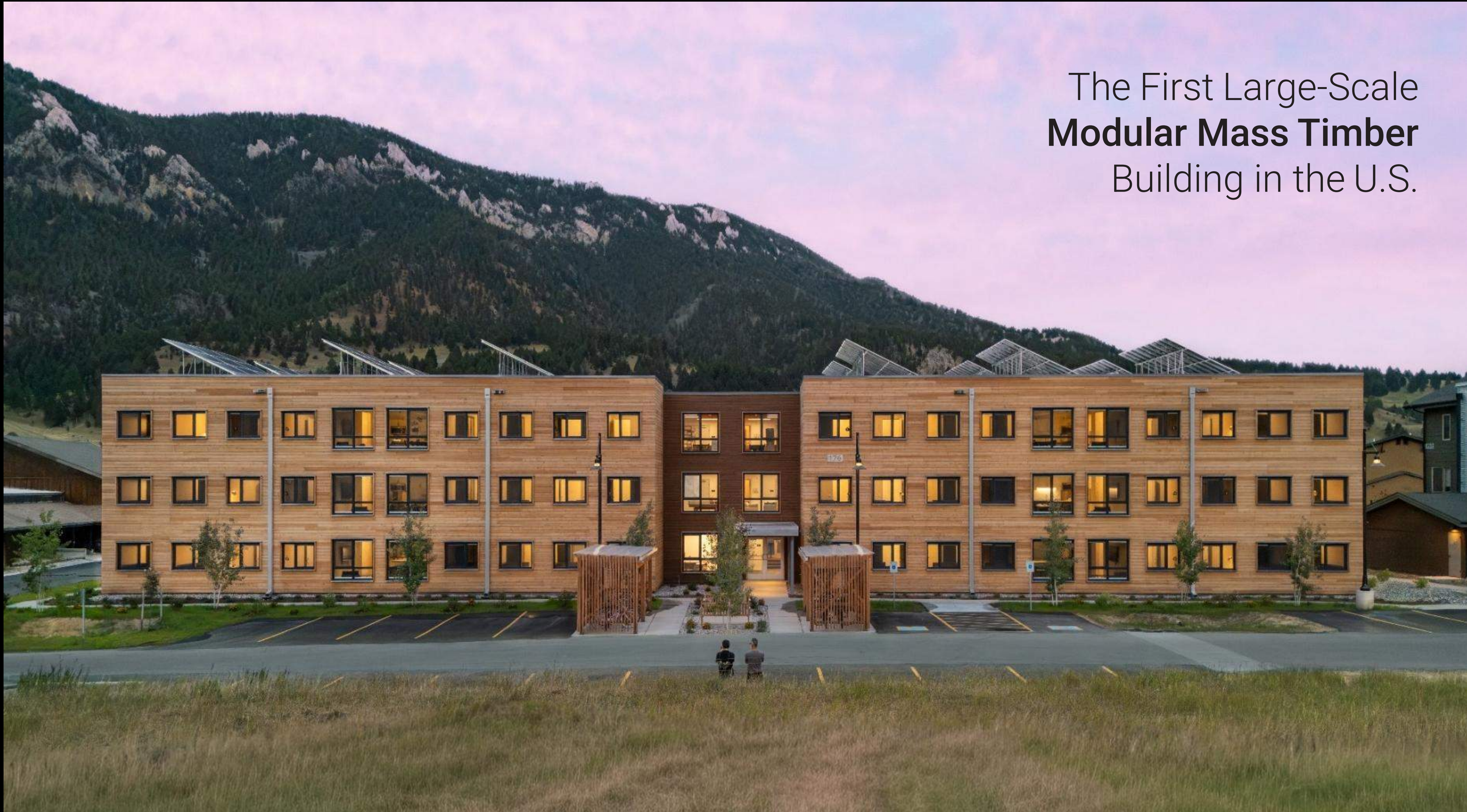
Stage 3: Building Assembly: Façade / Roof



MODULAR MASS TIMBER IN NORTH AMERICA

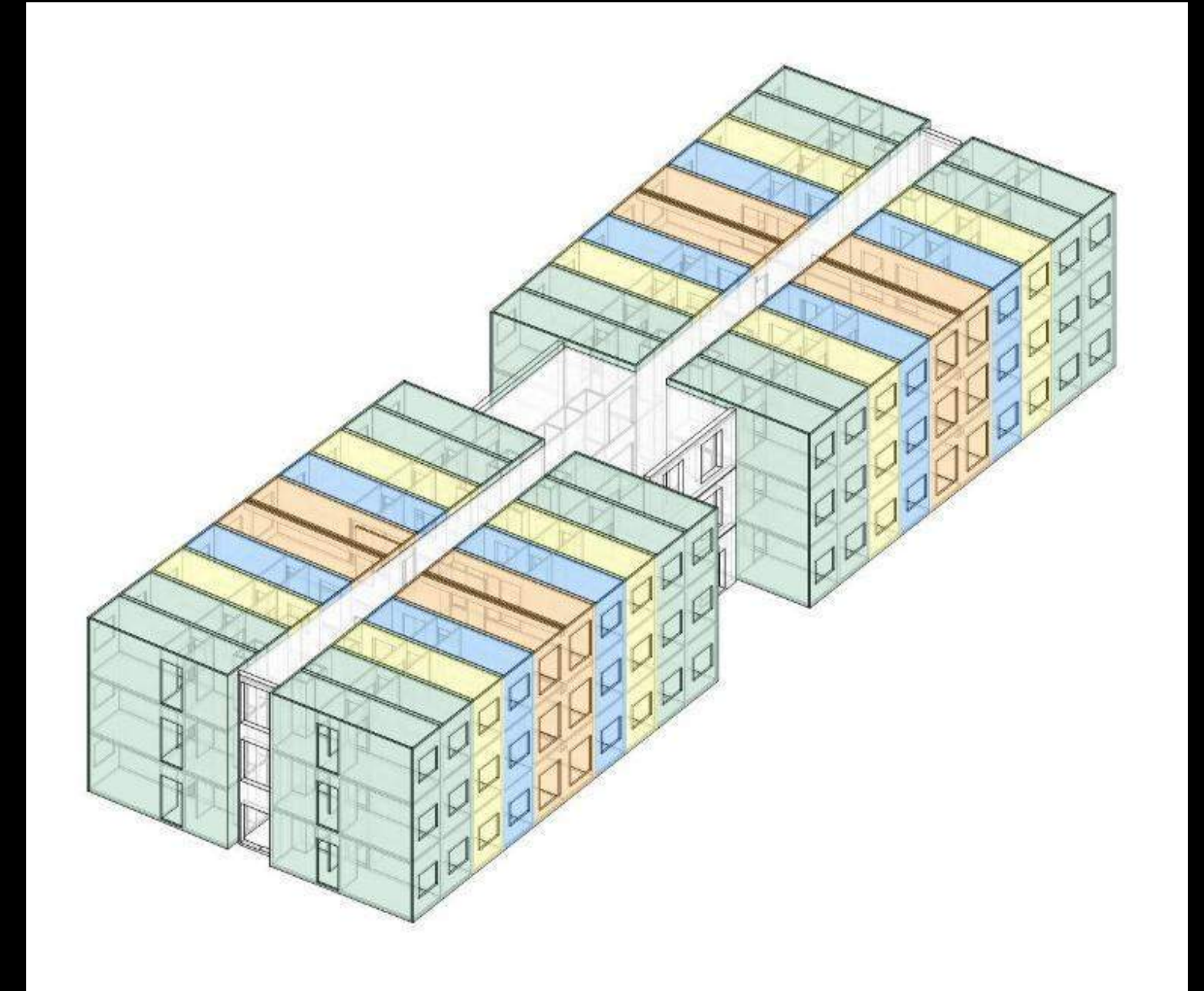
Knight Building, Big Sky, MT

The First Large-Scale
Modular Mass Timber
Building in the U.S.



MODULAR MASS TIMBER IN NORTH AMERICA

Knight Building, Big Sky, MT



120 modules

Set at a max rate of 20 per day

96 occupants

12 suites

8 bedrooms per suite

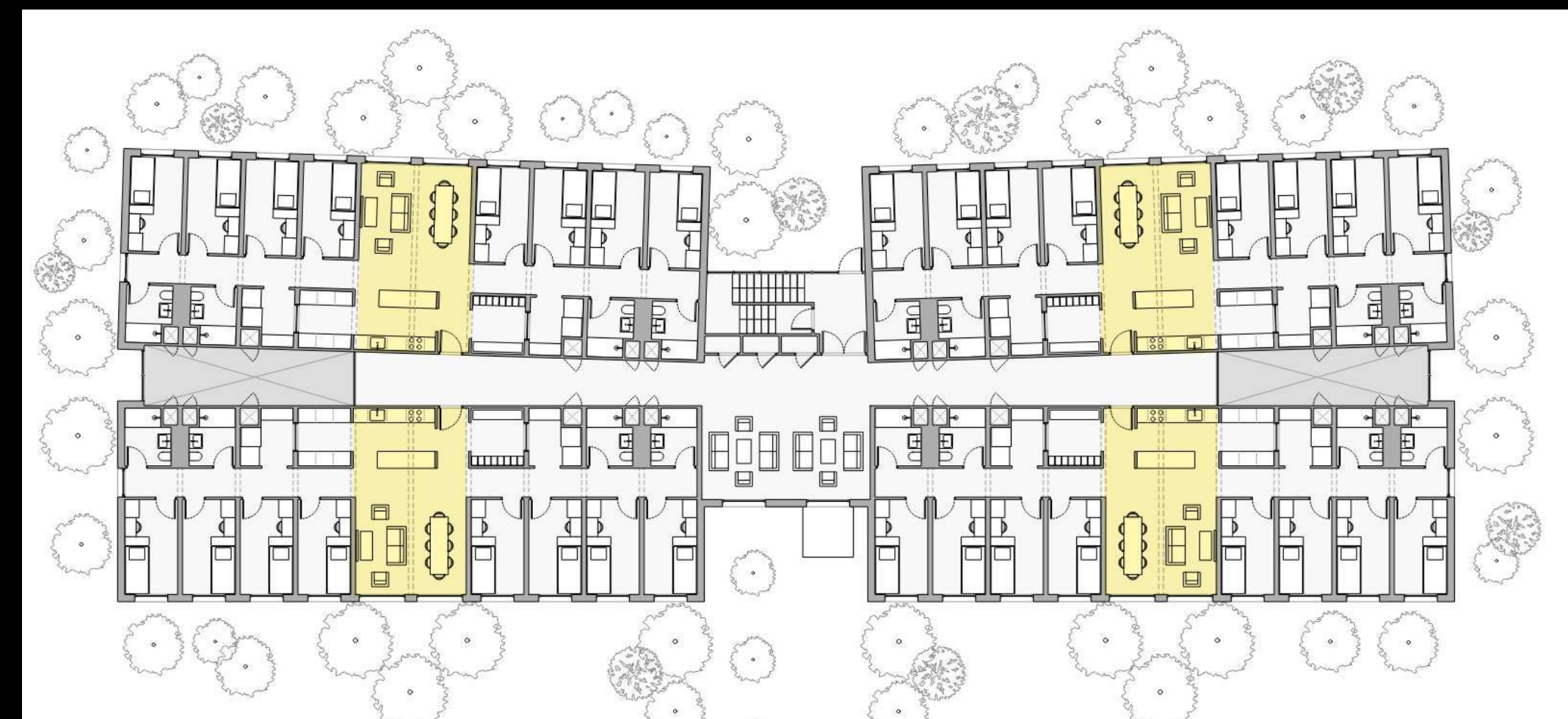
MODULAR MASS TIMBER IN NORTH AMERICA

Knight Building, Big Sky, MT

BEDROOM



LIVING ROOM



MODULAR MASS TIMBER IN NORTH AMERICA

Knight Building, Big Sky, MT



Workforce housing for 95 employees

31,000 GSF

11 months on-site construction

On time

Under budget

Sustainable, all electric, solar array

Stores 1,200 tons of carbon

MODULAR MASS TIMBER KEY ELEMENTS

Mass Timber



GLT Glue-laminated timber

CLT Cross-laminated timber

**A game-changing
innovative material.**

Precise, strong, beautiful.

**CLT panels available in
very large sizes.**

(up to 12' x 60' x 11")

MODULAR MASS TIMBER KEY ELEMENTS

Mass Timber Components



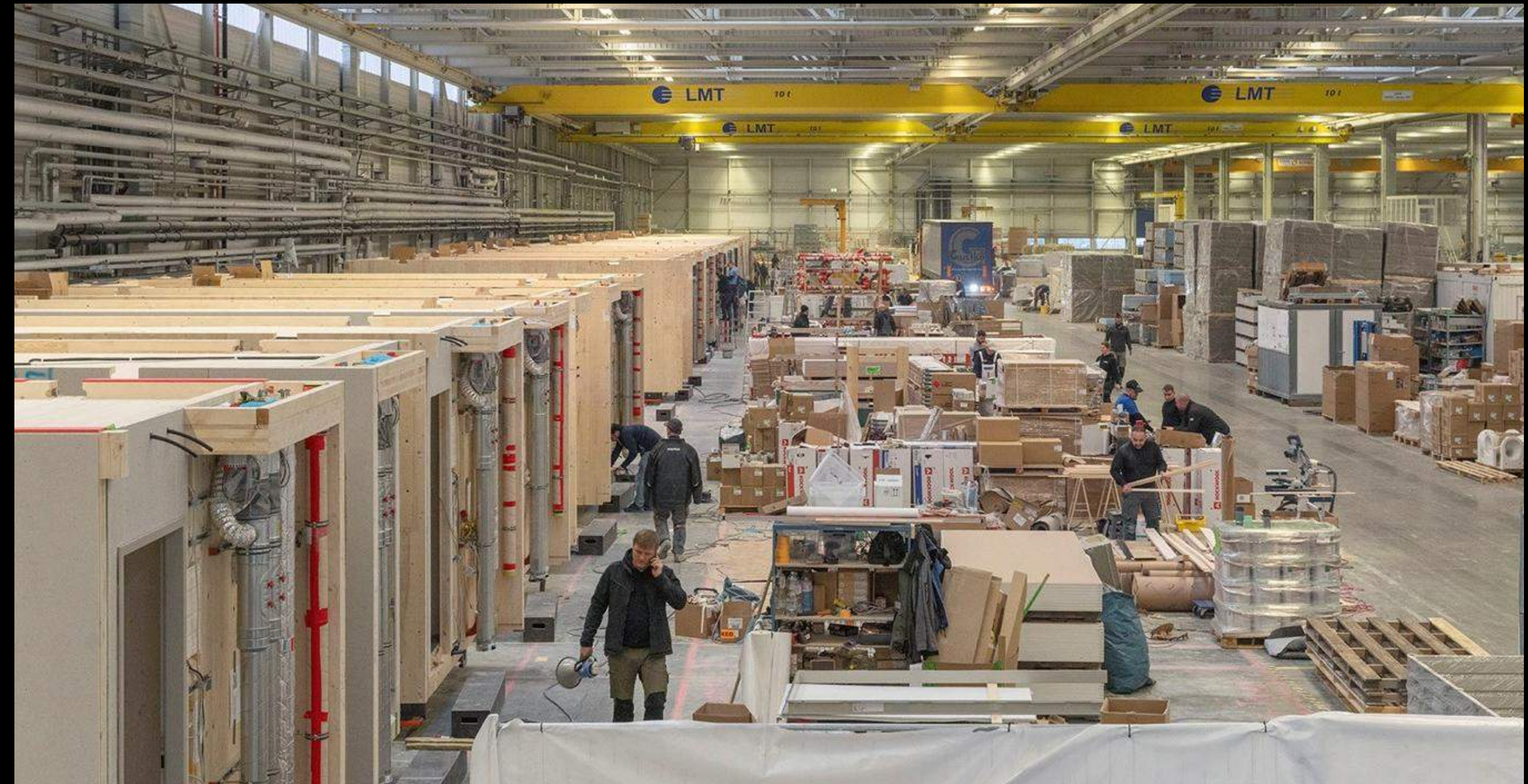
Components fabricated robotically with extreme precision to our specifications by others.

Available from a wide range of mass timber suppliers in North America and Europe.



MODULAR MASS TIMBER KEY ELEMENTS

Mass Timber Modules



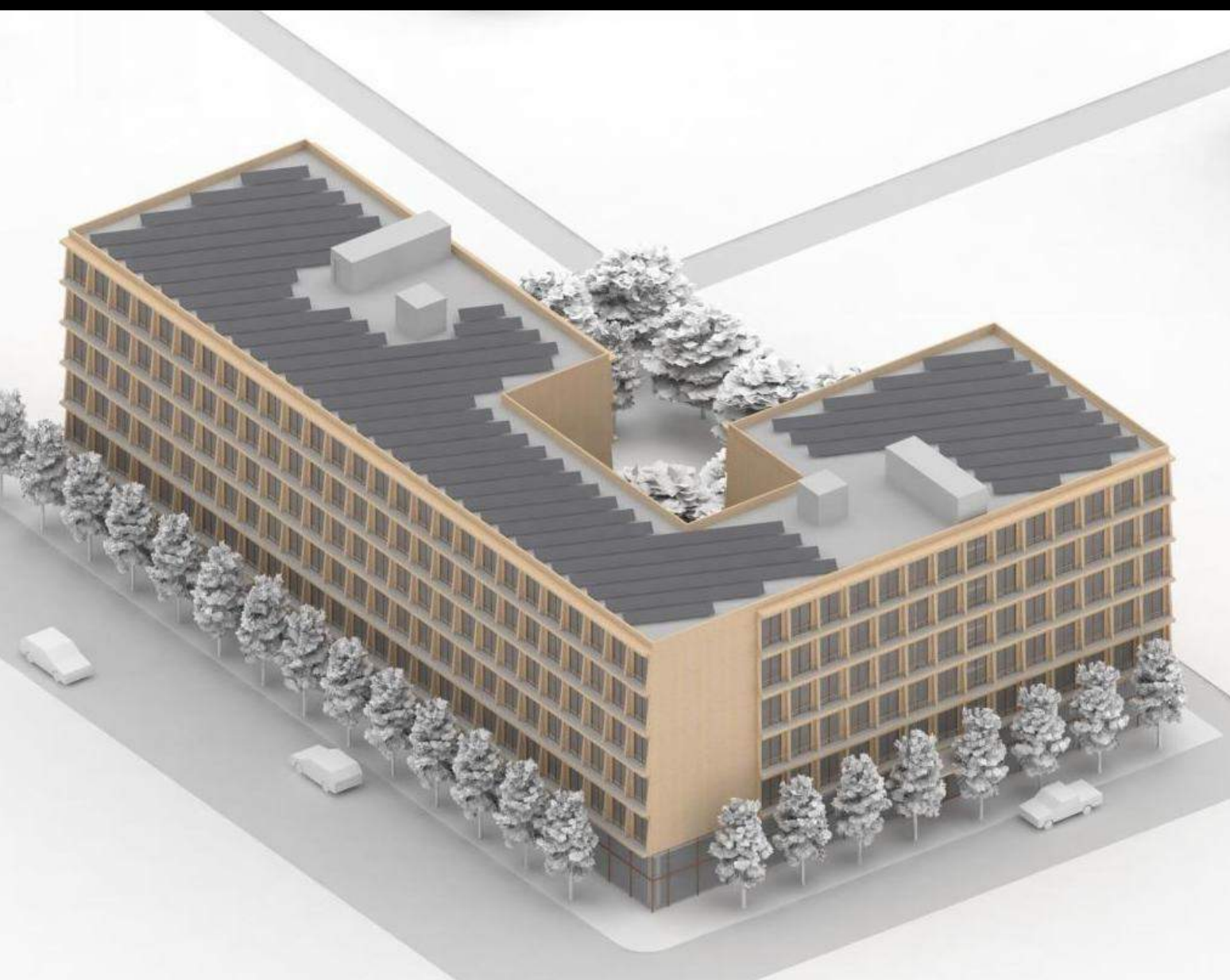
- Modules designed strategically with the goals of:
1. **Easy and quick assembly** by small teams of relatively low-skilled laborers in local assembly halls.
 2. **Easy and quick setting** on site
 3. **Exceptional buildings**

MODULAR MASS TIMBER PROJECTS



Exceptional buildings
for users and owners.

MODULAR MASS TIMBER PROJECTS

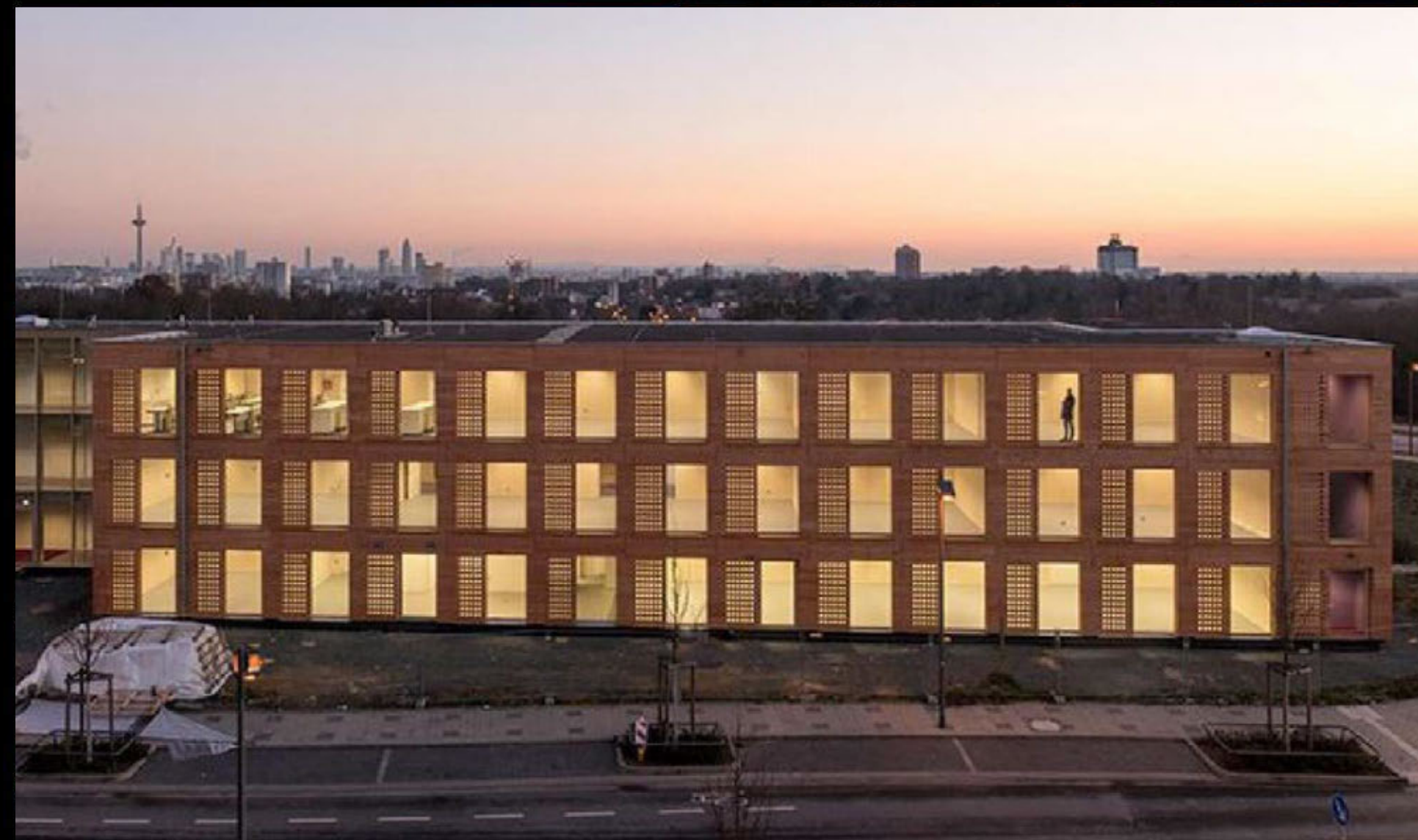
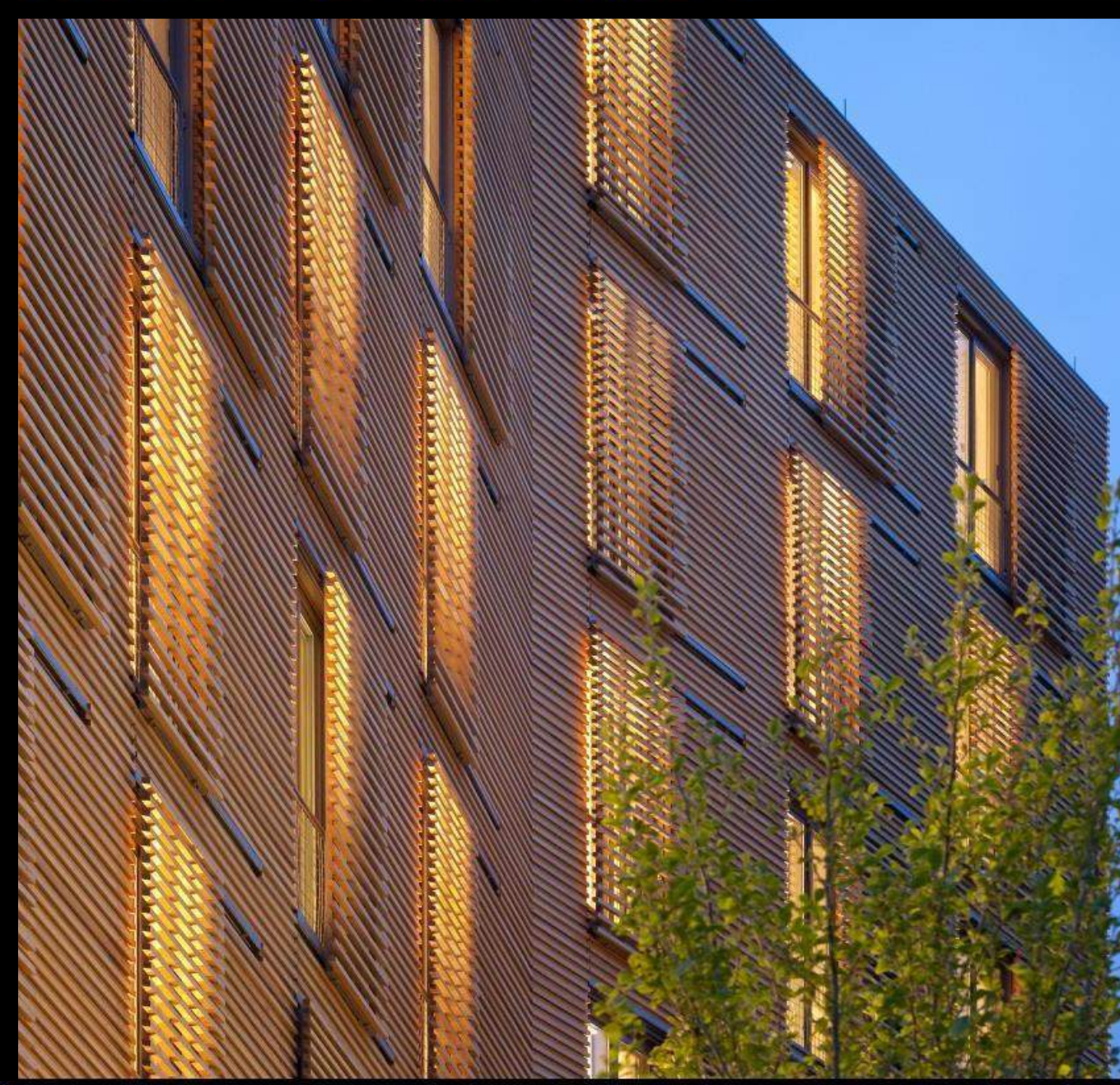


Every project:
on time, on budget.

MODULAR MASS TIMBER PROJECTS



A wide range of programs,
scales, and contexts.



Peter Rose, FAIA, FRAIC
 IDCUBED | *Co-Founder*
 Peter Rose + Partners | *Founder*
prose@roseandpartners.com

**INTEGRATED
 DESIGNCUBED**
 MODULAR MASS TIMBER

Andreas Krawczyk
 IDCUBED | *Co-Founder*
 NKBAK | *Co-Founder*
krawczyk@nkbak.de



This concludes The American Institute of Architects
Continuing Education Systems Course