

Wood in Industrial Design: Strategies for Large-Scale Warehouse Applications

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



Course Description

As industrial and warehouse facilities evolve to meet new operational and workforce needs, wood and mass timber systems are creating new opportunities within traditionally steel- and concrete-dominated building types. This two-part session will examine the design and construction of large-scale warehouse applications incorporating hybrid and mass timber systems, including exterior wall assemblies, multi-story office components, and other integrated wood elements. Presenters will discuss key design decisions, system optimization, coordination, constructability, and lessons learned from project delivery. The session will also explore how wood systems can support occupant well-being, architectural quality, and broader building performance goals in modern industrial facilities.

Learning Objectives

1. Identify opportunities for integrating mass timber and hybrid wood systems into large-scale warehouse and industrial facilities while addressing structural, enclosure, fire and life safety, and operational requirements.
2. Explain key design and detailing considerations for timber wall systems, multi-story office components, and interfaces between wood and conventional structural systems.
3. Evaluate how early coordination, system optimization, prefabrication, and construction sequencing can improve constructability, quality control, and project delivery for large-scale wood applications.
4. Describe how the use of wood and mass timber in industrial facilities can contribute to sustainability, occupant well-being, and long-term building performance while meeting functional and safety objectives.

Wood in Industrial Design:

Amazon D115 Mass Timber Delivery Station



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Learning Objectives

1. Identify carbon hotspots in warehouse buildings using tools like EC3 and certification targets such as Zero Carbon Certification.
2. Evaluate mass timber, panelized wood roofs, daylighting, and rainscreen strategies for reducing warehouse carbon impacts.
3. Explain how early design-assist collaboration supports structural decisions, code approvals, and constructible hybrid mass timber systems.
4. Describe fabrication, manufacturing, just-in-time delivery, and moisture-management practices needed to execute mass timber warehouses.





main entry

E002

amazon
WORKSPACE
ENTRANCE

E019

The site's imperatives are to
reduce embodied carbon and
operational carbon holistically

Elkhart, Indiana ★



Baseline Tilt-up Warehouse

MATERIALS & ENVELOPE



CODE MINIMUM ENVELOPE



TILT-UP

- Precast with XPS insulation
- Steel Framing
- Metal deck roof



REGIONAL MATERIALS

Industry Standard Materials

ENERGY EFFICIENCY



SYSTEMS CONTROLS

Basic Building controls and metering



100% ELECTRIC

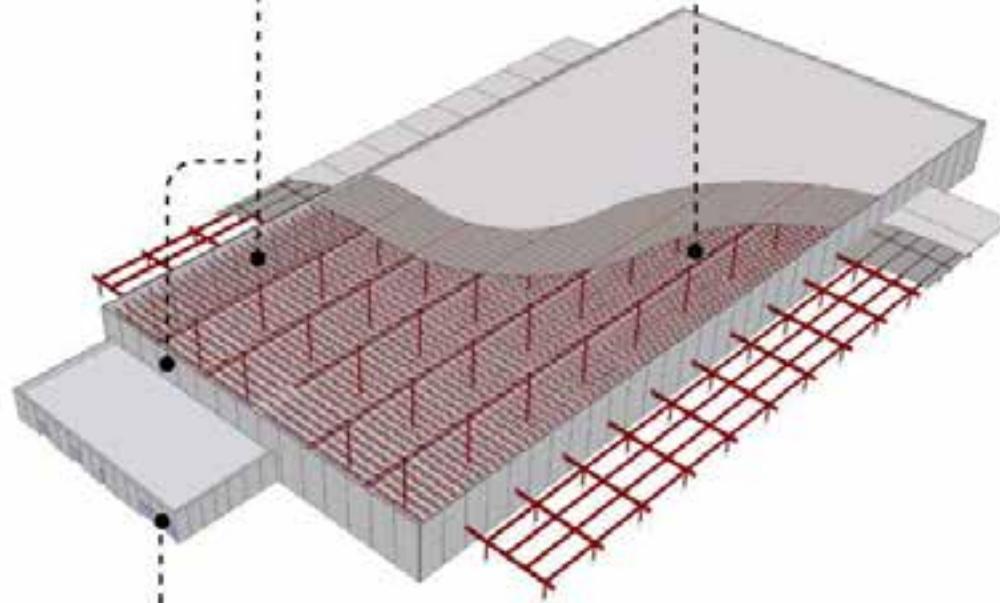
- VAV fan powered boxes
- Chilled water cooling
- Electric Resistance Heating
- Water cooled chiller

ENVIRONMENTAL QUALITY



DAYLIGHT & VIEWS

Storefront in office

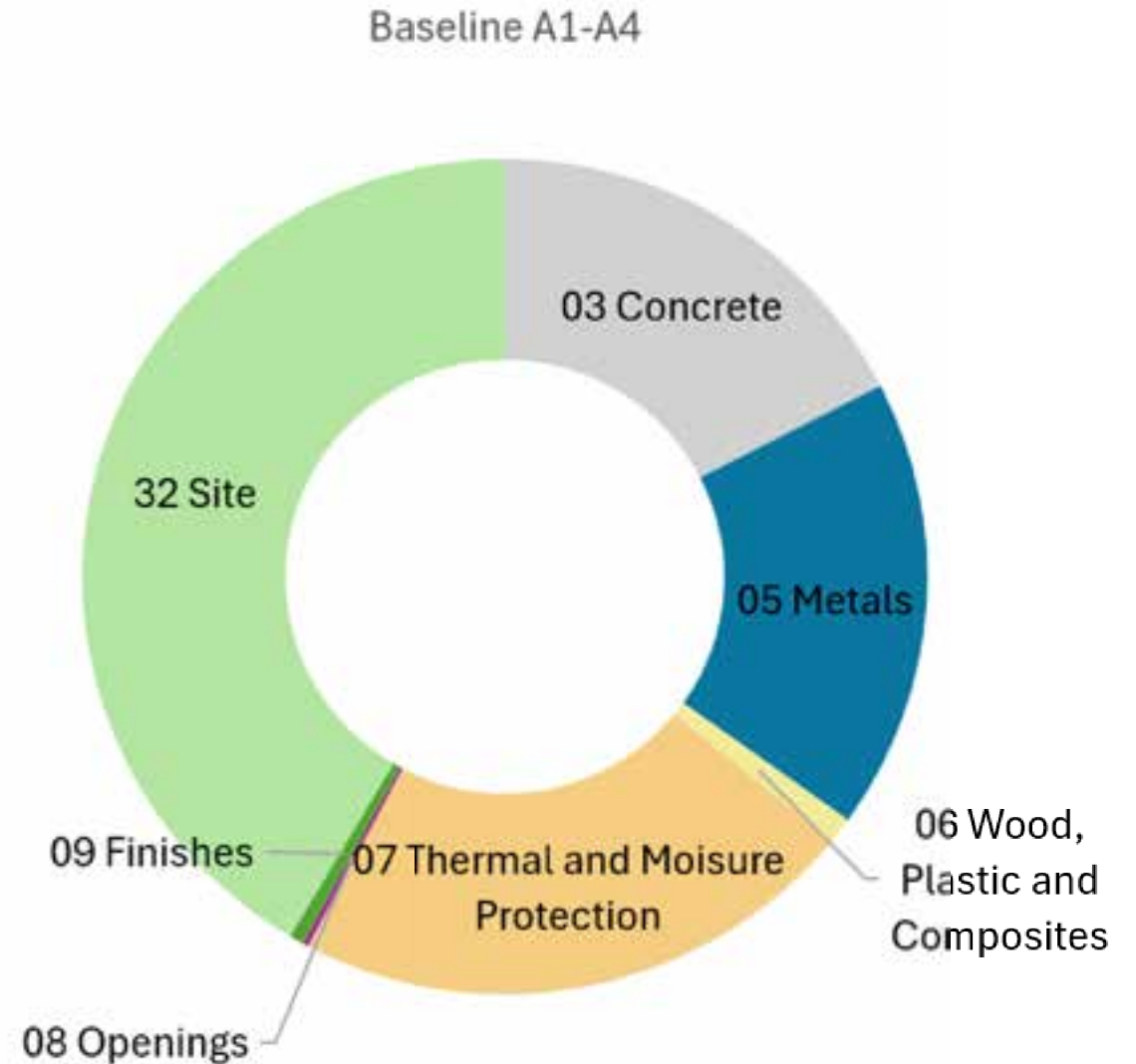


Embodied Carbon Hotspots

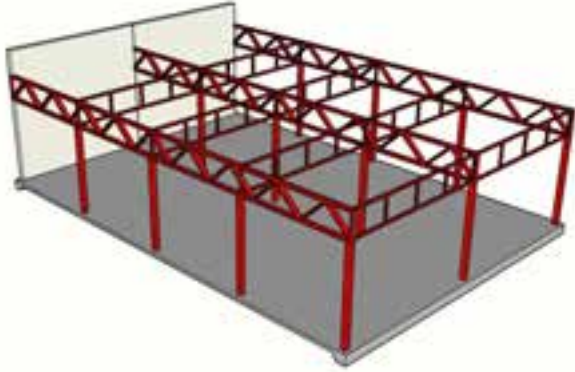
Carbon hotspots in the baseline (A1-A4) are concentrated in CSI Divisions:

- 32 Site hardscapes
- 07 XPS Roof & Wall Insulation
- 03 Concrete
- 05 Structural Steel

**excludes MEP and Finishes*

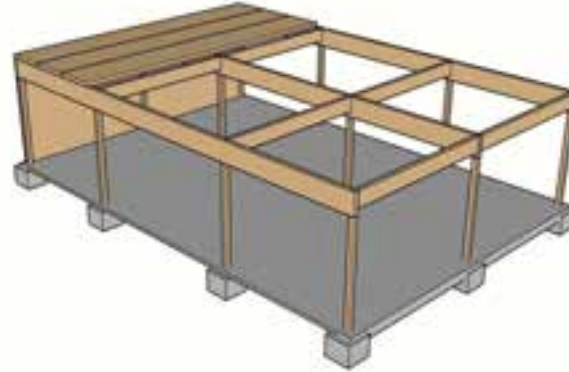


Hybrid Mass Timber



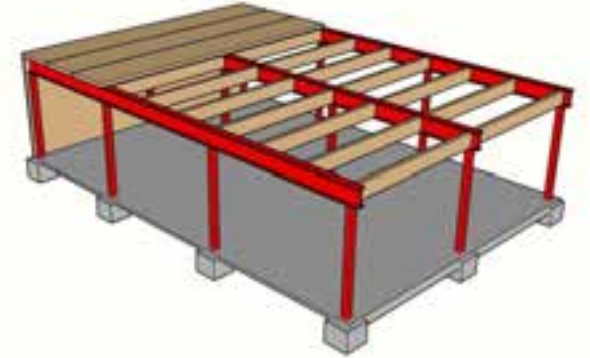
Baseline

- HSS Steel Columns
- Open Web Girder
- Bar Joist
- Tilt Conc Walls
- Metal Deck



Office

- Glulam Columns
- Glulam Girder
- Glulam Beam
- CLT Walls
- CLT Deck



Warehouse

- HSS Columns
- WF Girder
- Glulam Beam
- CLT Deck
- CLT or Conc Wall

Panelized Wood Roof





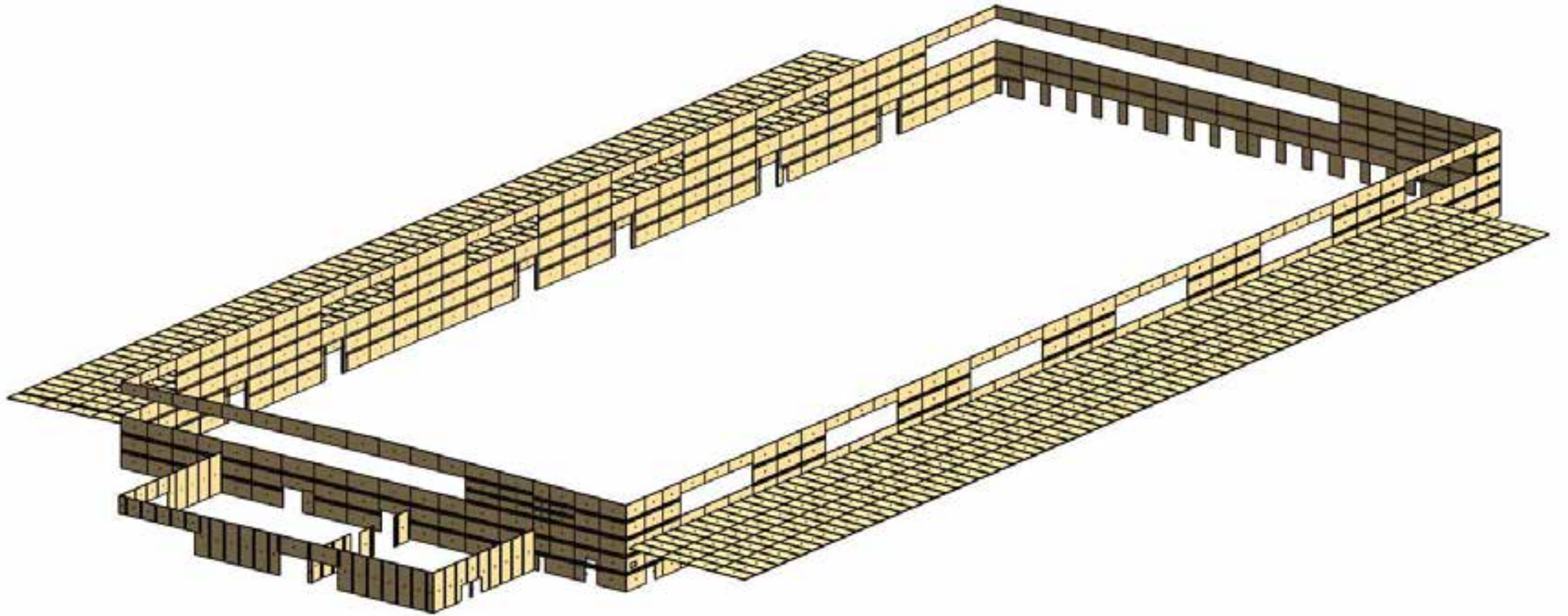


Enclosure Mockups





Fabrication Model



Manufacturing





Timber Frame







CLT Walls



Connection
s







CLT Canopy

Weather Protection



Wood Sourcing





Engineered Wood Studs Wood Fiber Insulation



Thermally Modified Indiana Poplar

Milled Black Oak from the Site



Salvaged Cambium Wood for Desks



Wood Sourcing





DII5 Project Team



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GRAYCOR
BUILDING SOMETHING MORE



RDH BUILDING
SCIENCE



Kimley»Horn

This concludes The American Institute of Architects Continuing Education Systems Course

WOOD IN INDUSTRIAL DESIGN

Strategies for Large-Scale Warehouse Applications



TIMBER
ENGINEERING

MITHŪN

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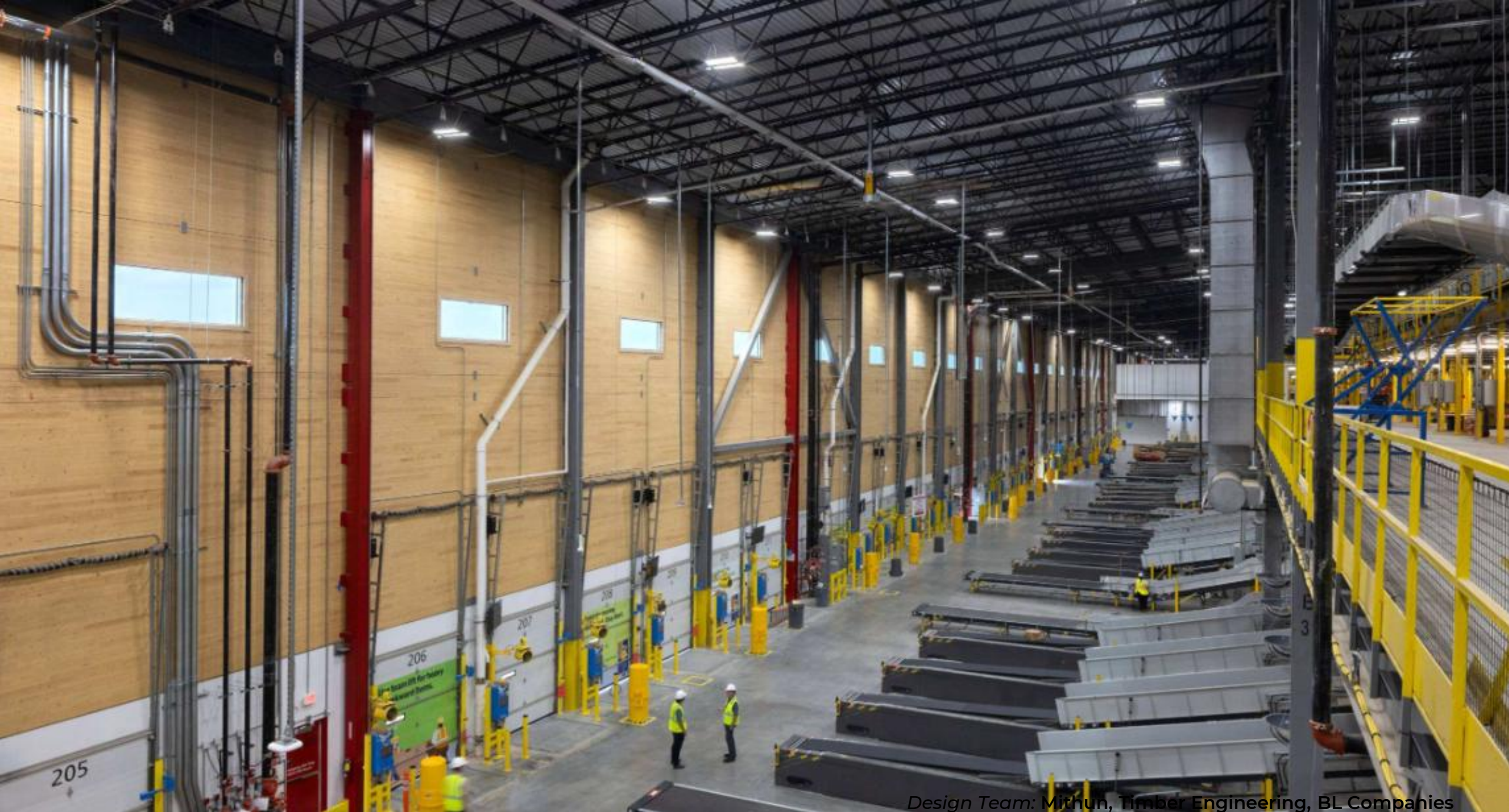
Building Footprint

1,513,800 SF
=
140,600 SqM

Football Field

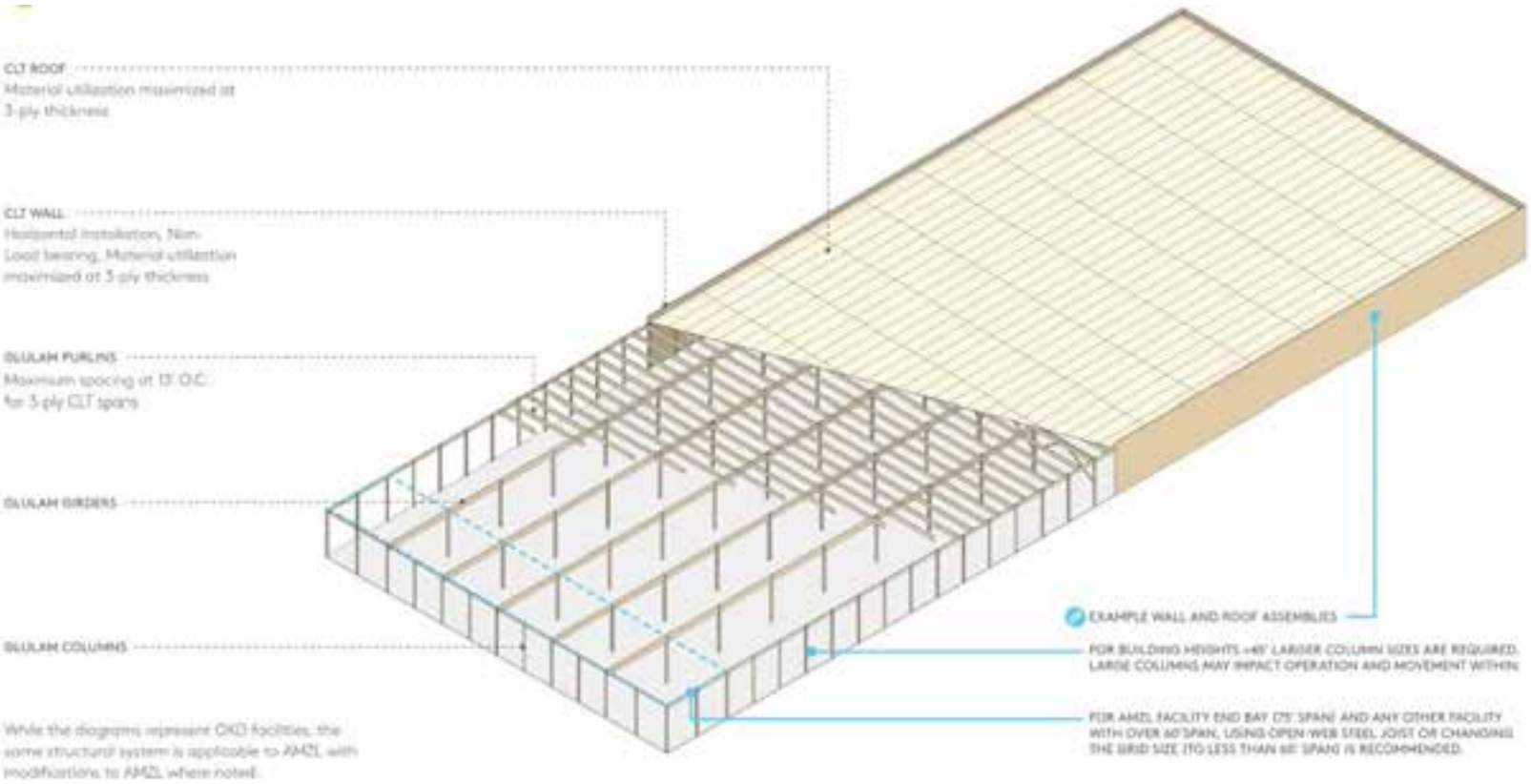
Philadelphia Convention Center

**Amazon
DIIS**



*Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez*

Evolution of Design Studies



ALL-TIMBER STRUCTURE

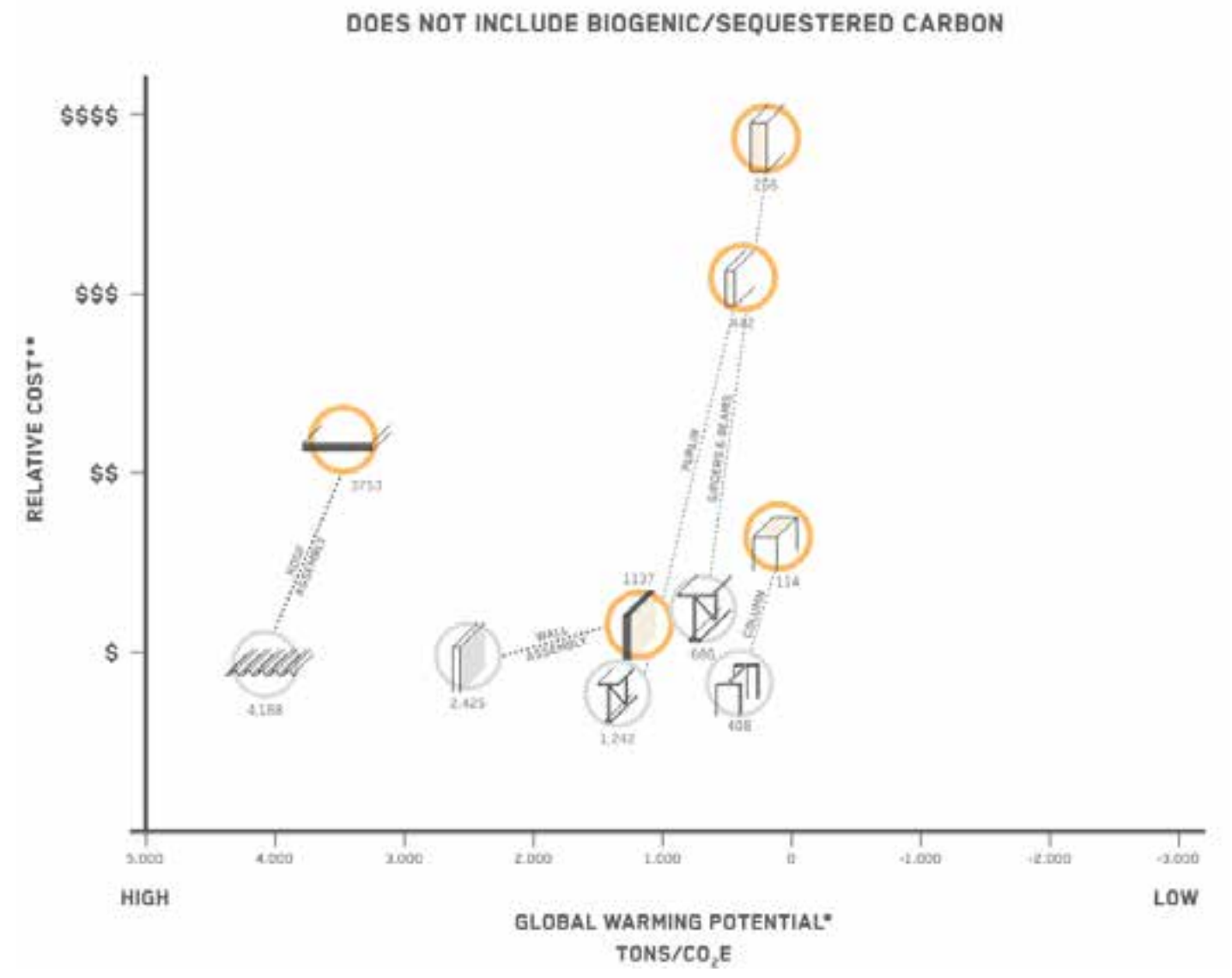


HYBRID: TIMBER WALL ONLY

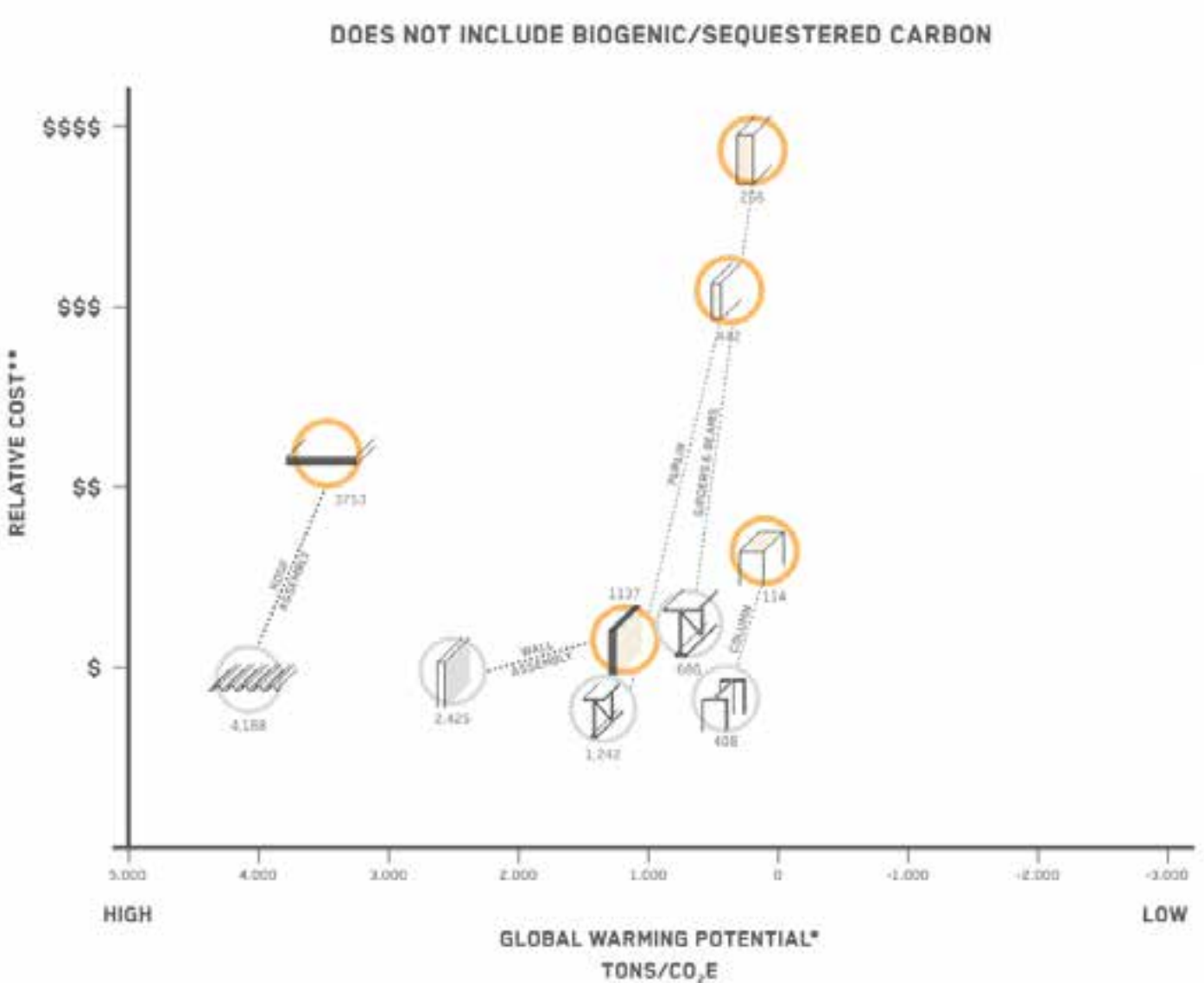


HYBRID: TIMBER WALL & ROOF

Evolution of Design Studies



Structural Design



ALL-TIMBER STRUCTURE



HYBRID 01: TIMBER WALL ONLY



HYBRID 02: TIMBER WALL & ROOF

CARBON/COST-EFFECTIVE SOLUTION



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Warehouse: Design Drivers



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez

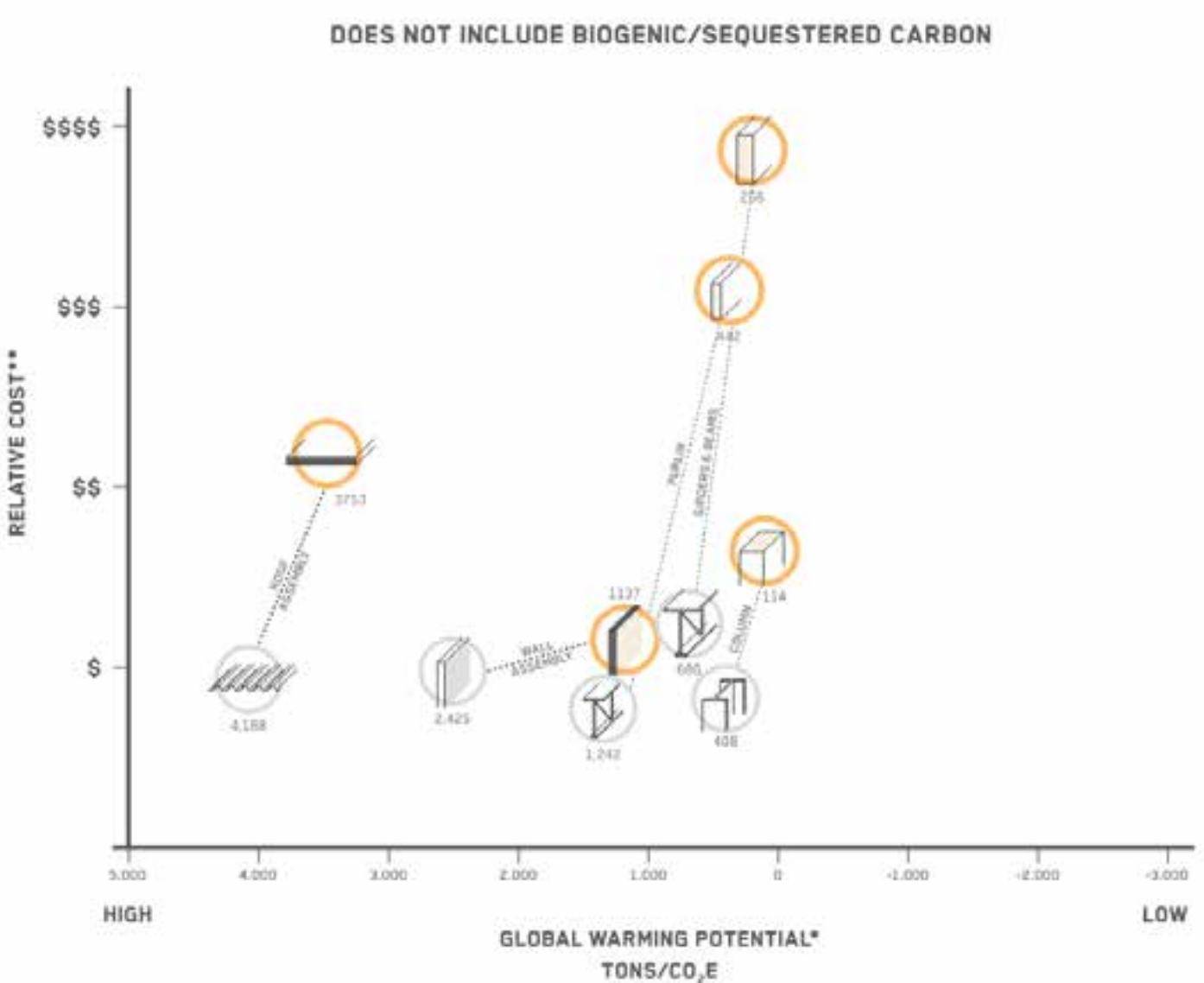


Dock doors drive grids.

Clear heights and CLT spans
drive layout and efficiency.

Program, lateral loads and
construction efficiency drive
hybridity

Structural Design



ALL-TIMBER STRUCTURE



HYBRID 01: TIMBER WALL ONLY



HYBRID 02: TIMBER WALL & ROOF

Warehouse Envelope: Hybrid Mass Timber Systems

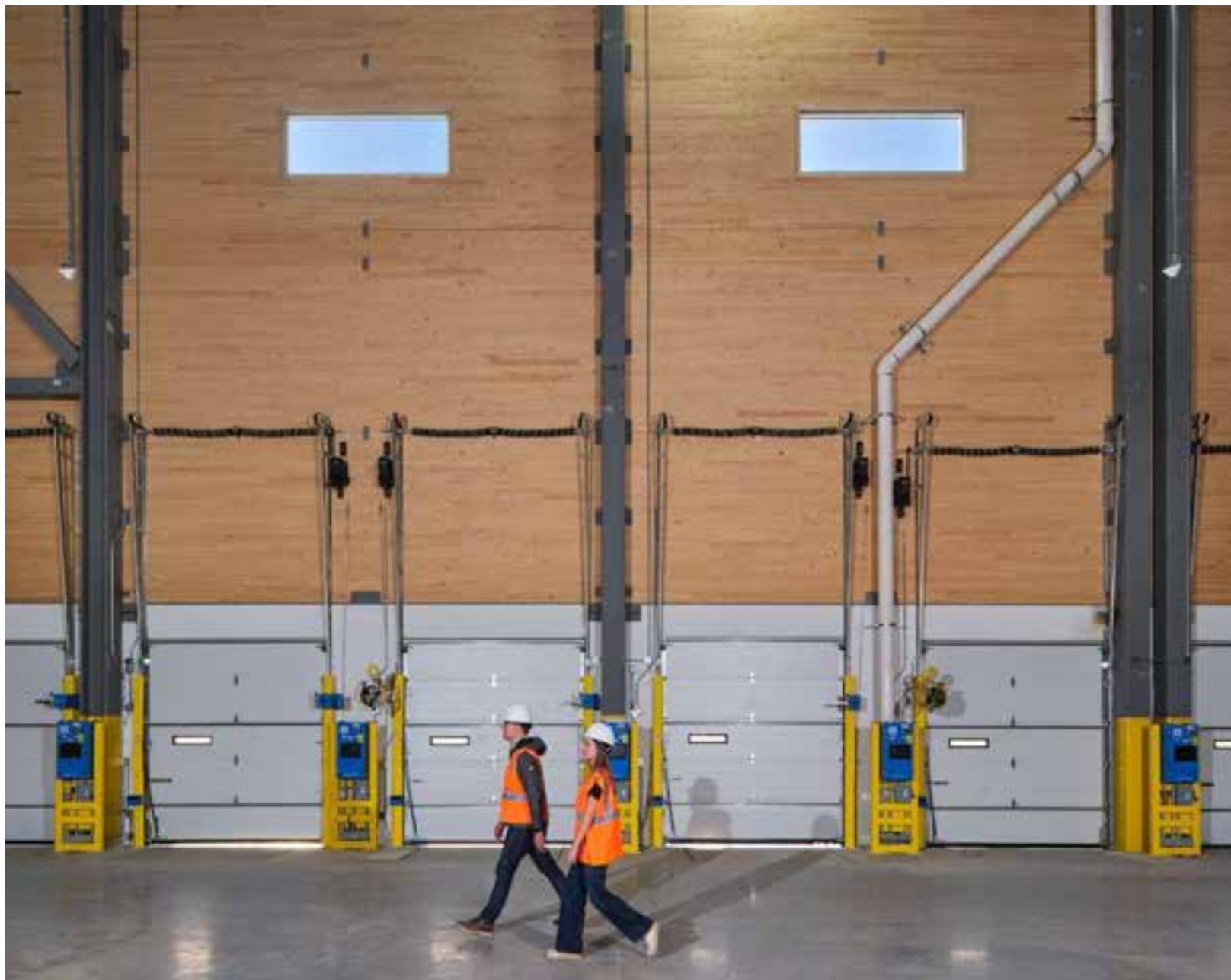


Conventional Bar joist &
metal deck roof

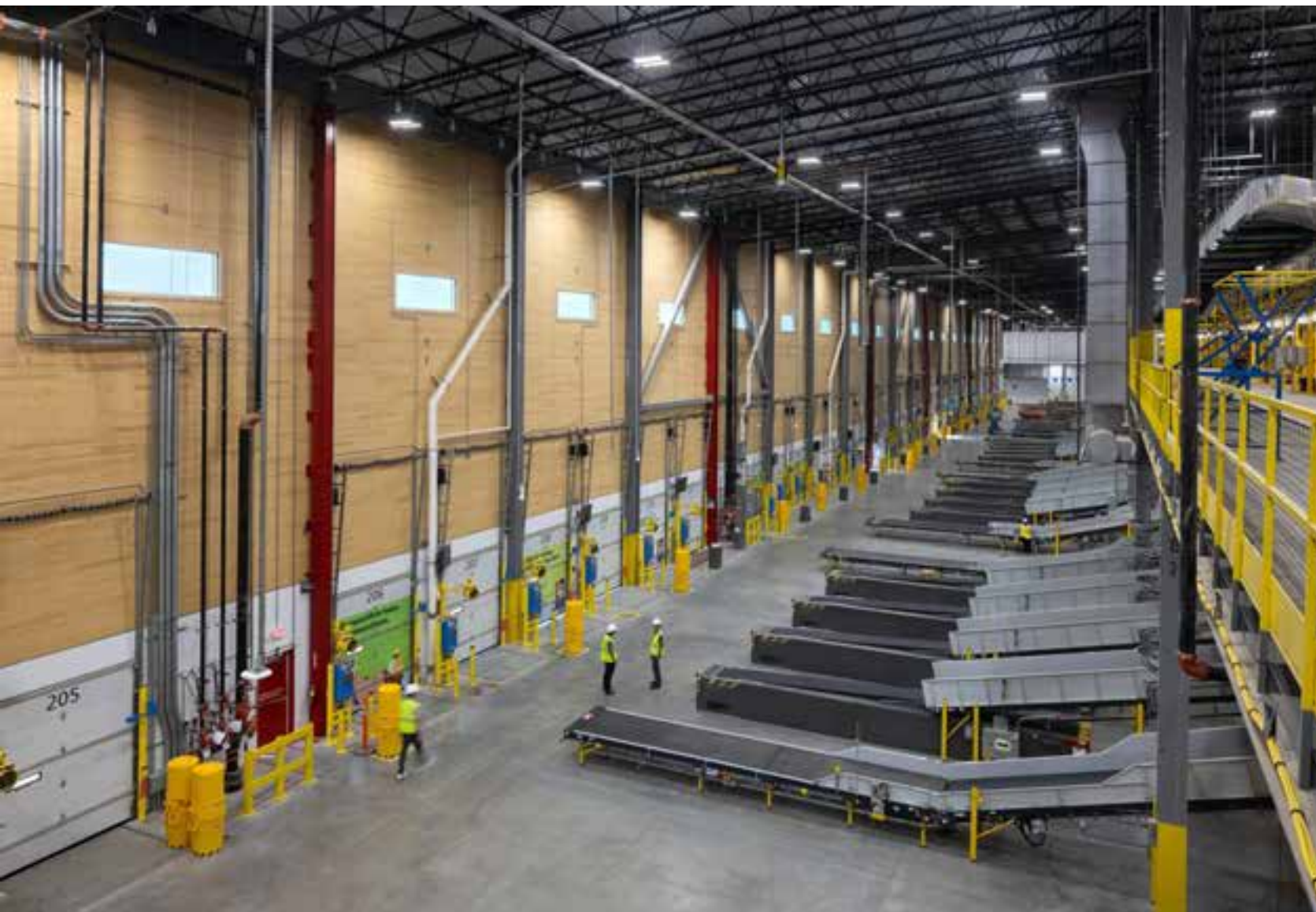
Primary Steel Frame

CLT Wind Wall

12-ft Precast Stem Wall



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Photos: Robert Gomez

Warehouse - Structural Design



Warehouse – Materials and Connections



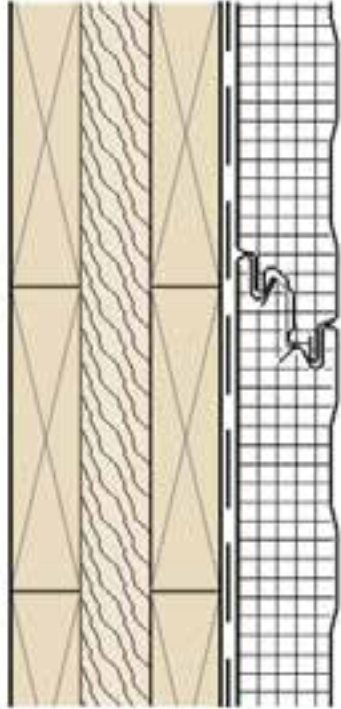
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Warehouse – Materials and Connections



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Warehouse Envelope: Construction Sequencing

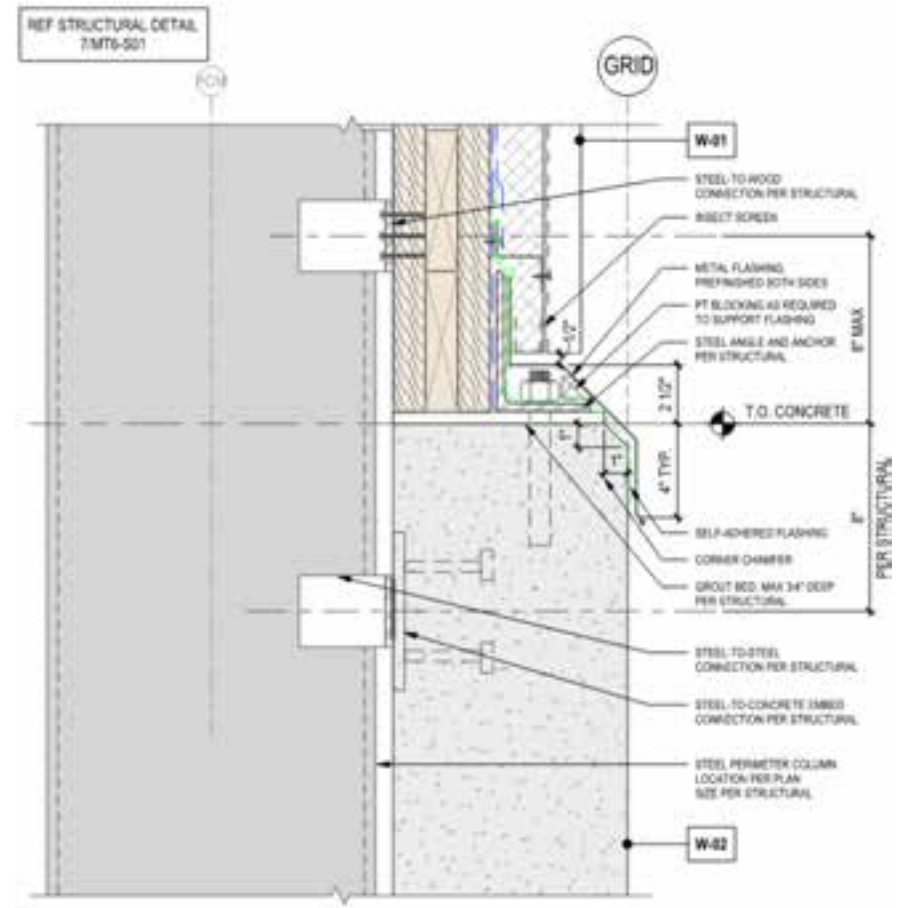


PLAN



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez

Warehouse Envelope: Construction Sequencing



SECTION DETAIL @ T.O. CONCRETE

Warehouse Envelope: Construction Sequencing



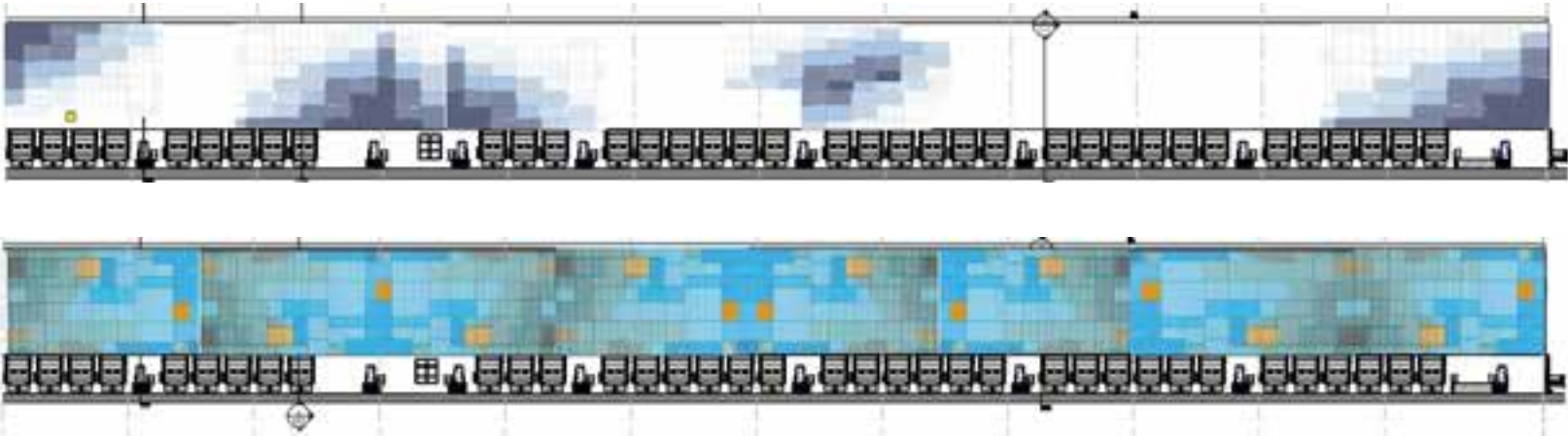
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Warehouse Envelope: Construction Sequencing



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Warehouse Envelope: Cladding & Waterproofing



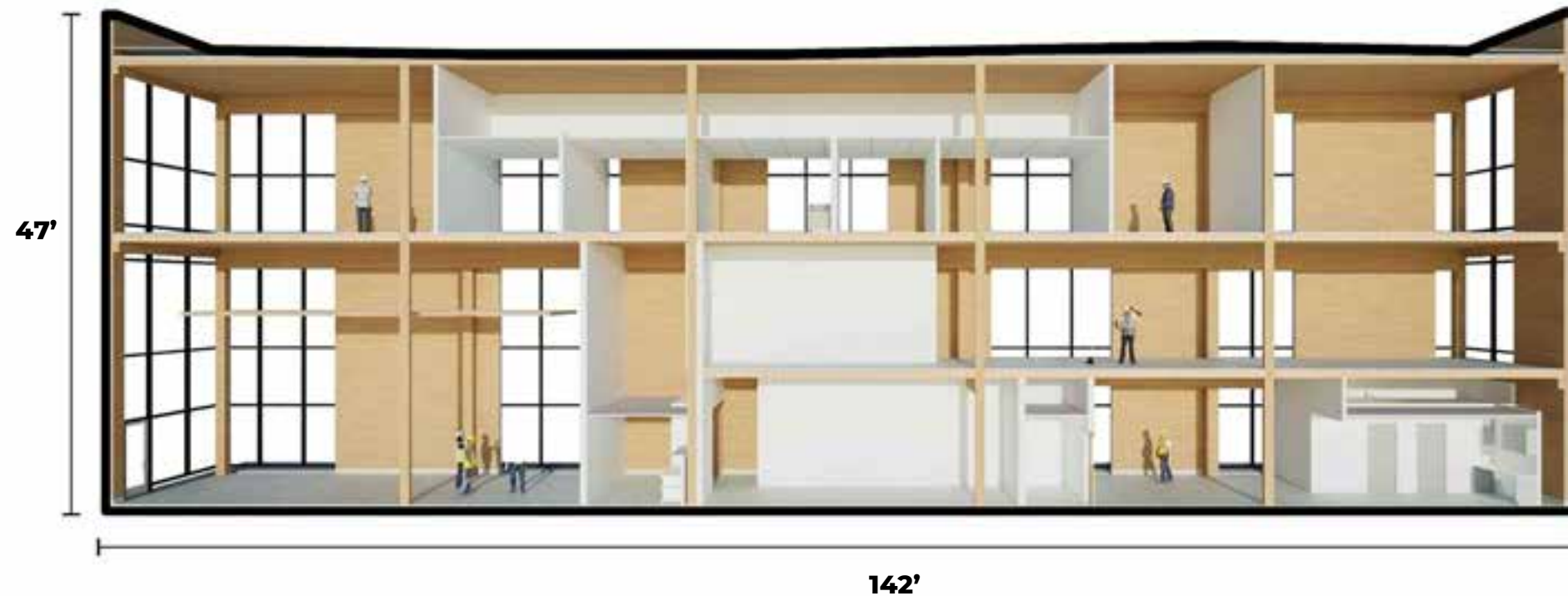
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Office Block – Full Mass Timber



Design Team: Mithun, Timber Engineering, BL Companies

Office Block – Full Mass Timber



- 2 Stories + Mezzanine
- CLT Roof & Floor Decks
- Glulam posts & beams
- CLT Shear Walls

Design Team: Mithun, Timber Engineering, BL Companies

Office Block – Full Mass Timber



158'

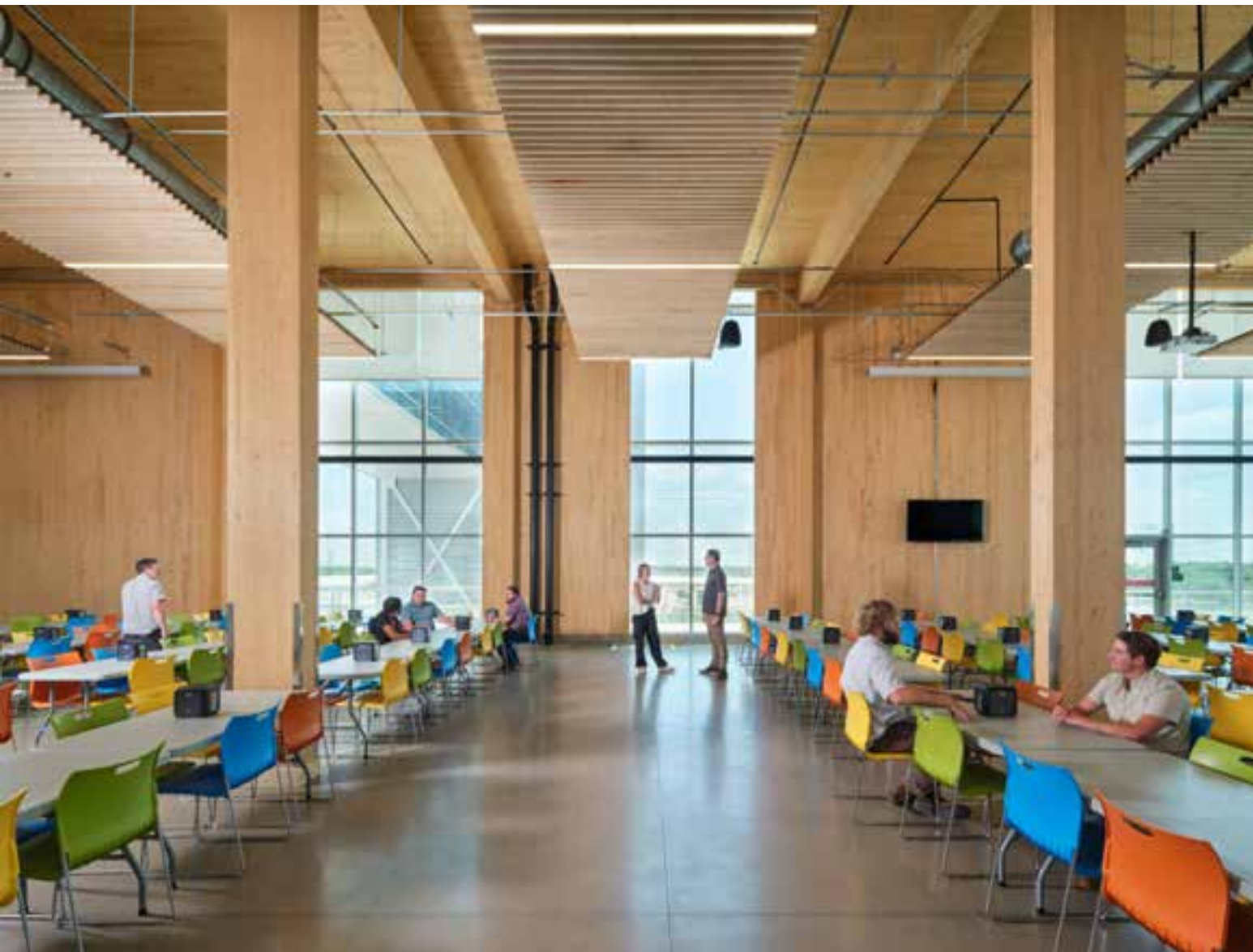
40,000 SF Office Space

Program: Locker Rooms, Offices, Conference Rooms, Amenities, Training Rooms, and large Break Room

Break room sized for up hundreds of associates

Full-height glazing & exposed timber

Design Team: Mithun, Timber Engineering, BL Companies



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez

Office Block – Full Mass Timber



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez

Office Block – Associate Experience



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez



Office Block – Associate Experience



Design Team: Mithun, Timber Engineering, BL Companies

Photos: Robert Gomez

Structural Design

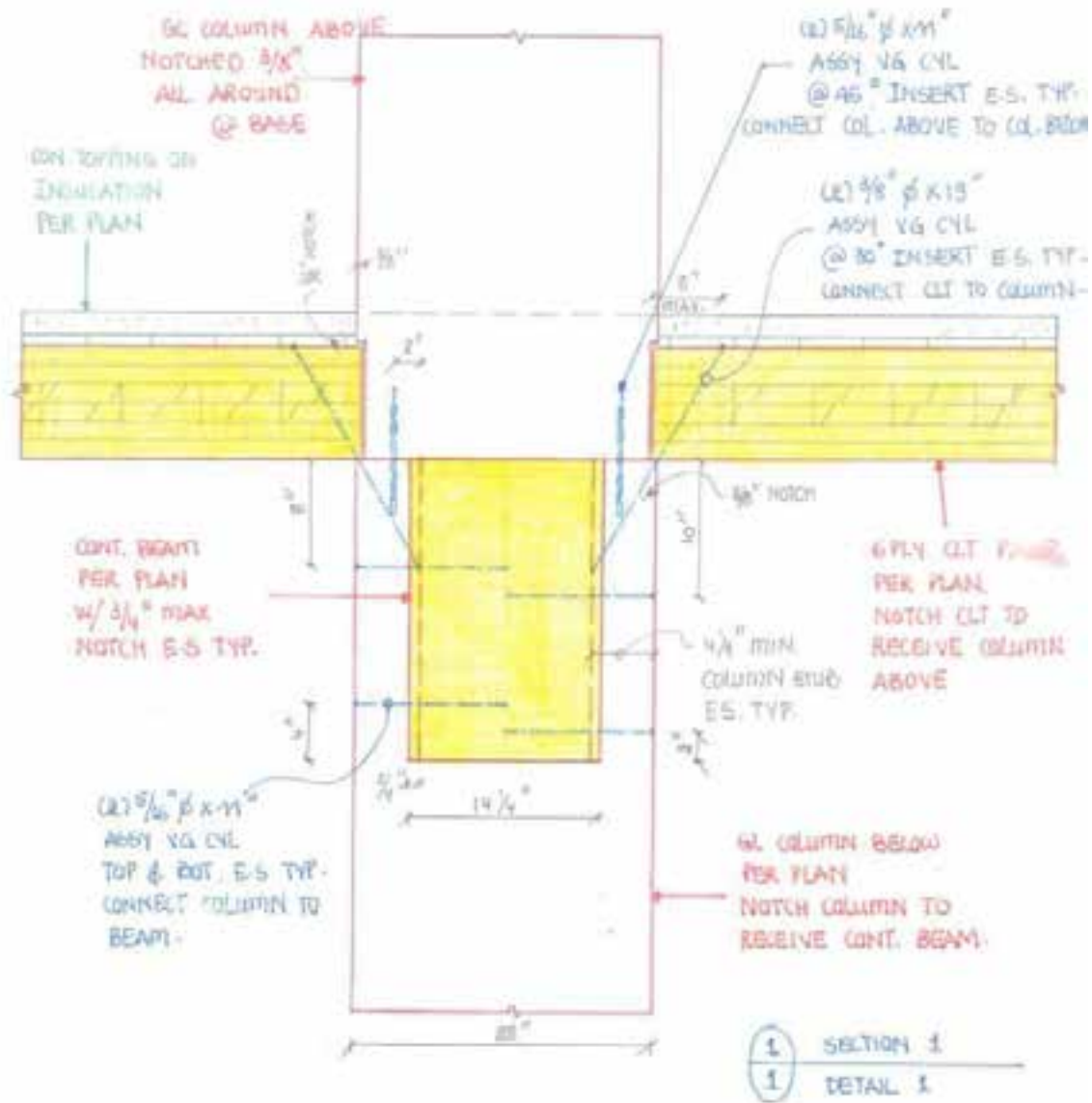


Office – Materials and Connections



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Office – Wood to Wood Connections



Office – Wood to Wood Connections

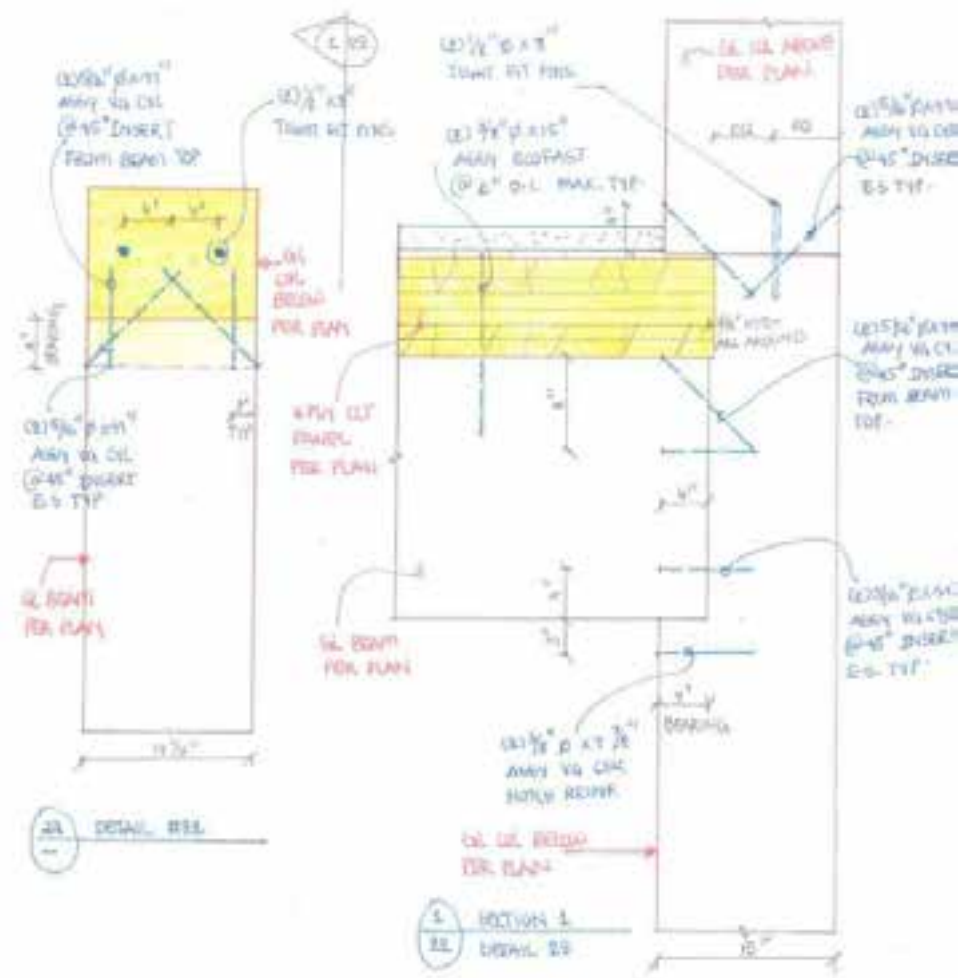


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Photos: Robert Gomez



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Office – Wood to Wood Connections



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Photos: Robert Gomez



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez

Office – Perimeter CLT Shear Walls



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez

Office – Perimeter CLT Shear Walls



Design Team: Mithun, Timber Engineering, BL Companies
Photos: Robert Gomez

Office – Perimeter CLT Shear Walls



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Photos: Robert Gomez

Thank You!

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



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ENGINEERING

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