Lexington High School

School Building Committee Meeting

01/13/2025

smma DORE + WHITTIER

1. Call to Order
2. Vote on Previous Meeting Minutes 12:00 – 12:05
3. Review MSBA PSR Comments 12:05 – 12:10
4. Discussion of alleviating overcrowding by inhabiting space in portions of the new building 12:10 – 12:30
5. Review Schematic Design Decision Matrix 12:30 – 1:00
6. Add/Reno Field House Scope & Constructability 1:00 – 1:20
7. Mass Timber vs Structural Steel Introduction 1:20 – 1:40
8. Public Comment 1:40 – 1:50
9. Reflections & Action Items 1:50 – 2:00
10. Adjourn 2:00

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A3 No	Title	Revision	Champion	Date Started	Collaborators	Approved by:	Approved date:	Status
1	LHS Early Classroom Wing	B	TJM	01/08/25	Jamie Meiser, Dan Scholler, Jack Dawson, Daniela Ojeda			☐ Development ☐ Collaborative review ☐ Implementation

Section 1 – Topic of Discussion:

Occupy portion of New Building Early

Section 2 – Background:

Is there opportunity to turn over classrooms early for the C.5b bloom option as little or no cost

Section 4 – Analysis: *Cost and Risk*

Schedule Analysis		
	Current Schedule	Revised Schedule
100% CDs 4-5 Months early	May 2027	January 2027
Early Bid Package (Long Lead Time Equipment)	October 2026	May 2026
Permanent Power - 1 year early	June 2028	June 2027

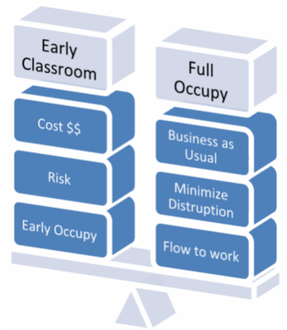
Temporary Costs and Coordination Required	
Water and Sewer Configuration	$$
Temporary Partitions	$
Rework Site Fence	$
Generator Rental (Permanent power not online in time)	$$
Permanent Power Shutdowns and Transfer	$
Temp HVAC	$$
Security and Communication Connection to Existing Bld	$
Start up and Commissioning 2X	$
Out of Sequence Work	$$
Expediting/Storage of Materials	$$
C of O Process 2X	$

Additional Impacts	
Impact on Design	
Main Mechanical and Electrical room in Designated Wing	$-$$
Modification of Sitework/Landscaping for Temp Egress	$
Massing Modifications	$-$$
Student Experience	
Directly Adjacent to Construction Activities	
Operating both Schools	

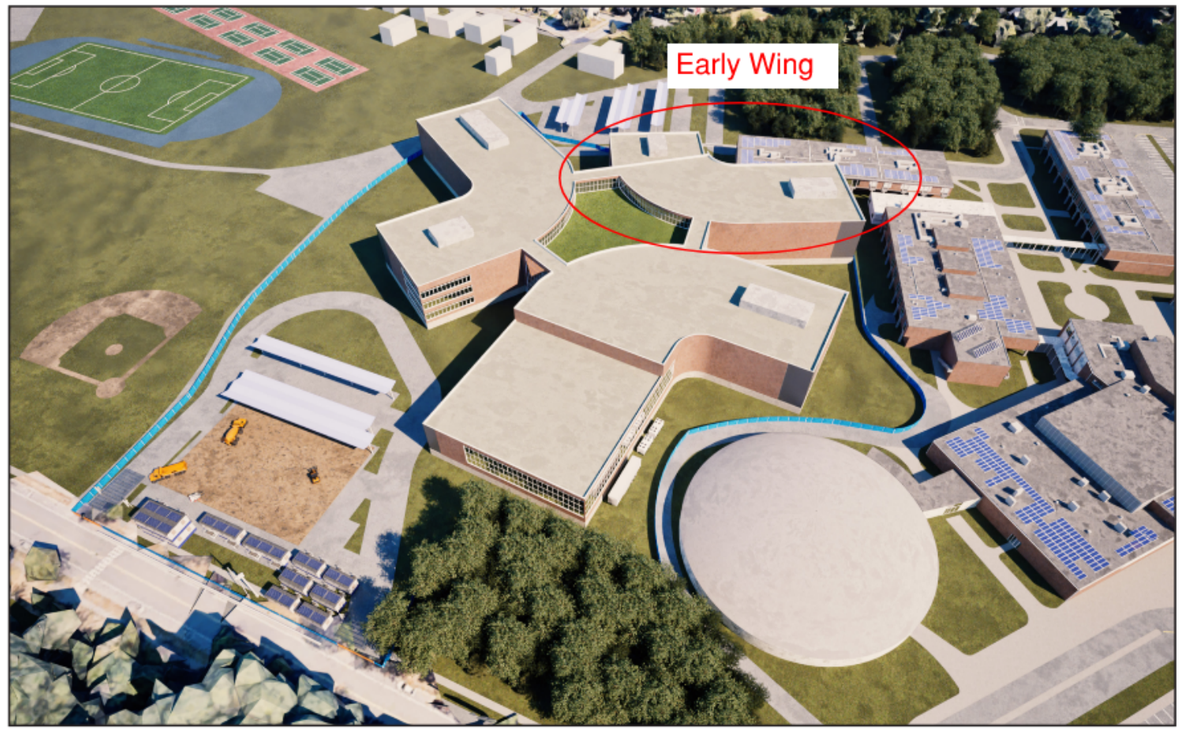
= Impact
= Significant Impact

Section 5 – Analysis Summary

- One Wing complete Early
- Added Cost and Complexity
- Added Coordination and Temporary Requirements
- Added Disruption to Students



Section 7 - Drawings



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Schematic Design Decision Matrix

	13-Jan	24-Feb	TBD	TBD	TBD	TBD	17-Mar	TBD	TBD	14-Apr	12-May	21-Jul	4-Aug	11-Aug	18-Aug
										Town Meeting	Package to estimators (6/4)	Reconciled Estimate (7/15)			Submit to MSBA (8/26)
MSBA															
Review MSBA Comments															
Review SD Decision Matrix															
Review SD Programming															
Review FAS Committee Meeting															
Review Costs and VE															
Vote to Submit SD to MSBA															
Focus Groups															
Educations Plannng & Equity															
MEP Systems & Sustainable Design															
Exterior & Interior Design															
Site Safety & Security															
Programming															
Confirm maximum assembly size in Gym/Field House		Confirm													
Decide between 146M or 200M track in Field House		Confirm													
Building Floor Plan Review															
Proposed space layouts and circulation		Introduce								Confirm					
Confirm future expansion GSF		Introduce								Confirm					
Building Design															
Exterior Design (Enclosure systems, Character, Colors, Materials and Patterns, Confirm Red List Materials)							Introduce			Confirm					
Design of Building Entrances							Introduce			Confirm					
Add/Reno Field House - Scope and Constructability	Introduce	Discuss/Confirm													
Mass timber versus Structural Steel	Introduce	Discuss/Confirm													
Driveways & Circulation															
Confirm off-site improvements required (Town project?)										Introduce	Discuss/Confirm				
Athletic Fields and Park Program															
Confirm lighted fields							Introduce			Discuss	Confirm				
Confirm field material (Seed, SOD or synthetic)							Introduce			Discuss	Confirm				
HVAC Design															
Identify spaces to be air conditioned.		Intro/Discuss					Confirm								

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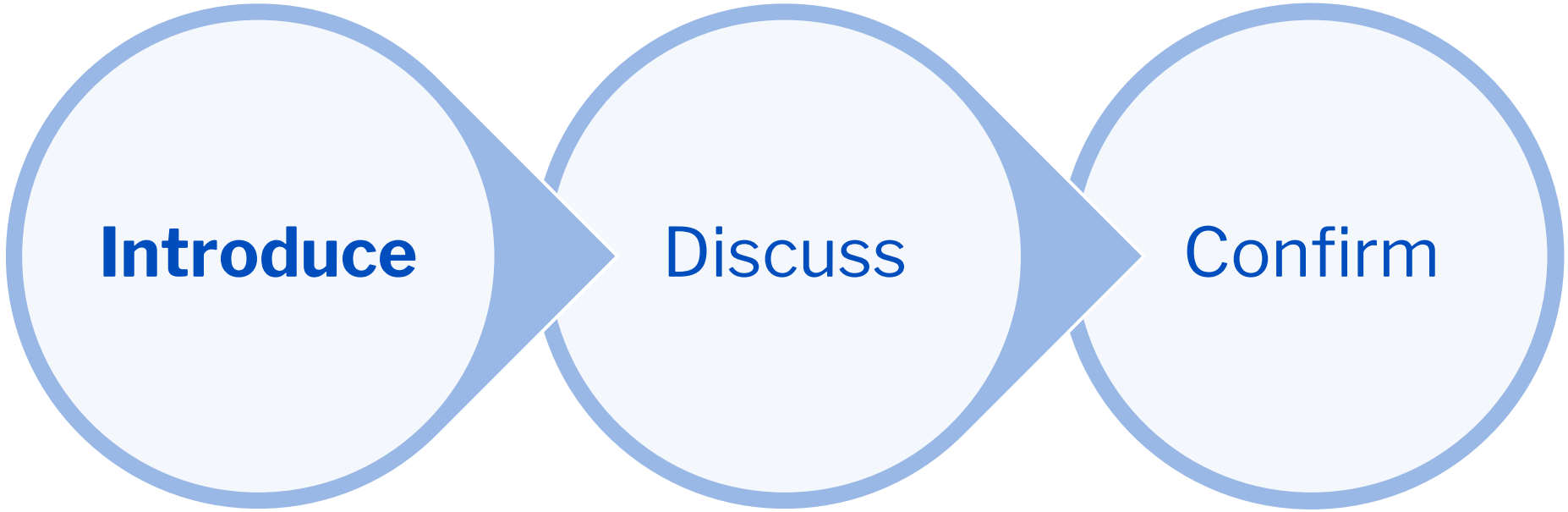
Add/Reno Field House Scope & Constructability



Add/Reno Field House Scope & Constructability

PSR Site Plan

Add/Reno Field House Scope & Constructability

Program

- Total 48,000 Gross Floor Area in the Addition/Renovation
- 146m or 200m Track to be studied
- Existing space within Field House includes:
  - 3,300 sf Alternative PE
  - 679 sf Weight Room and Storage

Appropriate space allocations for future uses within the expanded Field House footprint will be determined in the current round of Schematic Design Programming meetings, which are ongoing.

Next Field House Programming meeting with Physical Education, Athletics, and Recreation Departments to be held Tuesday, January 14 at LHS.

Add/Reno Field House Scope & Constructability

PSR Ground Floor Plan

Add/Reno Field House Scope & Constructability

Early Investigations – Domed Roof

- Maintain southeast half of foundation wall
- All new exterior shell, structure, and slab on grade
- Extend footprint northwest
- A domed roof with new steel trusses
- Height: same 48'-0" building height as existing Field House
- Does not allow for PV on roof

Add/Reno Field House Scope & Constructability

Current Investigations – Consolidated PE/Athletics/Community Programs

- School moves 10-15’ south to more fully engage with enlarged Field House volume
- All new exterior shell, structure, and slab on grade
- Physical features of Field House remain similar, but quantity of exterior enclosure may be reduced
- To be investigated: Could a flattened Field House roof allow for PV located on top?

Add/Reno Field House Scope & Constructability

Possible Consolidation of Ground Floor Plan (146m track)

△ Better access from both public entrance and internal PE areas may be possible by means of a shared, access-controlled corridor

Add/Reno Field House Scope & Constructability

Possible Consolidation of Ground Floor Plan (200m track)

△ Better access from both public entrance and internal PE areas may be possible by means of a shared, access-controlled corridor

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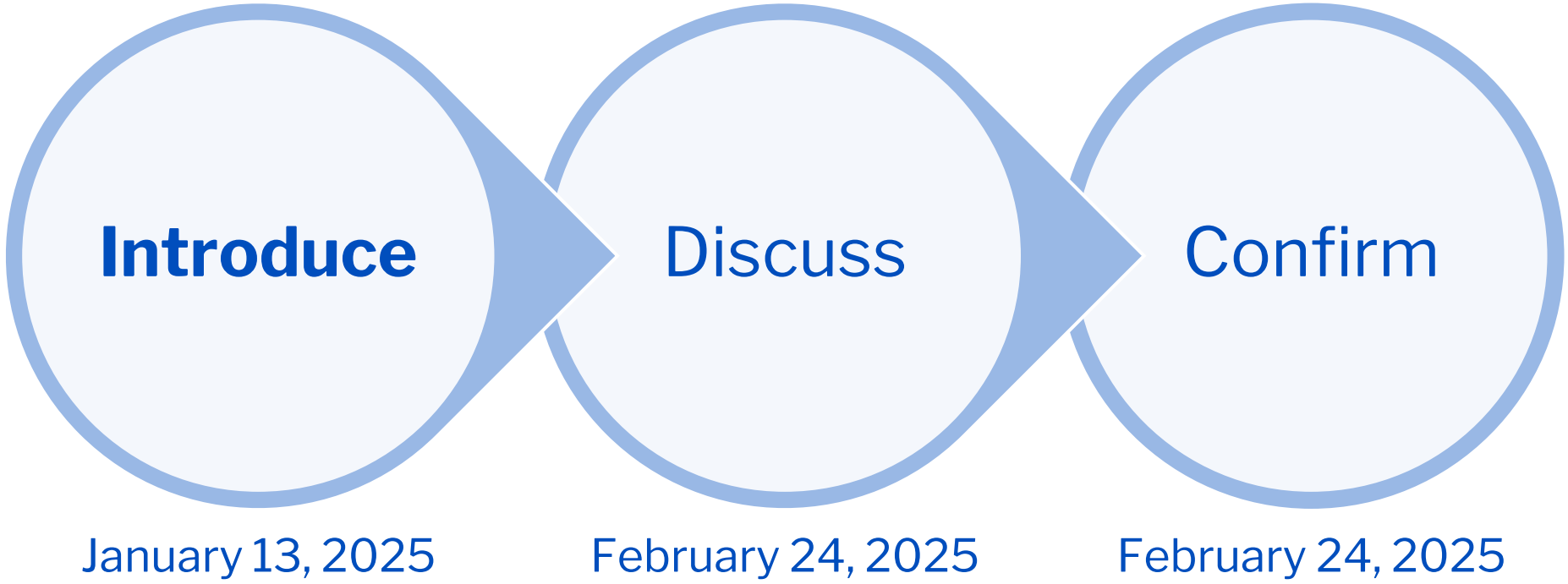
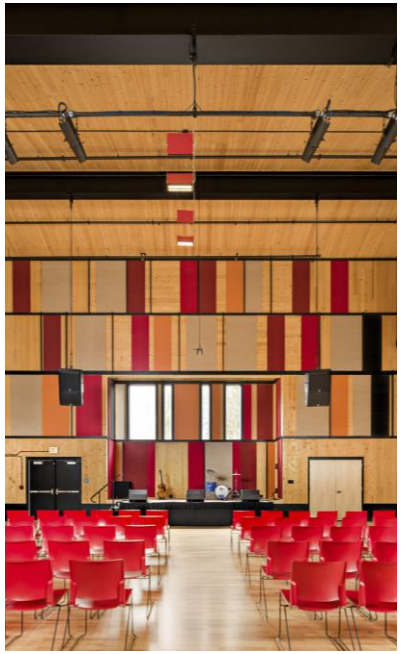
Mass Timber vs. Structural Steel



SUSTAINABILITY OF MASS TIMBER



Embodied Carbon

Construction Efficiency

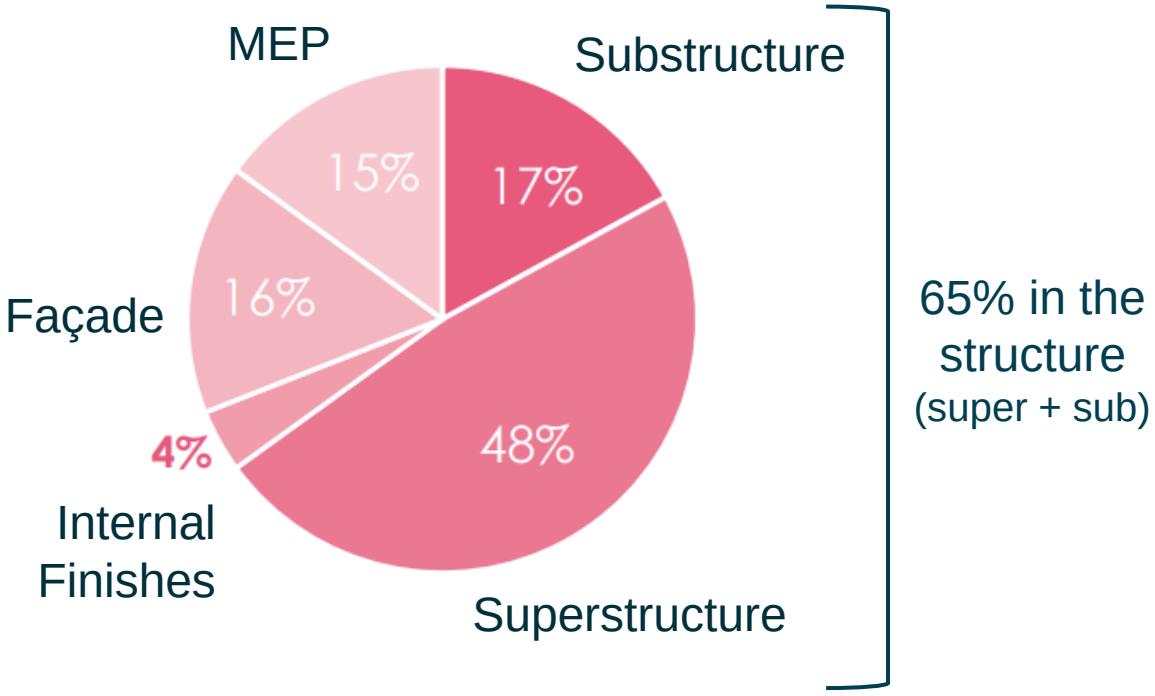
Deconstruct-ability & Material Circularity

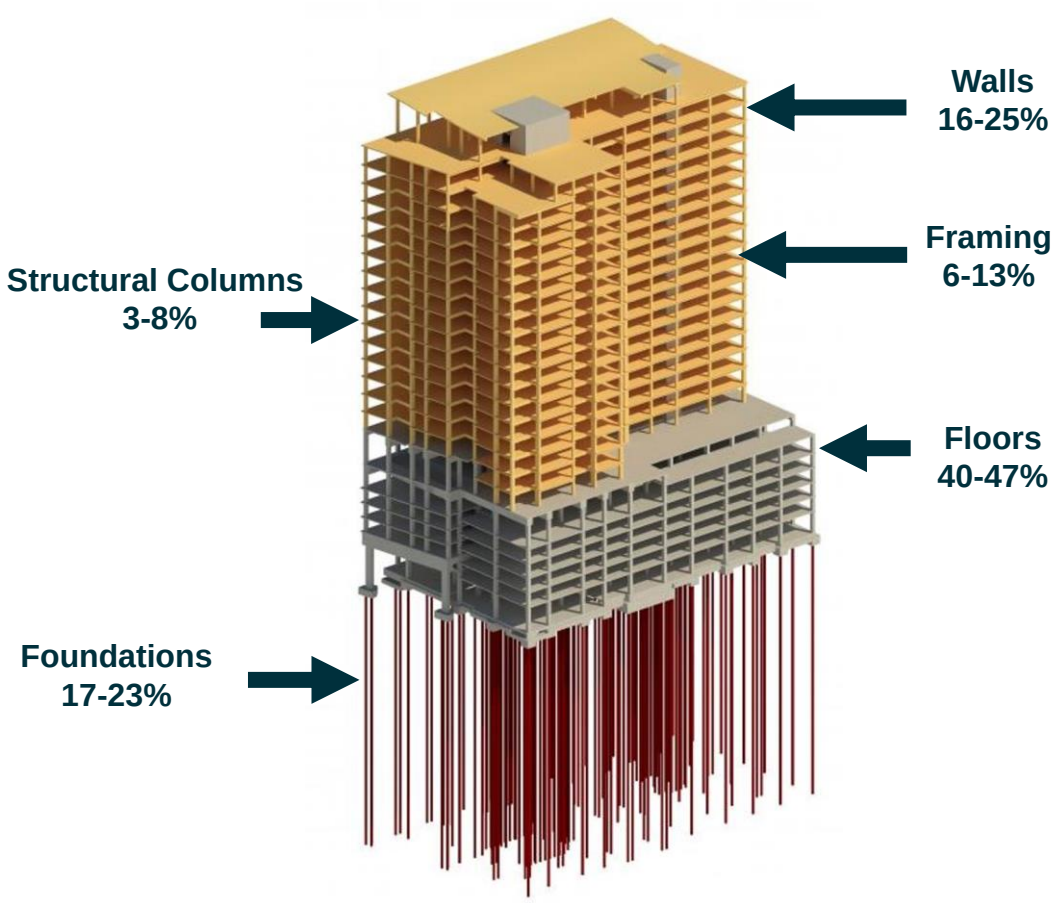
Biophilic Design

Wellbeing & Productivity

Certification Opportunities

CARBON OF STRUCTURES





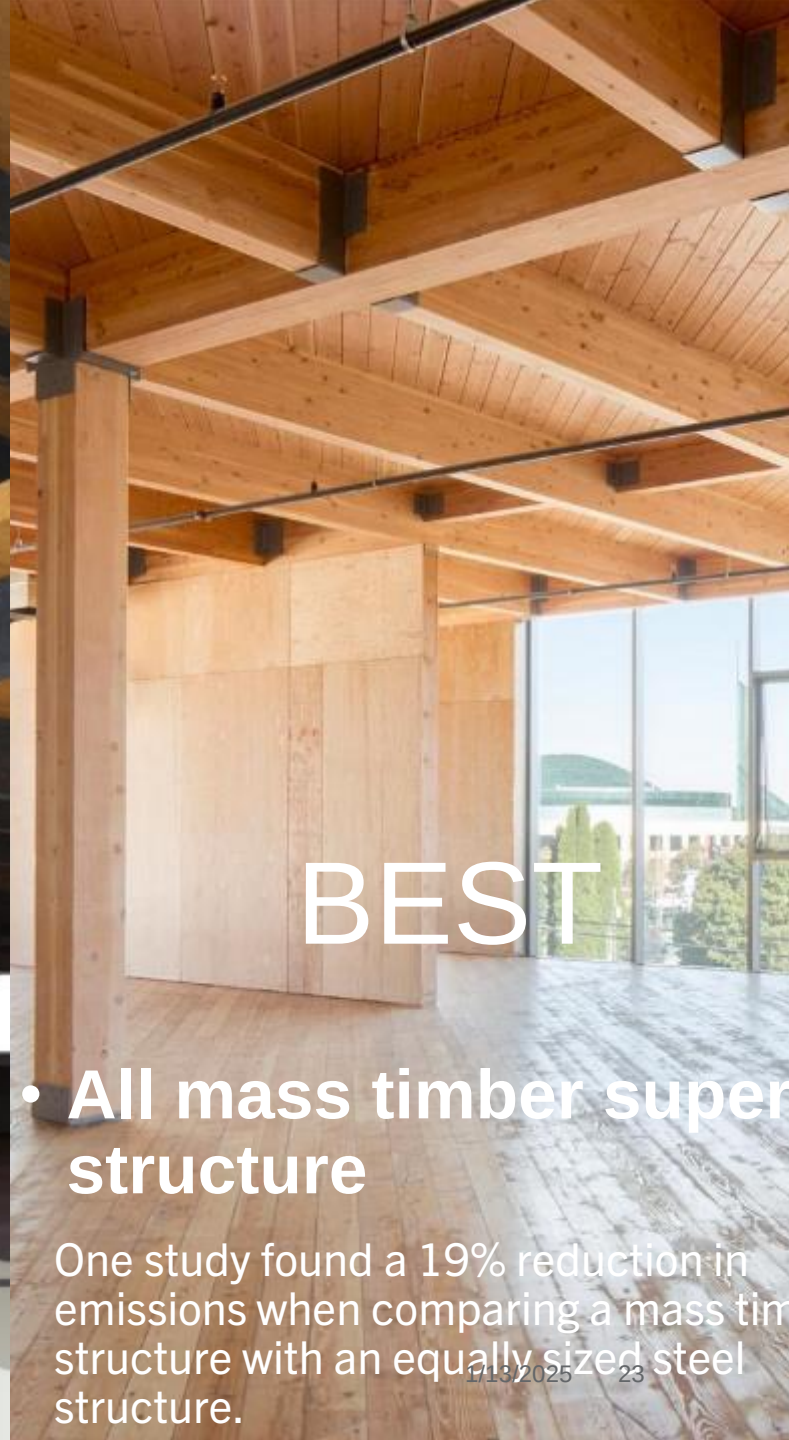
Source: LETI Embodied Carbon Primer

GOOD

- **CLT shaft walls (stairs, elevators)**

BETTER

- **Hybrid structures**
- **Full mass timber system for gravity system**

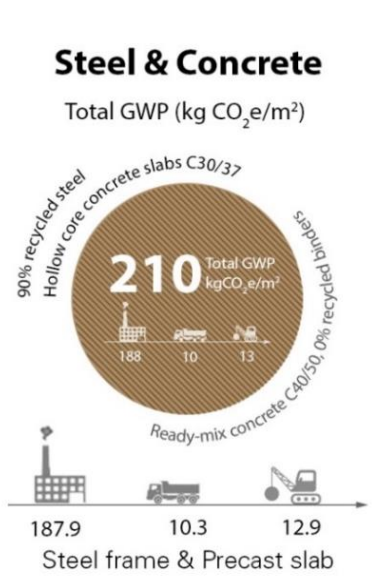


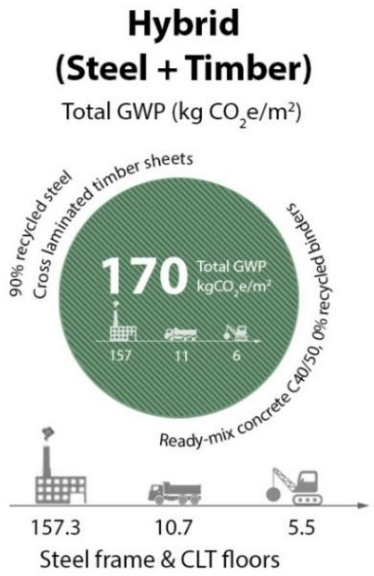
BEST

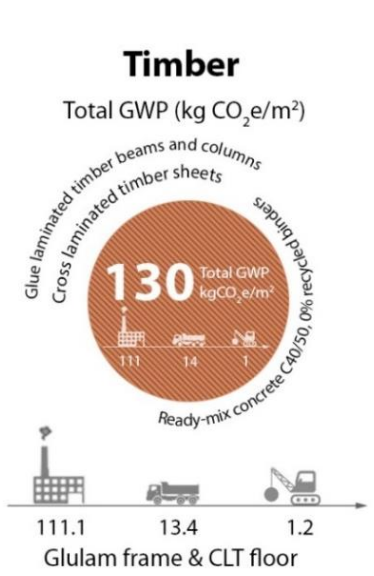
- **All mass timber super structure**

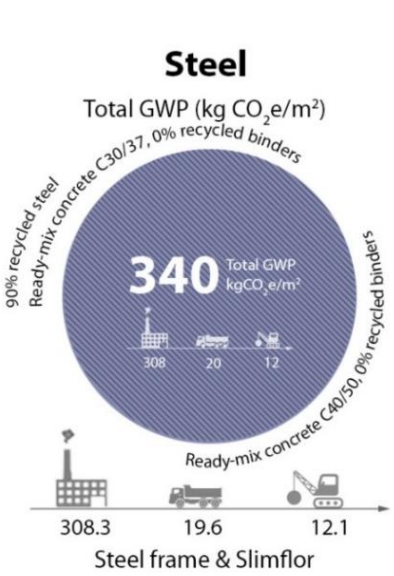
One study found a 19% reduction in emissions when comparing a mass tim structure with an equally sized steel structure.

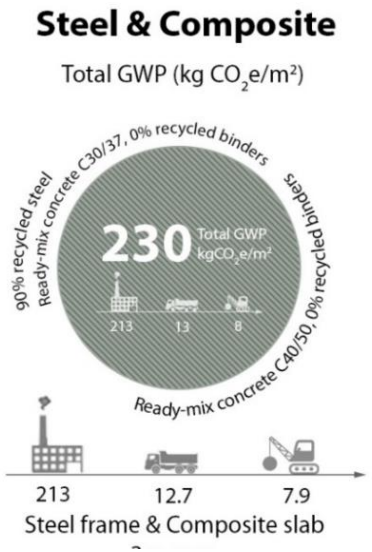
COMPARATIVE STUDIES

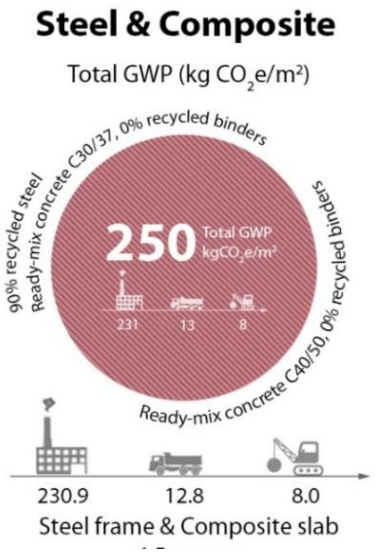


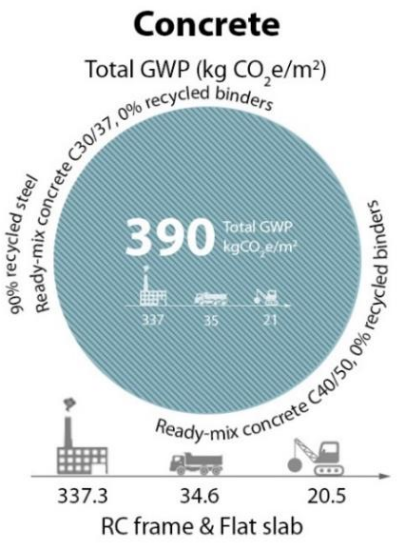


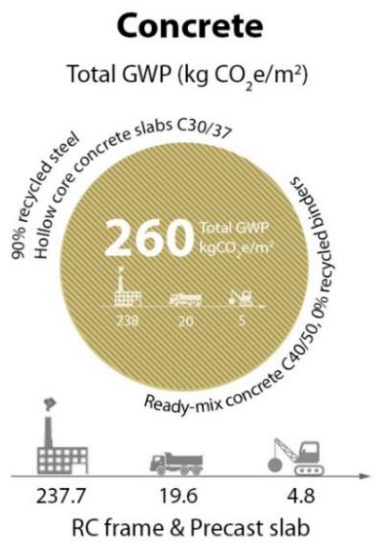












CONSTRUCTION EFFICIENCY

Speed of Onsite Construction

- Prefabricated timber elements reduces time to erect the frame

Smaller Crews

- Lower emissions for construction teams

Efficiencies in Interior Work

- Exposed mass timber elements reduces the cost, carbon emissions, and time of installation of finish materials

Image: Ascent Tower timber elements, Milwaukee, WI (photo: Swinerton Mass Timber)

ADDITIONAL EC CONSIDERATIONS

Biogenic Carbon Storage

- Biogenic carbon refers to carbon that is stored in living organisms, such as trees
- When wood is harvested from sustainably managed forests and used in construction, the biogenic carbon stored in the wood remains stored in the building, providing **a carbon sink for the life of the building**

Reduction of Interior Finishes

- Leaving mass timber elements are left exposed to serve as the interior finish material **reduces the need for additional finish materials**

Image: Ascent Tower in construction

DECONSTRUCT-ABILITY & MATERIAL CIRCULARITY

Deconstruct-ability of Mass Timber

- Made viable via modular elements, standardized dimensions, and reversible connections (e.g. metal connections)

Material Passports

- A digital record of each unique material element in a building used facilitate circular material strategies at the end of the building's life that informs inform material recovery, reuse, and recycling

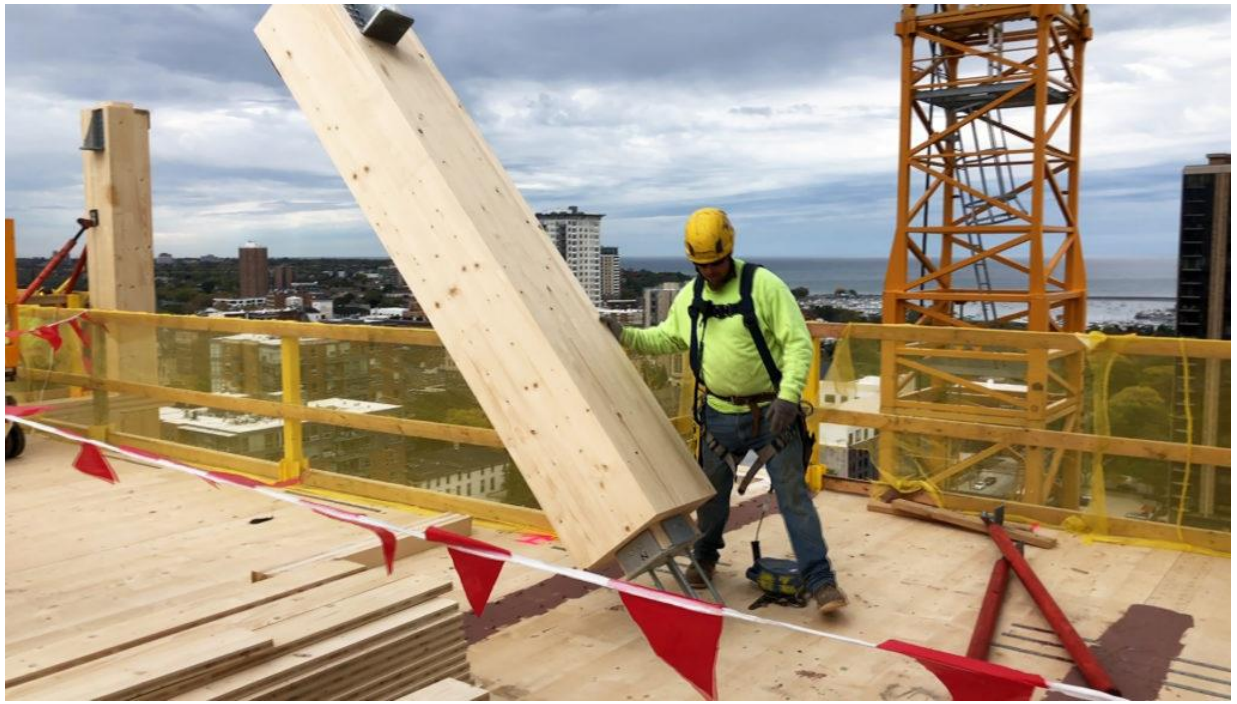


Image: Ascent Tower from PBS News Hour: "Is mass timber the building material of the future?"

BIOPHILIA HEALTH BENEFITS

A landmark study discovered that exposure to wooden environments can result in a significant **10% reduction in blood pressure, a 6% decrease in heart rate, and a 15% decrease in stress hormone levels among participants.**

Biophilic elements (such as wood) have a significant impact on cognitive function, improving on average 8% and elevating emotional well-being and positive emotions 12%.

Wood based interiors demonstrate:

- **9-12% reduction in stress**
- **15% improvement in emotional states**
- **12% increase in positive emotions**

Presence of plants improve feeling of **occupant wellness 40%.**

The visual presence of wooden elements can lower stress more effectively than plants. Rooms with 45% wooden surfaces boost perceptions of comfort and lower blood pressure.

*** Data references available upon request.**

BENEFITS: ALREADY INTEGRATED

Environmental Benefits

- **Renewable Resource:** Trees grown in sustainably managed forests and replanted after harvest, make Mass Timber renewable
- **Minimized Waste:** Sawmill residues used in Mass Timber manufacturing reduce waste
- **Reduced Resource Extraction:** Mass Timber does not require mined minerals or fossil fuels
- **Circularity:** Mass Timber can be repurposed
- **Water Efficiency:** Mass Timber production uses far less water than concrete and timber
- **Carbon Storage:** Mass Timber can store carbon and other pollutants for the life of the building

Economic Benefits

- **Faster Construction Time:** Mass Timber construction can be faster than traditional methods
- **Project Efficiency:** Prefabricated Mass Timber requires less on-site assembly, streamlining construction
- **Increased Safety:** Mass Timber prefabrication requires less on-site construction in high or precarious places
- **Reduced Labor Needs:** Mass Timber requires half the number of workers for erection
- **Cost Competitive:** Mass Timber is often cost-competitive with conventional materials
- **Job Creation in Diverse Communities:** Growing, harvesting, processing, and manufacturing of Mass Timber products creates substantial job opportunities

Human Benefits

- **Thermal Comfort:** Wood outperforms steel and concrete in terms of thermal conductivity (310 times better that steel according to the American Wood Council). Materials with low thermal conductivity resist heat flow, improving a building's energy efficiency
- **Noise Reduction and Tranquility:** Mass Timber provides excellent sound insulation and absorption properties, promoting a peaceful indoor environment
- **Excellent Fire Resistance:** Mass Timber's natural fire resistance makes is a safer building material--when ignited, the outer layers form a char layer, which protects and insulates the inner layers of the material-maintain structural integrity
- **Health and Wellness:** The presence of wood in the indoor environment can result in a significant reduction in blood pressure, a decrease in heart rate, and a decrease in stress hormone levels among participants.

*** Data references available upon request.**

RED LIST

Red List Substances to Avoid:

- Cadmium
- PVC
- Formaldehyde

Wood Preservatives:

- Creosote
- Arsenic
- Pentachlorophenol

Declare.

Mass Timber
SmartLam North America

Final Assembly: Columbia Falls, Montana, USA; Dothan, Alabama, USA
Life Expectancy: 100 Year(s)
Embodied Carbon: 178kg CO2 eq
Declared Unit: per Cubic Meter of Product
End of Life Options: Salvageable/Reusable in its Entirety, Biodegradable/Compostable (98%), Landfill (2%)

Ingredients:

softwood lumber, planed, dry: wood; **Adhesive:** Isocyanic acid, polymethylenepolyphenylene ester, polymer with 2-methyloxirane and oxirane; Polymethylene polyphenyl isocyanate; 4,4'-Methylenediphenyl diisocyanate; Benzene, 1-isocyanato-2-[(4-isocyanatophenyl)methyl]-; Boron zinc oxide (B6Zn2O11); Siloxanes and Silicones, di-Me, reaction products with silica; Benzene, 1,1'-methylenebis[2-isocyanato-

Living Building Challenge Criteria: Compliant

I-13 Red List:
■ LBC Red List Free
□ LBC Red List Approved
□ Declared
% Disclosed: 100% at 100ppm
VOC Content: Not Applicable

I-10 Interior Performance: Not Applicable
I-14 Responsible Sourcing: Product Available with FSC Chain of Custody; Low Risk Wood

SML-0001
EXP. 01 JUN 2025
Original Issue Date: 2023

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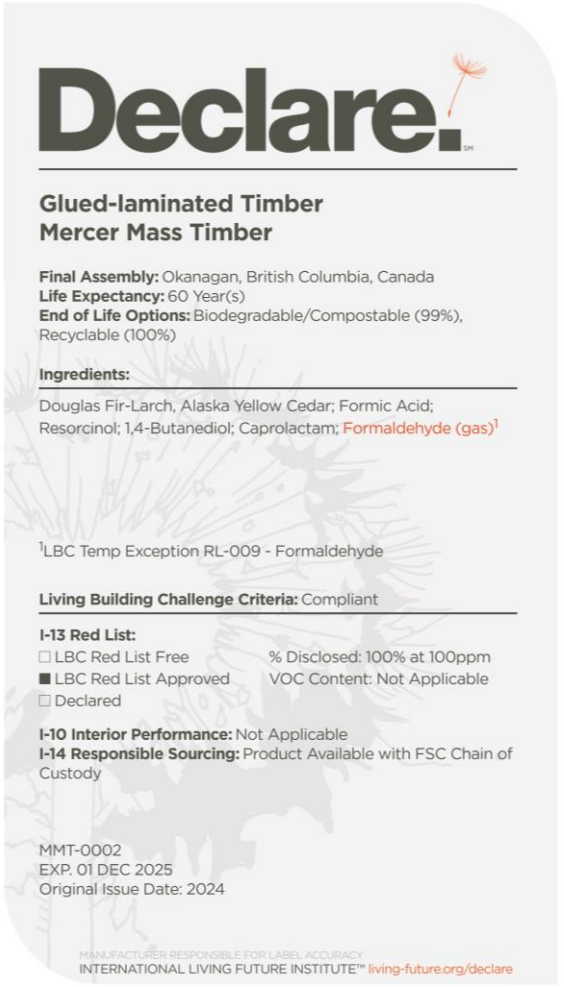
SmartLam (Manufactured in US)



Declare.

Glued-laminated Timber
Mercer Mass Timber

Final Assembly: Okanagan, British Columbia, Canada
Life Expectancy: 60 Year(s)
End of Life Options: Biodegradable/Compostable (99%), Recyclable (100%)

Ingredients:

Douglas Fir-Larch, Alaska Yellow Cedar; Formic Acid; Resorcinol; 1,4-Butanediol; Caprolactam; Formaldehyde (gas)[1]

[1]LBC Temp Exception RL-009 - Formaldehyde

Living Building Challenge Criteria: Compliant

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■ LBC Red List Approved
□ Declared
% Disclosed: 100% at 100ppm
VOC Content: Not Applicable

I-10 Interior Performance: Not Applicable
I-14 Responsible Sourcing: Product Available with FSC Chain of Custody

MMT-0002
EXP. 01 DEC 2025
Original Issue Date: 2024

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Mercer (Manufactured in Canada)

Mass Timber vs. Structural Steel

What is Mass Timber?

Engineered wood assembly of solid wood panels that are nailed or glued together

Glulam Beam

Glulam Column

Cross-Laminated Timber (CLT)

Mass Timber vs. Structural Steel

Davis Center – Williams College

28,000 GSF

- Glulam Columns
- Glulam Beams
- TJI/LVL Joists and plywood with concrete topping
- Supplemental Steel members

C Gerald Lucey Building – DUA Brockton

33,000 GSF

- Glulam Columns
- Glulam Beams
- CLT Slabs with concrete topping
- Steel-framed portions where needed

Mass Timber vs. Structural Steel

Advantages

- Low carbon footprint
  - Sequestered carbon during tree growth
  - Lower embodied carbon to manufacture members
- Potentially slightly lighter construction = smaller foundations
- Installation can be quicker than steel construction
- Attractive finished product

Disadvantages

- Cost (15%-50% more than steel and concrete framing)
- Weaker and more flexible material than steel
- Larger members (floor to floor dimensions will grow)
- Smaller column spacing (20 feet vs 30+ feet for steel)
- Not suitable for long spans and floors of assembly spaces
- Difficult to alter in the field for ducts/pipes (MEP Preconstruction Coordination required)

Other considerations

- Mass timber needs to be "oversized" to achieve a fire rating
- Floors will need a 2"-3" concrete topping to mitigate vibration and sound transmission
- Hybrid approach is commonly used, combining steel framing with mass timber

Mass Timber vs. Structural Steel / Embodied Carbon

Embodied Carbon Study Options	Embodied Carbon Reduction from Baseline Model (% tons CO_2eq)	LEED Impact
New Construction with Steel/Concrete Structure	-6.0*	2 points (10% reduction goal)
New Construction with Mass Timber Structure	-19.6	3 points (20% reduction goal)

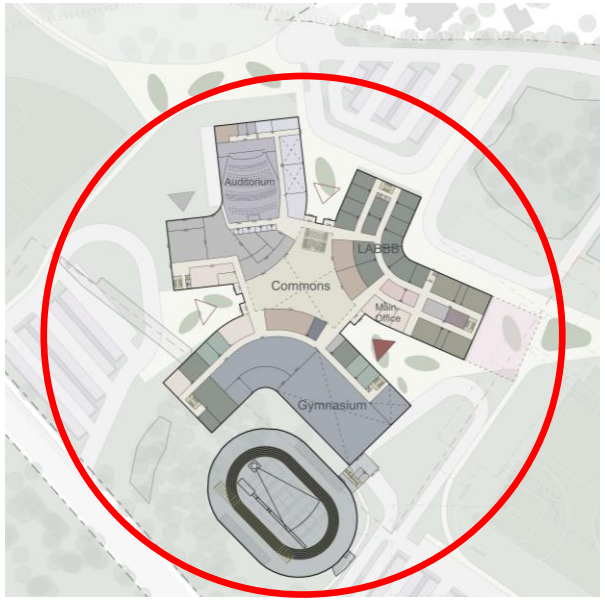
Notes:

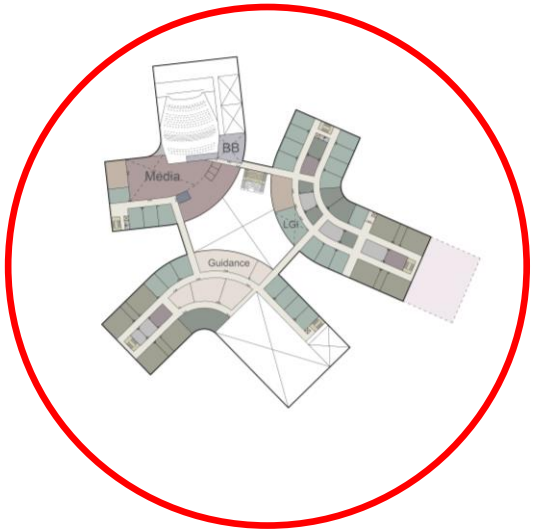
1. *Preliminary PSR Results of Structural Design Options. Analysis to be updated in SD.*
2. *Preliminary PSR analysis conducted using EPIC early carbon assessment tool (60-year LCA). Modeling tool Baseline model assumes building structure only recycled content, not including Low-Carbon concrete measures and enclosure components towards 10% goal.*
3. *Both Options in achieving 2 points will provide additional Regional Priority point.*

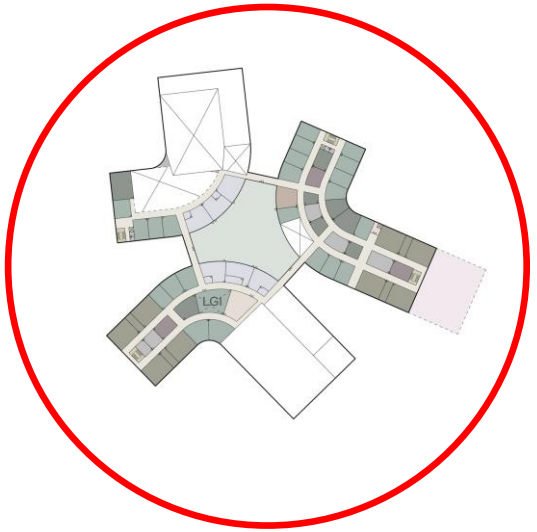
Mass Timber vs. Structural Steel

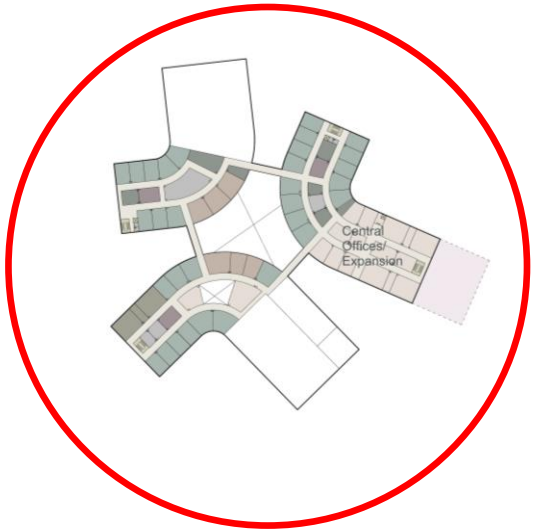
PSR Cost Estimate Considerations

- **Option A** (Mass timber used for the entire structure)
  - Est. Total Project Cost = $24,000,000





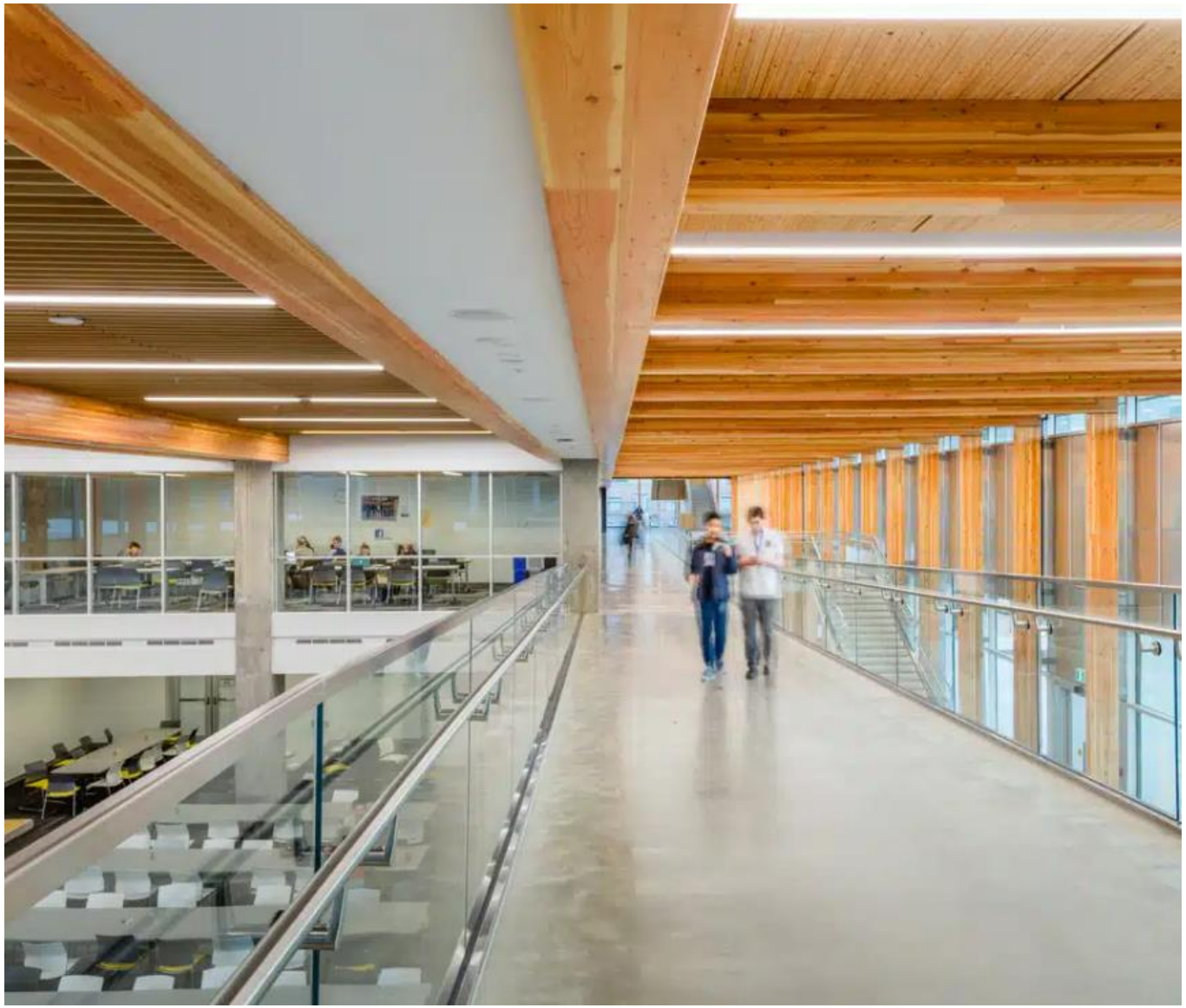




Mass Timber vs. Structural Steel

PSR Cost Estimate Considerations

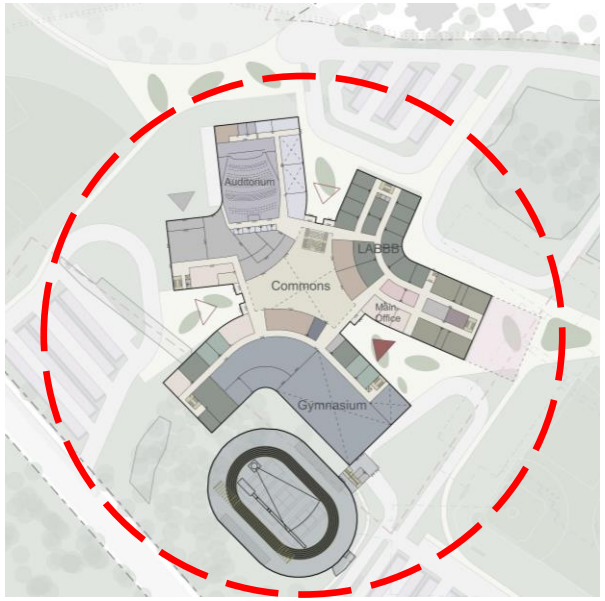
- **Option A** (Mass timber used for the entire structure)

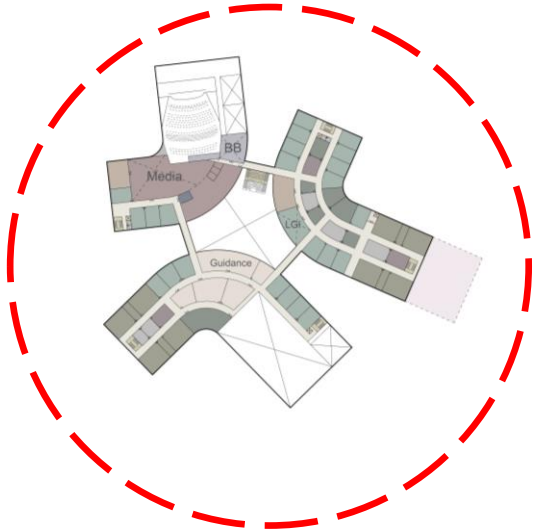


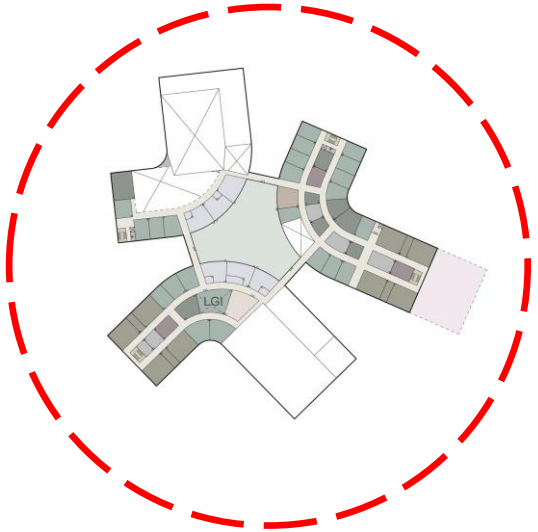
Mass Timber vs. Structural Steel

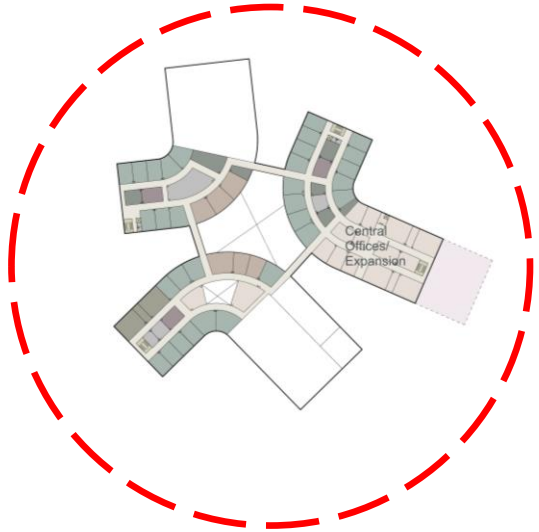
PSR Cost Estimate Considerations

- **Option B** (Hybrid system – all mass timber except steel used for columns)
  - Est. Total Project Cost = $19,000,000





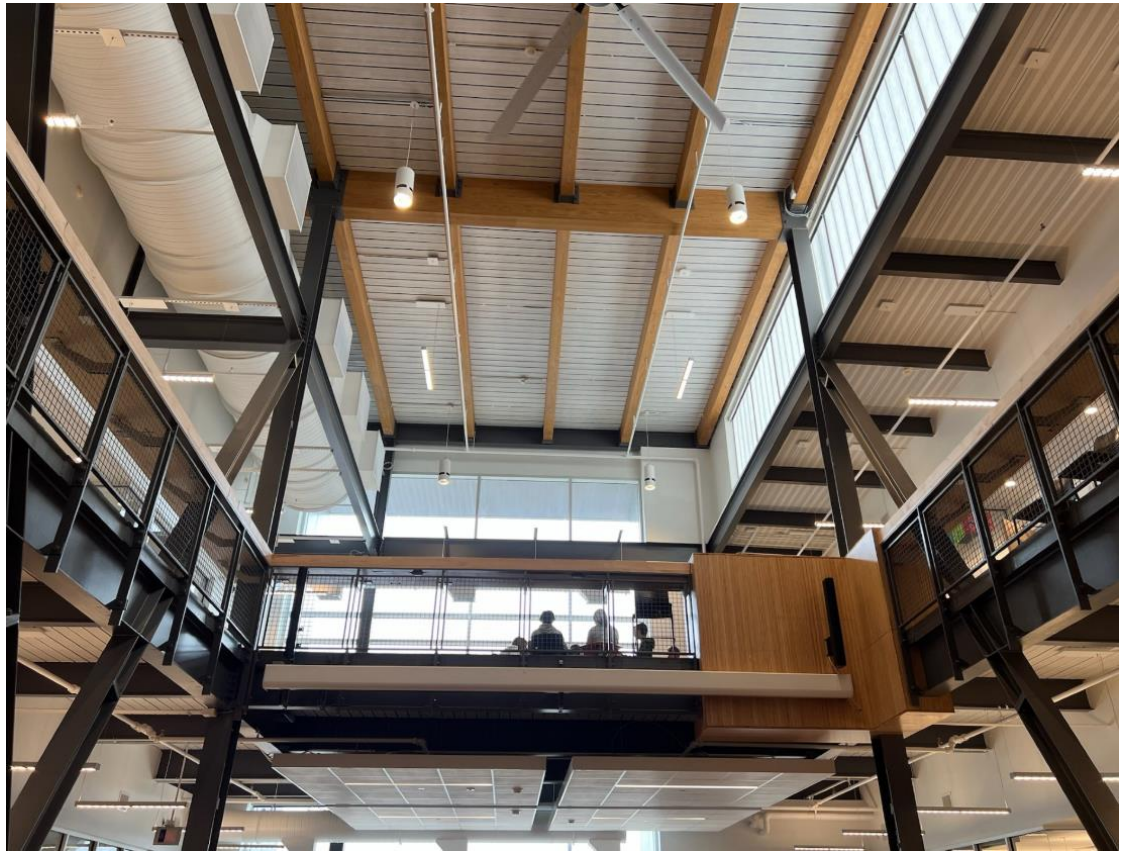




Mass Timber vs. Structural Steel

PSR Cost Estimate Considerations

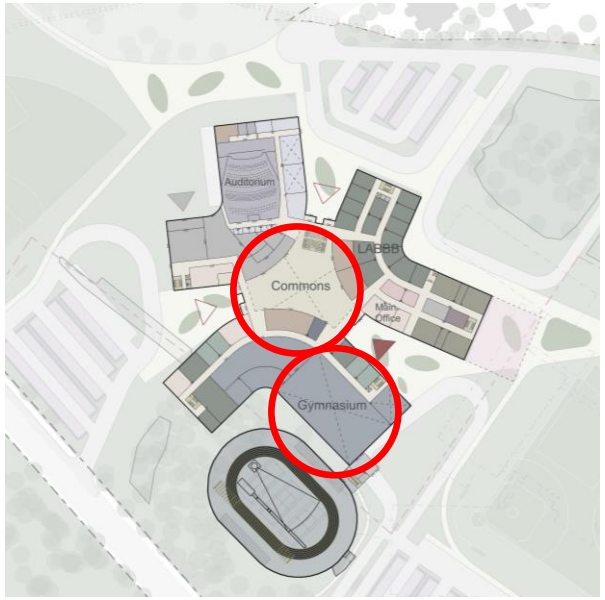
- **Option B** (Hybrid system – all mass timber except steel used for columns)

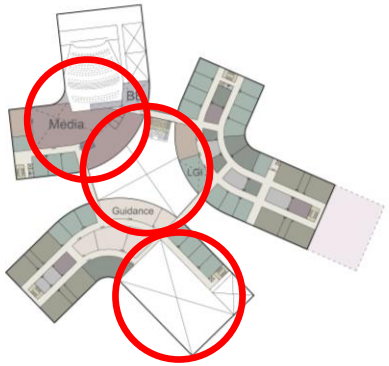


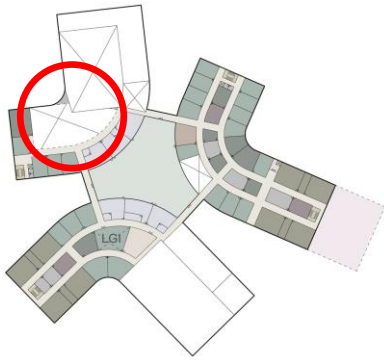
Mass Timber vs. Structural Steel

PSR Cost Estimate Considerations

- **Option C** (Mass timber used at the Gymnasium, Dining Commons and Media Center only)
  - Est. Total Project Cost = $2,000,000



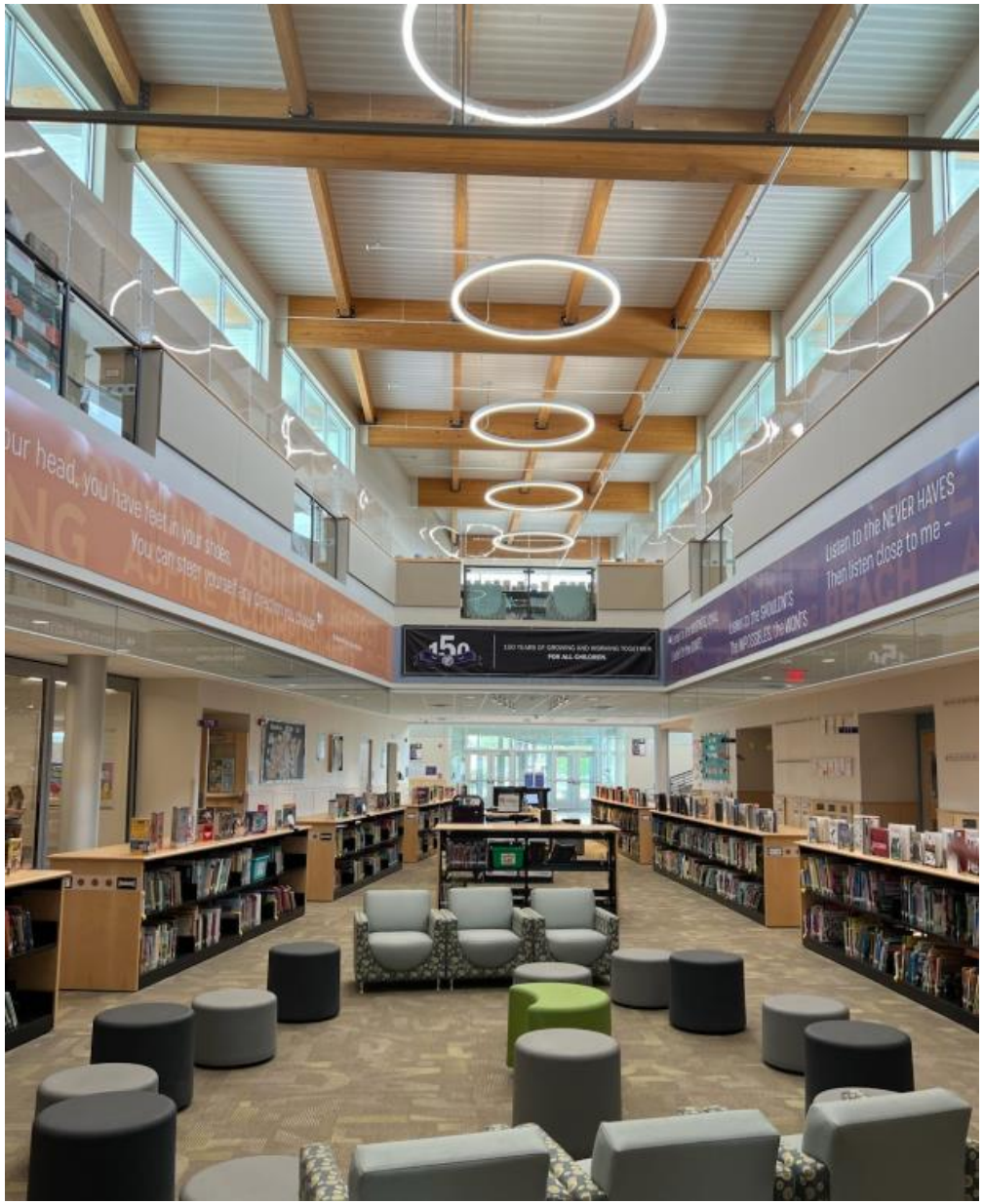




Mass Timber vs. Structural Steel

PSR Cost Estimate Considerations

- **Option C** (Mass timber used at the Gymnasium, Dining Commons and Media Center only)



1. Call to Order
2. Vote on Previous Meeting Minutes 12:00 – 12:05
3. Review MSBA PSR Comments 12:05 – 12:10
4. Discussion of alleviating overcrowding by inhabiting space in portions of the new building 12:10 – 12:30
5. Review Schematic Design Decision Matrix 12:30 – 1:00
6. Add/Reno Field House Scope & Constructability 1:00 – 1:20
7. Mass Timber vs Structural Steel Introduction 1:20 – 1:40
8. Public Comment 1:40 – 1:50
9. Reflections & Action Items 1:50 – 2:00
10. Adjourn 2:00

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Thank you