Advancing Mass Timber through Accelerator Programs

MASS TIMBER+ SM

OFFSITE CONSTRUCTION CONFERENCE

PRODUCED BY WOODWORKS FEA Forest Economic Advisors

Credits: 1.0 AIA/CES HSW LUs, 1.0 PHD credit, 0.10 ICC credit

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NYCEDC

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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 course examines how accelerator initiatives—such as the NYC Mass Timber Studio—are reshaping urban construction by supporting the adoption of mass timber as a viable alternative to traditional structural systems. These programs provide critical support for design teams to evaluate material performance, optimize cost and constructability, and navigate regulatory pathways for innovative building approaches. Focusing on a seven-story residential development in Harlem, NY, participants will gain insights into how mass timber and hybrid systems can meet or exceed safety, fire resistance, and code compliance requirements, while also delivering added benefits in construction efficiency, indoor environmental quality, occupant well-being, and cost savings. The course compares multiple structural systems, including various floor assemblies, and highlights how mass timber contributes to healthier, more resilient building environments with lower embodied carbon impacts. Intended for architects, engineers, developers, and policymakers, this course highlights how accelerator projects serve as a launchpad for scalable solutions in the evolving urban development landscape.

Learning Objectives

1. Explain how design accelerator initiatives help advance the adoption of mass timber in urban construction through technical support, research, and pilot demonstrations.
2. Identify key code considerations, including fire safety, structural performance, and height limitations, related to the use of mass timber in mid-rise urban buildings.
3. Analyze the advantages of different mass timber floor assemblies (including dry-installation systems) on construction logistics, design flexibility, and embodied carbon impacts.
4. Use findings from real-world case studies to inform decision-making on structure selection, material efficiency, and project planning for similar developments.

Advancing Mass Timber Through Accelerator Programs: New York City Mass Timber Studio

Nicole Spina, New York City Economic Development Corporation
Susan Jones, FAIA, alteriorjones
Arizona Dabrusin, PE, LEED AP BD+C, DCI Engineers

NEW YORK CITY MASS TIMBER STUDIO

NYC/EDC
NYC Buildings
Newlab
WOODWORKS
SLB SOFTWOOD LUMBER BOARD
AIA New York

About NYCEDC Green Economy + Climate Innovation

Building Our Future Economy

Ensure businesses, investors, and employees have confidence in NYC

Enable equitable growth and development of priority industries

Deliver future-forward infrastructure

Shape the growth of and strengthen neighborhoods where New Yorkers live, learn, and work

About NYCEDC Green Economy + Climate Innovation

Building Our Future Economy

225 managed properties

64M square feet of real estate

170 capital projects

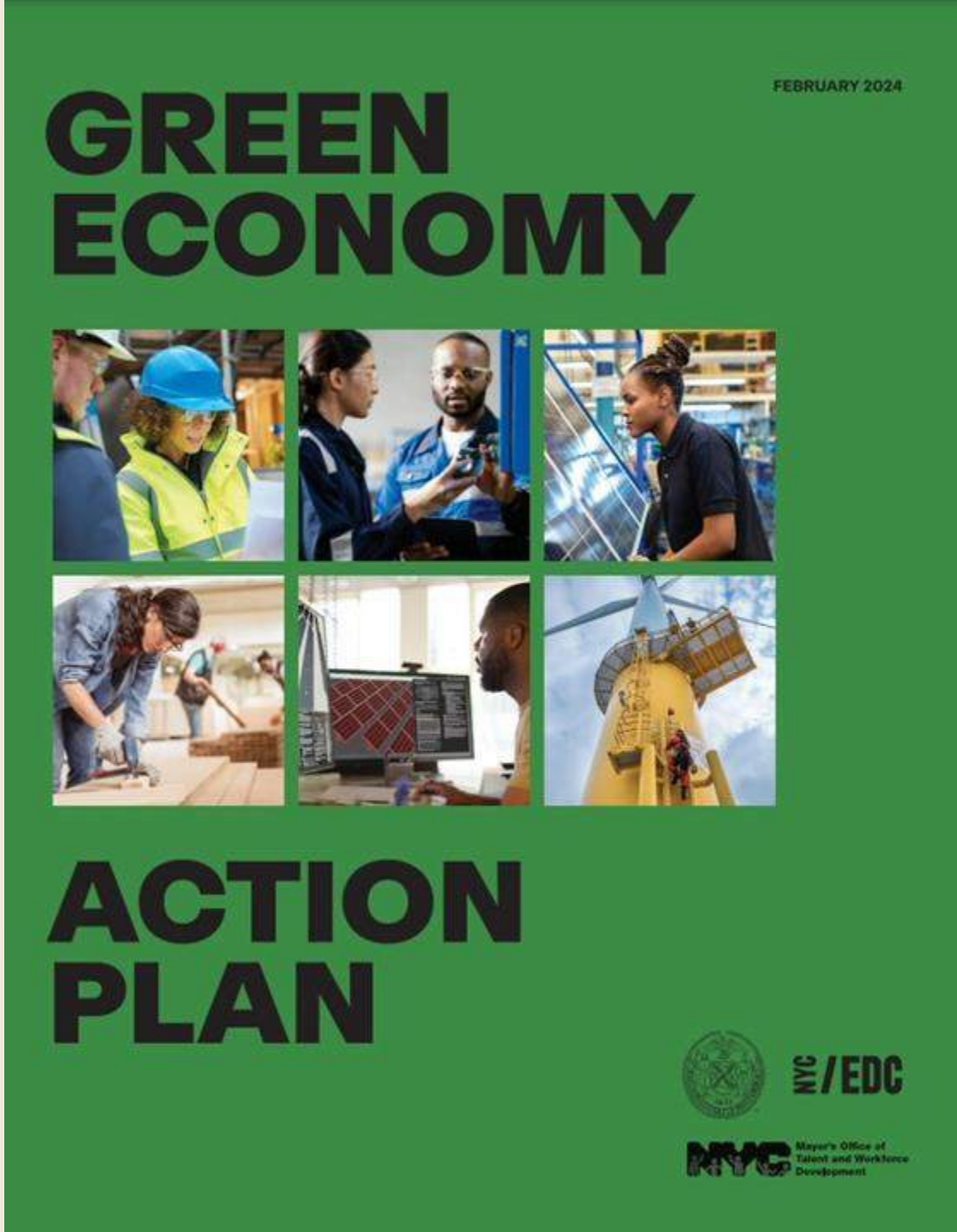
$9B capital budget

435 initiatives

$1B life sciences investment

$200M offshore wind investment

New York City's green economy will become the anchor of a prosperous, equitable, and just future for New Yorkers, while delivering the bold solutions needed to address climate change



NYCEDC Green Economy partners with public and private stakeholders to de-risk and scale emerging low carbon materials & technologies for the built environment

PILOT DEMOS IN LIVE URBAN ENVIRONMENTS

REGULATORY WAYFINDING & IMPLEMENTATION

SCALE ACROSS USE CASES VIA PROJECTS & PROCUREMENTS

STUDIO OVERVIEW

New York City must expand use of low carbon building materials, including mass timber, to reduce embodied carbon emissions for new buildings, infrastructure, and major retrofits.

Delivering successful mass timber projects requires critical considerations of code compliance, fire safety, and structural integrity to scale in NYC .

The **NYC Mass Timber Studio** is a Climate Innovation Program to provide grants, technical assistance and regulatory feedback to design and development teams working on NYC based projects.

BPL New Lots Branch by MASS Design & TYLin
Mass Timber Studio Cohort 1 Participants

STUDIO PARTNERS

Operators

NYC/EDC

NYC Mayor's Office of Climate & Environmental Justice

Advisors

WOODWORKS

AIA New York

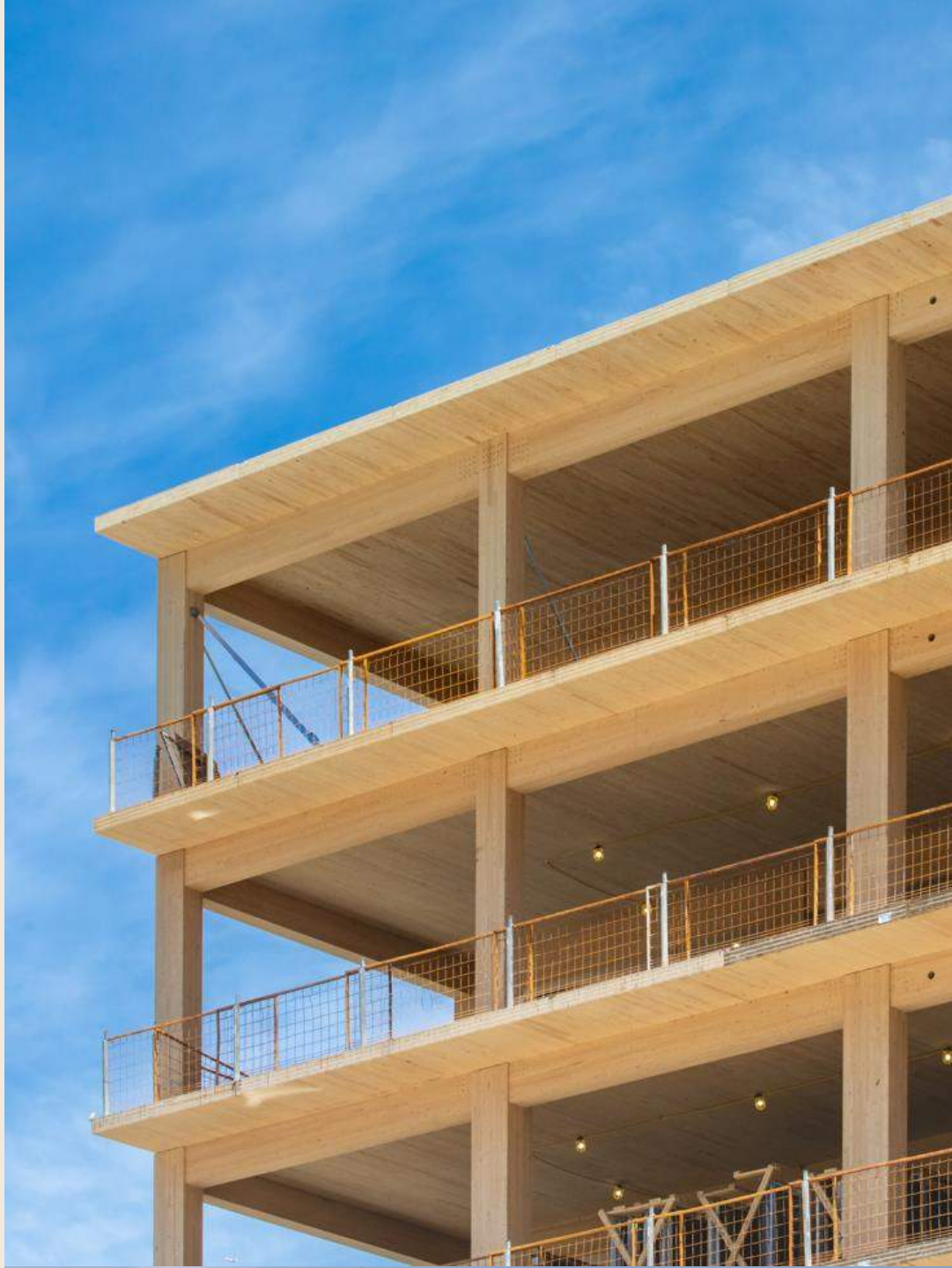
FIRE DEPARTMENT CITY OF NEW YORK

NYC Buildings

Funding Supporters

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

SLB® SOFTWOOD LUMBER BOARD



STUDIO OBJECTIVES

FOR PROJECT TEAMS

- **PROJECT SUPPORT**
  Advance feasibility, design and engineering of real-world mass timber projects in NYC.

- **REGULATORY NAVIGATION**
  Receive guidance on NYC's permitting, code and safety requirements for mass timber.

- **INDUSTRY CONNECTIONS**
  Engage with a network of technical experts, agency advisors and peers to build momentum and unlock deployment opportunities.

FOR NYCEDC

- **DEMONSTRATION PATHWAYS**
  Identify barriers and enablers to mass timber construction through hands-on project work.

- **POLICY & MARKET READINESS**
  Generate insights to inform local code updates, permitting guidance and decarbonization efforts.

- **SUPPLY CHAIN & INDUSTRY DEVELOPMENT**
  Lay the groundwork for a regional mass timber economy by creating demand signals and highlighting local project potential.

STUDIO THEORY OF CHANGE

[OH] Regulatory Office Hours

[TA] Technical Assistance

[SME] Subject-Matter Expert Workshops

KICK OFF

IDENTIFY DESIGN, REGULATORY, AND TECHNICAL FEASIBILITY FOCUS AREAS

INDUSTRY ROUNDTABLE #1

DESIGN & FEASIBILITY ANALYSIS CONTINUED, ESTABLISH REGULATORY PATH FORWARD

INDUSTRY ROUNDTABLE #2

FINAL REVIEW

STUDIO PROGRAMMING

WoodWorks providing Technical Assistance Sessions to discuss technical questions and review:

- Project overview and updates
- Grids and spans
- Acoustics
- Fire design
- Moisture protection
- Connecting the team with other mass timber experts
- Share lessons-learned

NYCDOB and FDNY holding monthly office hours for teams seeking responses to regulatory questions as they advance towards or work through permitting, including clarification on:

- Use of Structural CLT
- Concealed Spaces
- Lateral Systems and Structural Diaphragms
- Shafts
- Connections
- Penetrations

In June 2024, informed by the Studio, DOB published its first-ever Bulletin on mass timber—spurring conversation on mass timber code in practice

Current code revision process ongoing, via which DOB is pursuing potential code modifications

STUDIO COHORT 2 AT A GLANCE

8 active project teams across **5** NYC boroughs.

Represents over **800,000 square feet** of proposed mass timber development.

Mix of **public, residential, institutional, and community buildings**—from libraries and schools to affordable housing and civic pavilions.

Nearly **50%** of projects are publicly sponsored or community-serving, including parks, rec centers, and park pavilions.

Several projects are located in **environmental justice or under-resourced neighborhoods**.

Includes both **ground-up construction and adaptive reuse/addition projects**.



STUDIO PROJECTS

Walter Gladwin Recreation Center / Tremont, Bronx
Public project to construct a new mass timber recreation facility, bringing the Tremont neighborhood fitness amenities and community programming inclusive and accessible to all ages.

Stapleton Residential Development / Stapleton, Staten Island
EDC's first mass timber project, which will be the largest mass timber residential development in NYC. Artimus and Phoenix Realty Group will build 500+ mixed-income housing units, 25% of which will be affordable.

STUDIO PROJECTS

Brooklyn Public Library, New Lots / East New York, Brooklyn
Public project to replace the existing branch with a new library intending to use mass timber construction. The facility will include an educational and communal program to host classes, gatherings, and events.

New York Climate Exchange / Governors Island, New York
Largest mass timber commercial project in NYC on Governors Island – totaling more than 140,000 SF – to house its educational, research, and workforce development programming.

MASS TIMBER STUDIO

with NYC/EDC

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

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atelierjones llc

MASS TIMBER + | BOSTON, MA
30 OCTOBER 2025

atelierjones, llc

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atelierjones
mass timber work

2010-2025

CLTHOUSE,
SEATTLE, WA
2010-2015

CLTCHURCH,
BELLEVUE, WA
2013-2016

MASS TIMBER MODULAR
SCHOOLS, WASHINGTON
STATE LEGISLATIVE GRANT
2016-2017

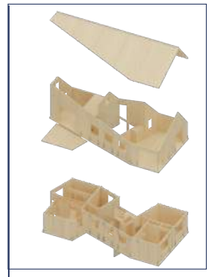
AIA RESEARCH AWARD
TALL TIMBER CODES
2016-2019

HEARTWOOD
SEATTLE, WA
FIRST TYPE-IV-C BUILDING
2019-2023

SIERRA HOUSES,
GREENVILLE, CA
FIRE-HARDENED MODULAR
MASS TIMBER
2021-2023

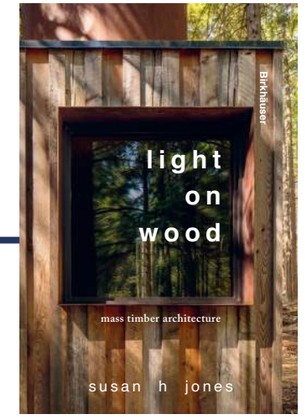
CLT HOUSE,
KENMORE, WA
2022-2025

ROUNDHOUSE,
GREENVILLE, CA
2023-2025



CLT HOUSE
SHORELINE WA
2023-2025

VENICE
BIENNALE
2025



DESIGN

2010 2013 2016 2018 2019 2020 2023 2025

RESEARCH

UNIVERSITY OF
WASHINGTON MASS
TIMBER STUDIOS
2013-2016

ICC TALL WOOD
BUILDING CODE
COMMITTEE
2016-2019

FIRE TESTS & RESEARCH,
ATF, WASHINGTON, DC
2017

MASS TIMBER
| DESIGN AND
RESEARCH, BY
SUSAN JONES
2018

TESTIFYING ICC NATIONAL
CODE HEARINGS
2018

2021 IBC ADOPTED
2019

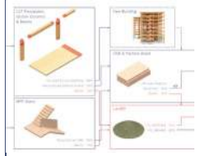
SIGNING WASHINGTON STATE
TALL WOOD CODES, 2019

FIRE TESTS &
RESEARCH,
RESEARCH INSTITUTE
OF SWEDEN
2020

WHOLE BUILDING LCA GRANT,
THE NATURE CONSERVANCY, UW,
FOREST PRODUCTS LAB
2018-2021

ICC G-147 PASSED,
100% EXPOSED
CEILINGS, TYPE IV-B
2022 + 2025

HEARTWOOD LCA
WITH END OF LIFE,
NET NEGATIVE GWP,
UNIVERSITY OF
WASHINGTON
2024



THERMALLY
MODIFIED CLT
DOD/UW/WSU/CRTC
2025

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MASS TIMBER STUDIO COMPONENTS

PROJECT IN NEW YORK CITY
REAL PROJECT | MASS TIMBER | ANY PHASE

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sageandcoombearchitects

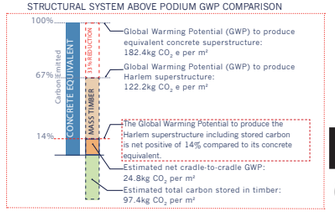
TEAM IN NEW YORK CITY
TEAMING ACCEPTABLE

NYC Buildings

WOODWORKS
WOOD PRODUCTS COUNCIL

MASS TIMBER CONSULTING
NYC DOB/WOODWORKS

COST ESTIMATE
COLLABORATION WITH CONTRACTOR AND MASS TIMBER SUPPLIER



LIFE CYCLE ASSESSMENT
OUTCOMES PER NYC TEMPLATE

VERTICALLY INTEGRATED TEAM

DEVELOPER	Magna & York
DESIGN ARCHITECT	atelierjones, llc
ARCHITECT OF RECORD	Sage and Coombe Architects
STRUCTURAL ENGINEER	DCI Engineers
GENERAL CONTRACTOR	Swinerton
MASS TIMBER FABRICATION	Timberlab
LIFE CYCLE ANALYSIS	DCI Engineers
ACOUSTICAL CONSULTANT	Pilteq Inc.

MICHAEL DWYER
Founder & CEO | Magna & York

SUSAN JONES, FAIA
Principal Architect | atelierjones

PETER COOMBE
Founder | Sage and Coombe Architects

ADAM JONGEWARD, PE SE
Structural Engineer | DCI Engineers

ANDREW PEARL
Vice President | Swinerton

TANYA LUTHI, PE
Director of Engineering | Timberlab

PROJECT DESCRIPTION

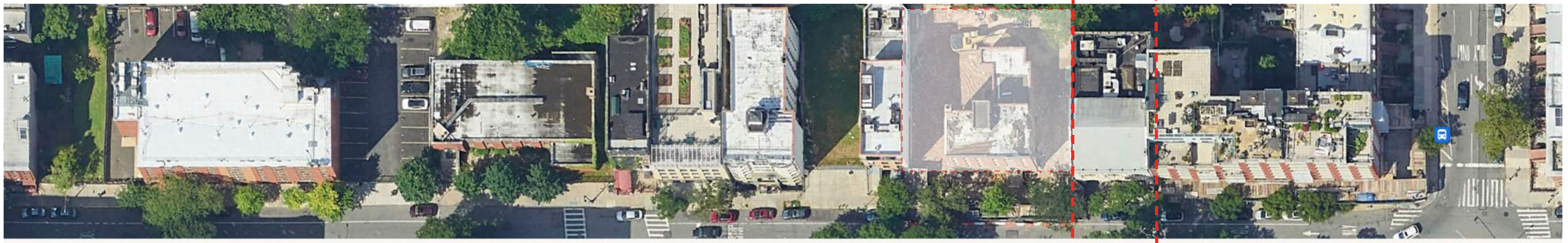
LOCATION	15-21 W 124th Street, New York, NY 10027
OWNER	Magna & York
PROGRAM & USE	Residential 35 Unit Apartment Building
HEIGHT	7 story | 75′
AREA	49,291 SF
PHASE	Design Development 50% completed
CURRENT STRUCTURAL SYSTEM	Concrete
PROPOSED STRUCTURAL SYSTEM	Cross-laminated Timber floors with Steel Stud Bearing Walls and Glulam Post-and-Beams

15-21 West 124th Street is a 7-story apartment building located in the heart of Harlem on a 10,000 square foot south-facing site overlooking Marcus Garvey Park. The project is approximately 50,000 GSF and includes 35 two- and three-bedroom units with ample amenity space. The site is directly adjacent to the Harlem branch of the New York Public Library to the east. The site is well-served with transit less than a 5-minute walk from multiple subway lines and adjacent to the 125th Street commercial core.

Early design emphasis was placed on ample green space, maximum light penetration, and healthful interiors. However, the owner's Swiss heritage and strong desire to create a meaningful, lower-carbon project pushed him to transition away from a concrete design and seek out a new AEC team to embrace and execute a legacy Mass Timber building that will shape Harlem innovatively, sequestering carbon for generations.

Demolition and clearing of the site is complete and the project is in Design Development and the project has received a parking waiver from the NY Planning Commission. The MTS grant tested the integration of the Mass Timber superstructure to the previous concrete design and found an estimated potential cost reduction of roughly $4.7million.

SITE



MT. MORRIS PLAZA SENIOR HOUSING

GREATER CALVARY BAPTIST CHURCH

41 W 124th St

HARLEM VILLAGE ACADEMIES HIGH

31 W 124th St

23 W 124th St

15 W 124th St

HARLEM LIBRARY

2002 5th Ave

5th Ave

LOWER CARBON PROGRAM

DECARBONIZING THE BUILDING PROGRAM

LOWER CARBON PROGRAM, BELOW GRADE STRUCTURE	Eliminate 10' Concrete Sub-Cellar Parking Level, Concrete Drive Entry + Steel Parking Lift. Zoning Amendment with CPC/City Council Process eliminated 17 car parking stalls
AMENITIES	Multi-Story Wooden Forum + Lobby Co-Working + Gym/Hoops + Dining + Rooftop Garden + Landscaped Gardens + Bike Parking + Storage Units
NEW GARDEN UNITS	Two new at-grade rear units facing garden, 35 units total
AREA REDUCED	Approx. 5,200 SF below grade concrete/excavation
NEIGHBORHOOD IMPACT	Quieter, less invasive construction, shorter duration, and a lower carbon, greener footprint — the first of its kind for Harlem.
LOWER CARBON STRUCTURAL SYSTEM	Cross-laminated Timber floors with Steel Stud Bearing Walls and Glulam Post-and-Beams
LOWER CARBON ACOUSTICAL ASSEMBLY	Recycled GWB Acoustical panels Genie-Board, subsituted for Gypcrete, non-combustible floor topping

VIEW UP ENTRY STAIR TOWARDS W. 124th FROM GARDEN COURTYARD

CELLAR LEVEL PLAN

DECARBONIZING THE BUILDING PROGRAM

PARKING	Eliminate 10' Concrete Sub-Cellar Parking Level, Concrete Drive Entry + Steel Parking Lift. Zoning Amendment currently proceeding through CPC/City Council Process to eliminate 17 car parking stalls.
AMENITIES	Multi-Story Wooden Forum + Lobby Co-Working + Gym/Hoops + Dining + Rooftop Garden + Landscaped Gardens + Bike Parking + Storage Units
NEW GARDEN UNITS	Two at-grade rear units facing garden
AREA REDUCED	Approx. 5,200 SF below grade concrete/excavation
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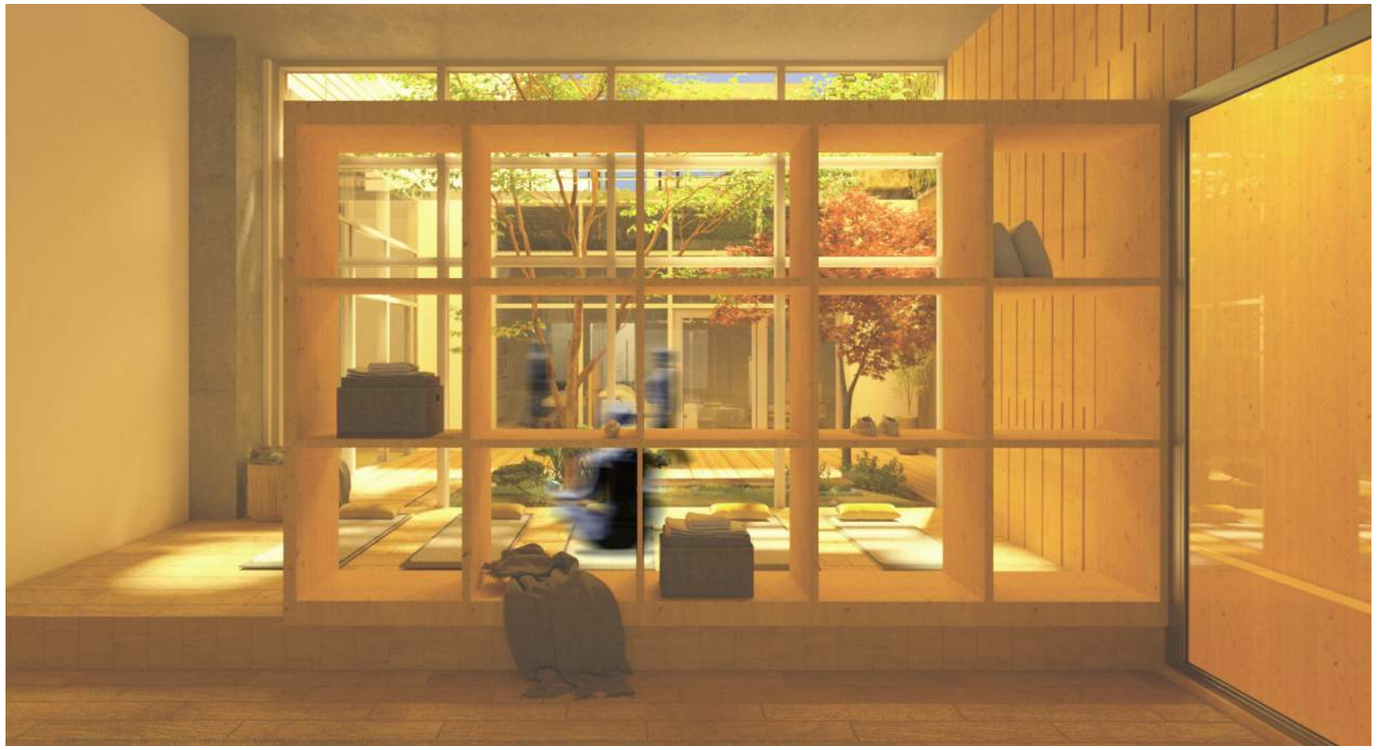
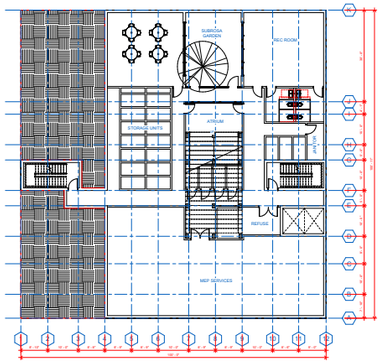


YOGA ROOM IN GARDEN COURTYARD



GROUND LEVEL PLAN

DECARBONIZING THE BUILDING PROGRAM

PARKING Eliminate 10' Concrete Sub-Cellar Parking Level, Concrete Drive Entry + Steel Parking Lift. Zoning Amendment currently proceeding through CPC/City Council Process to eliminate 17 car parking stalls.

AMENITIES Multi-Story Wooden Forum + Lobby Co-Working + Gym/Hoops + Dining + Rooftop Garden + Landscaped Gardens + Bike Parking + Storage Units

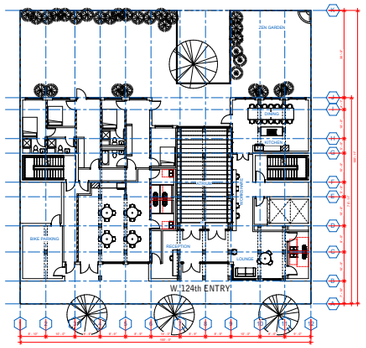
NEW GARDEN UNITS Two new at-grade rear units facing garden

AREA REDUCED Approx. 5,200 SF below grade concrete/excavation

NEIGHBORHOOD IMPACT Quieter, less invasive construction, shorter duration, and a lower carbon, greener footprint — the first of its kind for Harlem.

LOWER CARBON STRUCTURAL SYSTEM Cross-laminated Timber floors with Steel Stud Bearing Walls and Glulam Post-and-Beams on Ground and Cellar Level lobby/amenity spaces, Typical Residential Floors.

W. 124th ENTRY



COST ESTIMATES

EVOLVING CONCRETE TO MASS TIMBER

COMPARATIVE COST ESTIMATES

15-21 W. 124th Street project's 2022 cost estimate was approx. $28 M, using a concrete structure, and including below grade parking. The MTS Studio allowed us to:

- redesign based on eliminate the below grade parking
- reduce the overall square footage
- add two more units
- substitute mass timber for concrete structure where efficient and exposed

As part of the NYC/EDC Mass Timber Studio process, the NYC teams of Swinerton Construction and Timberlab led a full systems construction cost estimating process in June 2024, resulting in a $27.7M cost estimate for the 43,631 SF building. Applying industry standard escalation to the existing 2022 estimate to Q2/2024, the existing building came in at $32.5M resulting in a $4.7M savings, in large part due to the elimination of the parking garage. The Mass Timber had a negligible cost impact.

CONCRETE BUILDING
Q2 2024 ESCALATION,
INC. PARKING

$32,400,000

MASS TIMBER BUILDING
JUNE 26, 2024

$27,686,000

MAGNA & YORK
Harlem Multi-Family Apartments
Construction Services (Revised Estimate & Qualifications)

June 26, 2024

Mass Timber Studio Harlem

Estimate Version: Conceptual Estimate V1.0
Owner: Magna & York
Architect: atelierjones, LLC

SWINERTON

June 26, 2024

Description	15-21 W 124th St, Harlem - DD Estimate Escalated to Q2 2024, Parking Scopes Removed		Mass Timber Studio Harlem - Conceptual Estimate V1.0		Variance			
Uniformat Level 2 > Masterformat Level 1	46,686 gsf		43,631 gsf				(3,055) gsf	
	Amount	Cost/gsf	Amount	Cost/gsf	Quantity	Unit Price	Amount	Cost/gsf
A10 Foundations	$ 2,408,627	$ 51.59	$ 1,560,332	$ 35.76			$ (848,295)	$ (15.83)
A40 Slabs-On-Grade	$ 565,040	$ 12.10	$ 172,104	$ 3.94			$ (392,936)	$ (8.16)
B10 Superstructure	$ 3,177,249	$ 68.06	$ 3,456,935	$ 79.23			$ 279,686	$ 11.18
B20 Exterior Vertical Enclosures (Walls)	$ 3,654,050	$ 78.27	$ 2,812,933	$ 64.47			$ (841,117)	$ (13.80)
B30 Exterior Horizontal Enclosures (Roof)	$ 1,170,033	$ 25.06	$ 848,093	$ 19.44			$ (321,940)	$ (5.62)
C10 Interior Construction	$ 2,659,807	$ 56.97	$ 1,603,872	$ 36.76			$ (1,055,935)	$ (20.21)
C20 Interior Finishes	$ 2,229,953	$ 47.76	$ 1,684,145	$ 38.60			$ (545,808)	$ (9.17)
D10 Conveying	$ 787,392	$ 16.87	$ 752,000	$ 17.24			$ (35,392)	$ 0.37
D20 Plumbing	$ 1,717,361	$ 36.79	$ 1,510,100	$ 34.61			$ (207,261)	$ (2.17)
D30 Heating, Ventilation, and Air Conditioning (HVAC)	$ 1,939,816	$ 41.55	$ 1,723,680	$ 39.51			$ (216,136)	$ (2.04)
D40 Fire Protection	$ 667,684	$ 14.30	$ 425,000	$ 9.74			$ (242,684)	$ (4.56)
D50 Electrical	$ 1,666,127	$ 35.69	$ 1,735,800	$ 39.78			$ 69,673	$ 4.10
D60 Communications	$ 316,494	$ 6.78	$ 334,000	$ 7.66			$ 17,506	$ 0.88
D70 Electronic Safety and Security	$ 187,046	$ 4.01	$ 162,539	$ 3.73			$ (24,507)	$ (0.28)
E10 Equipment	$ 427,222	$ 9.15	$ 286,625	$ 6.57			$ (140,597)	$ (2.58)
F30 Demolition								
G10 Site Preparation								
G20 Site Improvements	$ 502,523	$ 10.76	$ 475,986	$ 10.91			$ (26,537)	$ 0.15
G30 Liquid and Gas Site Utilities	$ 49,827	$ 1.07	$ 75,000	$ 1.72			$ 25,173	$ 0.65
Z10 General Requirements	$ 854,901	$ 18.31	$ 1,369,998	$ 31.40			$ 515,097	$ 13.09
Direct Cost Subtotal	$ 24,981,152	$ 535.09	$ 20,989,143	$ 481.06			$ (3,992,009)	$ (54.03)
Make Ready Staffing	$ 161,730	$ 3.46	-				$ (161,730)	$ (3.46)
General Conditions	$ 2,004,382	$ 42.93	$ 2,223,202	$ 50.95			$ 218,820	$ 8.02
General Requirements	$ 663,455	$ 14.21	$ 601,725	$ 13.79			$ (61,730)	$ (0.42)
Preconstruction Services	-		$ 163,050	$ 3.74			$ 163,050	$ 3.74
General Conditions & Requirements	$ 27,810,719	$ 595.70	$ 23,977,120	$ 549.54			$ (3,833,599)	$ (46.15)
Estimating Contingency	$ 1,762,351	$ 37.75	$ 1,049,457	$ 24.05	- %	-	$ (712,894)	$ (13.70)
Adjustment for Eliminated Parking	$ (995,735)	$ (21.33)	-				$ 995,735	$ 21.33
General Contractor Contingency	$ 1,287,872	$ 27.59	$ 1,104,610	$ 25.32	- %	-	$ (183,262)	$ (2.27)
Contingencies	$ 29,865,206	$ 639.70	$ 26,131,187	$ 598.91			$ (3,734,019)	$ (40.79)
General Liability Insurance	$ 1,233,646	$ 26.42					$ (1,233,646)	
OCIP Gap Insurance			$ 276,152	$ 6.33			$ 276,152	
Subcontractor Default Insurance	-		$ 241,375	$ 5.53	1.15 %	-	$ 241,375	$ 5.53
Builders Risk	-		-		- %	-	-	-
Performance & Payment Bond (By Owner)	-		-		- %	-	-	-
Insurances	$ 31,098,852	$ 666.13	$ 26,648,714	$ 610.77			$ (4,450,137)	$ (55.35)
Contractor Overhead and Profit	$ 1,287,872	$ 27.59	$ 966,534	$ 22.15	(0.50) %	-	$ (321,338)	$ (5.43)
Taxes	-						-	
Fee & Taxes	$ 32,386,724	$ 693.71	$ 27,615,248	$ 632.93			$ (4,771,476)	$ (60.79)
GRAND TOTAL	$ 32,386,724	$ 693.71	$ 27,615,248	$ 632.93			$ (4,771,476)	$ (60.79)

COMPARATIVE LCA RESULTS

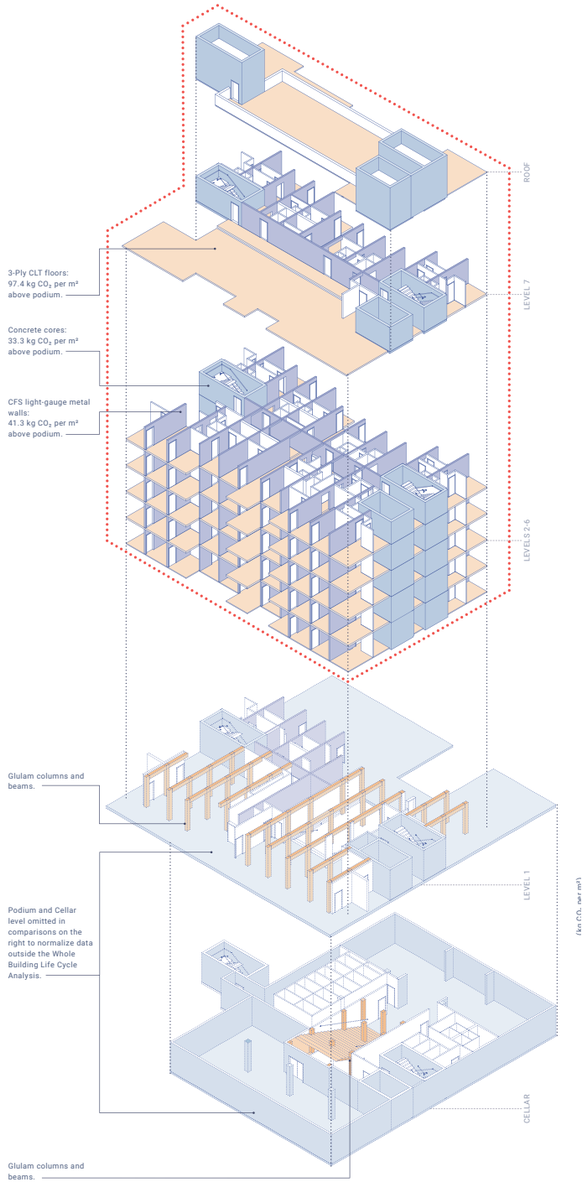
LOWER CARBON SUPERSTRUCTURE

The NYC/EDC Mass Timber Studio required that the team produce at least one comparative LCA between the mass timber structure and a conventionally constructed equivalent structure. Leading the modeling process, using the existing DD-level design for the building, as the comparative structure, atelierjones created two equivalent structures, one in wood, one in concrete. with support from our industry partner, Pliteq Engineering, DCI Engineers led three LCA analyses using the software program One-Click on three different scenarios, one, including the entire Whole Building LCA, including the Building Enclosure, the second, Structure only, including the below grade foundation and parking structure, and the third, including only the structure, above the podium level.

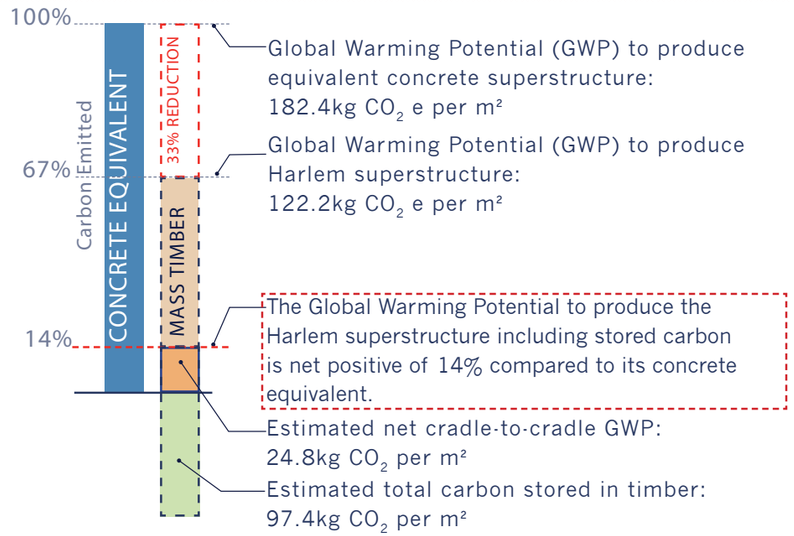
Following the LCA reporting templates supplied by NYC/EDC, the following results were achieved:

33% Lower Upfront Carbon Mass Timber Superstructure vs. Concrete Equivalent Superstructure above the podium

86% Lower Carbon Mass Timber Superstructure vs. Concrete Equivalent Superstructure above the podium, including Stored Carbon in the Mass Timber



STRUCTURAL SYSTEM ABOVE PODIUM GWP COMPARISON



L C A /DESIGN IMPACTS: DRY ASSEMBLIES

FLOOR ACOUSTIC ASSEMBLY OPTION

In addition to the comparative analysis of a concrete building to mass timber, the team further studied the impacts of using an alternative, dry-assembly in-lieu of traditional gypcrete topping. The dry-assembly material used was GenieBoard by Pliteq, a gypsum fiberboard subfloor panel made from 90% recycled content.

9% 3-Ply CLT Model, projected GWP Reduction for GenieBoard vs. Gypcrete (970,150.6 kg CO_2 per m²).

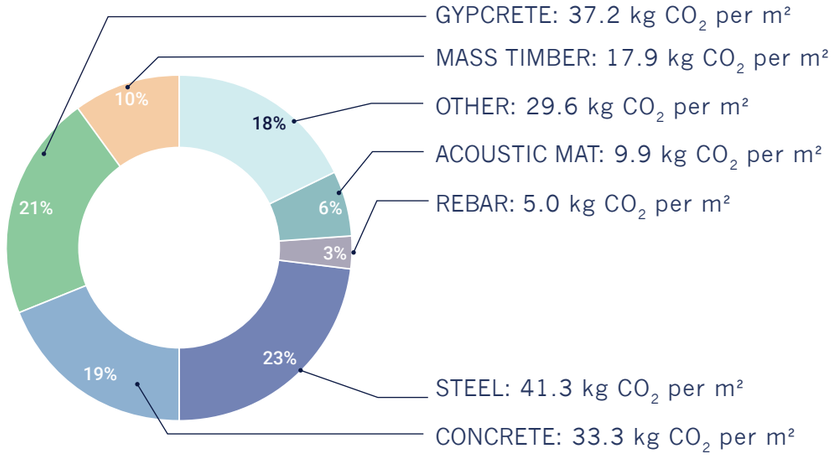
This comparative study was carried further by also studying the assemblies in varying structure of 3-Ply to 5-Ply CLT, as the lesser weight of the dry-assembly reduced the structural impact by roughly 10 psf at each floor.

11% 5-Ply CLT Model showed a 2.5% reduction (1,037443.1 kg CO_2 per m²).
11% reduction for Genieboard vs. Gypcrete (950,802.8 kg CO_2 per m²)

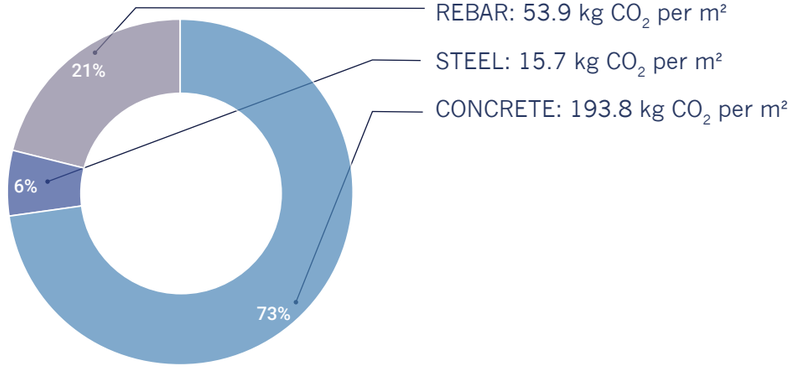
Assumes a baseline value of 1,063,220.7 kg CO_2 per m² (for structure only above podium and not including comparable enclosure) in the 3-Ply design.

STRUCTURAL SYSTEM ABOVE PODIUM RESOURCE TYPE COMPARISON

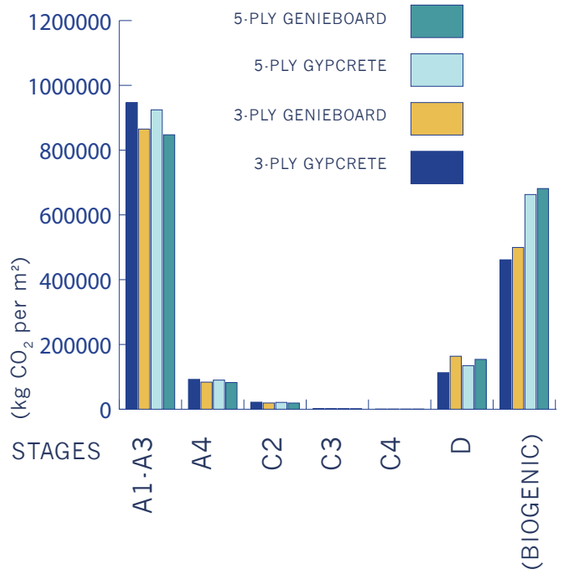
MASS TIMBER BUILDING (3-PLY GYPCRETE)



CONCRETE BUILDING



MASS TIMBER ACOUSTIC/NON-COMBUSTIBLE TOPPING ALTERNATIVE LCA COMPARISONS



LOWER CARBON STRUCTURE

HYBRID: MASS TIMBER + COLD FORMED STEEL (CFS) BEARING WALLS

HYBRID SYSTEM | OPTIMIZING UNITS

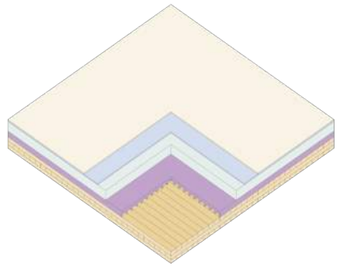
Evolving both the structural system and the units to change in tandem with each other allowed both to work without having to flex too far as to break. Taking cues from the inherited design, that interior spaces wanted to be spaced at a rhythm of 8'-10' and that units were roughly 20'-25' deep, the team explored using a Steel Stud Bearing Wall structural system, thereby saving not only cost for the project but also critical square footage in the plan and section.

Additionally, this choice gave the flexibility of allowing the units and grids to shift off-axis where or when necessary, more easily than would be in a post-and-beam scenario. Further flexibility was also available in that post-and-beams could be inserted to work in conjunction with adjacent bearing walls in areas that either required more open spans, or in areas where it was desirable to use more wood for aesthetics, such as in the lobby and atrium FORUM areas.

CFS FRAME RESIDENTIAL FLOORS

GLULAM POST AND BEAM ENTRY/ AMENITY FLOORS

CLT + LOWER CARBON ACOUSTICAL ASSEMBLY



COMMUNAL KITCHEN LOOKING OUT TO COURTYARD

NYC DOB INPUT ON DRAFT 2024_004 TECHNICAL BULLETIN

-- 1+1 CONCEALED SPACES REGULATIONS

REDUCE SOFFITS/CONCEALED SPACES
MEP/FLS EFFICIENCY +
EXPOSE MAXIMUM WOOD CEILINGS +

REDUCE USE OF GYPSUM WALL BOARD SOFFITS

The programming and grid redesign also reduced the soffit area as much as possible and condensed the required soffit area as close as possible to the central core and hallway of the building.

This approach reduced the impact of GWB on the LCA, as well as reduced the cost impact of NYC's current building code requirement of 1+1 protection methods for concealed spaces in mass timber.

-- 1 HR INTERIOR WALL REQUIREMENT

NOT REQUIRED FOR IBC 2021/2024 CODES
BUT REQUIRED IN NYC DOB

-- ALLOWABLE HEIGHTS FOR MASS TIMBER IN NYC

NOT PER IBC 2021/2024 CODES

atelierjones llc

10th May, 2024

Keith Wen
Assistant Commissioner
Code and Zoning Interpretation
New York City Department of Buildings

RE: 2024-0xx Technical Bulletin Draft on Section BC 602.4

Mr. Wen,

Thank you for developing the referenced technical bulletin and allowing the opportunity to review and provide comments on NYC's approach to building code for Mass Timber. It is a pleasure and honor to be involved in such important innovation. Within this bulletin are two primary areas of concern that we would like to evolve further — Concealed Spaces and Interior Wall construction.

Many of our colleagues and friends in the industry have provided admirable feedback on the concealed space allowance and how NYC might best and appropriately adjust its code language as outlined in the bulletin to better align with existing IBC to promote and permit the continued growth of mass timber in NYC, and we echo their concerns and recommendations. However, of equal or greater concern for us is the limitations placed in the code on interior wall construction within the outlined Type IV for NYCBC.

The requirement that all interior walls are to be 1-hr rated construction at minimum when not constructed with allowable mass timber design per the outlined chapter of BC 2304.11.2.2 (reference section VII of the bulletin) is an stringent requirement that is divergent from the development of mass timber design as outlined in the current IBC cycle. This requirement seems to have arisen as a consequence of NYC not adopting the IBC changes which introduced the new building types of Type IV-A, -B, and -C such that the NYCBC is now limited by referencing only the previous (and current) requirement that still states that Type IV Heavy Timber interior nonload-bearing walls and partitions must be of 1-hr rating.

In comparison, the 2021 and 2024 IBC allows interior nonload-bearing walls and partitions under Type IV-A, -B, and -C to be of mass timber construction *or* of 0-hr noncombustible material (where not otherwise provisioned in separate areas

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BUILDINGS
2024-004
BULLETIN
TECHNICAL

ISSUANCE DATE
June 5, 2024

NYC Buildings

ISSUER: **Keith L. Wen, R.A.**
Assistant Commissioner
Code & Zoning Interpretation

PURPOSE: This Bulletin provides clarification to the specific requirements of Section BC 602.4 regarding mass timber construction.

SUBJECT(S): Solid wood, Glue-laminated timber (glu-lam), Structural composite lumber (SCL), Cross-laminated timber (CLT), Concealed spaces, Mass timber, Type IV-HT, Type IV, Heavy timber, interior walls and partitions

RELATED CODE SECTIONS & RESOURCES
2022 BC 602.4, 2022 BC 718, 2022 MC 602, 2021 IBC 602.4.4.3

I. BACKGROUND

The 2022 NYC Building Code allows the use of mass timber materials, including cross laminated timber (CLT) and structural composite lumber (SCL) to be categorized as Type IV construction, in addition to solid wood, glue-laminated timber, and heavy timber (HT), which have been allowed in previous NYC Building Codes. Mass timber construction is categorized as Type IV construction and can include the building elements described above or a combination of those elements.

Section BC 602.4 outlines several conditions for Type IV construction. This bulletin provides clarification regarding the specific requirements of this section. Other methods of complying with Section BC 602.4 that are not addressed in the bulletin will be reviewed on a case-by-case basis through the Department's determination process.

II. MASS TIMBER MUST BE FILED AS TYPE IV CONSTRUCTION

The 2022 NYC Construction Codes include provisions that specifically address the unique characteristics of Type IV construction in New York City. The requirements are intended to provide a greater degree of safety in relation to relatively new materials and construction methods. These requirements include but are not limited to special inspections and construction site safety provisions. To ensure that the relevant provisions are applied, any building using mass timber elements must file the building as Type IV construction.

Mass timber buildings that are filed as other construction types will be subject to audits and may trigger the need to be re-filed as Type IV construction.

NOTE: Type IV construction projects that are professionally certified are subject to review by the Department.

III. CONCEALED SPACES IN TYPE IV CONSTRUCTION

Section BC 602.4 states, in part, as follows with emphasis added:

NYC MTS IMPACT

MT. MORRIS PLAZA SENIOR HOUSING

GREATER CALVARY BAPTIST CHURCH

41 W 124th St

HARLEM VILLAGE ACADEMIES HIGH

31 W 124th St

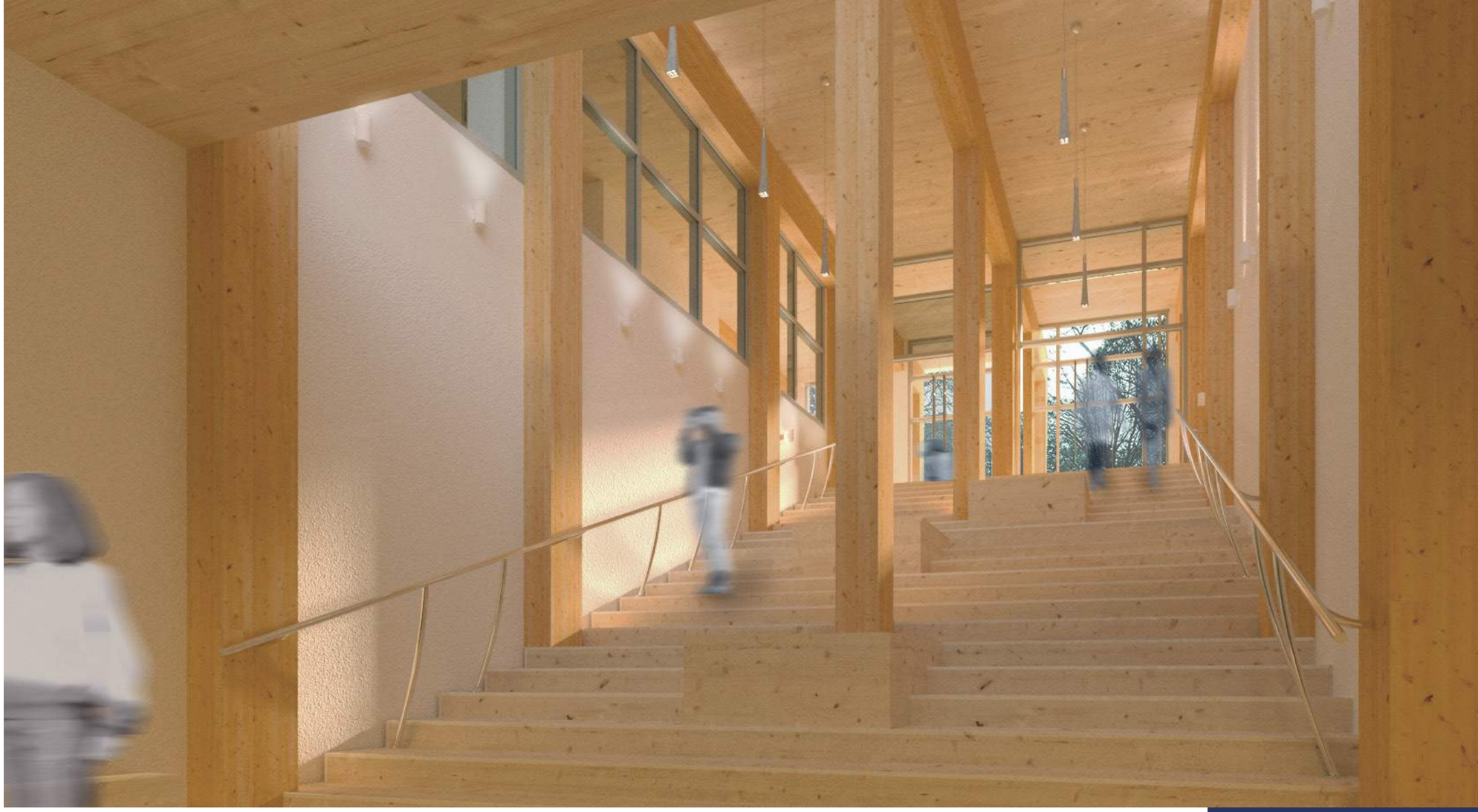
23 W 124th St

15 W 124th St

HARLEM LIBRARY

2002 5th Ave

5th Ave



MASS TIMBER STUDIO

with NYC / EDC

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MASS TIMBER + | BOSTON, MA
30 OCTOBER 2025

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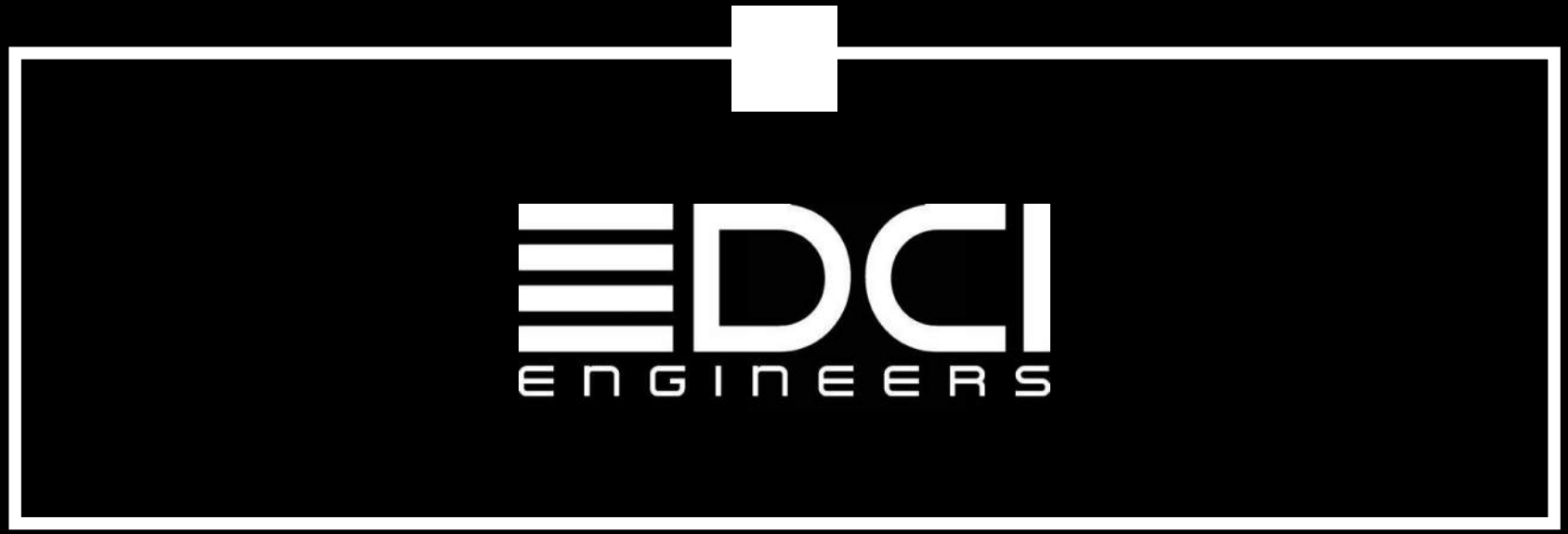


NEW YORK CITY MASS TIMBER STUDIO: LCA CASE STUDY FOR UTILIZING MASS TIMBER IN HARLEM

ARIZONA DABRUSIN, PE, LEED AP BD+C
DCI ENGINEERS

CONCRETE VS. MASS TIMBER **DESIGN COMPARISON**

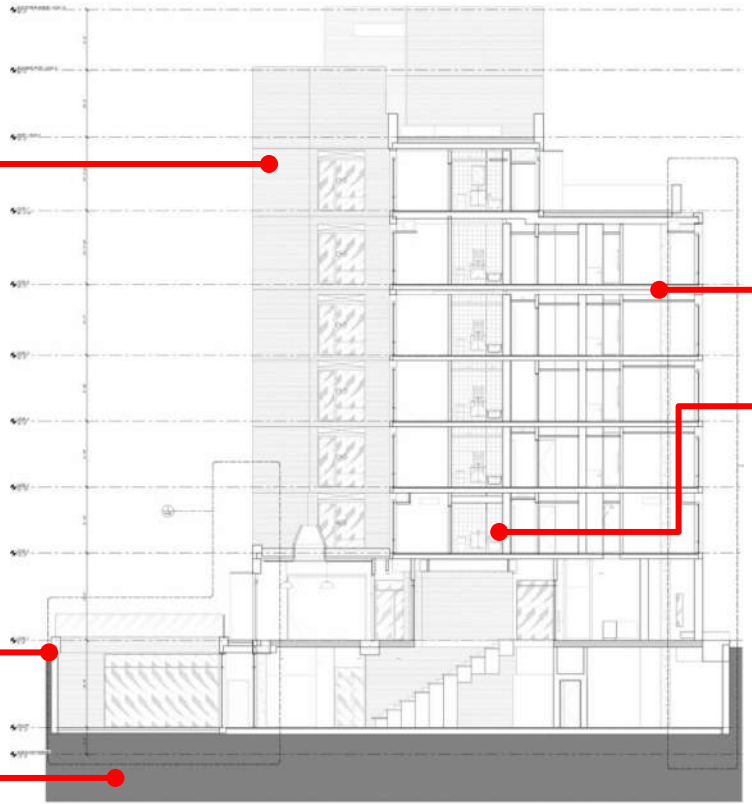
SECTION DIAGRAM THROUGH ATRIUM

ALL-CONCRETE **SCENARIO**

Concrete Shear Wall Lateral System

Concrete Basement Walls

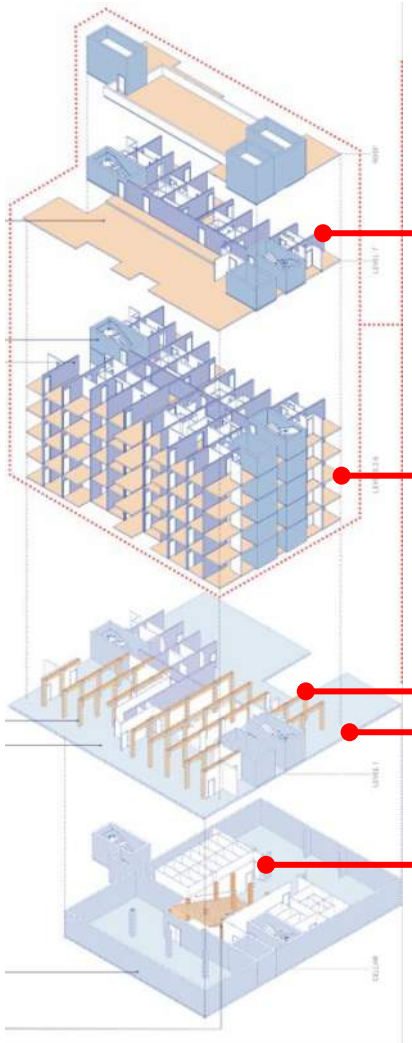
Concrete Mat Slab Foundation



8-12” Mild-reinforced Concrete Slabs

16”x16” Concrete Columns, Typical

MASS TIMBER **SCENARIO**



3-ply CLT w/ Gypcrete Topping,
6” Cold-Formed Steel Stud Walls,
Typical at Residential Levels

Glulam Beams and Columns
at Level 2, Atrium

12” Mild-reinforced Concrete Slab
at Ground Level

18”x18” Concrete Columns,
Only Basement Level

LCA **METHODOLOGY**

LCA info required by NY Mass Timber Studio:

- Structure and enclosure reported separately
- EPDs based off industry averages set by 2023 CLF North American Baseline Guide, except Pliteq product specific
- 60-year building lifespan

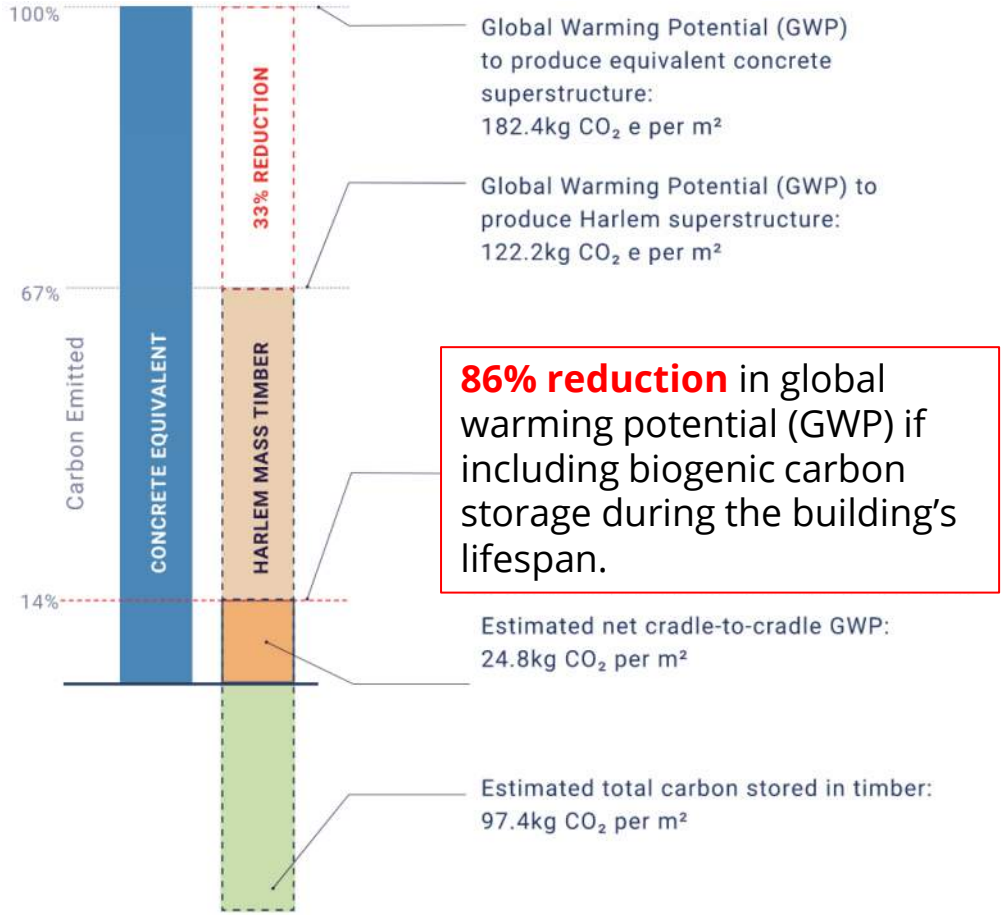
One Click LCA software

Biogenic carbon reported separately and only considered as benefit during building lifespan

LCA **RESULTS**

33% reduction in global warming potential (GWP) from Mass Timber Hybrid design over the Concrete equivalent, for superstructure and enclosure above podium.

28% reduction for whole building, including the podium/basement.



86% reduction in global warming potential (GWP) if including biogenic carbon storage during the building's lifespan.

FLOOR ASSEMBLY COMPARISON

Study began with **8 inch concrete slab vs. 3-ply CLT** topped with 3” gypcrete

Expanded the study to include **5-ply CLT** topped with 2” gypcrete, and **genieboard** in lieu of gypcrete

Goal was to understand impacts of **dry vs. wet assembly** on emissions, acoustics, and fire code

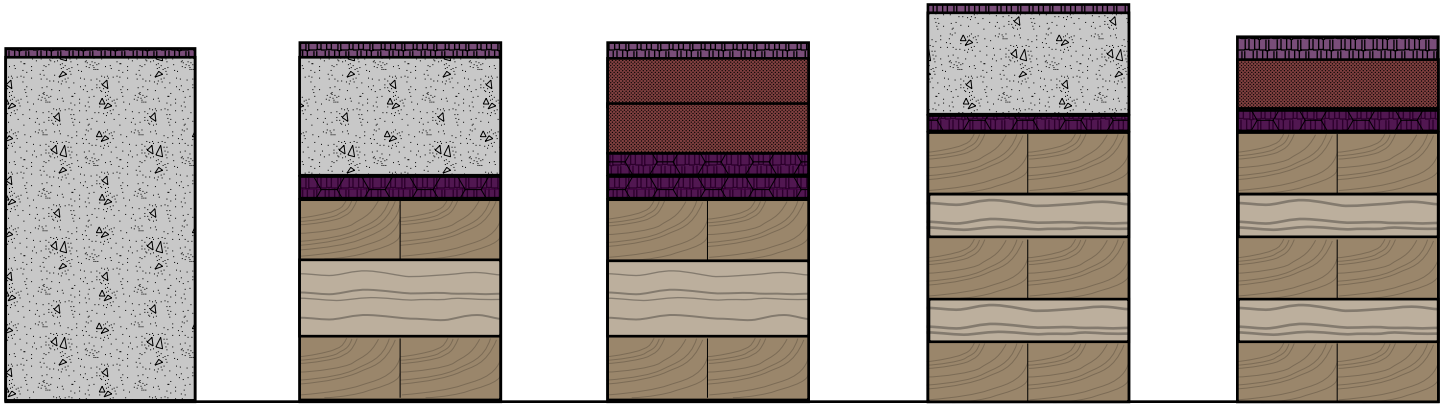
CONCRETE:
8 5/64"
THICKNESS

3-PLY GYPCRETE:
8 5/16"
THICKNESS

3-PLY GENIEBOARD:
8 5/16"
THICKNESS

5-PLY GYPCRETE:
9 5/16"
THICKNESS

5-PLY GENIEBOARD:
8 3/4"
THICKNESS



GENIEMAT RST02

8” CONCRETE

GENIEMAT RST05

3” GYPCRETE

GENIEMAT FF25

3-PLY CLT

GENIEMAT RST05

(2-LAYER)
GENIEBOARD 302

(2-LAYER)
GENIEMAT FF25

3-PLY CLT

GENIEMAT RST02

2” GYPCRETE

GENIEMAT FF10

5-PLY CLT

GENIEMAT RST05

GENIEBOARD 302

GENIEMAT FF17

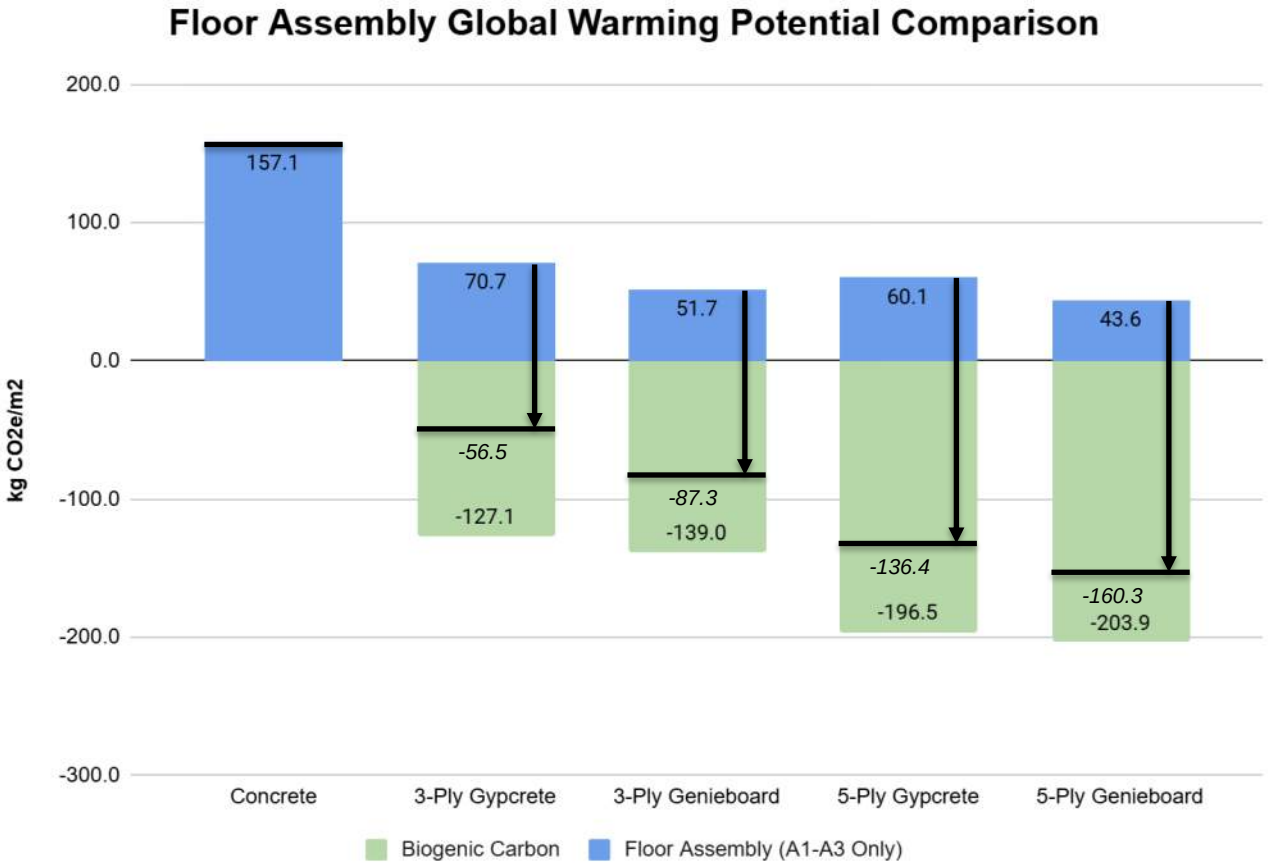
5-PLY CLT

FLOOR ASSEMBLY **TAKEAWAYS**

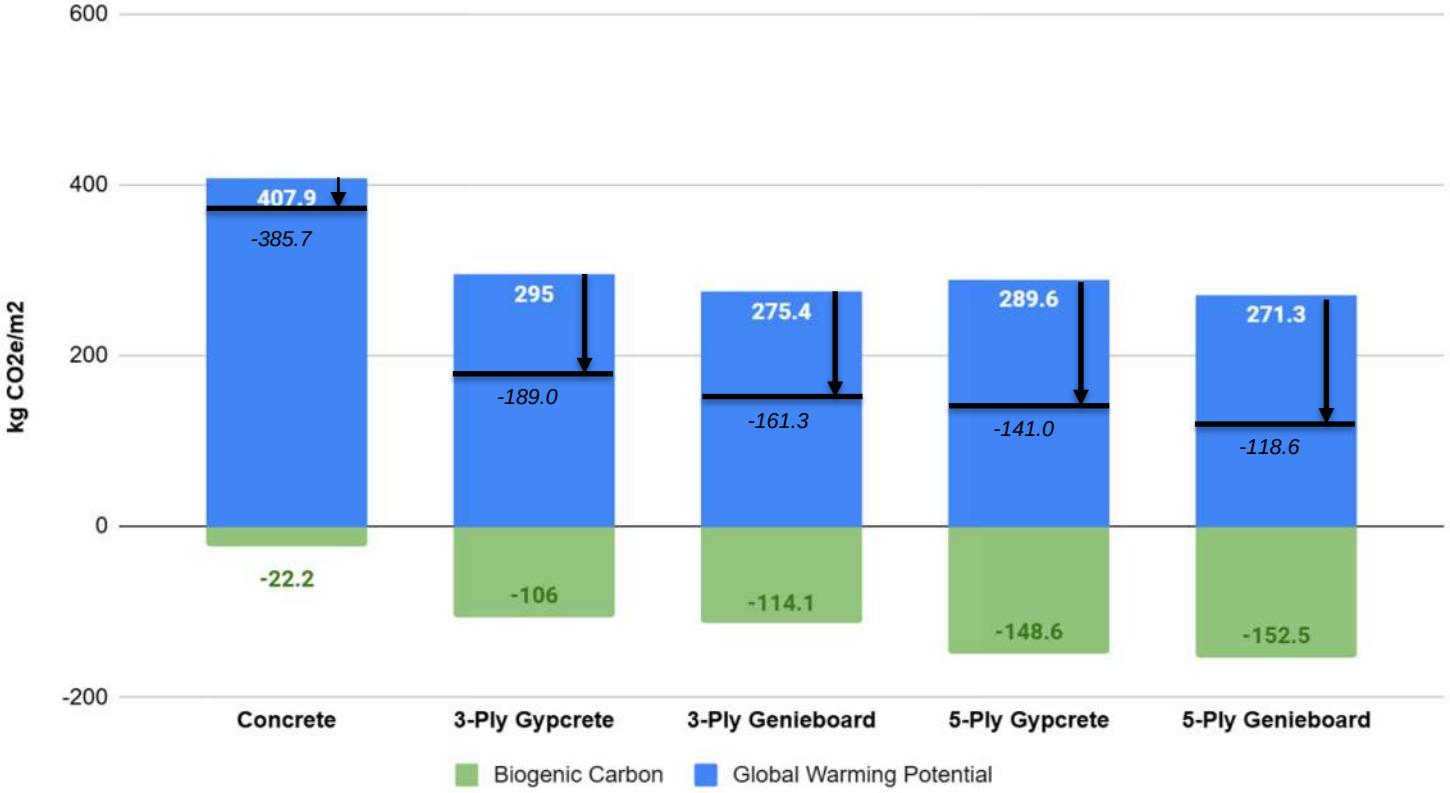
- Genieboard reduced the floor assembly weights by **10 psf,** culminating in a **16% reduction** in CFS wall mass and **10% reduction** concrete slab and foundations.
- An added layer of acoustic mat was required, but Genieboard contains recycled material and has low GWP intensity.
- Material saved: 58 cubic yard of concrete, 31.2 tons rebar, 13.2 tons cold-formed steel

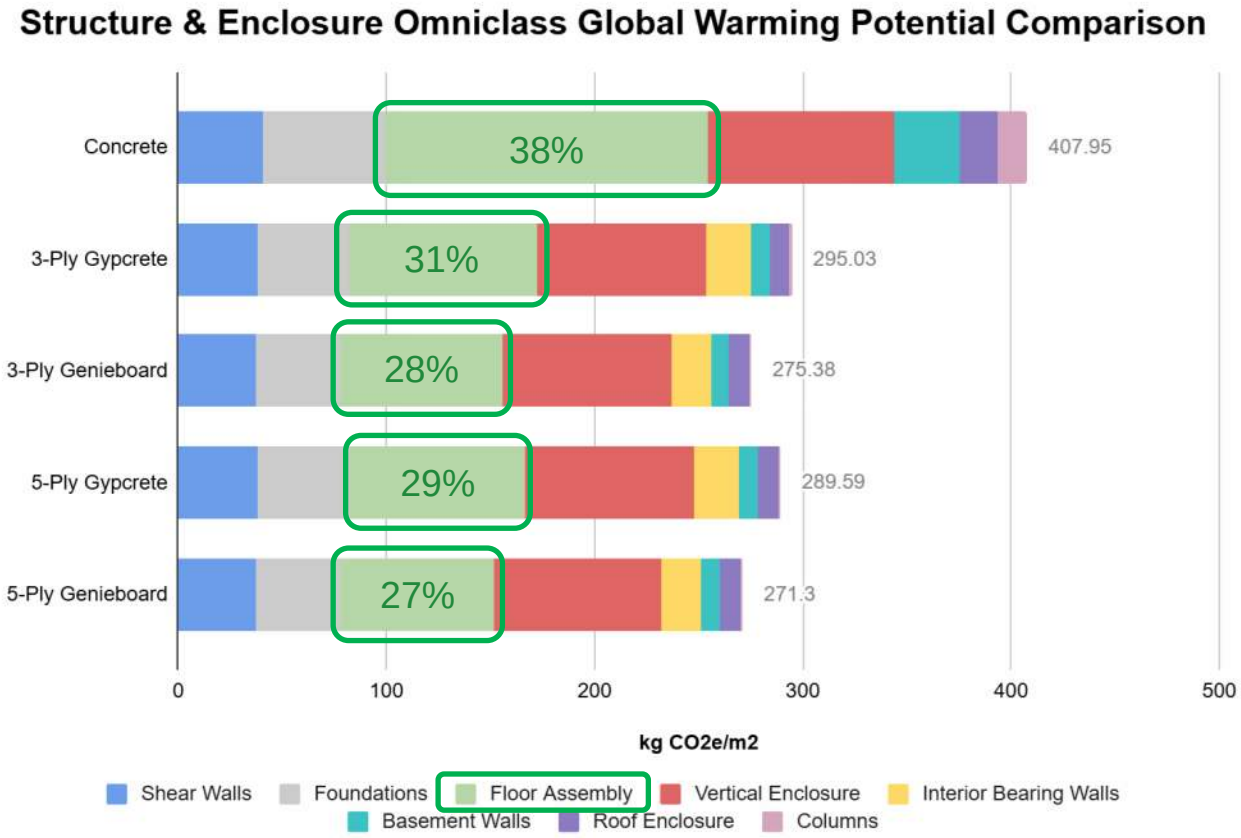
FLOOR ASSEMBLY **TAKEAWAYS**

- 5-ply CLT performance reduced the thickness of gypcrete and acoustic mat required, kept similar overall weight, but reduced GWP and increased biogenic carbon.
- The product has great acoustic and fire performance which helped maintain NYC 1+1 fire rating requirements.


Floor Assembly Global Warming Potential Comparison
200.0
100.0
0.0
-100.0
-200.0
-300.0
kg CO2e/m2
157.1
70.7
51.7
60.1
43.6
-56.5
-127.1
-87.3
-139.0
-136.4
-196.5
-160.3
-203.9
Concrete
3-Ply Gypcrete
3-Ply Genieboard
5-Ply Gypcrete
5-Ply Genieboard
Biogenic Carbon
Floor Assembly (A1-A3 Only)

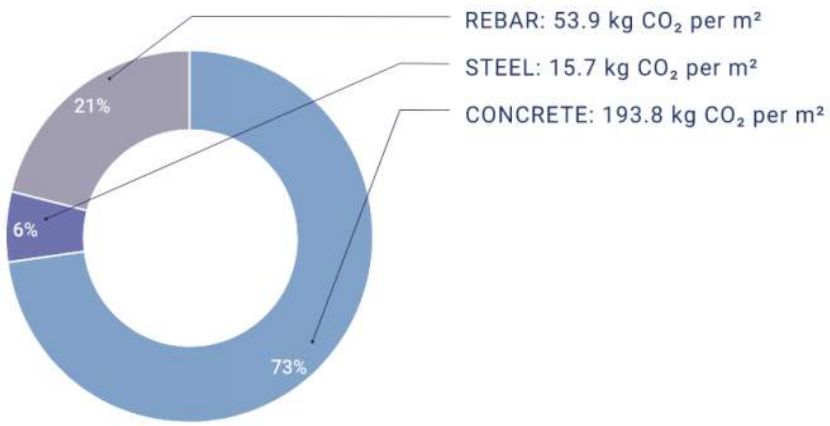
Structure & Enclosure Global Warming Potential Comparison



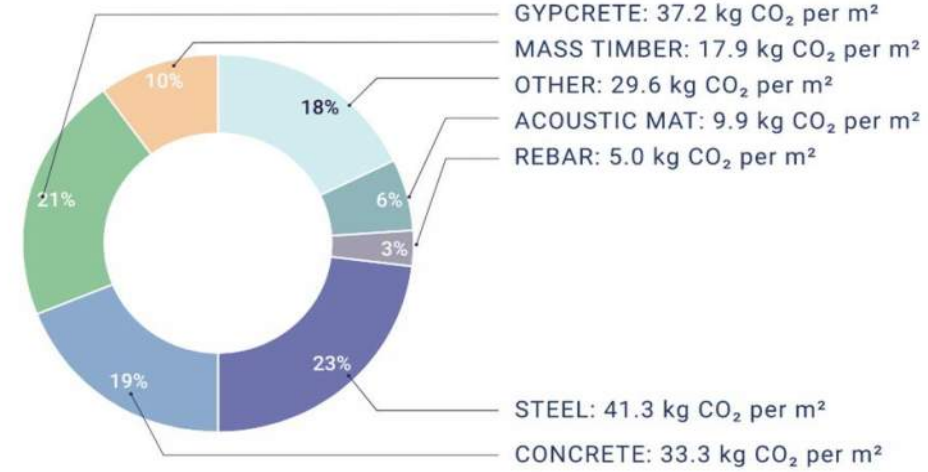

Structure & Enclosure Omniclass Global Warming Potential Comparison
Concrete
3-Ply Gypcrete
3-Ply Genieboard
5-Ply Gypcrete
5-Ply Genieboard
38%
31%
28%
29%
27%
407.95
295.03
275.38
289.59
271.3
0
100
200
300
400
500
kg CO2e/m2
Shear Walls
Foundations
Floor Assembly
Vertical Enclosure
Interior Bearing Walls
Basement Walls
Roof Enclosure
Columns

STRUCTURAL SYSTEM ABOVE PODIUM
RESOURCE TYPE COMPARISON

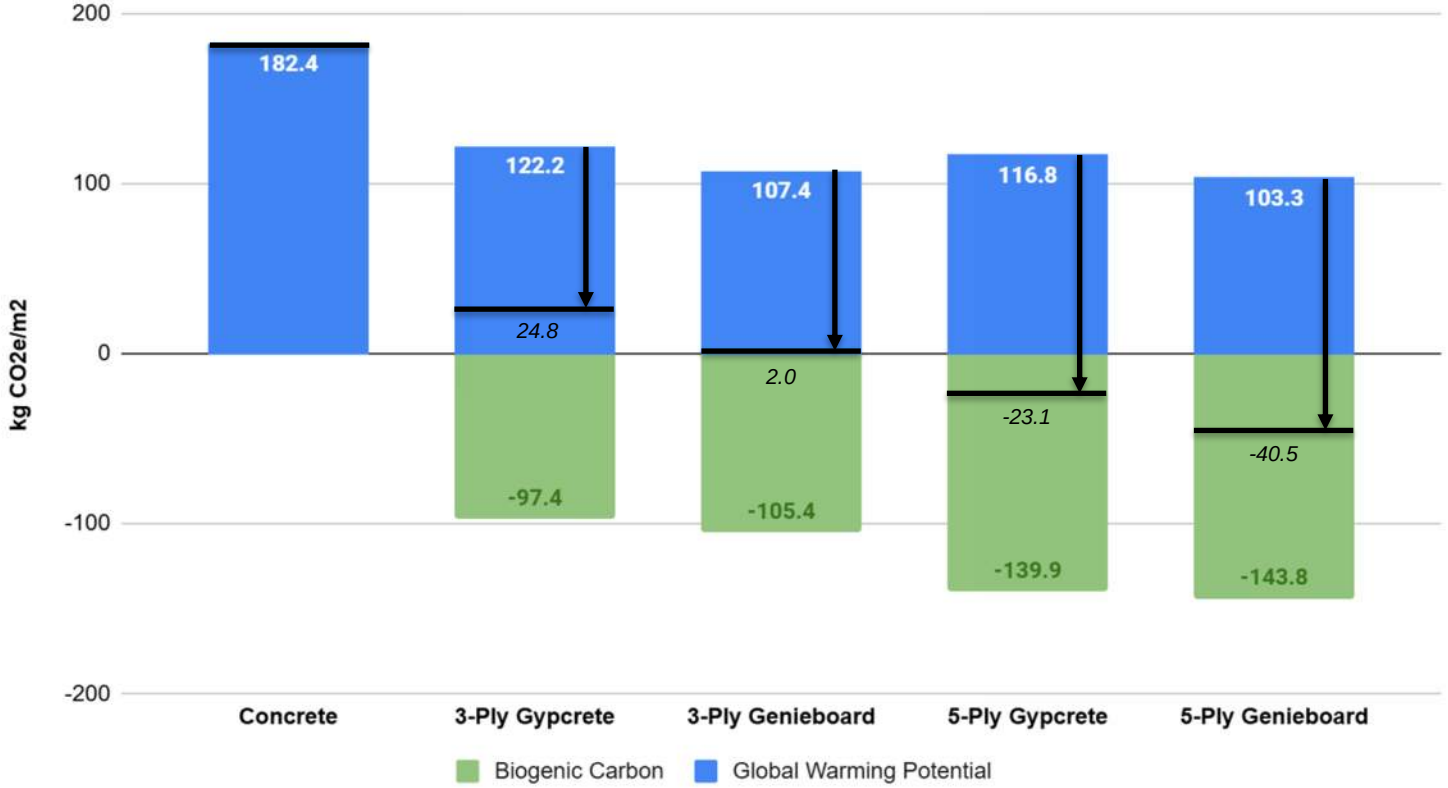
CONCRETE BUILDING



MASS TIMBER BUILDING (3-PLY GYPCRETE)



Structure Above Podium Global Warming Potential Comparison



LCA **RESULTS**

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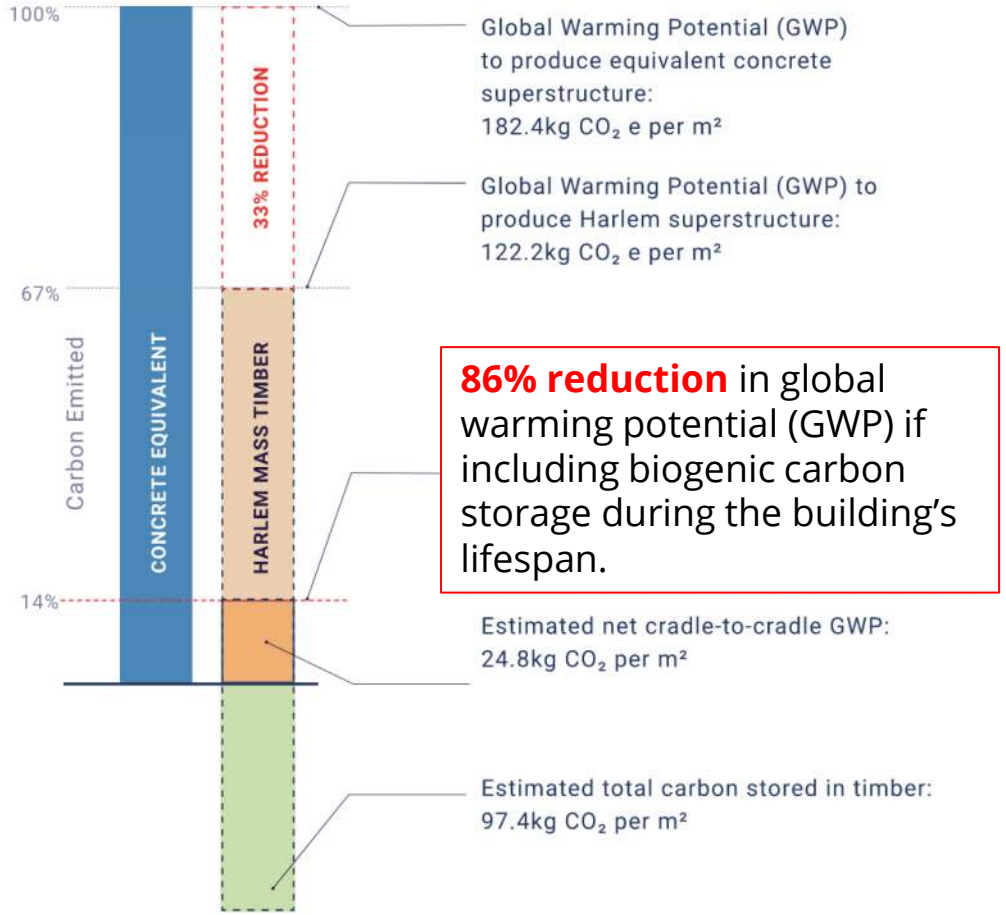

86% reduction in global warming potential (GWP) if including biogenic carbon storage during the building's lifespan.

COST COMPARISON **RESULTS**

CONCRETE BUILDING COST

$32.4 million

*Repriced by Swinerton to account for inflation and rising construction cost since original design

MASS TIMBER BUILDING COST

$27.6 million

=$4.8 Million in Savings

Biggest cost savings due to:

- Reduced foundations
- Prefabrication of CFS wall panels
- Reduced interior finishes for exposed CLT
- Insurance (OCIP vs. General Liability)

2 Additional Units!

OTHER **CONSIDERATIONS**

Mass Timber sourcing: study assumed European supplier, but could be procured from North American suppliers shown

CONCLUSION

- NY Mass Timber Studio Program offers a great pathway to **encourage and incentivize** owners and designers to explore **mass timber** and its embodied carbon impacts.
- Biogenic carbon storage is important, but so is **overall reduction of material**, **performance, occupant health, construction schedule**, and **cost**.
- **Early and consistent collaboration** across the team is crucial to realize the **full benefits** of mass timber design decisions.

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