80 M St. Case Study

Adding Complexity - Mass Timber Vertical Expansion

Presented by Sean Fox

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

SESSION AGENDA

1. Project Details
2. Preconstruction
3. Delegated Design
4. Procurement
5. Project Sequence
6. Lessons Learned and Best Practices

PROJECT STAKEHOLDERS

Owner
Columbia Property Trust CxP

Architect
Hickok Cole

Structural / Fire / Code Engineer
ARUP

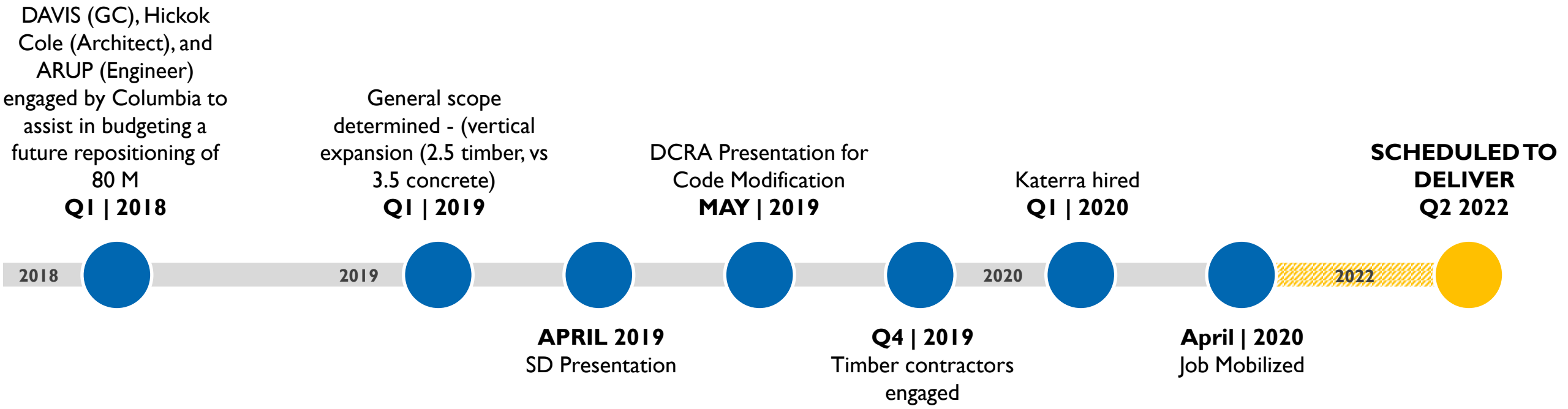
General Contractor
DAVIS Construction

Timber Contractor
Katerra

PROJECT DETAILS

- First Mass Timber Project in DC
- Existing 7-Story Concrete Building
- Vertical Expansion of 3 floors, adding 105k sq ft.
- Occupied Building
- Upgrading of Existing Structure
- Phased Modernization of Existing Elevators

PRECONSTRUCTION



PRECONSTRUCTION

HCA began researching mass timber in 2016

Designed under DCMR 2013 (IBC 2012)

DCRA was willing to look at projects on case-by-case basis

Accepted as a code modification using IBC 2021 type IV-C, even though over 85'
DCRA required addition of normal use sprinklers and redundant fire pump

DAVIS assisted throughout design with concrete cores, early demolition of L7, and structural construction strategy

PRECONSTRUCTION 2

DC Code Acceptance

IBC 2021 and Type IV-C updates have not been adopted by the local AHJ, however the design team was able to get the project accepted as a code modification. IBC 2021 may be adopted by DCMR by 2023.

Early Design Assist Packages

Elevators, Curtainwall, and Mass Timber

Design team provided an early release drawing package to price and release the delegated design mass timber scope of work

MASS TIMBER RELEASE PROCESS + TIMELINE

BID SOLICITATION + INTERVIEW

- TIMBER vs STEEL CONCEPTUAL BUDGETING
- SCHEMATIC DESIGN
- EARLY RELEASE DESIGN PACKAGES
- MASS TIMBER BIDDING AS DELEGATED DESIGN
- INTERVIEWS

PROCUREMENT PROCESS + TIMELINE

DESIGN ASSIST + SUBMITTAL CRITERIA

- PROGRESS MEETINGS
- ANALYSIS
- TESTING
- SHOP DRAWINGS
- FINAL SHOP DRAWINGS

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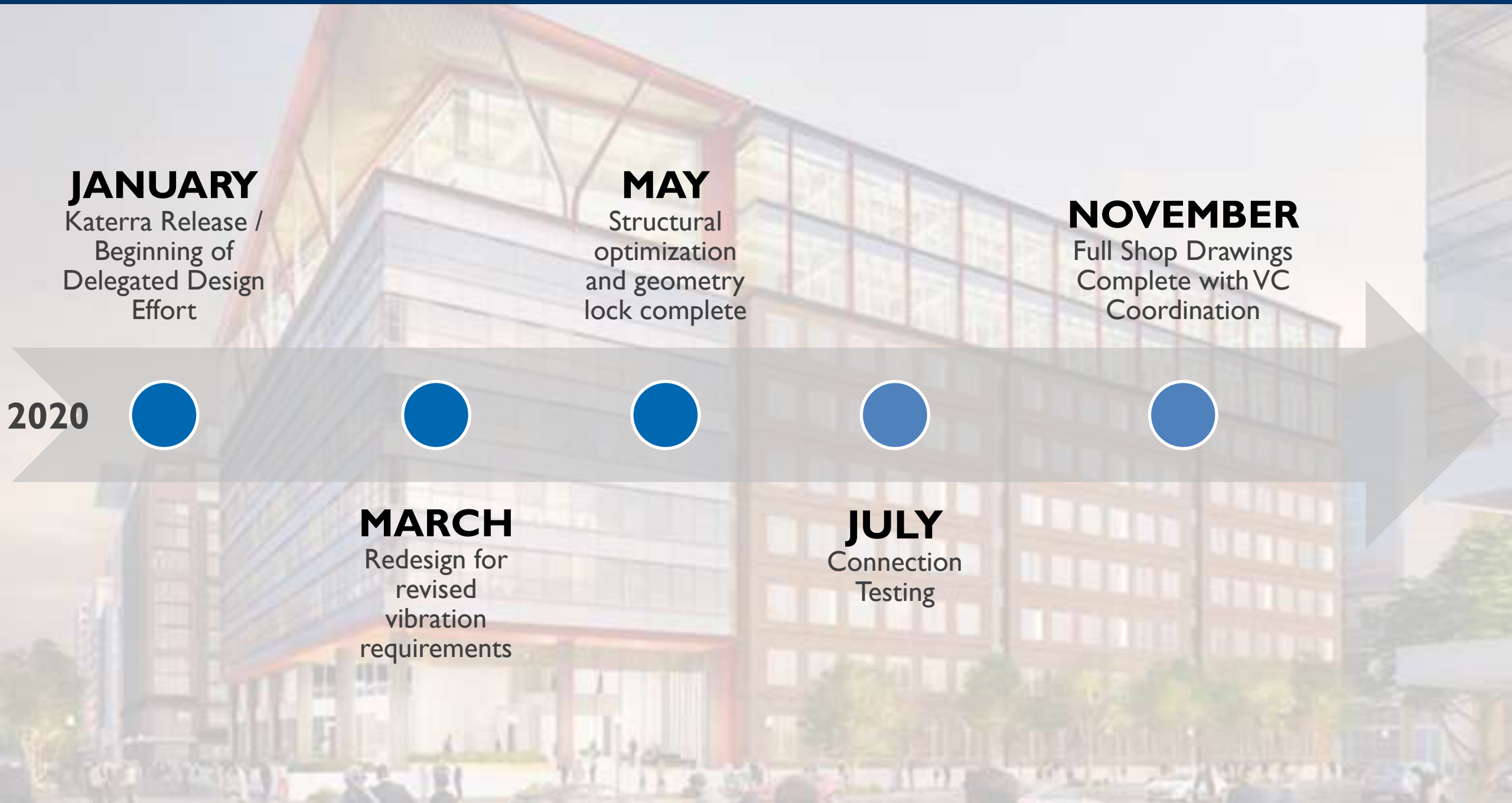
Month Overall Submittal Process

PROCUREMENT – DELEGATED DESIGN



JANUARY
Katerra Release / Beginning of Delegated Design Effort

MARCH
Redesign for revised vibration requirements

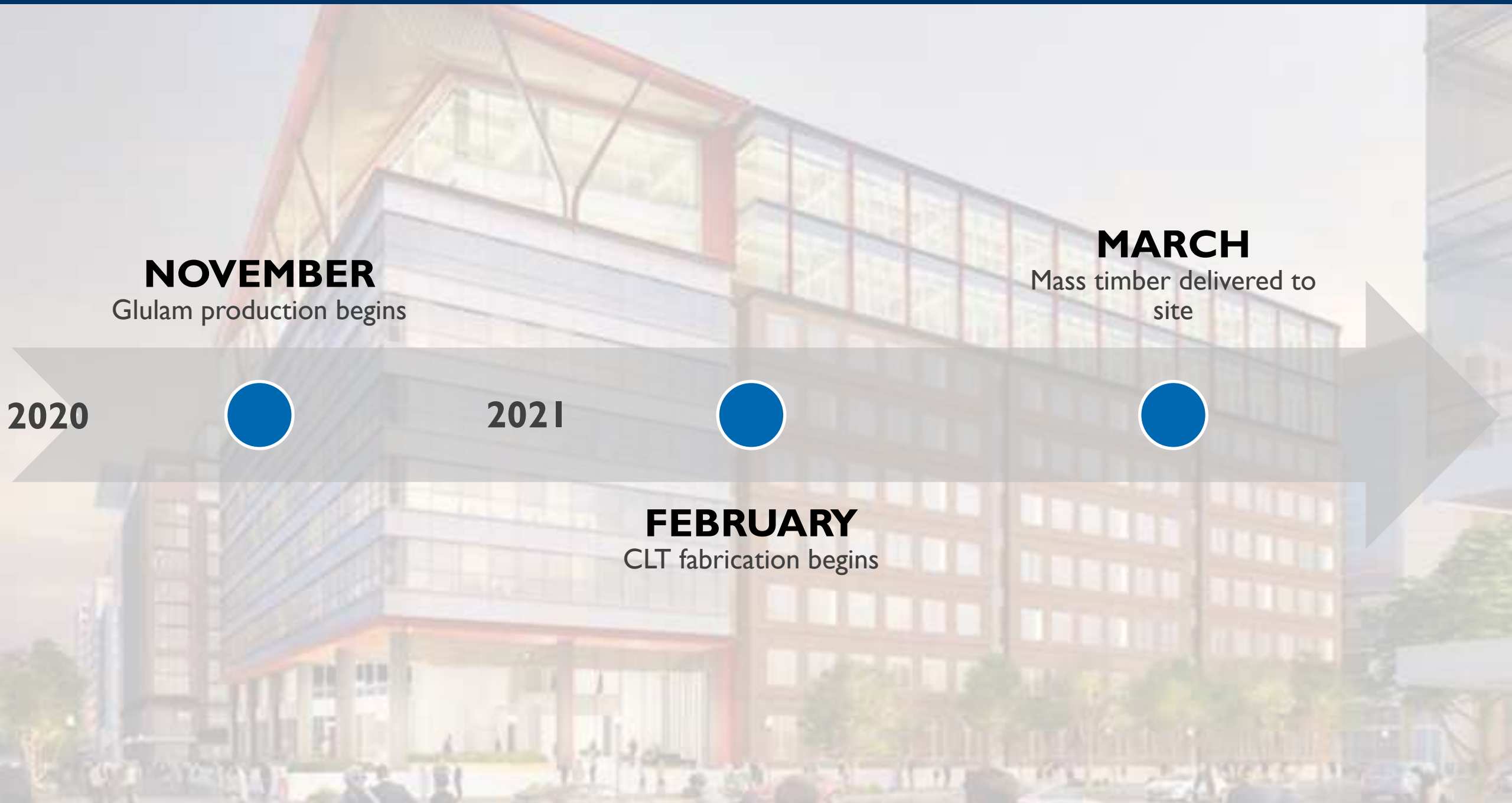
MAY
Structural optimization and geometry lock complete

JULY
Connection Testing

NOVEMBER
Full Shop Drawings Complete with VC Coordination

2020

PROCUREMENT – FABRICATION AND DELIVERY



NOVEMBER
Glulam production begins

FEBRUARY
CLT fabrication begins

MARCH
Mass timber delivered to site

2020

2021

PROCUREMENT PROCESS + TIMELINE

DESIGN ASSIST + SUBMITTAL CRITERIA

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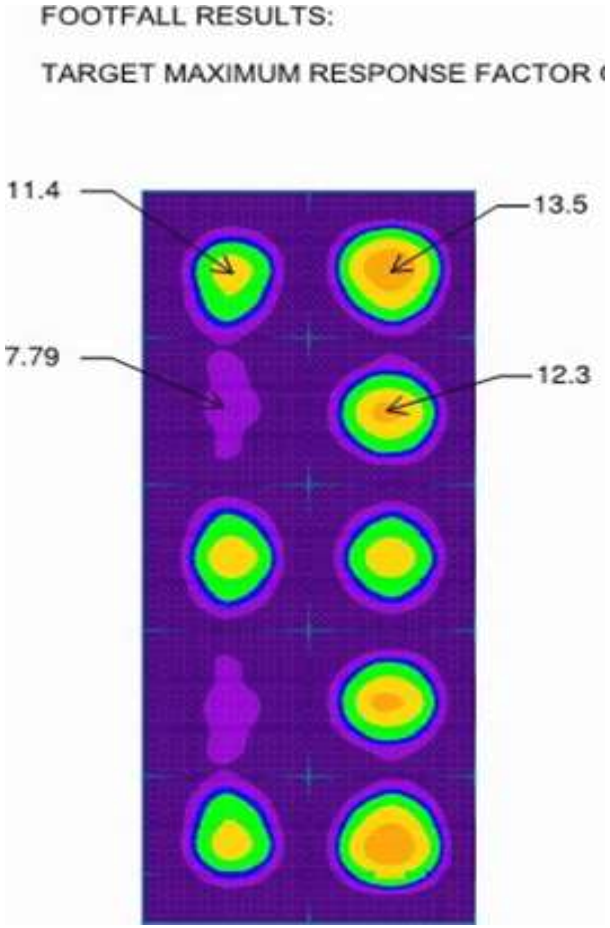
Month Overall Procurement After Initial Engagement

PROCUREMENT

PROCESS + TIMELINE

FABRICATION + PROCUREMENT

- GLULAM COLUMN BEAMS
- CLT DECKING



DESIGN ASSIST, ENGINEERING + TESTING

Designed as Type IV-C per 2021 IBC, although DC AHJ has not formally adopted this code update

Vibration Model / Requirements are the primary controlling factor in Mass Timber Design

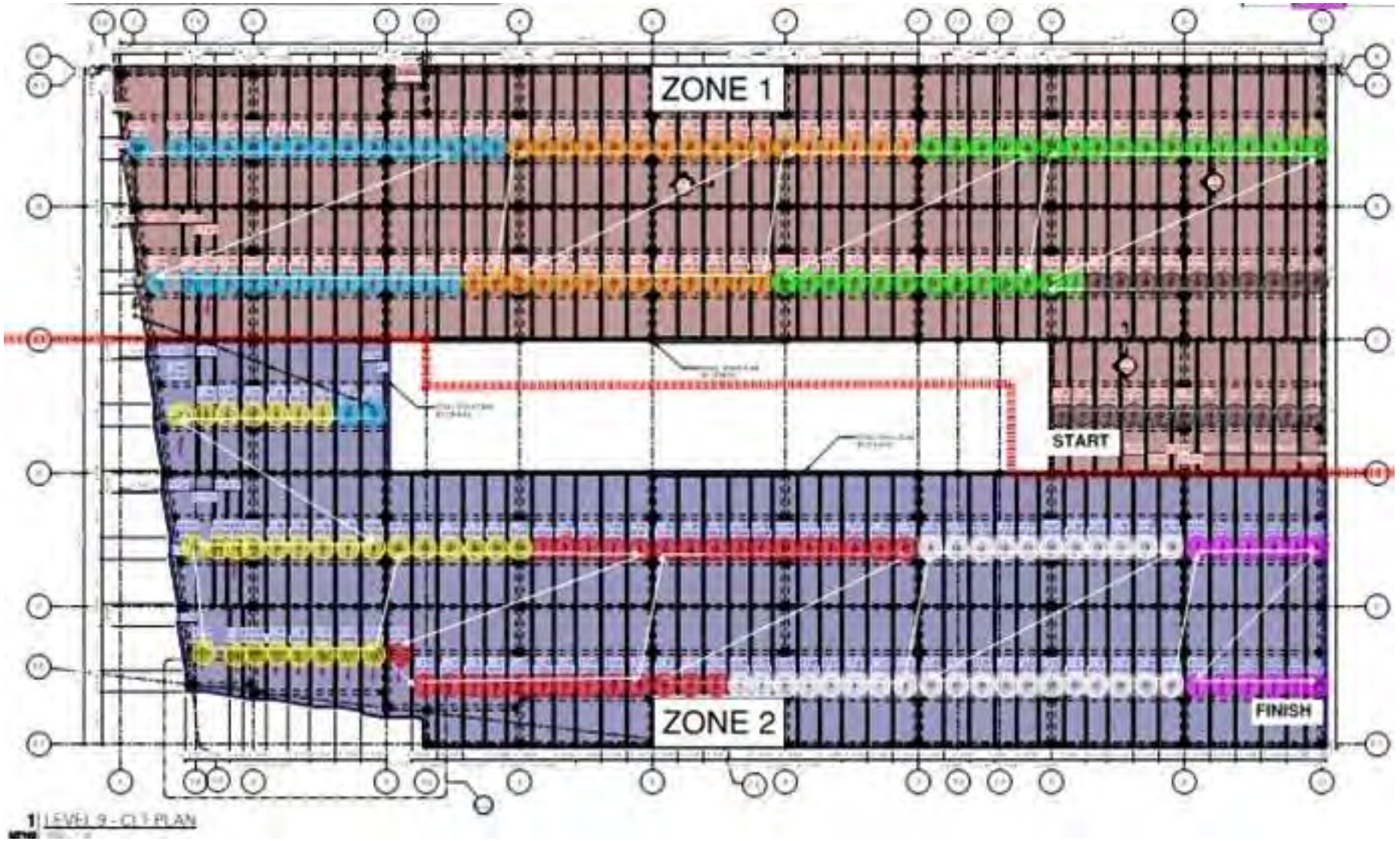
Core of 80 M Street is steel. Remainder of floorplate is CLT and Glulam

Glulam and CLT portion of the structure included a Design Assist Effort

Design Assist Process originally scheduled for 14 weeks; It was extended due to redesign of footfall and vibration model, totaling almost 30 weeks altogether

Sound Transmission Testing will be conducted in early 2021 to confirm acoustic properties of CLT slabs

INSTALLATION SCHEDULE
L9 CLT INSTALLATION DIAGRAM



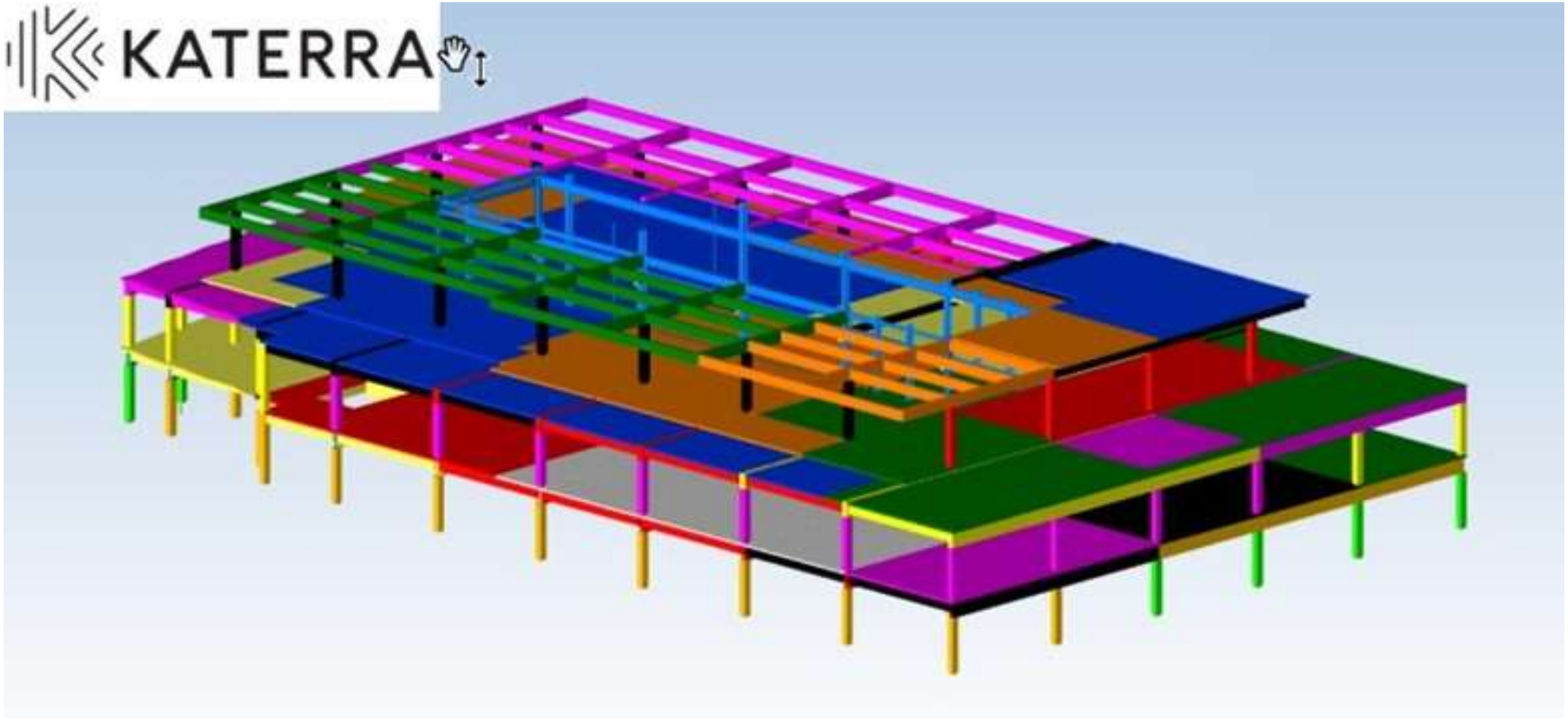
Day

Every Colored Dot equals 1 Day of Installation

Delivery + Logistics

Delivery + Logistics are keyed off of this plan

INSTALLATION SCHEDULE
L9 CLT INSTALLATION DIAGRAM



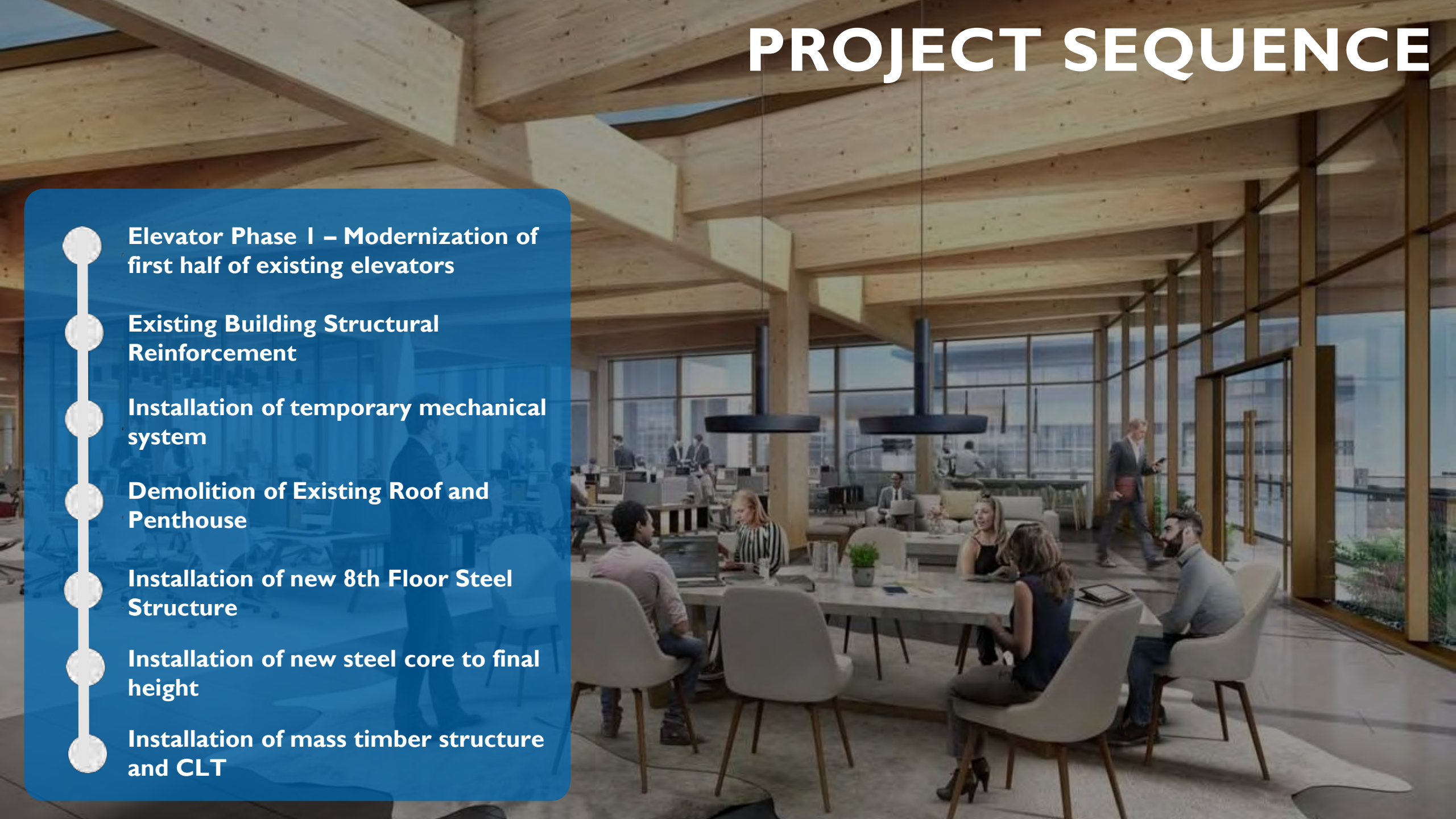
Faster Installation

Glulam + CLT Installation: 10 weeks
Equivalent Steel Building: 14-16 weeks

Timeline

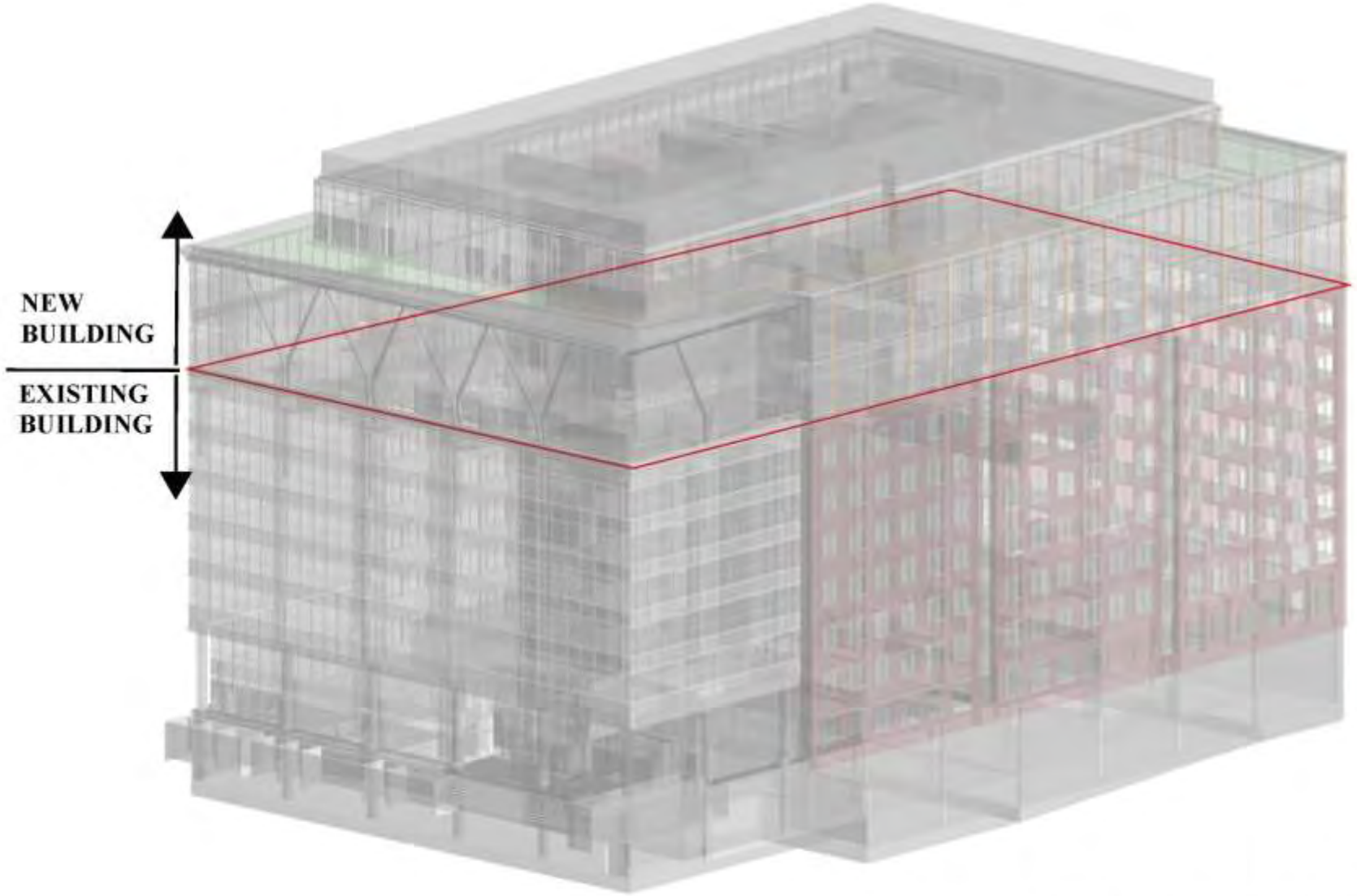
Mass Timber installation is scheduled to begin early March 2021

PROJECT SEQUENCE



- Elevator Phase I – Modernization of first half of existing elevators
- Existing Building Structural Reinforcement
- Installation of temporary mechanical system
- Demolition of Existing Roof and Penthouse
- Installation of new 8th Floor Steel Structure
- Installation of new steel core to final height
- Installation of mass timber structure and CLT

PROJECT SEQUENCE



PREMOBILIZATION

OCTOBER 1, 2020


wework
NOVEMBER 1, 2020

DECEMBER 1, 2020

JANUARY 1, 2021

FEBRUARY 1, 2021


MARCH 2, 2021


MARCH 12, 2021


DAVIS
MARCH 17, 2021

Current photo

APRIL ##, 2021

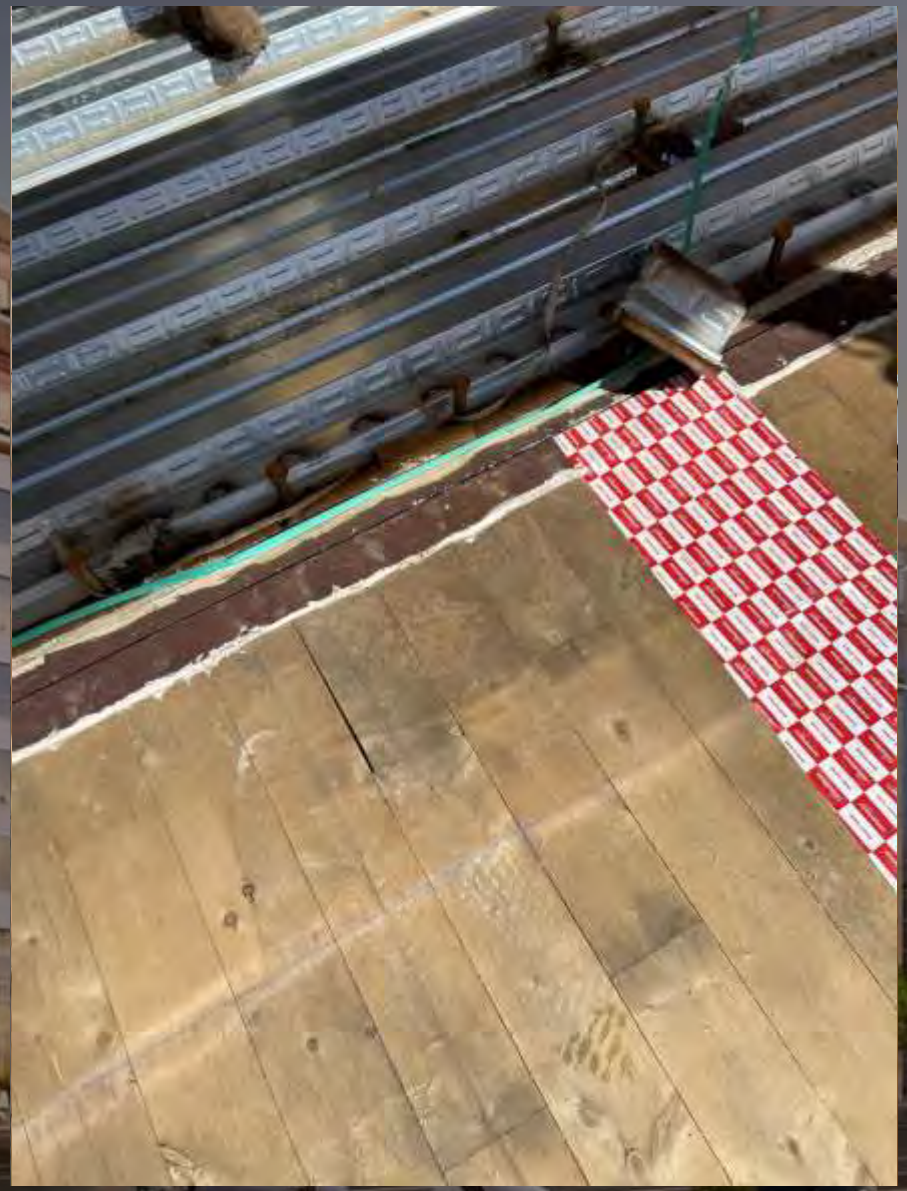
LESSONS LEARNED + BEST PRACTICES

Water Mitigation
- CLT Spline sealing
- Top of Column Sealing
- Early Unwrapping of Structure
- Perimeter Flashing

Factory vs. Field Sealing

Construction Tolerances
- AISC Steel Tolerances
- Concrete Slab Tolerances

Temporary Storm System



QUESTIONS?

This concludes The American Institute of Architects Continuing Education Systems Course

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