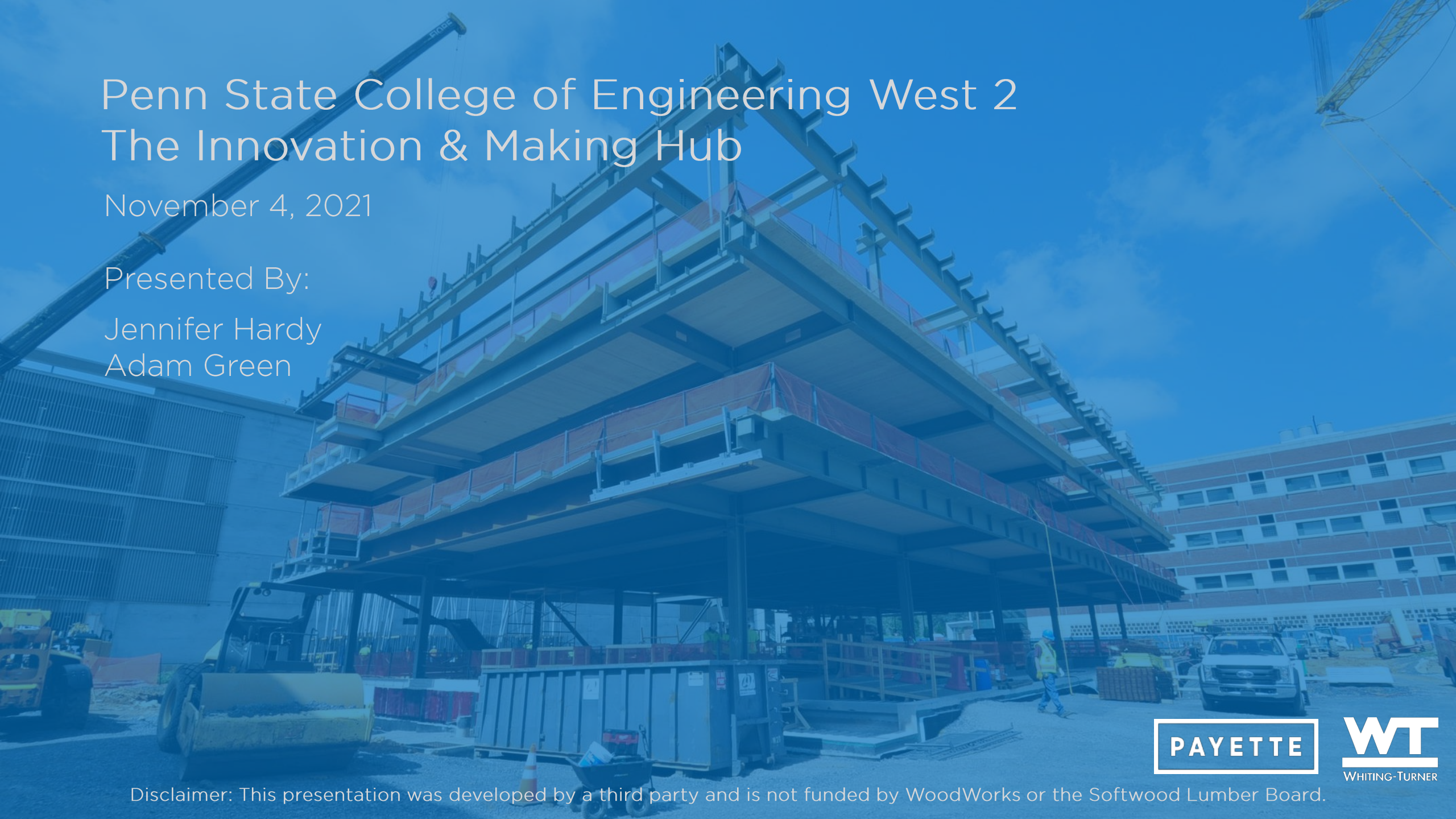


Penn State College of Engineering West 2
The Innovation & Making Hub

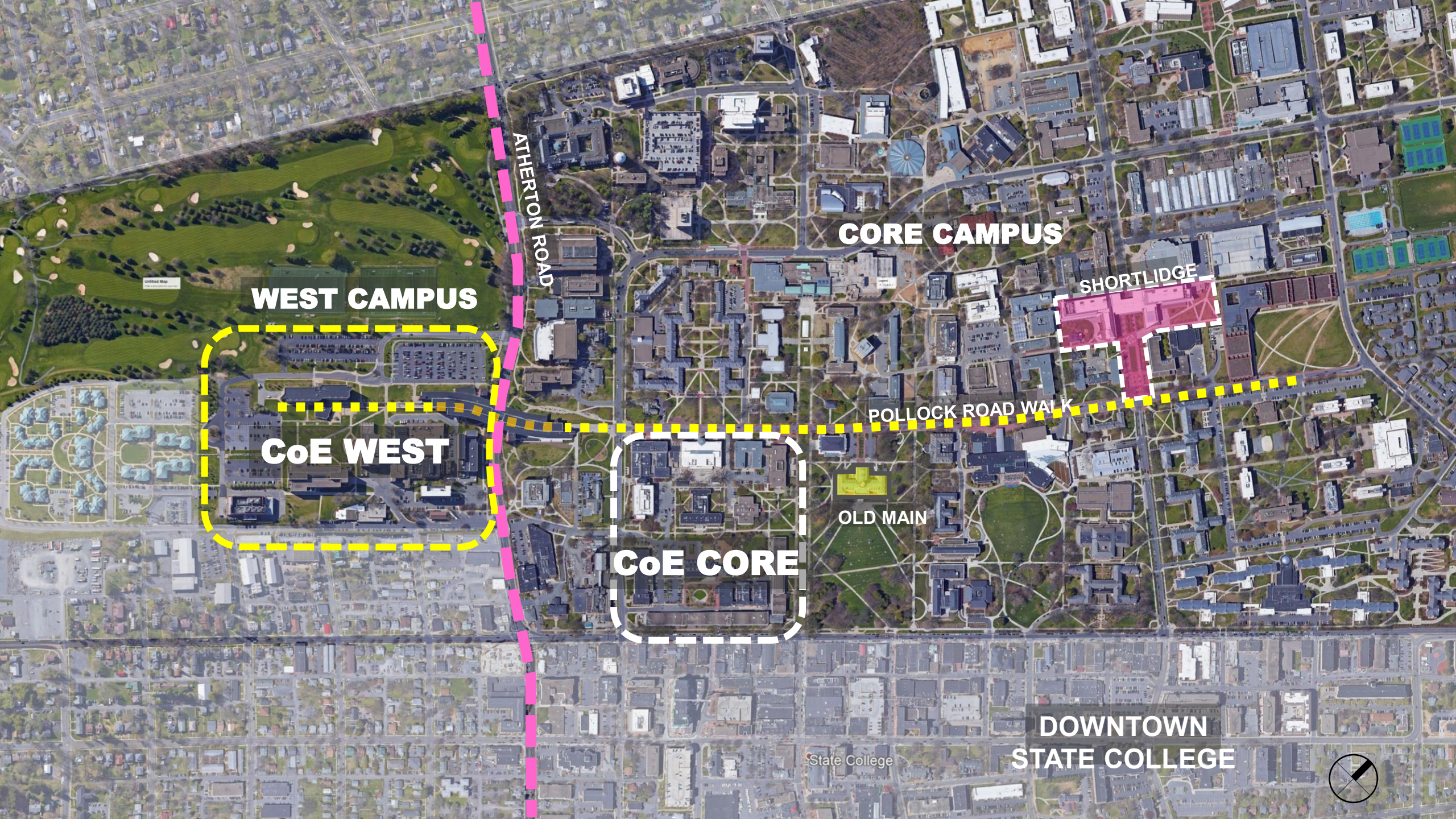
November 4, 2021

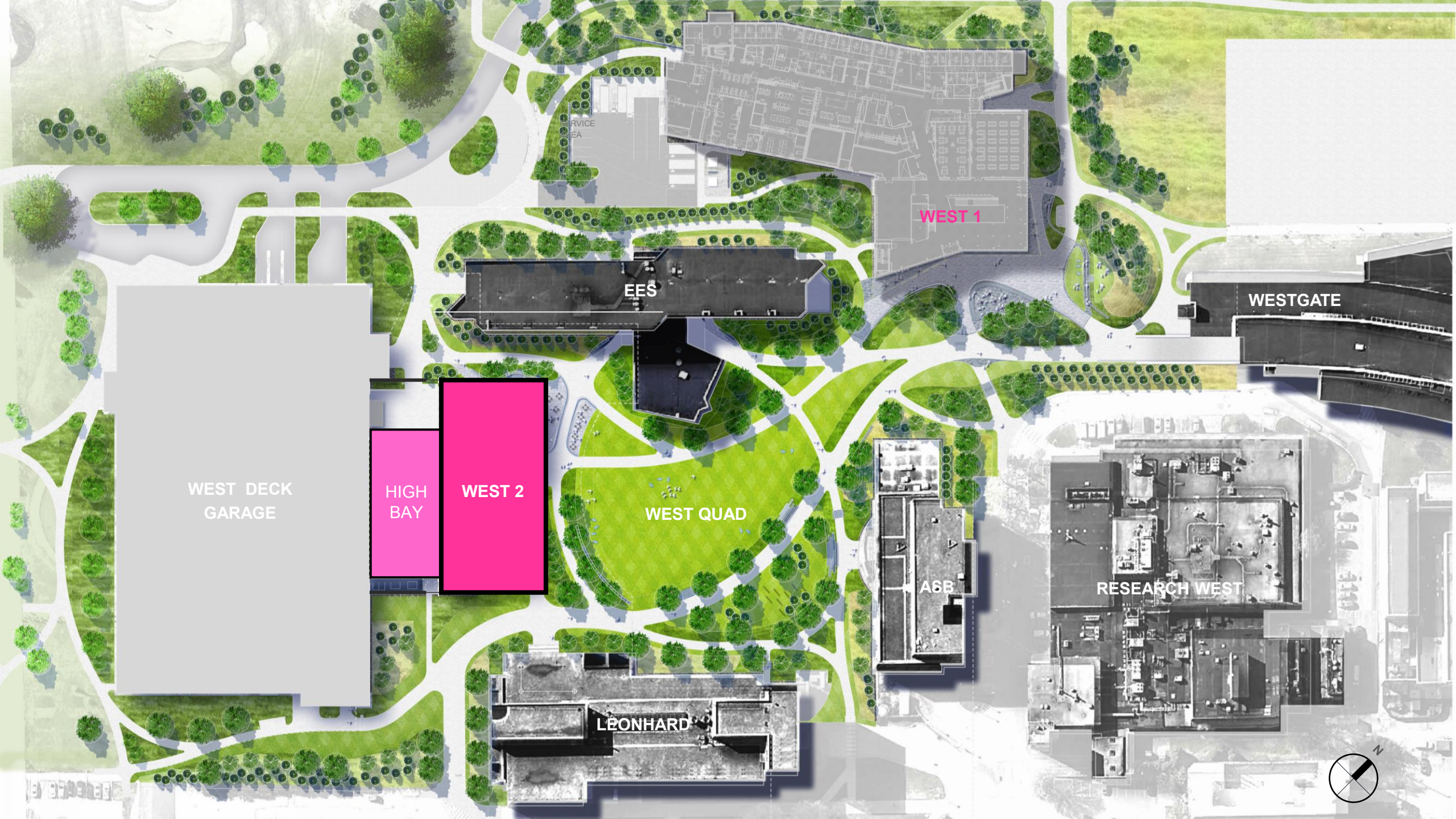
Presented By:

Jennifer Hardy
Adam Green

PAYETTE

WHITING-TURNER

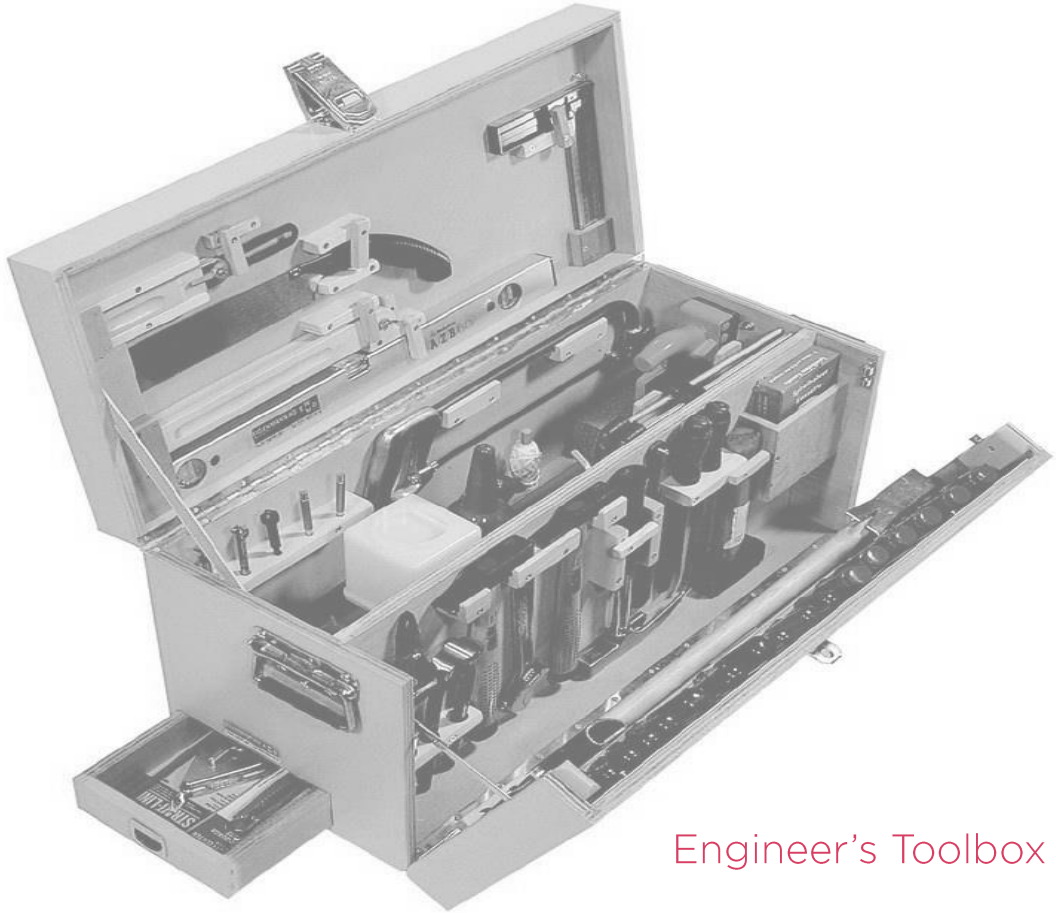

ATHERTON ROAD
WEST CAMPUS
CoE WEST
CORE CAMPUS
SHORTLIDGE
POLLOCK ROAD WALK
OLD MAIN
CoE CORE
DOWNTOWN
STATE COLLEGE
State College


WEST 1
EES
WESTGATE
WEST DECK
GARAGE
HIGH
BAY
WEST 2
WEST QUAD
ASB
RESEARCH WEST
LEONHARD
N

The Innovation & Making Hub for the College of Engineering

Mass Timber Enhancing Project Goals

- Building as a teaching tool
- Forward-looking design
- Real-life engineering problems
- A toolbox for all scales of making
- Pedagogy of innovative thinking
- Innovation in construction technology
- High visibility with energy efficiency



Engineer's Toolbox

A Toolbox for all Scales of Making

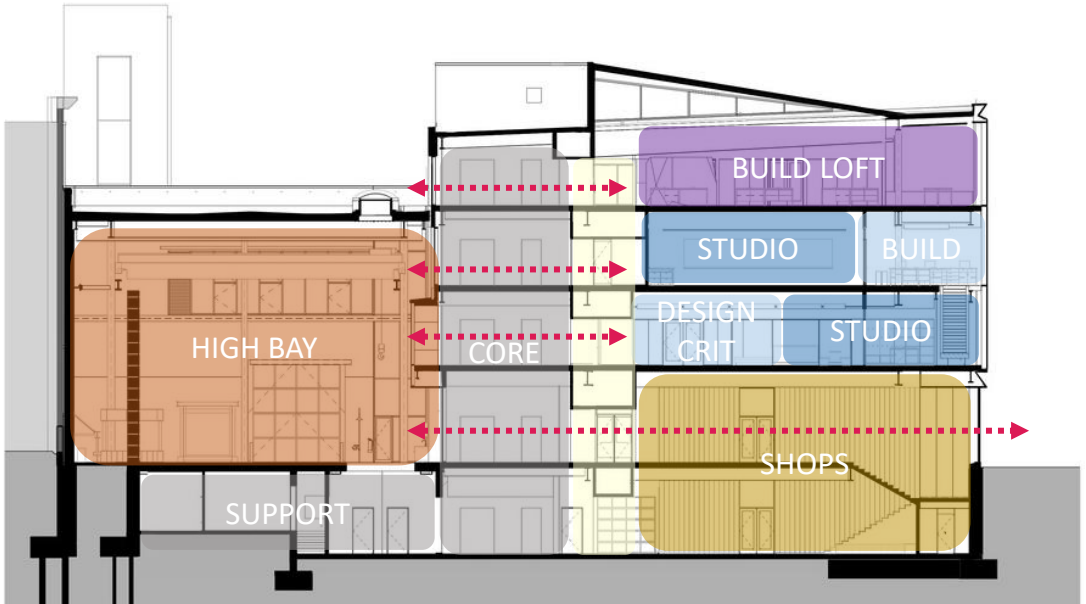
Large open column-free build spaces

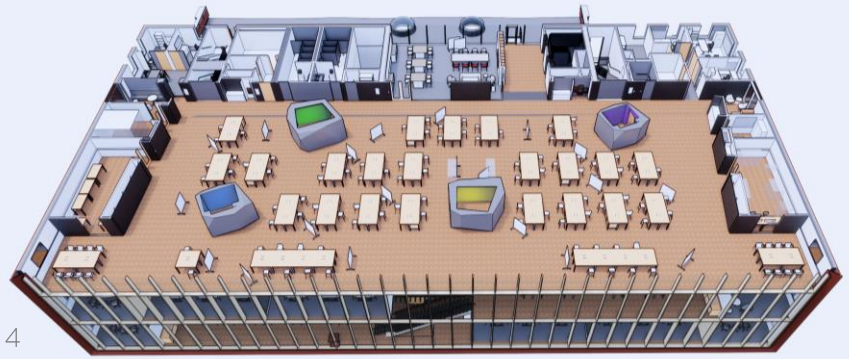
Flexibility & adaptability of use

Aspirational design elements as a teaching tool

Environment for cornerstone to capstone engineering

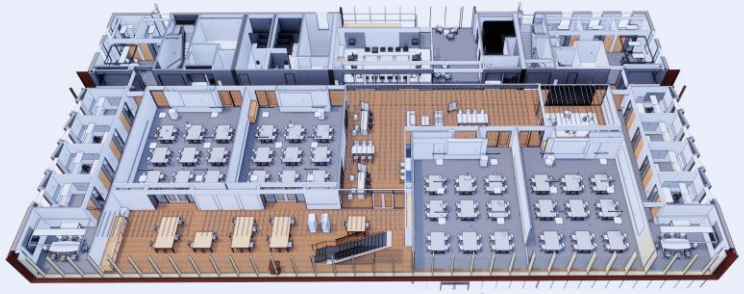
Design from concept to industry partnership





Level 4

Level 3

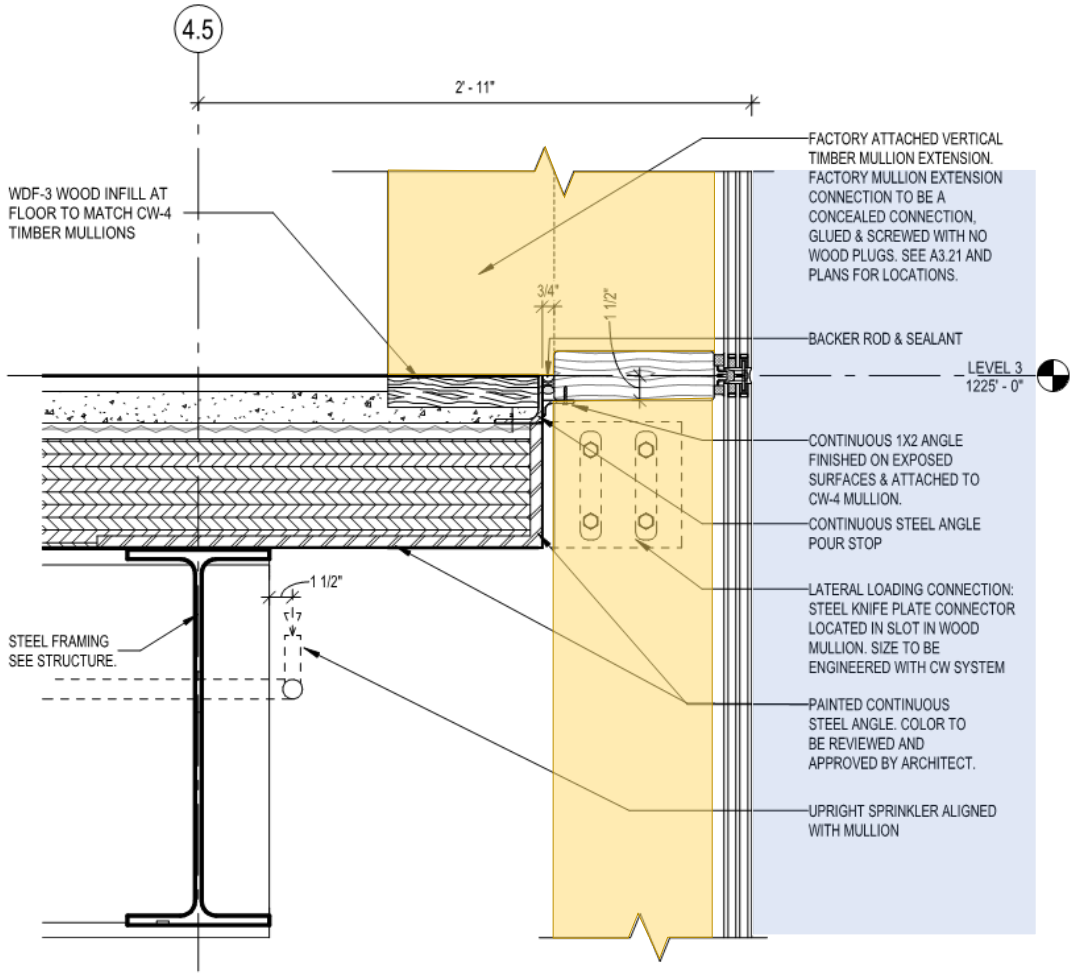


Level 2

Level 1

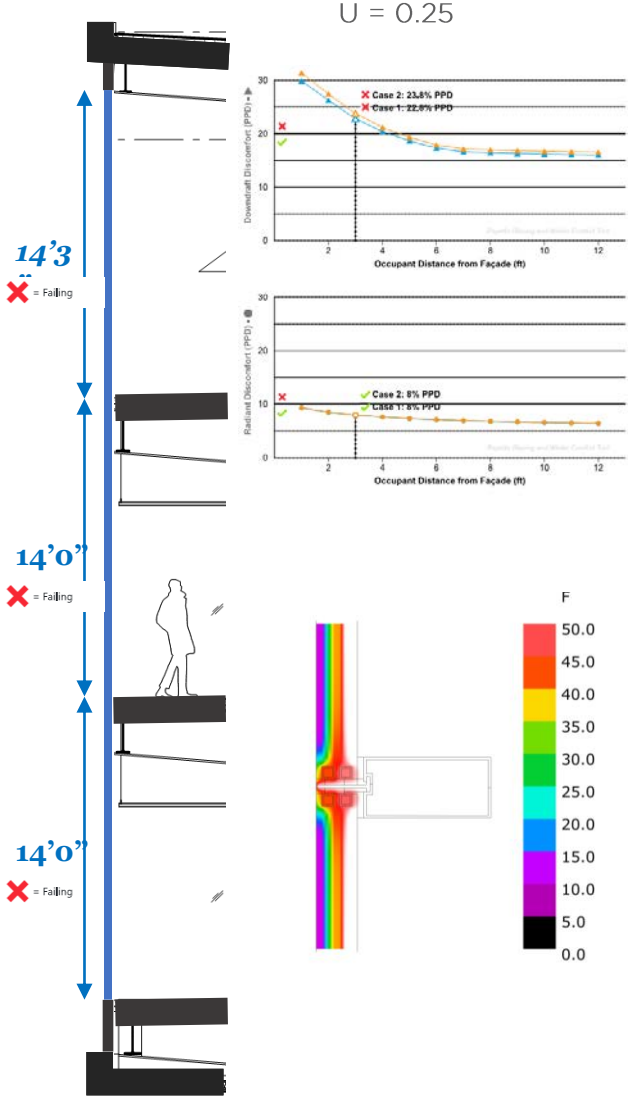
Innovation on Display

Timber Curtain Wall

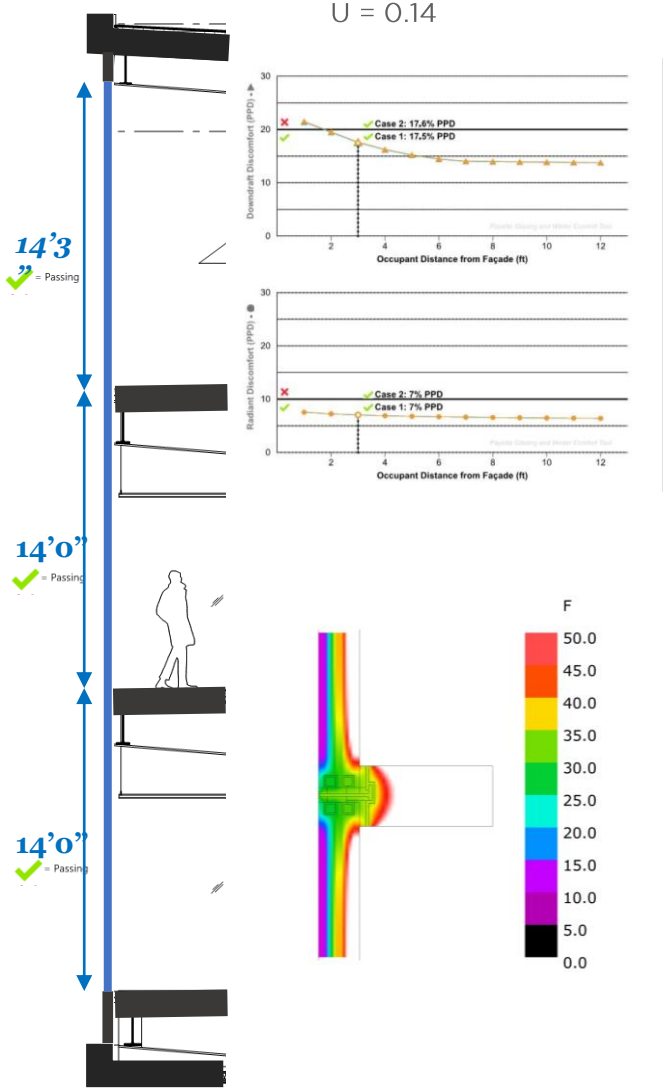


Thermal Performance & Comfort

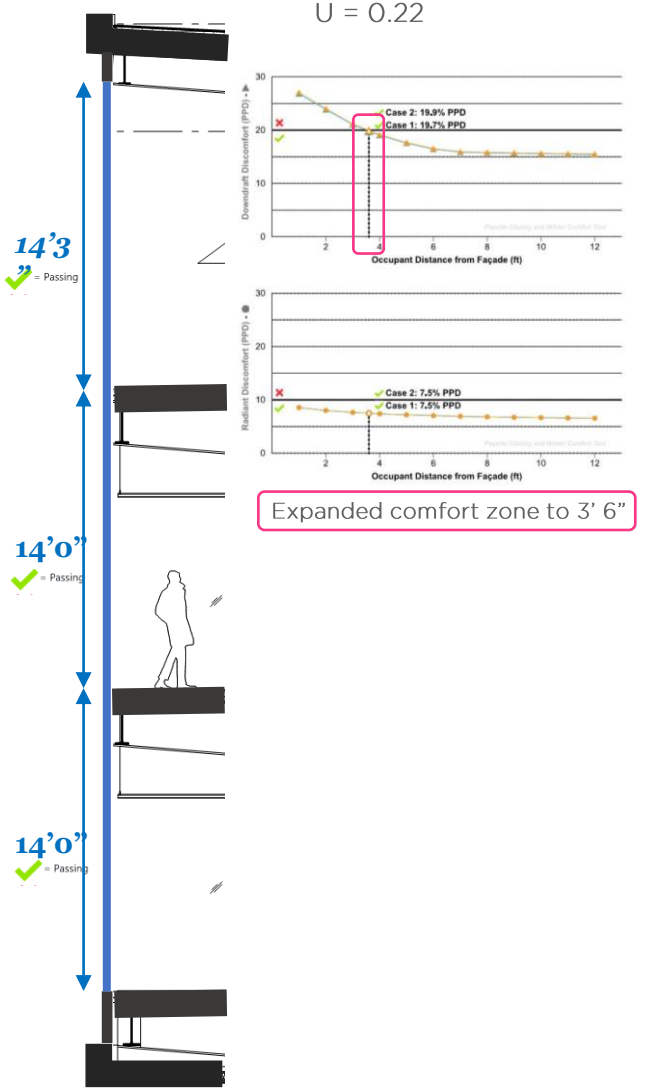
ALUMINUM + TRIPLE GLAZING
U = 0.25



TIMBER + TRIPLE GLAZING
U = 0.14

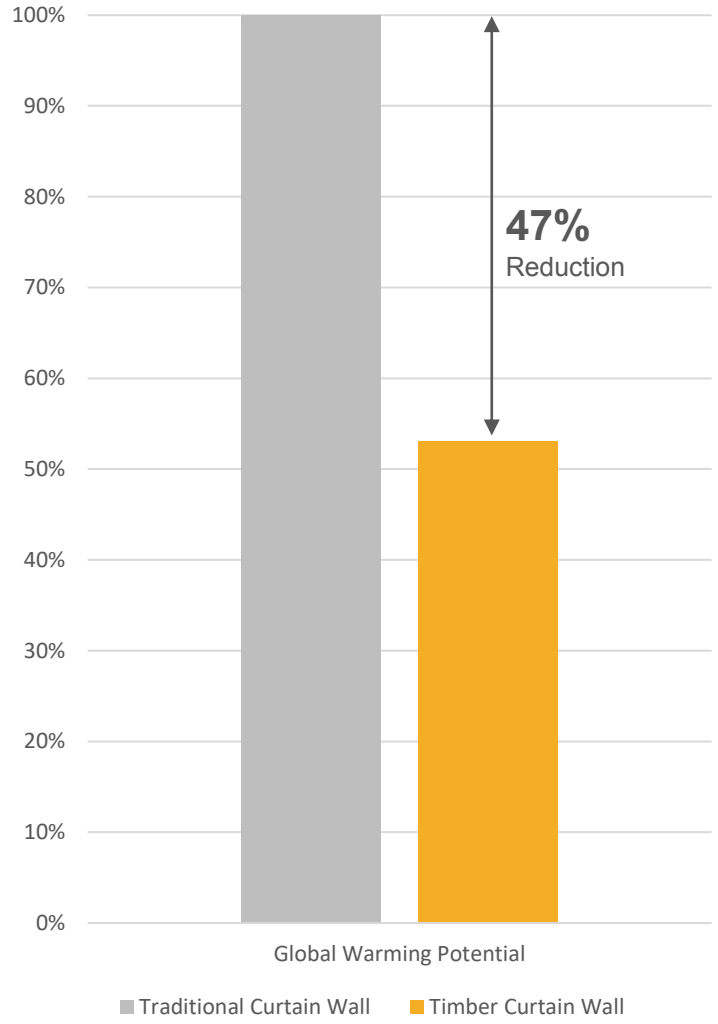


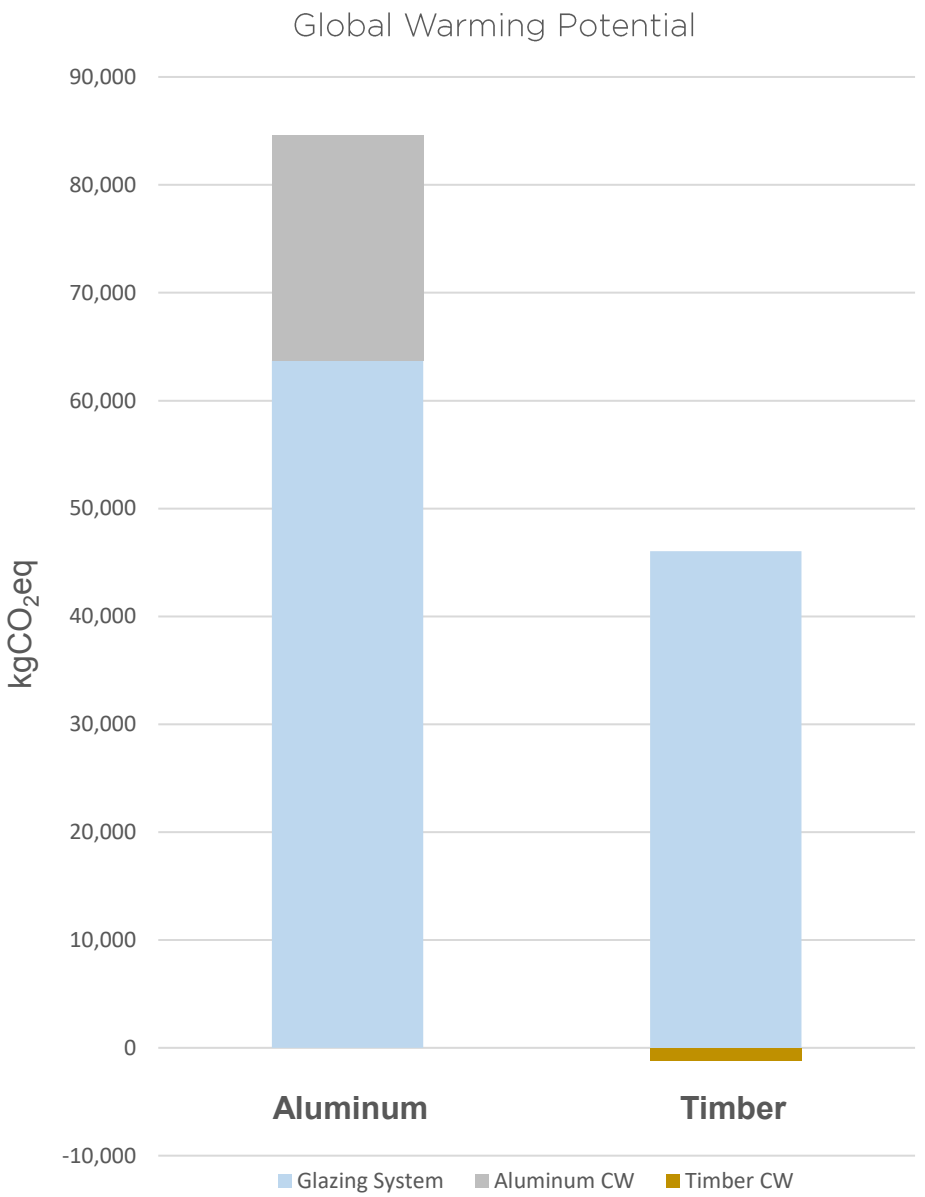
TIMBER + DOUBLE GLAZING
U = 0.22



Expanded comfort zone to 3’ 6”

Performance Based Embodied Carbon Savings





Wood Palette

History of Making

- Heavy timber industrial mill buildings with large open interior floor plans
- Industrial use of wood flooring for durability

Targeted Embodied Carbon Reduction

Health & Wellness of Occupants

Biophilic Benefits

Beauty

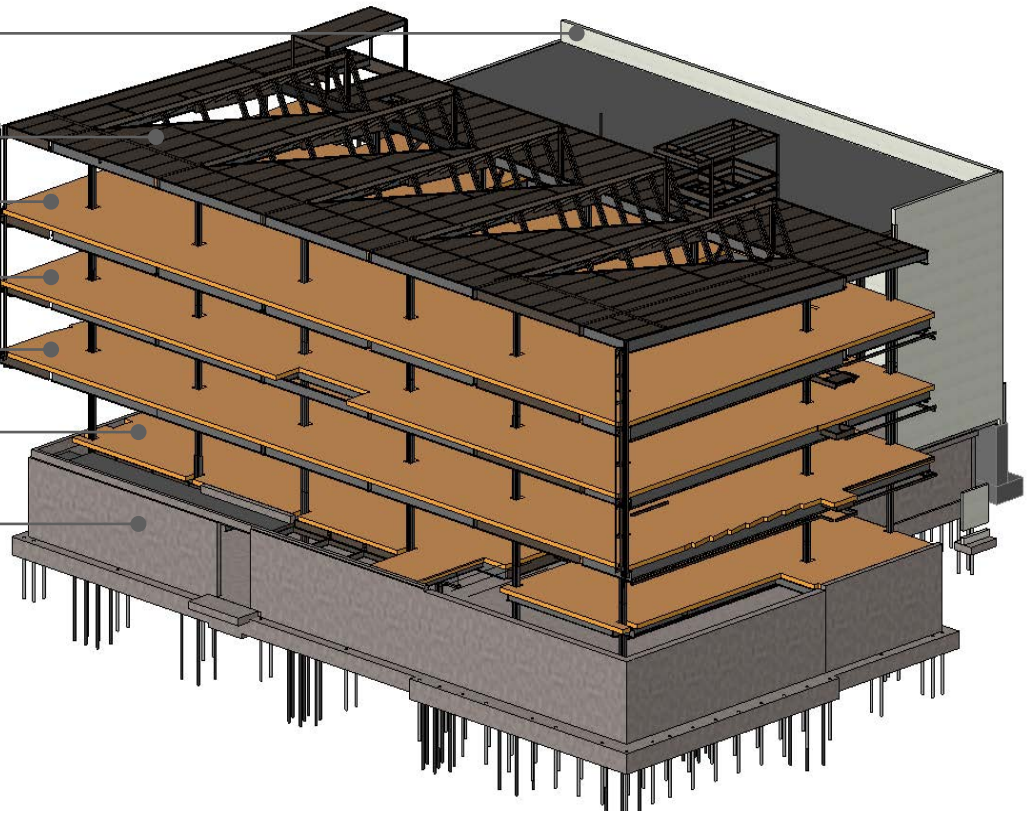
Hybrid Structure

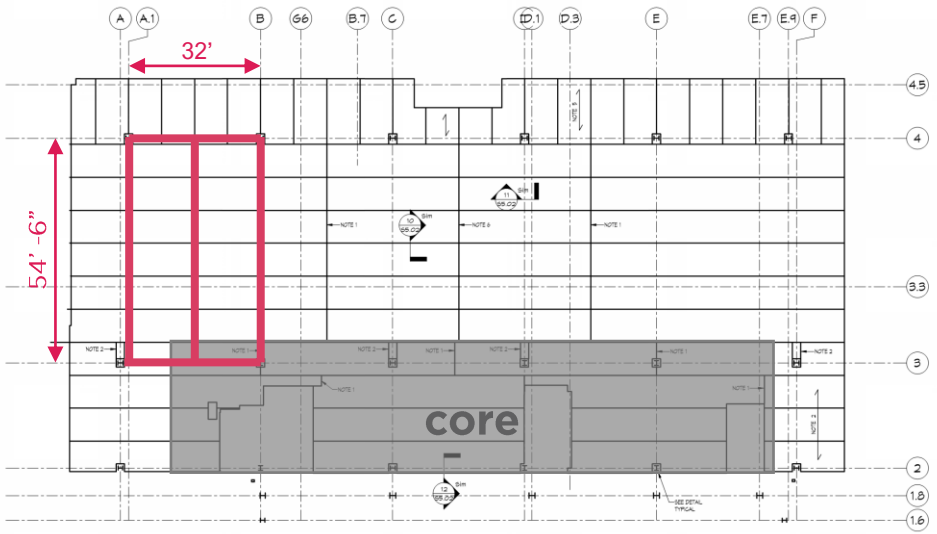
High Bay:
REINFORCED CMU &
STEEL FRAMING

Roof:
STEEL DECK &
STEEL FRAMING

Levels 1,2,3,4:
CLT DECK
ON STEEL FRAMING

Basement:
CONCRETE
FOUNDATION &
SLAB ON GRADE






msc

Competitive Bidding Considerations

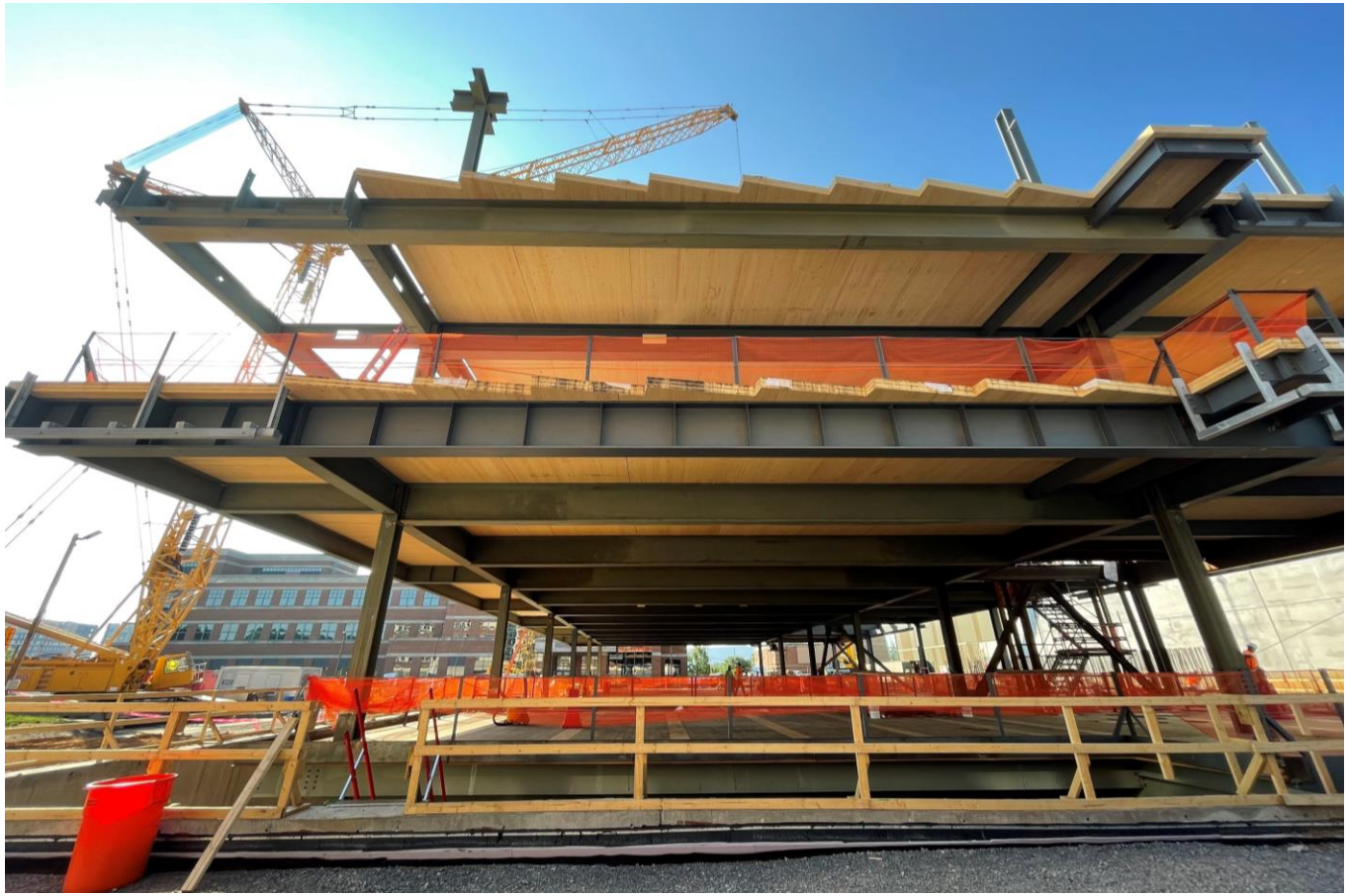
CLT species, stress grade, panel size & thickness, ANSI/APA PRG 320 certification

Glulam options compatible with timber curtain wall

Responsibly sourced wood availability from different manufacturers

Factory vs. field applied sealant for moisture mitigation depending on manufacturer

Acoustic floor assembly options with equal performance and dimensions



Floor Assembly

Availability of wet vs. dry acoustic assemblies

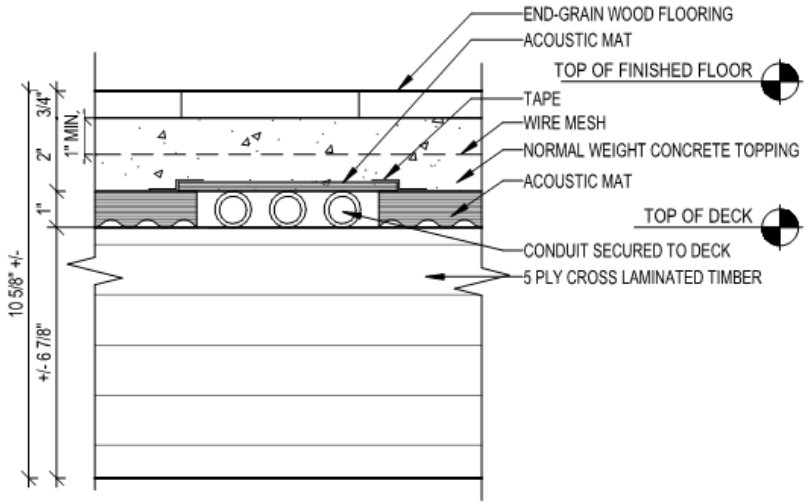
Concrete vs. gypcrete

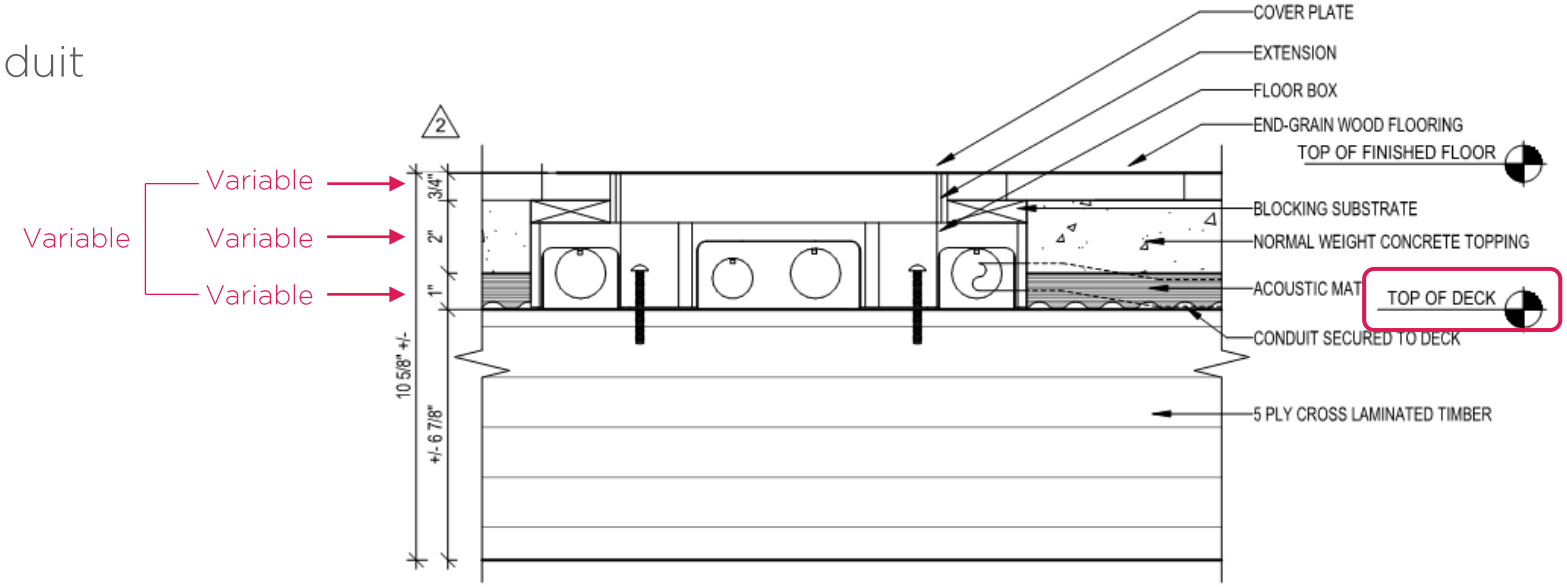
Finish floor subfloor requirements

Acoustic performance and dimensional variability in products

Performance-based concrete topping (low embodied carbon)

Adequate depth for floor boxes and conduit





Intersection of CLT & Steel

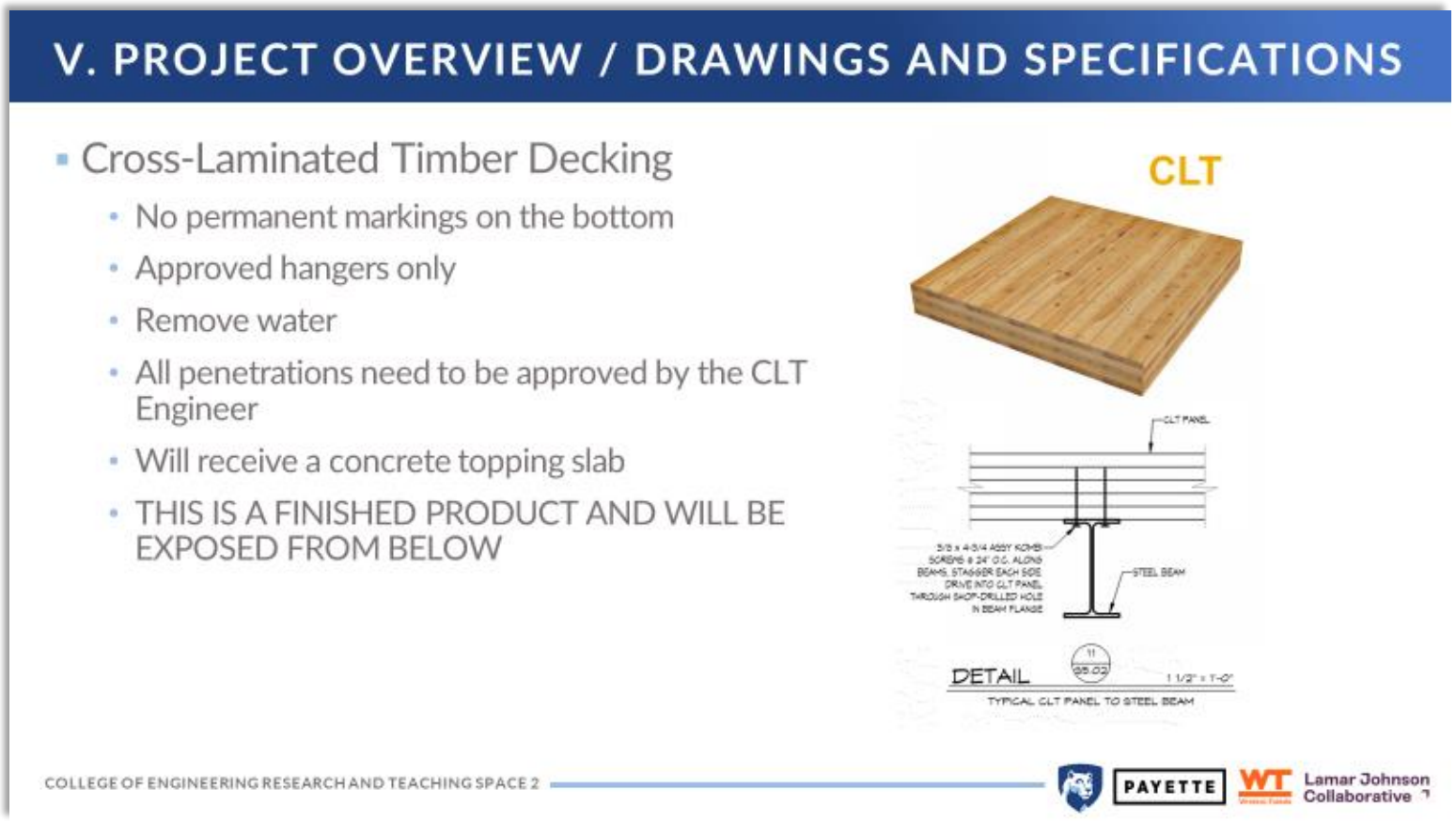
Bidding the Packages

Cross Laminated Timber:

1) Packaging CLT with Structural Steel
2) Pre-Qualification Process
3) Pre-Bid and Scope Review Meetings
4) Education of All Trades

Timber Curtainwall:

1) Packaging with all glazing
2) Locked into local, small firm

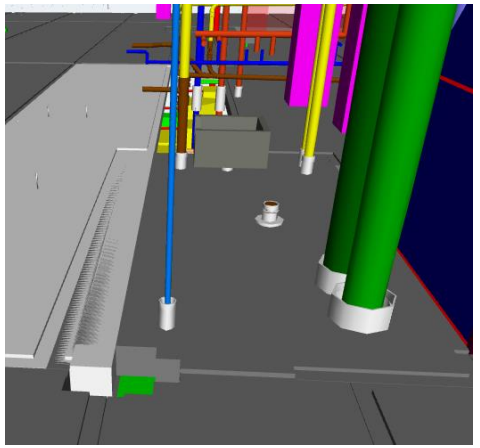


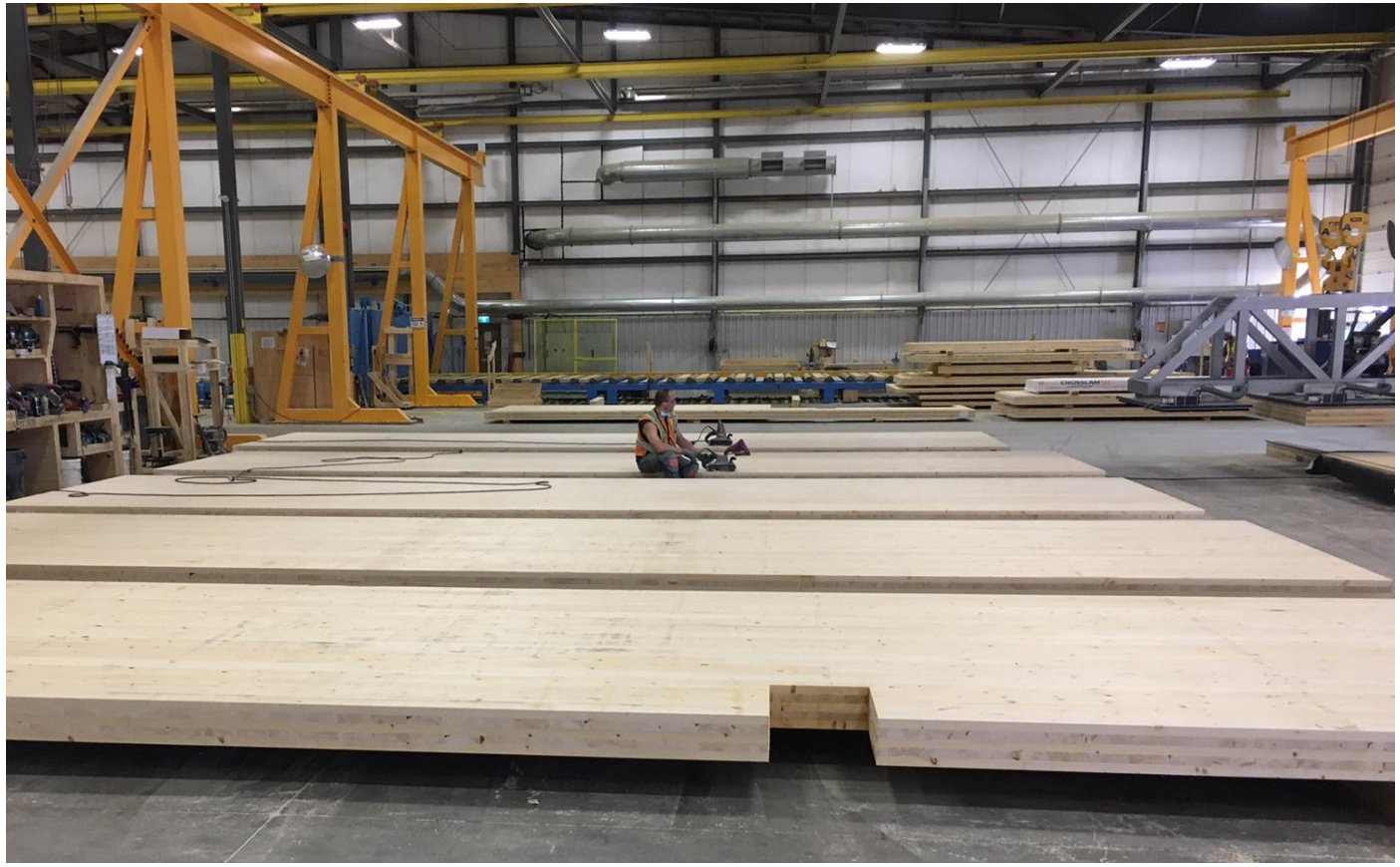
Pre-Construction Phase

Cross Laminated Timber:

1) Immediate vendor buy-in

2) Pre-Construction / Pre-Installation Meetings
    1) During MEP coordination
    2) Prior to manufacturing
    3) Factory visit (attempted)
    4) Prior to shipping





Pre-Construction Phase

Timber Curtainwall:

1) Immediate vendor buy-in

2) Pre-Construction / Pre-Installation Meetings
    1) Prior to steel installation
    2) Before material release
    3) Factory visit

Installation of CLT

1) Moisture Management Plan
    a) Develop
    b) Maintain
    c) Lessons Learned
        i) Review every condition
        ii) Adjust to site conditions
2) Ease of Installation
    a) Quick learning curve
3) Open Communication
    a) “Lean” problem solving
4) Preservation of CLT Underside


PennState
ENGINEERING

QUESTIONS

This concludes The American Institute of Architects Continuing Education Systems Course

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