DCAMM Department of Unemployment Assistance Site Tour: A Firsthand Look at Mass Timber Construction

Presented by Marc Perras

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

AIA Approved Continuing Education

Course Description

This unique educational event will provide an in-depth look at the new DCAMM Department of Unemployment Assistance facility in Brockton, MA. This 33,000-sf urban infill building was constructed using cross-laminated timber (CLT) floor plates with a glulam post-and-beam structural system and provides modern, flexible workspaces for DCAMM's contact center, hearings rooms, and administrative staff. The ground floor will also be home to a downtown outpost for Massasoit Community College. Attendees will tour the site with project team members, who will share information on detailing and construction techniques utilized throughout the building. The project architect will also give a presentation on the design process for the project, noting lessons learned. The tour format encourages questions and discussion, and attendees can expect to leave not only with insights into the project’s design and execution, but the factors that influenced material and detail selection.

Learning Objectives

1. Discuss typical construction practices for exposed mass timber projects.

2. Highlight a variety of structural and architectural uses of glulam and CLT framing through an in-person tour of a completed and occupied project.

3. Demonstrate connection detailing techniques used in code-compliant mass timber education buildings.

4. Explain methods of fabricator/design team interaction that reduce costs and contribute to project success.

C. Gerald Lucey Building

Lessons Learned Designing a Mass Timber Building in a Public Procurement Environment

Department of Unemployment Assistance

Massasoit Community College

DESIGN AND CONSTRUCTION TEAM

Marc Perras

JONES

OWNER

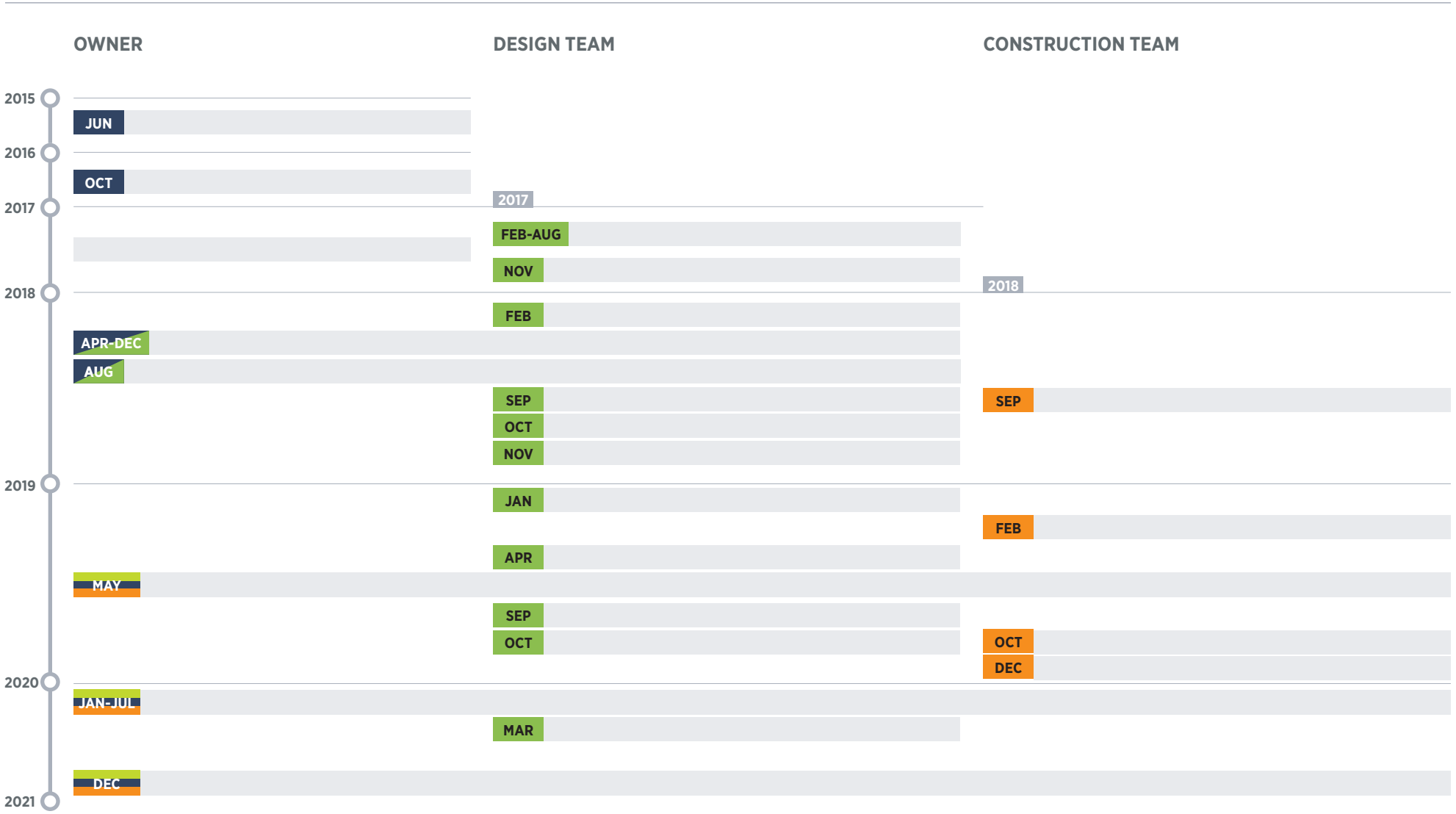
RSE STRUCTURAL ENGINEER

BOND Building CONSTRUCTION MANAGER

TIMBER SUPPLIER/INSTALLER

CIVIL ENGINEER
LANDSCAPE ARCHITECT
HVAC, FP, PLUMBING ENGINEER
ELECTRICAL, FA, TELECOM ENGINEER
BUILDING CODE
COST ESTIMATION
SUSTAINABLE DESIGN
LIGHTING DESIGN
HAZMAT CONSULTANT

PROJECT TIMELINE



Agenda

Context

Design

Procurement

Coordination

Conclusions

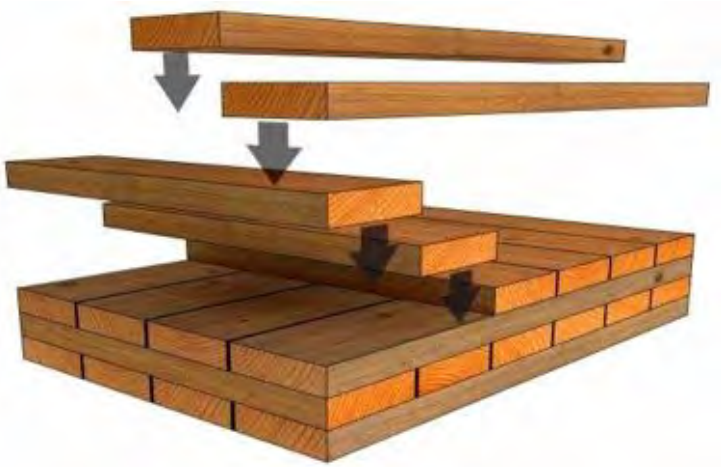
Context

02 03 04 05

A. Cross Laminated Timber Brief
B. Precedents in the Commonwealth
C. Site as a Factor for CLT
D. Program as a Factor CLT

CONTEXT - A. Cross Laminated Timber Brief

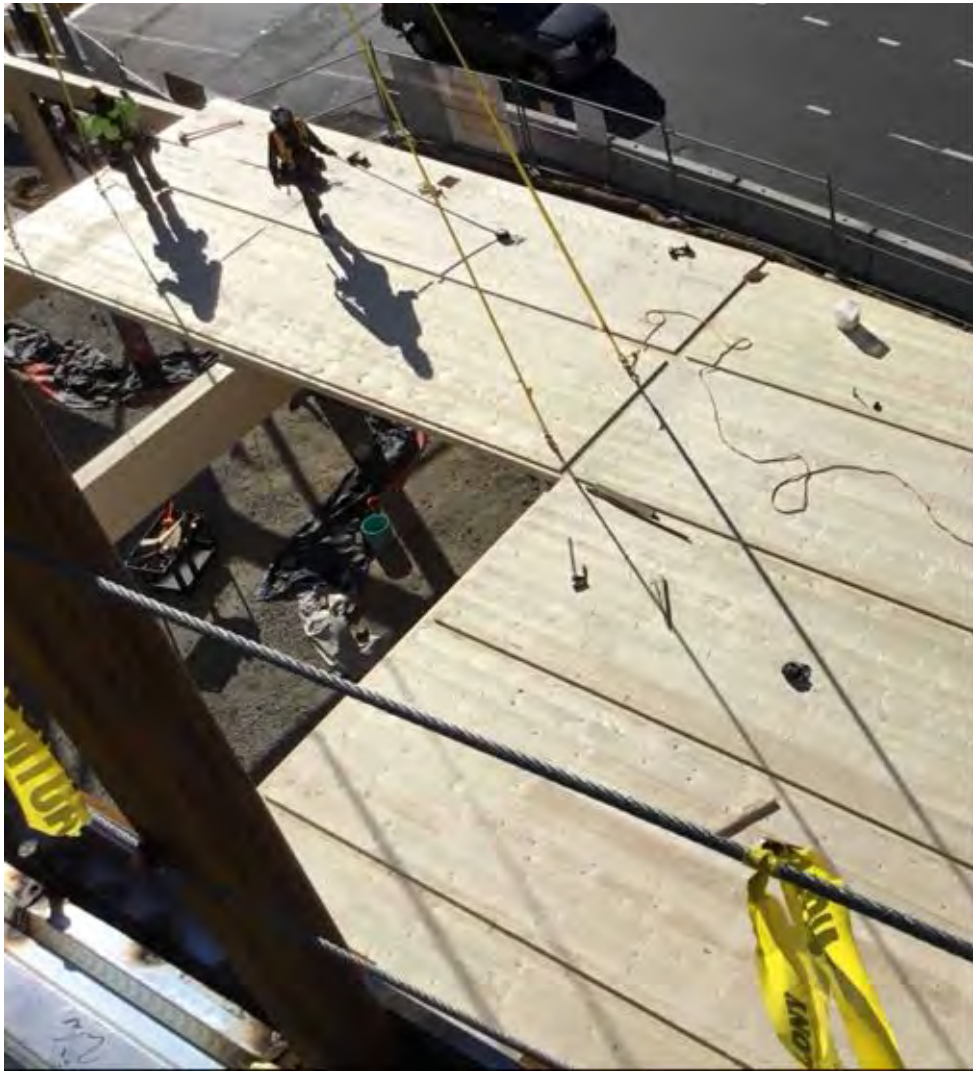
1. Engineered wood composed of layers stacked perpendicular to each other for added structural rigidity in both direction.
2. First developed in early 1990's in Austria and Germany
3. First adapted to IBC in 2015.
4. Can be used for multiple building elements.



CONTEXT - A. Cross Laminated Timber Brief

1. "Honest structure" vision. All mass timber to be exposed. No cladding of steel beams
2. CLT wall panels eliminated due to fire code requirement of cladding
3. Glulam diagonal braces eliminated to forego variance process. Lateral system solved in more elegant way, integrated with architecture

1. **CLT Floor and Roof Decks**
2. **Glulam Beams**
3. **Glulam Columns**
4. **Steel Service Core**
5. **Steel Bracing**

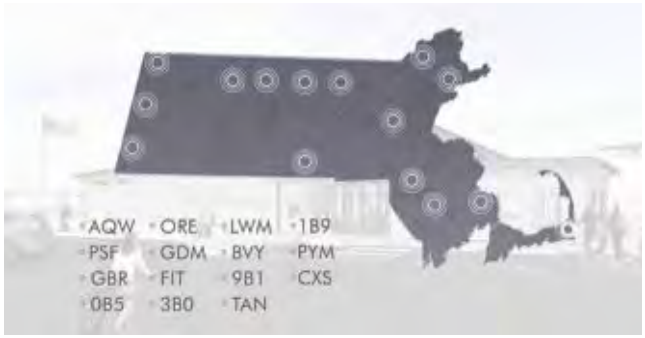


CONTEXT - B. CLT Precedents In The Commonwealth

Beverly
Fitchburg
Mansfield

Fennick McCredie Architecture

1. **CLT Roof Decks**
2. **Glulam Beams**
3. **Steel Columns**
4. **Steel Bracing**



CONTEXT - B. CLT Precedents In The Commonwealth

Leers Weinzapfel Associates

1. **CLT Floor and Roof Decks**
2. **CLT Stair Cores** (clad)
3. **Glulam Beams and Columns**
4. **Glulam Bracing** (variance)
5. **Wood Clad Steel Members**
6. **Wood and Steel Trusses**
7. **CLT and Steel Stair**
8. **Steel Service Core**

CONTEXT - C. Site as a Factor for CLT

SITE:

226 Main Street

Brockton, MA

1. Within:

Corcoran Sub-District

Downtown Economic

Redevelopment Strategy

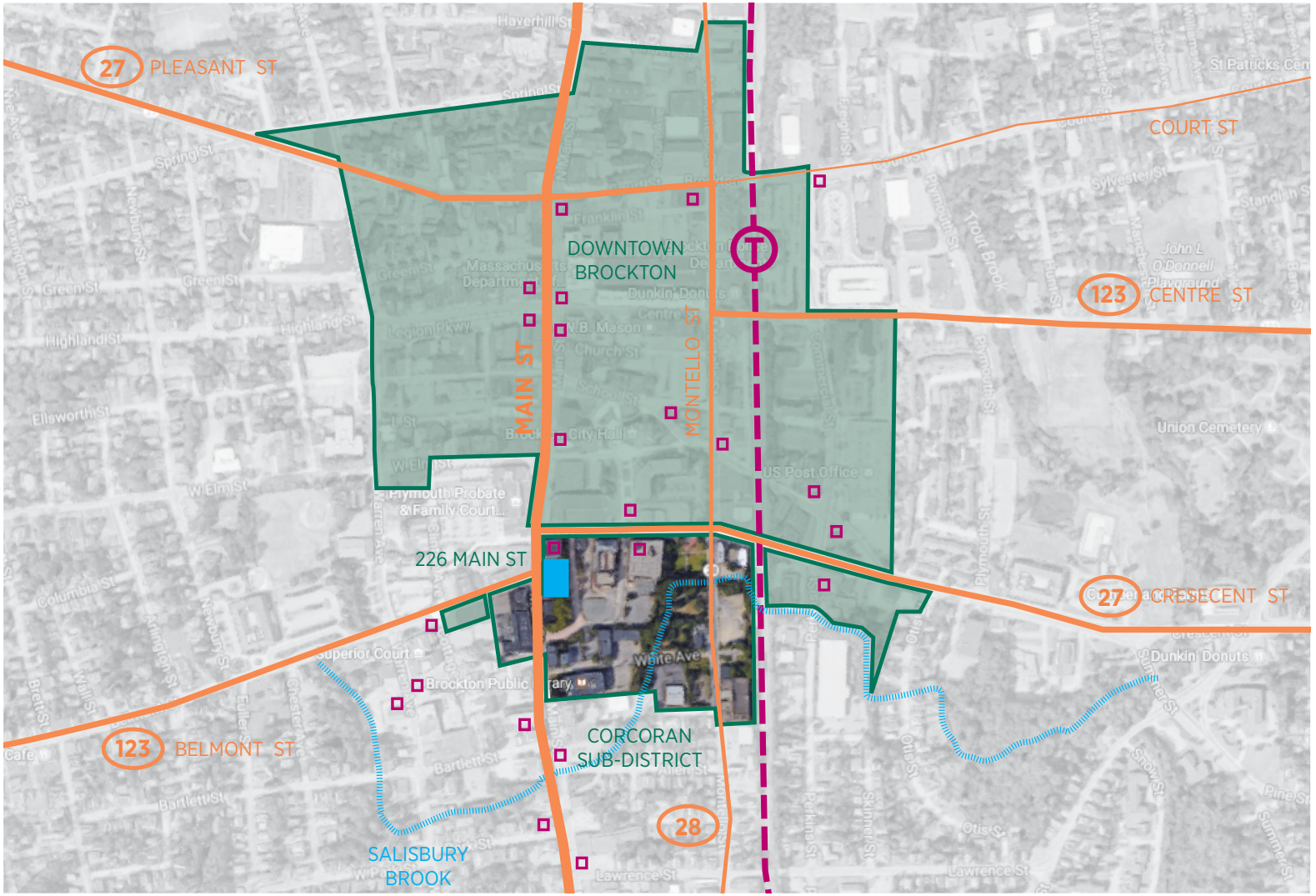
Smart Growth Overlay

2. Proximal:

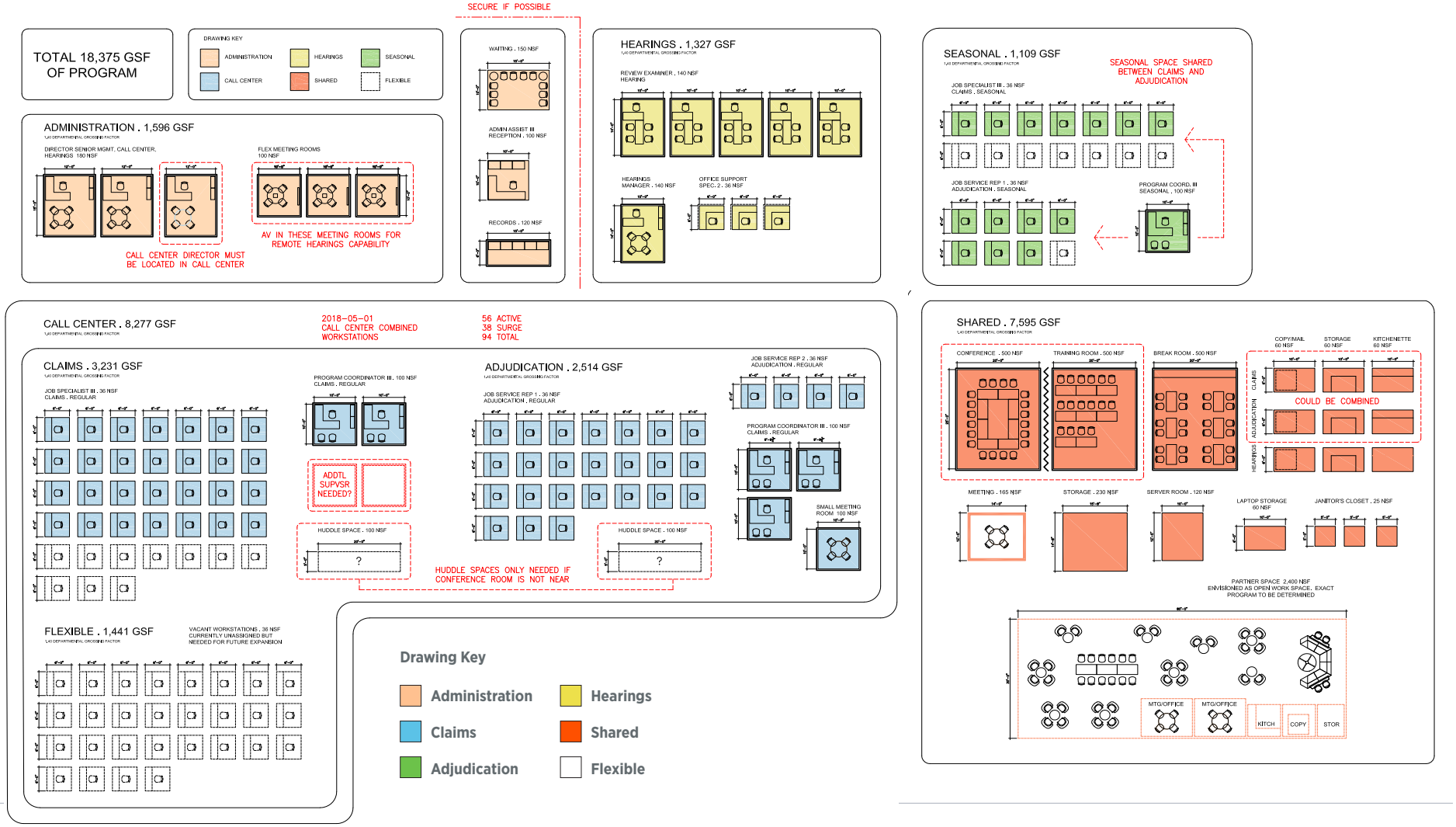
Urban Revitalization Area

Arts & Culture District

Downtown Core



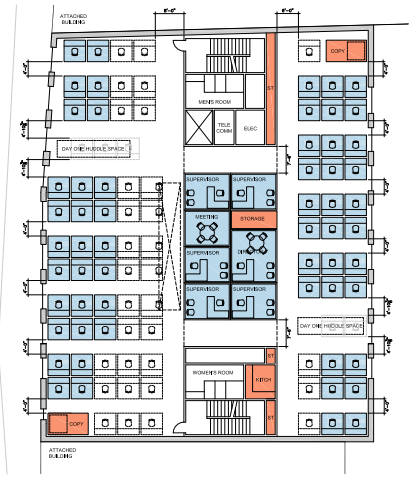
CONTEXT - D. Program as a Factor for CLT



CONTEXT - D. Program as a Factor for CLT

L1

L2



L3

Design Considerations

01 02 03 04 05

A. Sustainability
B. Hybrid Structure
C. Acoustic Considerations

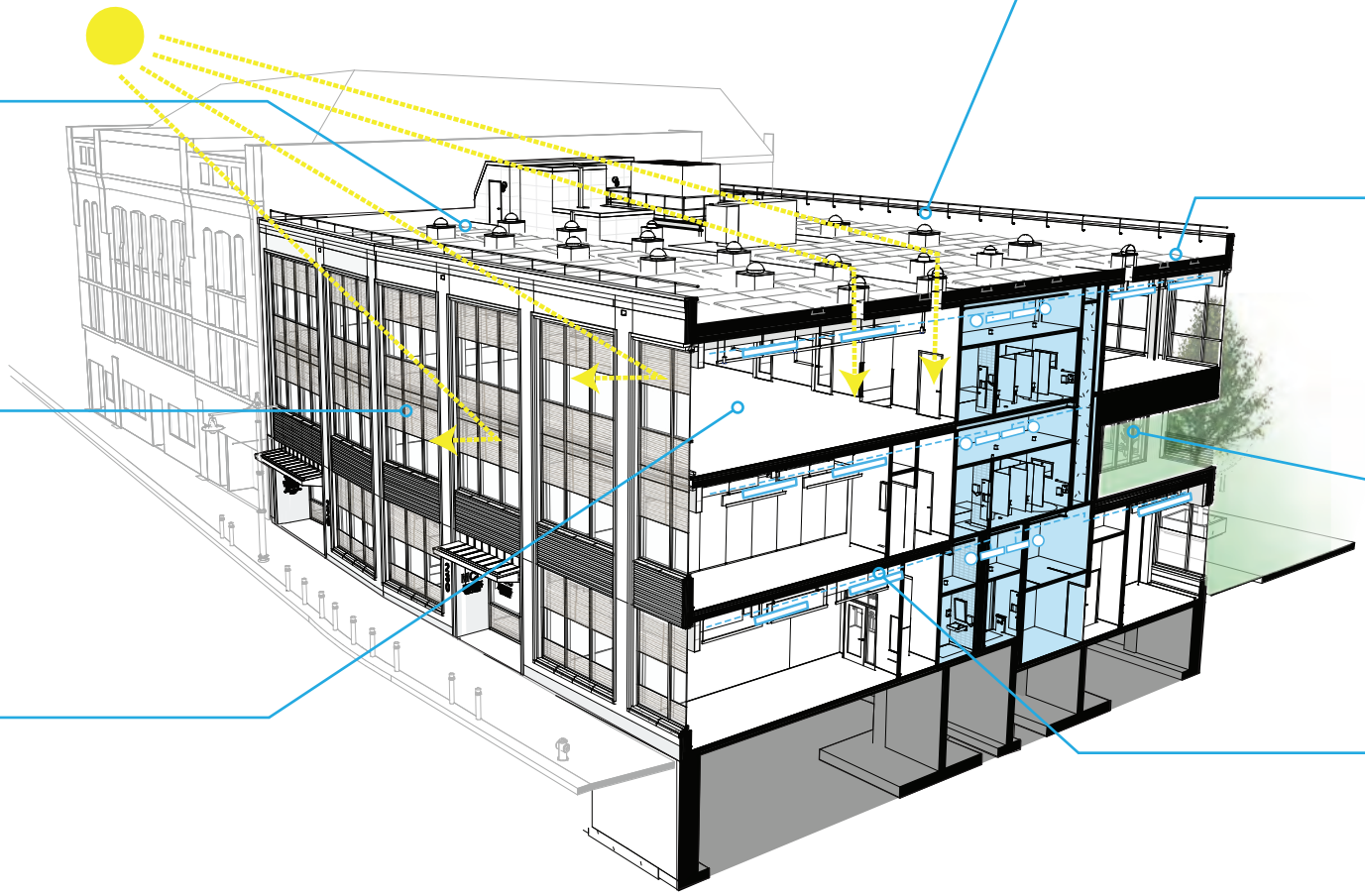
44% ENERGY COST REDUCTION

DUE TO THESE SUSTAINABLE DESIGN MEASURES

PHOTOVOLTAICS
Angled Roof Infrastructure Provides Opportunity For Renewable Energy

FACADE
Screening Elements In Glazing. Deep Set Openings.

ELECTRICAL
Raised Floor System At Open Work Areas



DAYLIGHTING
Solatube Skylights For Ambient Lighting At Call Center

TIMBER STRUCTURE
Lower Embodied Energy And Renewable Building Material

COVERED TERRACE
Terrace Provides Connection To Green Space

CHILLED BEAMS
Maximise Energy Reductions

DESIGN CONSIDERATIONS - A. Sustainability

WOOD (CLT AND GLULAM)

PROS

1. **Lower embodied energy**
2. **Concrete (1/5) or steel and deck (1/3)**
3. **Contributes to LEED**
4. **Renewable material**
5. Less impact from steel tariffs
6. Local Industry
7. Weight reduction
8. **Provides a finish surface**
9. Inherent spatial quality
10. Shortens erection schedule
11. Program/Site ideal for CLT
12. Inherently fire resistant

CONS

1. **First cost typically higher 3X steel and deck (economy of scale)**
2. Sound transmission between floors
3. Less familiarity with contractors
4. **Complex building systems coordination**

STEEL AND CONCRETE DECK

PROS

1. Longer spanning members
2. Familiarity for local contractors
3. More flexibility for heavier facades
4. Full ceiling results in concealed systems

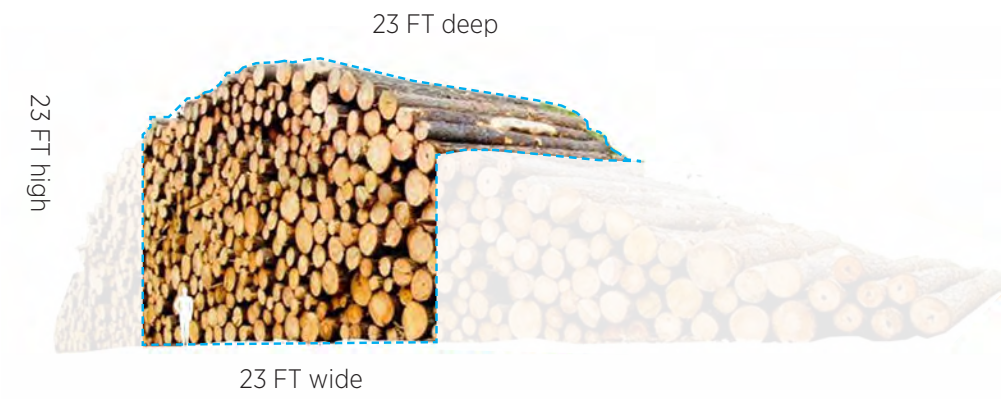
CONS

1. Higher embodied energy
2. Steel spanning members may req cladding
3. Structural deck to be concealed
4. Cost fluctuation

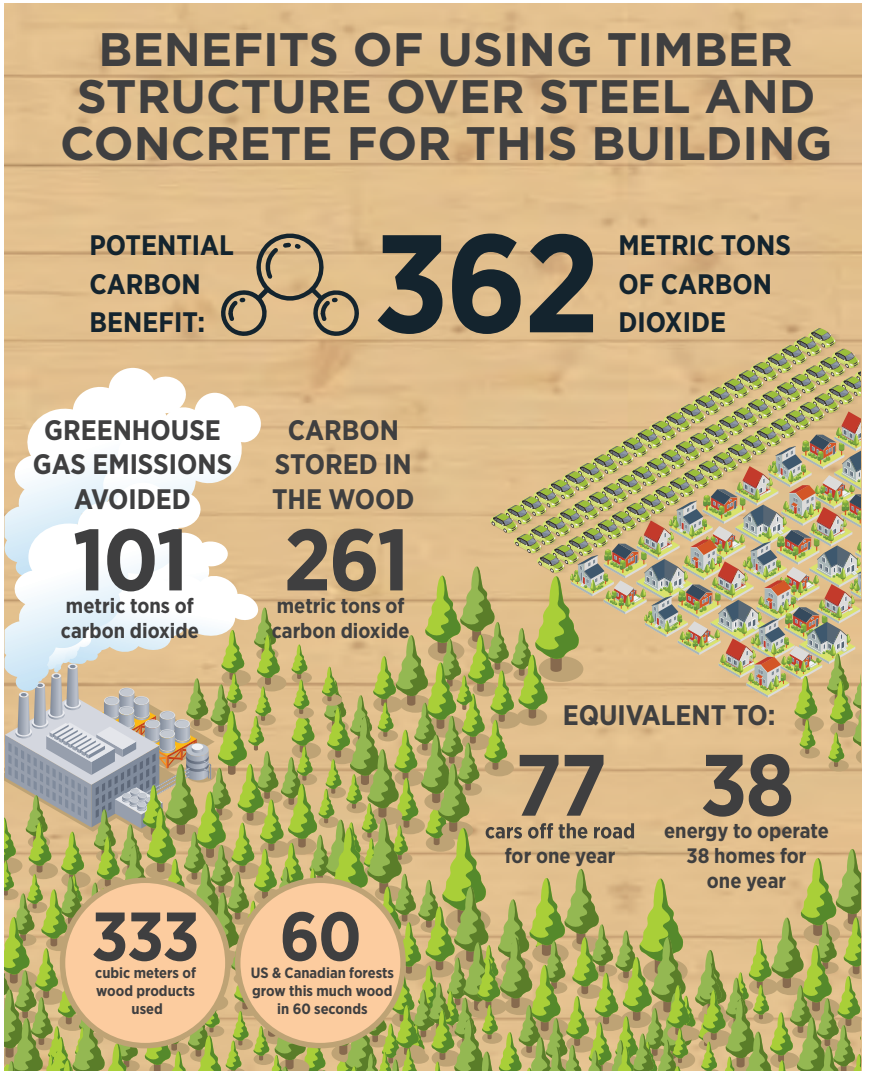
Contributes to: LEED MRc1 Building Impact Life Cycle Reduction
LEED Innovation Credit

DESIGN CONSIDERATIONS - A. Sustainability

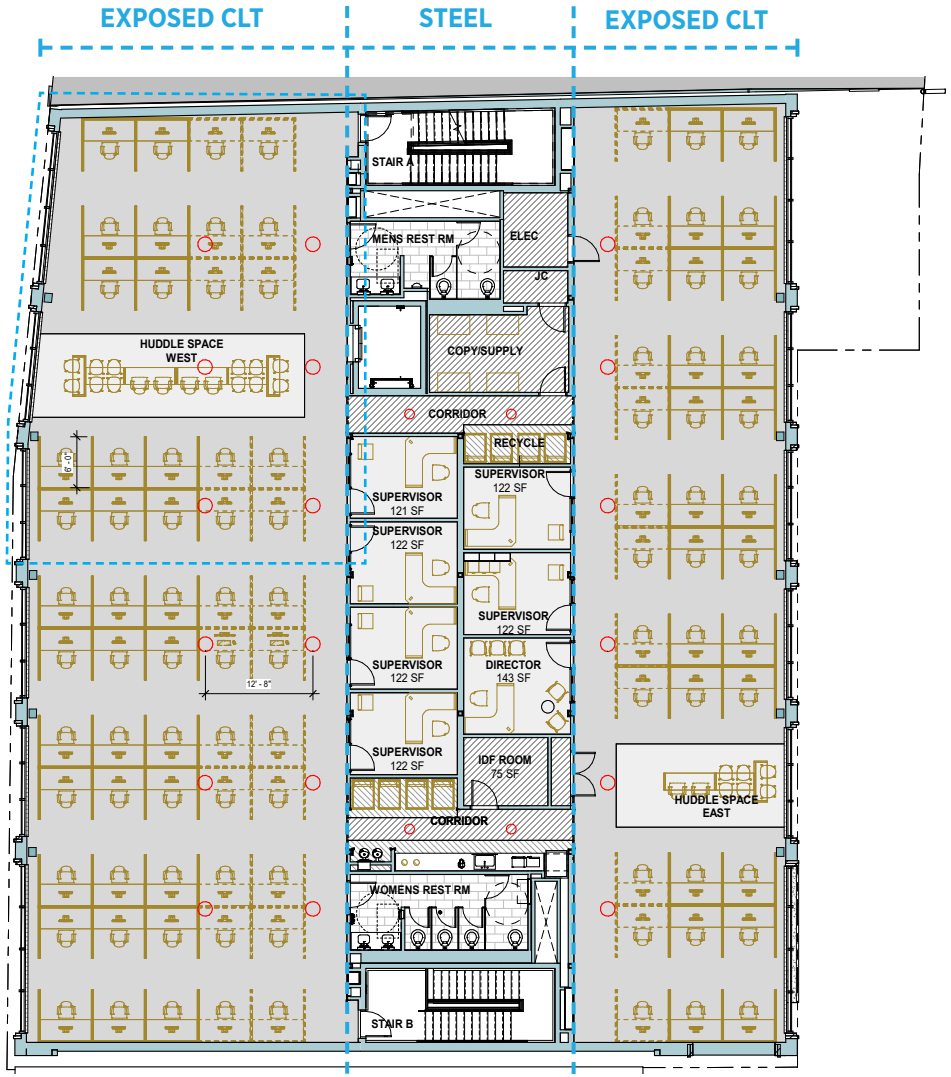
1. Volume of wood products used: **333 Cubic meters (11, 763 cubic feet)**
2. U.S. And Canadian forests grow this much wood in: **1 Minute**
3. Total potential carbon benefit: **362 Metric Tons.**
4. Carbon stored in the wood: **261 Metric Tons.**
5. Avoided greenhouse gas emissions: **101 Metric Tons.**



WoodWorks™
WOOD PRODUCTS COUNCIL



DESIGN CONSIDERATIONS - B. Hybrid Structure



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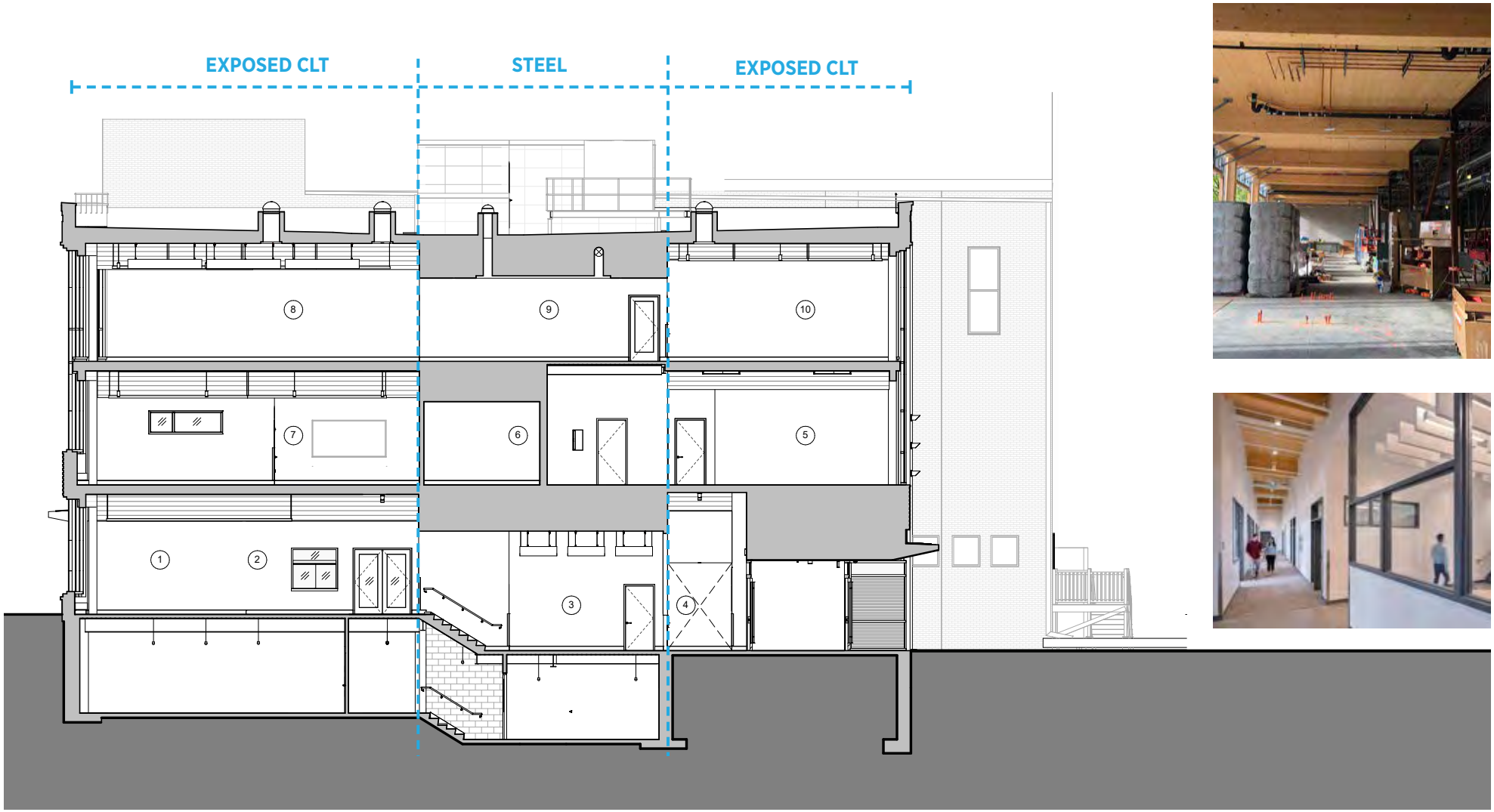

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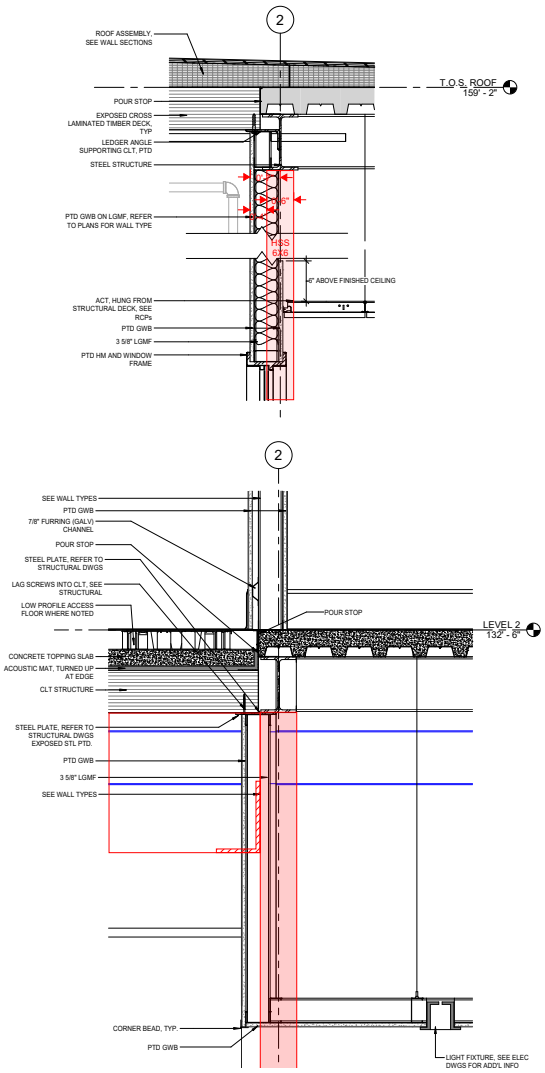

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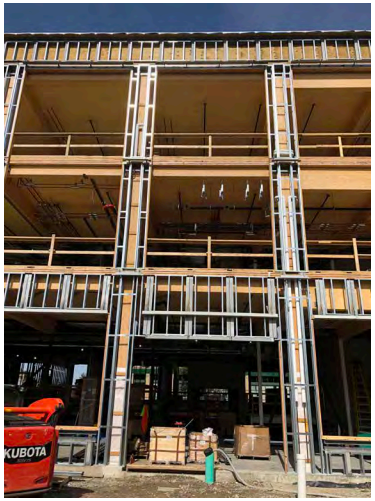

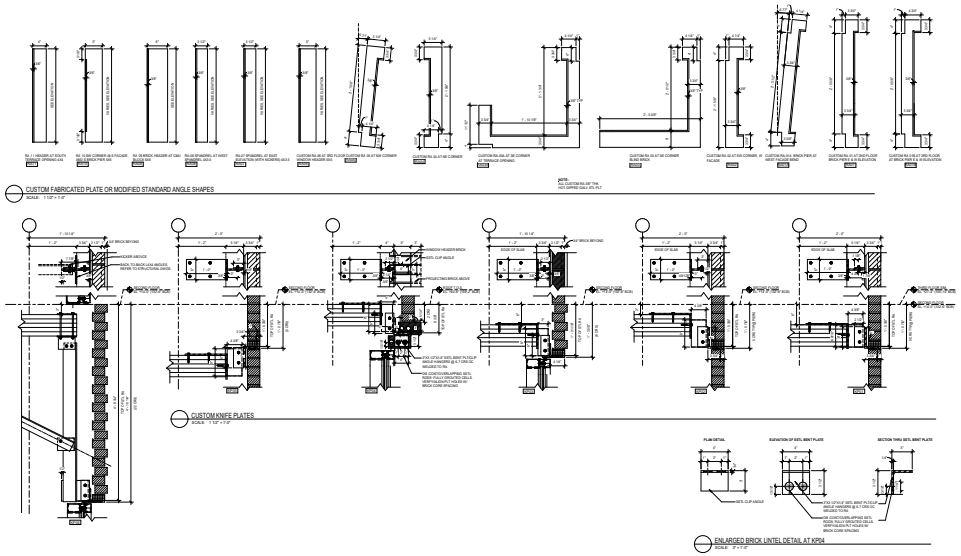

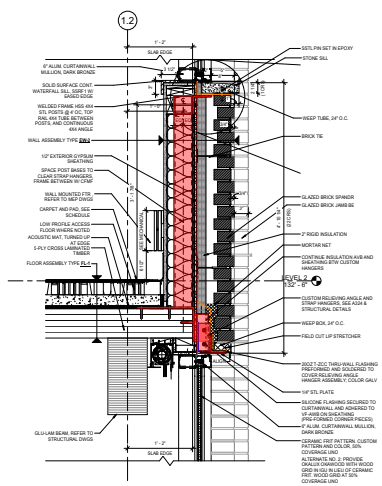

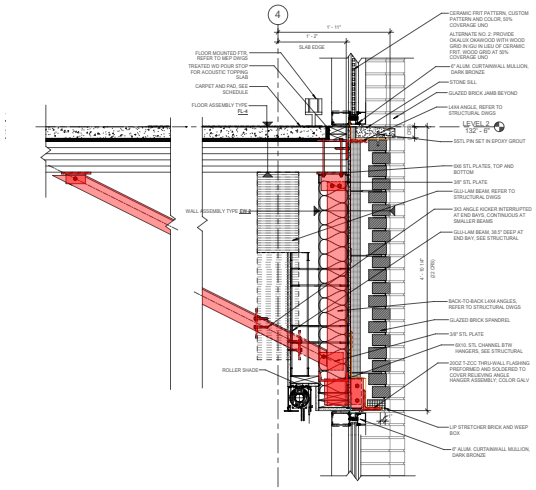

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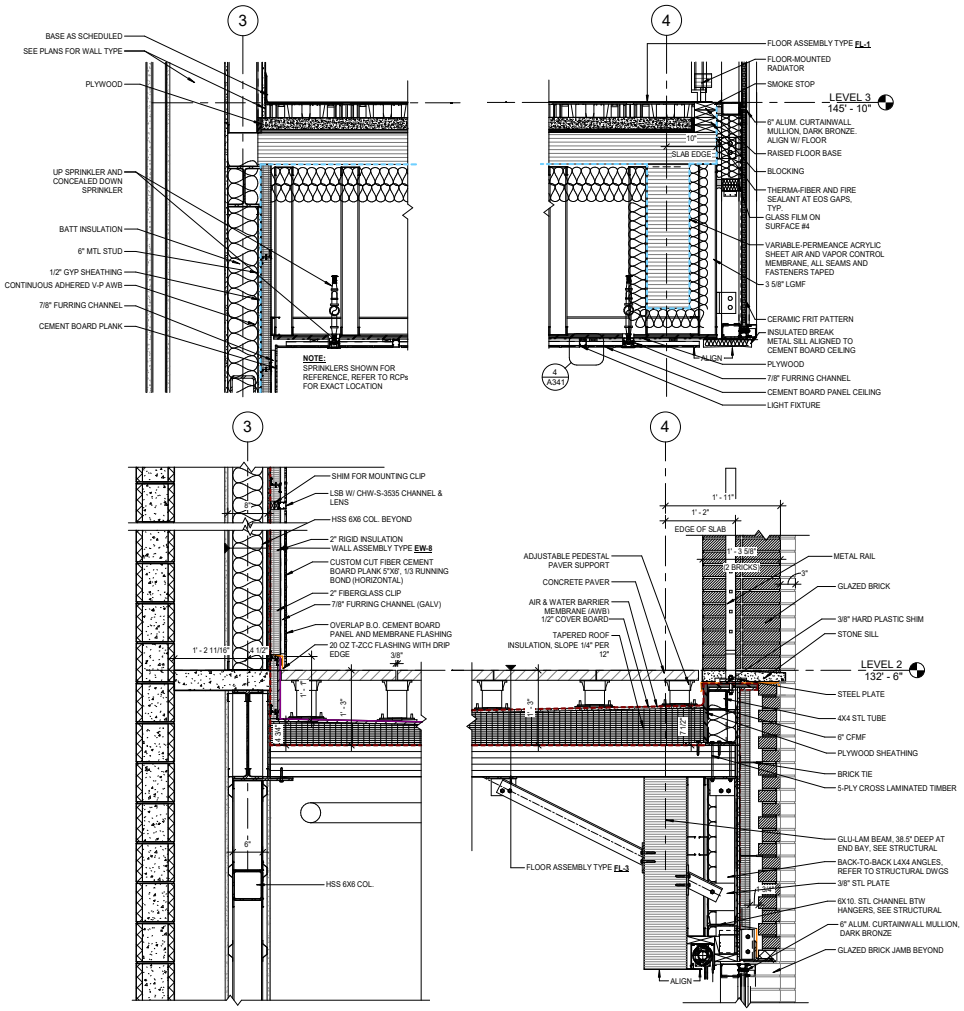
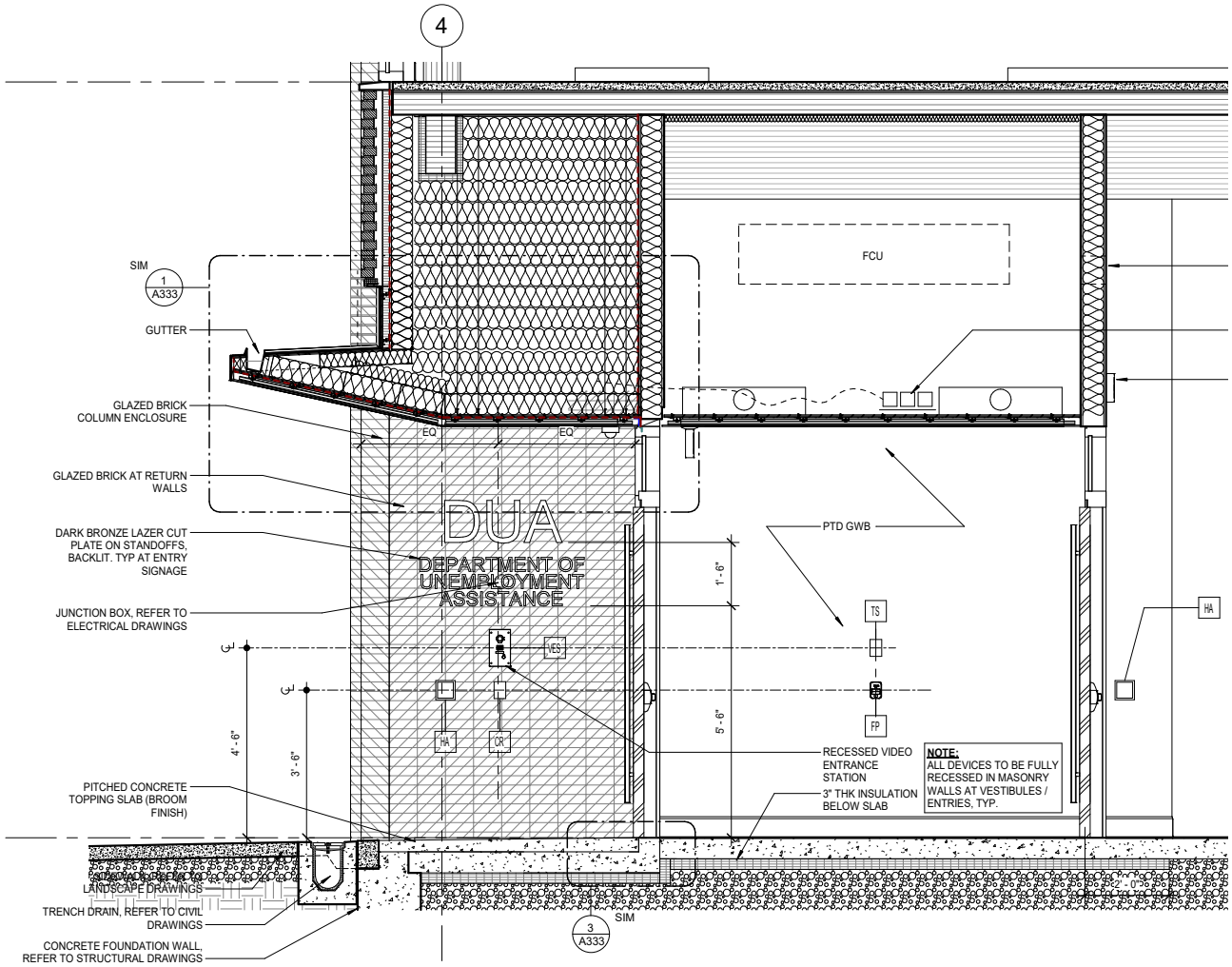
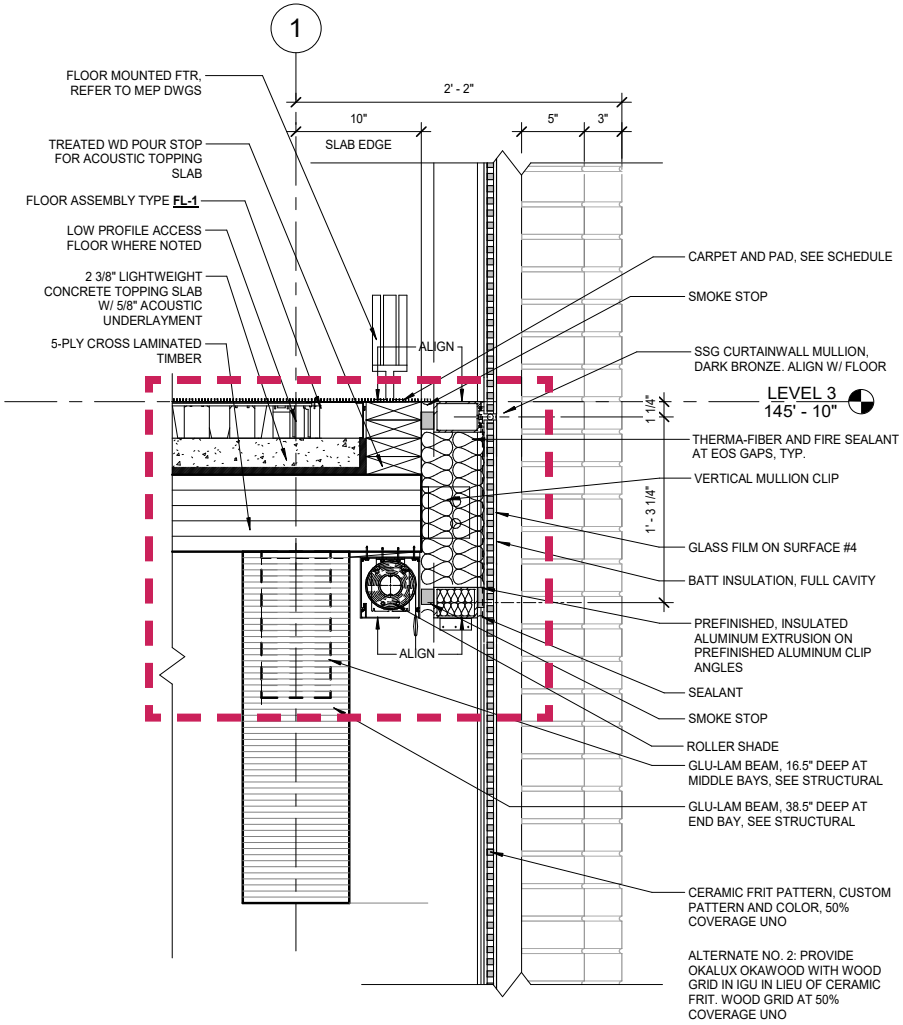


Terrace section details - cement board hung from timber structure

DESIGN CONSIDERATIONS - B. Hybrid Structure



DESIGN CONSIDERATIONS - C. Acoustic Considerations



DESIGN CONSIDERATIONS - C. Acoustic Considerations

Sound Baffles

Sound Masking System

Construction Management

A. Procurement in the Commonwealth
B. Early Bid Package
C. Cost Savings and Challenges Due to CLT and GL

Public Vertical Construction in MA M.G.L. C149 VS C149A

C149

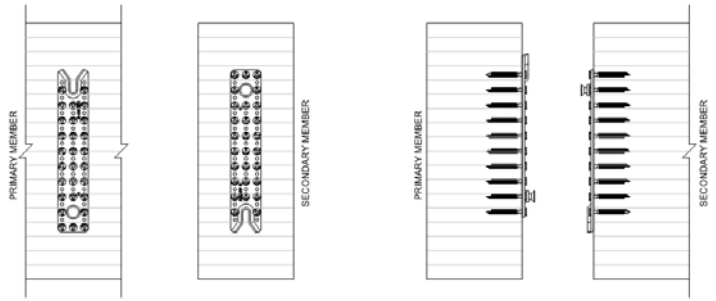
C149A

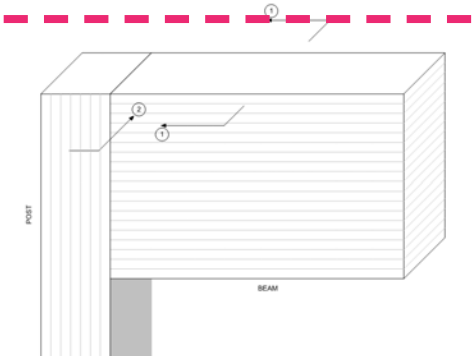
Early Timber Package

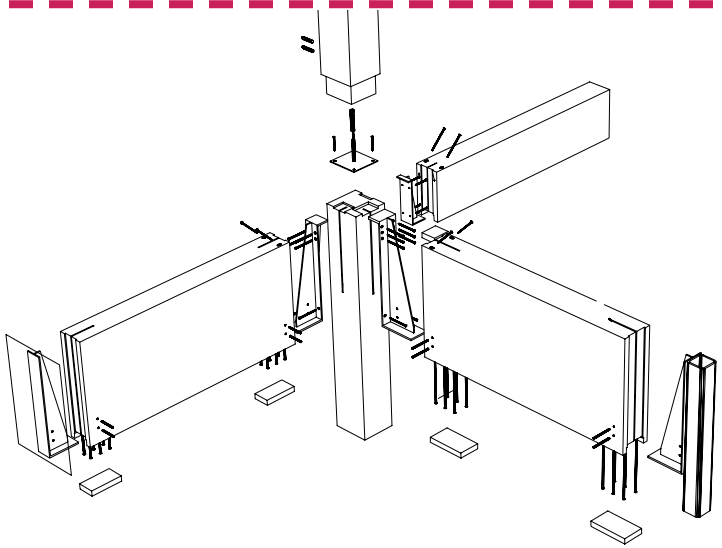
PROCUREMENT - B. Early Bid Package

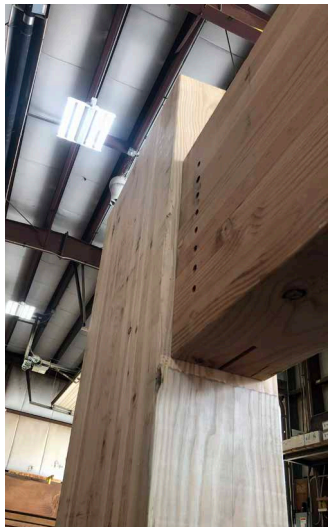
COORDINATION EFFORT

1. Packaging and awarding the work
2. Design assist from timber manufacturer
3. Mockups of joint details









PROCUREMENT - C. Cost Savings and Challenges Due to CLT and GL

SAVINGS

Detailing Requirements
Far less involved detailing requirements with CLT/GL than with steel members. Same day install versus weeks of welding.

Decking Advantage

A CLT deck overhead acts as safe cover for other trades to begin work underneath. Ironworkers do not allow work below.

Change Management
If not fully coordinated, the nature of the wood material allows for revisions to be made much easier than with steel members.

Weather
Carpenters were able to work through snow/rain that ironworkers would not have been able to. Snow clearing CLT much easier than metal deck.

Hot Work and Fire Watches
No fire watch or hot work permitting requirements for CLT/GL install where welding with steel would require one.

Follow on work with CLT Decks
Instead of having to wait for rebar/mesh/slab on deck placement for smooth surface to work off of, lifts could almost immediately be loaded onto floors.

CHALLENGES

On Site Storage
Material takes up considerably more space than traditional steel and decking bundles. Would need to have available space on site for staging of materials to be put in place.

Protection
Protection, especially if exposed like it should be – need to consider costs and time to install protection of components for duration of the project. This is tied in with punchlist repairs after as well.

Tracking
Lengthy tracking of shipping and logistics getting from ports to site.

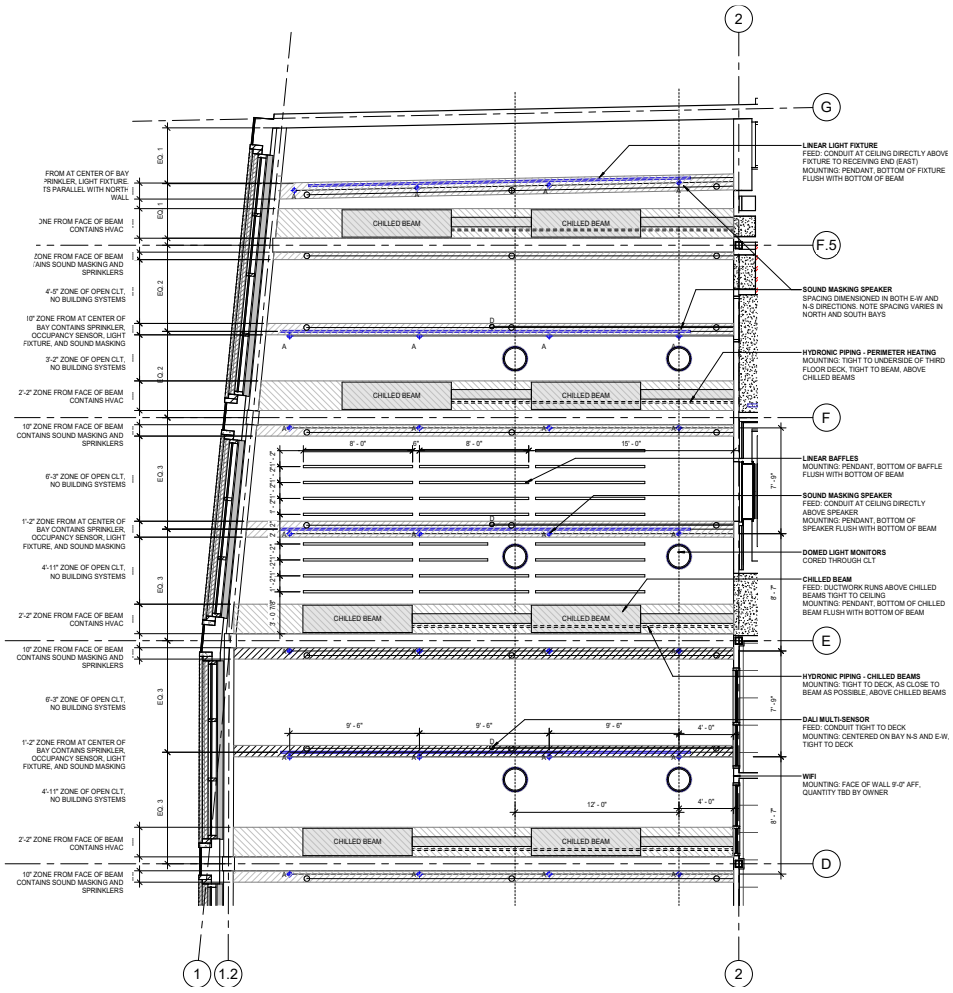
Coordination

Lengthened and more detailed coordination process.

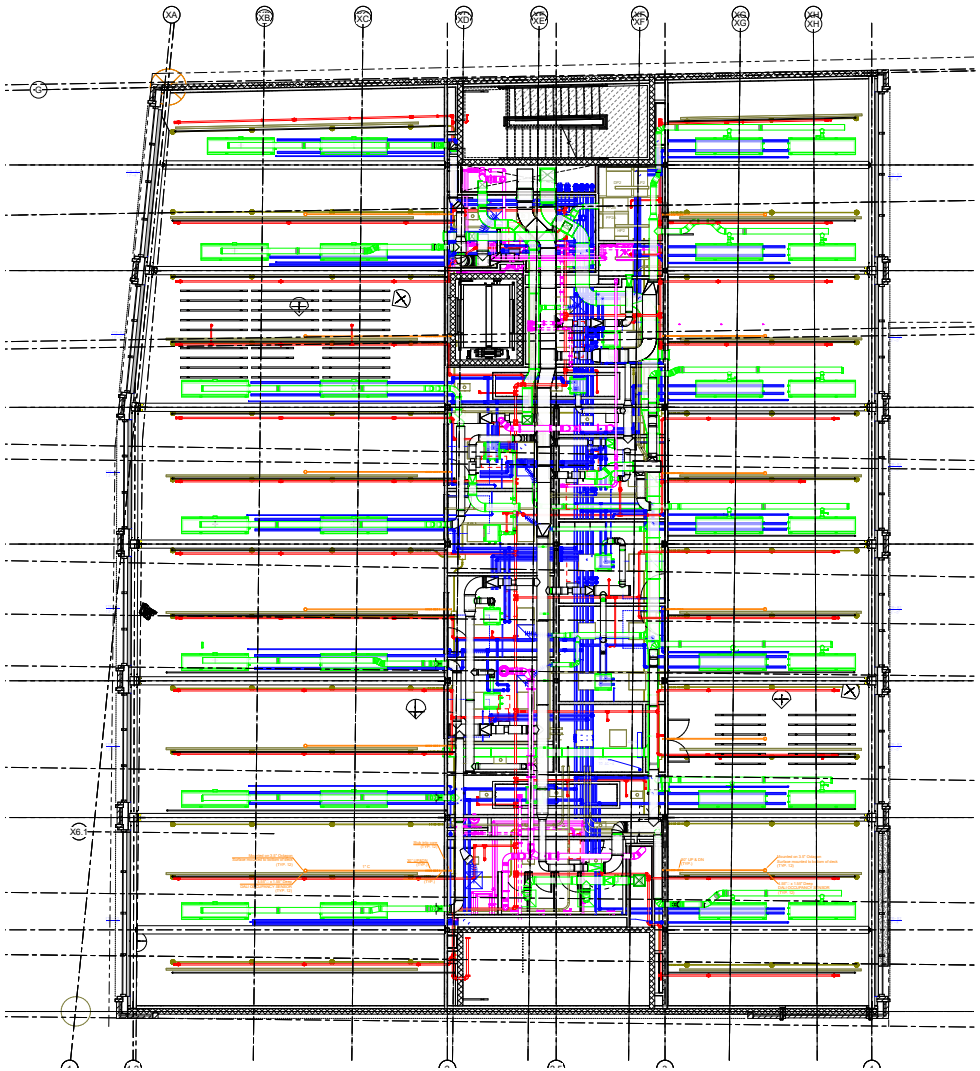
Coordination

A. Design Phase
B. Preconstruction
C. Construction

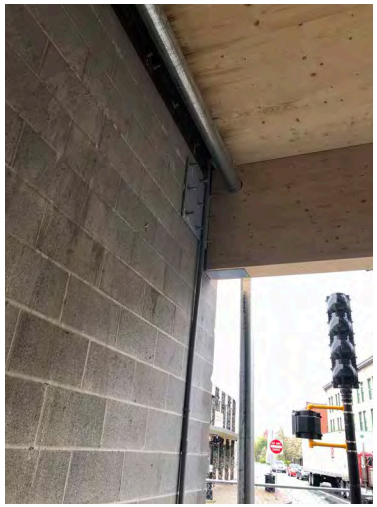
COORDINATION - A. Design Phase

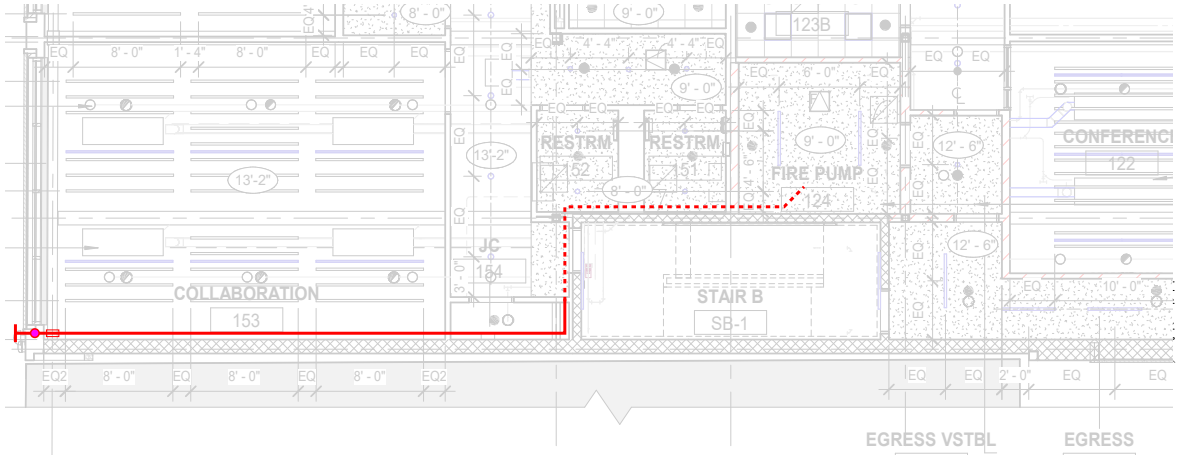


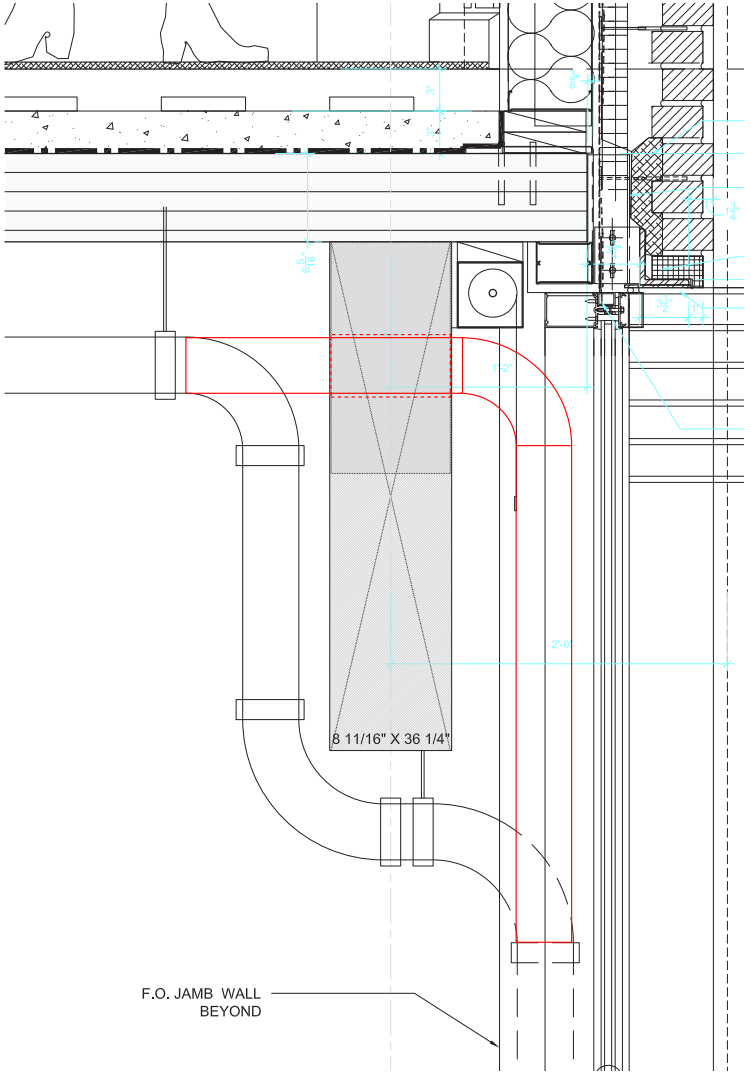
COORDINATION - B. Preconstruction Phase



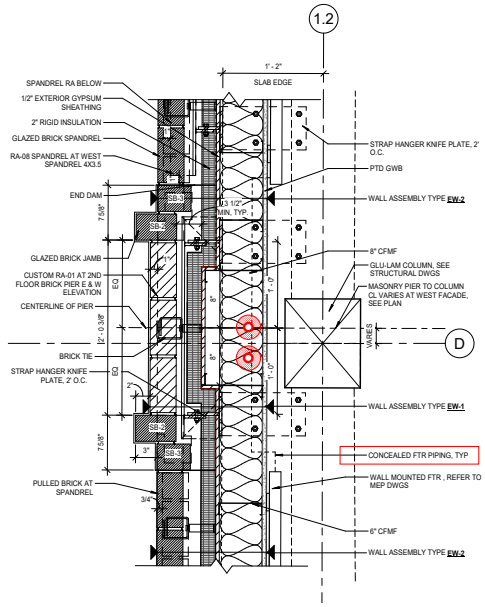
COORDINATION - B. Preconstruction Phase

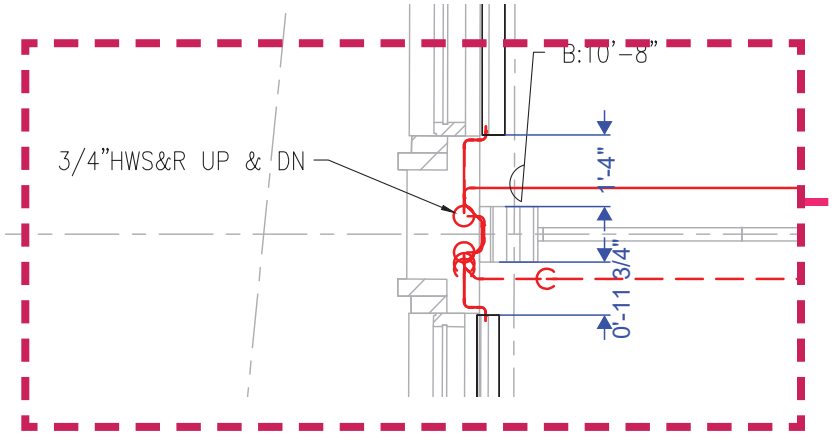


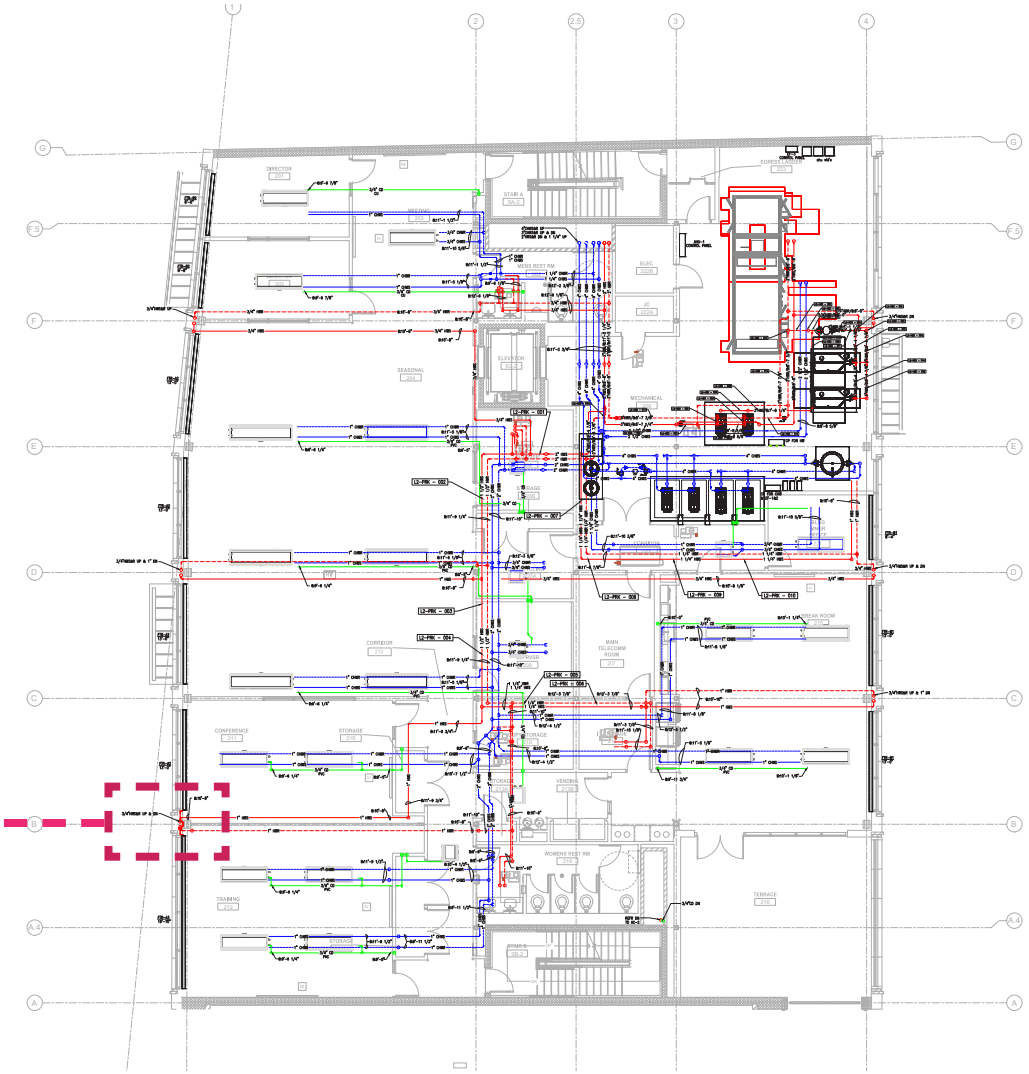




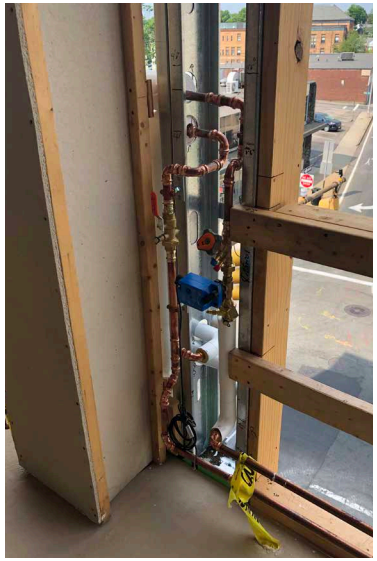
COORDINATION - B. Preconstruction Phase

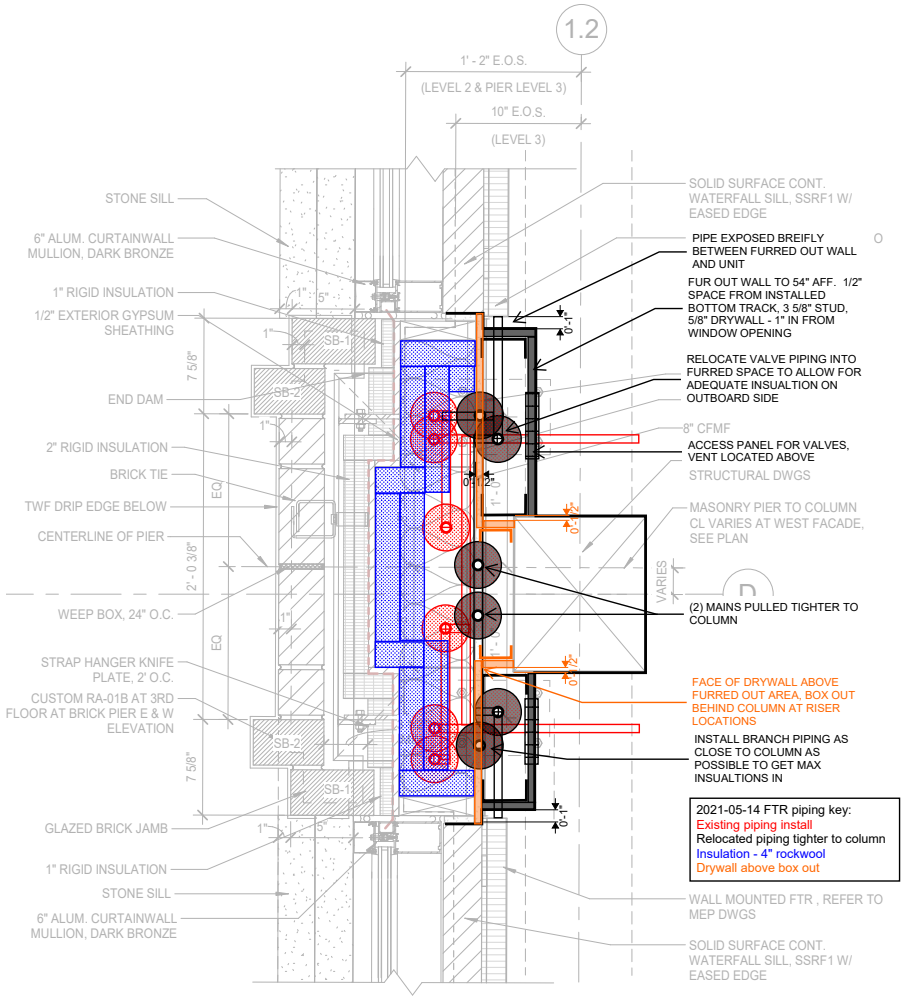




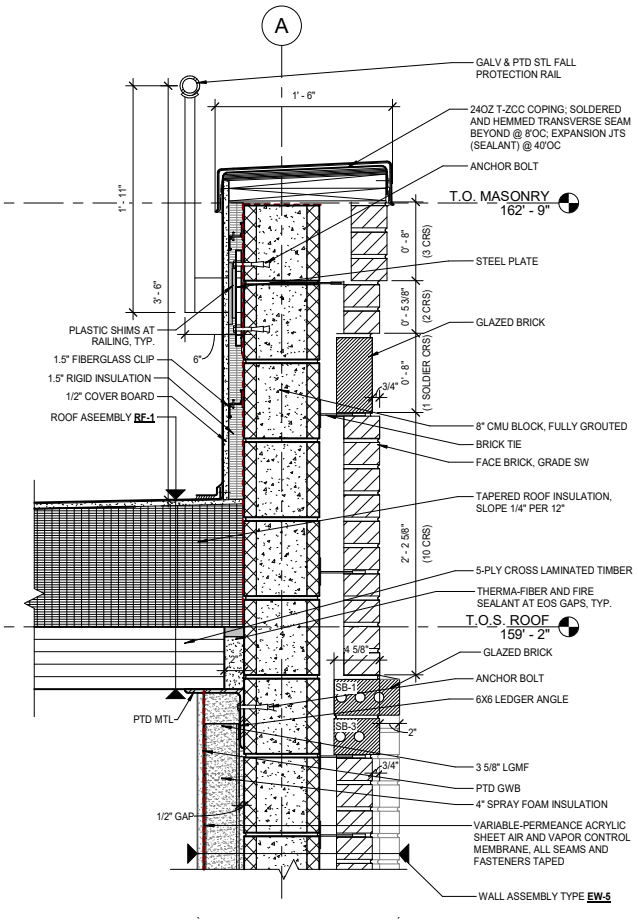


COORDINATION - C. Construction Phase



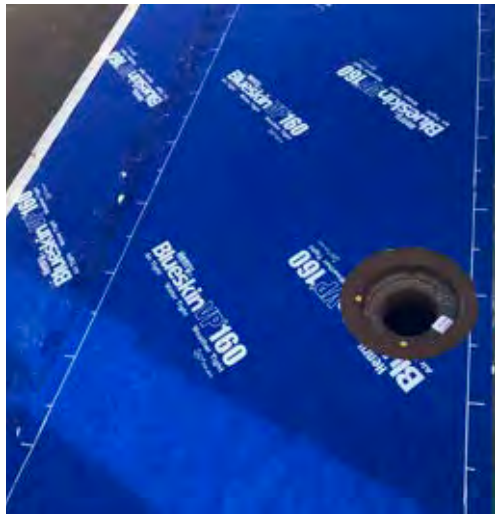


COORDINATION - C. Construction Phase



RF-1 TYPICAL ROOF ASSEMBLY (CLT)

- 80 MIL. FULLY-ADHERED PVC ROOF MEMBRANE, REFLECTIVE GRAY **070002**
- 1/2" COVER BOARD **070002**
- TAPERED POLYISOCYANURATE INSULATION, MIN. 3" **070002**
- VAPOR RETARDER **070002**
- 5-PLY CLT (SEE STRUCTURAL DRWGS)



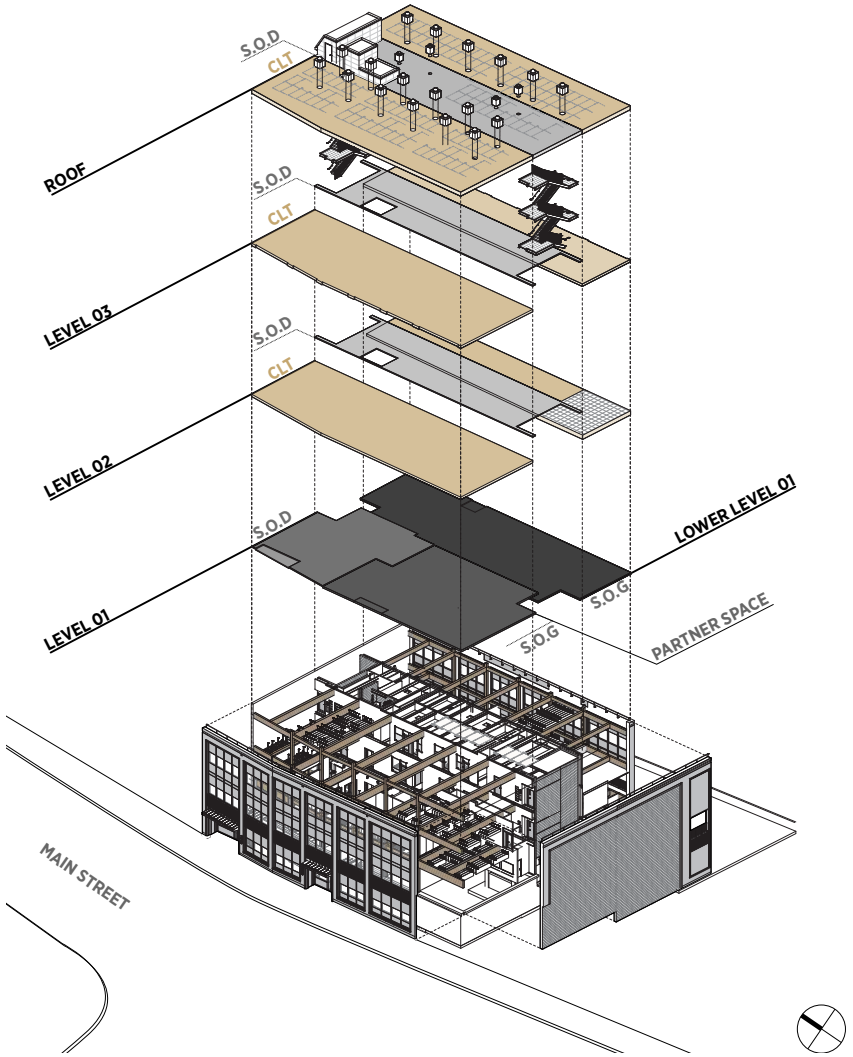
Conclusions

1. Owner Involvement.

2. Research and Preparation.

3. Bid Packages.

4. Coordination.



CONCLUSION

October 2020

December 2020

January 2021

April 2021

CONCLUSION

QUESTIONS?

This concludes The American Institute of Architects Continuing Education Systems Course

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JONES ARCHITECTURE

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