



# 2023

SE 2050  
EMBODIED CARBON ACTION PLAN  
2023



GLOTMAN • SIMPSON



SERVANT LEADERSHIP  
 INTEGRITY  
 LOYALTY

IT'S AT OUR CORE

**Founded** on the west coast,  
**Glotman-Simpson** has fully  
 embraced the **innovative** side of  
 sustainable building **design.**

GREAT PEOPLE  
 PASSION  
 ALIGNMENT  
 COMMUNICATION

**2023 SUSTAINABILITY COMMITTEE**

Harrison Glotman, Principal      Rachelle Habchi, Director of Sustainability

Amin Sadeghi  
 Aniket Tolani  
 Brandon Schachter  
 Claire Dou  
 Cody Johnston

Dareen Thabet  
 Ehsan Dezhdar  
 Georgia Rea  
 Heather Stefaniuk  
 Kelsie Priest

Marcus Monk  
 Miguel Bilotta  
 Omar AlHarras  
 Parsa Taghvaei  
 Peter Atkinson

Rory Roberts  
 Ryan Nikiforuk  
 Sara Tam  
 Simran Surve  
 Steve Hou

OUR  
 MISSION

To the SE 2050 team and signatory firms,

Glotman Simpson is thrilled to present our SE 2050 ECAP for the year 2023.

In 2023, we made it a mission to keep our team of 100 at the forefront of sustainable building design research. Our dedicated efforts ensured that our team was not merely up to date with the latest developments but actively engaged in shaping a lower-carbon future. By fostering a culture of continuous learning, we are aligning ourselves as leaders in sustainable structural engineering.

Our commitment doesn't end within the confines of our firm, recognizing the importance of disseminating information to the broader community. In the last year, our team has diligently crafted educational content (such as blogs and bite-sized social media material), built from the findings of internal research reports. These recurring blog posts, endearingly and pun-ningly referred to as GSONTrack to keep us on track, break down complex sustainable design concepts, making sustainability not only more easily comprehensible but more compelling for the general public.

In our pursuit of continuously reducing embodied carbon in our designs, our Sustainability Committee has collaborated with our Automation and BIM teams to create innovative integrated technology tools for building design. These tools redefine possibilities for each of our projects' trajectory as they provide more information about embodied carbon and reduction strategies at initial phases of design and then, subsequently thereafter. They are instruments of engineering that have enabled us to set our own internal company-wide benchmark and will hopefully encourage other in the industry to pursue similar trajectories. Our achievements in 2023 are simply first the steps of a marathon, as we strive to reduce our emissions in compliance with the United Nations Intergovernmental Panel on Climate Change stated 1.5°C of warming. As more clients embrace principles of sustainable building design, more jurisdictions pass embodied carbon policies, and emerging technologies continue to make lower-carbon design more feasible, we are excited to rise to the challenge in these incredibly critical years.

As we navigate the trajectory towards carbon neutrality in 2050, we are committed to making exponential strides. Our vision is not just to meet industry standards but to redefine them. The challenges ahead are formidable, but so is our determination.

Here's to a more sustainable built environment, achieved through one innovation at a time.

**RACHELLE HABCHI**  
 Director of Sustainability

FRONT PAGE IMAGES:  
 GS VANCOUVER OFFICE  
 PROTOTYPE (VANCOUVER, BC)  
 843 N SPRING STREET (LOS ANGELES, CA)



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**Glotman•Simpson** has provided structural engineering consulting services for 60 years.

With over 5,000 projects completed to date in the areas of residential, commercial, industrial and institutional buildings.

For **60 years**, Glotman•Simpson has engineered some of North America’s most iconic structures. We believe that exceeding client expectations begins and ends with superior service. Our commitment to **creative** thinking and efficient structural **design** is representative of our dedication to creating value for our clients, and future generations.

Our firm currently retains a staff of 100 including 50 engineers, who are part of the creative engineering behind some of the most iconic structures in Vancouver, across Canada and throughout North America.





# 2023 IN REVIEW

At **Glotman•Simpson**, sustainability is a mission that drives every facet of our work, with **embodied carbon reduction** in building design at the forefront of our priorities. With one-fifth of our firm actively participating in our Sustainability Committee, we have cultivated a **dedicated** group of individuals **passionate** about fostering a culture of innovation, education, and advocacy, through data-driven application of initiatives to make a positive impact on the **built environment**.

1. We released **GS On Track**, an educational compilation of research topics, providing insights into our firm's dedication to building decarbonization and furthering the SE 2050 movement. This series serves as a platform for sharing updates on sustainability design trends, policy changes, observations from our design work, and introductions to the innovative automation tools and BIM plug-ins we've developed.
2. We brought **STEVIE** to life. Sustainable Tech Tool for Embodied Carbon Visualization of Integrated Efficiency, better known as STEVIE, is a BIM-integrated tool designed to automate the tracking of embodied carbon throughout a project's lifespan, ultimately creating diagrams to provide a clear visualization of the carbon intensity of different structural elements.
3. We also developed **CASEY** for our team. CASEY or Comparative Analysis for Sustainable Efficiency, is our proprietary REVIT plug-in tool designed to assist designers in providing foundational building layout and material type options for clients and architects during the project's preliminary stages. This allows design teams to create a plan to reduce embodied carbon from a chosen baseline layout at project onset.
4. We are amidst placing the final touches for the **CARMA** launch. CARMA, or Carbon Assessment and Reduction Made Accessible, provides an analytical comparison of two structural options on an element-by-element basis, considering both GWP and cost impacts and enabling informed decision-making at the project's preliminary stage.
5. We set a **GWP Benchmark** for our firm after evaluating multiple projects that are representative of typical projects we work on and running WBLCA's. Based on the results, our GWP Benchmark is 350 kgCO<sub>2</sub>e/m<sup>2</sup>. We will use this benchmark to guide our reduction goals in years to come.
6. We've updated our in-house design spreadsheets with a built-in **GWP Calculator App**, allowing designers to actively assess the embodied carbon impact of the ongoing design. Our design spreadsheets are now a powerful tool, allowing for comparisons between lower carbon alternatives in real time.
7. We have a series of **internal initiatives** to ensure our staff is apprised of all of the firm's sustainability-related work at all times, namely our embodied carbon reduction strategies. From introducing a sustainability section in our Policies and Procedure handbook to regularly penning articles in our quarterly newsletter, The Take-Down, our company is on the same page.

Needless to say, **Glotman•Simpson** remains strongly committed to the **SE 2050** movement.



# EDUCATION

## FOSTERING A CULTURE OF KNOWLEDGE SHARING

At Glotman•Simpson, knowledge meets action in our commitment to decarbonization.

Our journey towards sustainable practices starts with knowledge, and we firmly believe in sharing this knowledge openly. This belief has inspired the creation of our "OnTrack" blog series, a comprehensive educational resource covering various research topics. Through this series, we offer insights into our firm's unwavering commitment to decarbonization and advancing the SE 2050 movement. Serving as a platform for dialogue, the series shares updates on sustainability design trends, interpretations of policy changes, observations from our design projects, and showcases the innovative automation tools and BIM plug-ins we've developed. Internally, our Sustainability Committee convenes monthly, collaborating closely with our Automation Team to develop internal tools for tracking and reducing embodied carbon. Moreover, the Sustainability Committee actively engages with suppliers and vendors of sustainable building materials, ensuring our entire team remains well-informed about the latest technologies for reducing embodied carbon.

**Our journey towards sustainable practices begins with knowledge, and we firmly believe that knowledge should be shared.**

### WITHIN OUR COMPANY

CHANGE STARTS FROM WITHIN. Entering our third year of the SE 2050 program in 2023 brought a surge of interest from our team members, with one-fifth of our firm coming together as the official Sustainability Committee. Additionally, to bolster our dedication to sustainability, we proudly appointed a Director of Sustainability. Their primary focus? Ensuring our team meet our SE2050 milestones and keeping our firm on track. Alongside providing sustainability updates in our company-wide staff meetings, our Sustainability Committee took charge of integrating sustainability-focused articles into The Take-Down, our quarterly newsletter. But perhaps the most thrilling development of 2023 was the collaboration between the Automation Committee and the Sustainability Committee. This brilliant partnership resulted in exciting enhancements to our in-house design spreadsheets and the creation of a BIM-integrated tool, revolutionizing the tracking of embodied carbon throughout a project's lifecycle.

### KEEPING UP WITH BUILDING MATERIALS

WE TAKE PROACTIVE STEPS TO FOSTER PARTNERSHIPS WITH SUPPLIERS AND VENDORS SPECIALIZING IN SUSTAINABLE BUILDING MATERIALS. Through these engagements, we ensure that our entire team remains updated of the latest advancements and innovations in technologies aimed at reducing embodied carbon in our projects. By staying connected with industry leaders and staying informed about emerging trends, we empower our team to make informed decisions that align with our commitment to sustainability.

### STAYING ON TRACK AND SHARING OUR JOURNEY

MORE THAN JUST A COLLECTION OF ARTICLES, THE GLOTMAN SIMPSON "ON TRACK" SERIES IS AN EDUCATION JOURNEY THROUGH THE REALM OF SUSTAINABILITY. Launched in 2023, this meticulously curated series delves into various research topics, offering profound insights into our firm's internal research studies on various methods of embodied carbon reduction and how we perceive the industry's transformation. Not only does this series disseminate updates on the latest sustainability design trends, it also provides in-depth analyses of policy changes, drawing out their implications for our industry. It's a platform for sharing invaluable observations gleaned from our design endeavors, offering readers a firsthand glimpse into our innovative approaches and methodologies, introductions to the groundbreaking automation tools and BIM plug-ins meticulously developed by our team. Through the "OnTrack" blog series, our aim is to both inform and hopefully inspire.

# ON TRACK

## JOURNEY TO NET ZERO AND HOW WE PLAN TO STAY



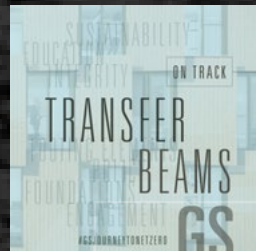
### POLICY UPDATES

Policies set the standard for the built environment. Though named as one of the world's most sustainable cities, Vancouver aims to take further strides to become the "greenest city in the world" with its robust Climate Emergency Action Plan.



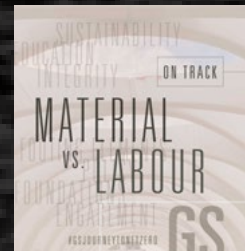
### POST-TENSIONING

For developers looking to reduce their building's carbon footprint, directing their attention toward these concrete slabs is a great starting point. We dive into the alternatives available to us and the efficiencies we can find by adopting post-tensioning.



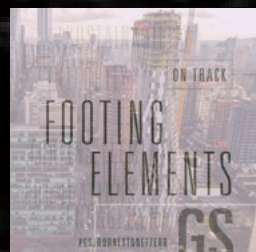
### BUILDING TRANSFER

As engineers, we consider all the options to avoid a transfer. While this process may require additional coordination, especially if the project has already advanced and works on paper, we've seen the benefit and think it's worth it – here is why!



### MATERIAL | LABOUR

As the balance between labour and material costs continues to shift, how will this change our behavior and design approach? To reach our embodied carbon reduction goals, we must fundamentally rethink our structural systems.



### PAD FOOTINGS USE

Because footings are buried, this is the rare occasion in which structural engineers are given free rein to design the most efficient structure with minimal constraints. With this freedom, we have made it our mission to solve for the most cost-effective, structurally efficient, and sustainable pad footing – glamorous, we know!



### CODES AND COSTS

Seismic codes are ever evolving and generally ever increasing to enhance building performance and creating an immediate impact on cost and embodied carbon. We take a closer look at this tradeoff with a focus on high-importance and post-disaster structures.

Our On Track series explores what levers we can pull to reduce the environmental impact of building structures. The need to accelerate climate action in the form of innovative solutions that minimize both operational and embodied carbon is imperative and represents a critical part of a low-carbon future.

### WHY THIS MATTERS

It's easy to feel powerless in the fight against climate change. We must think beyond what we can do individually, rather what we can do as a community and an industry. I am excited by the opportunity we have at Glotman•Simpson to affect meaningful change through the buildings we design. Even if the buildings we work on account for only a small part of the global emissions, my hope is that we can lead the way with novel practices and be an example to the rest of the world.

### HARRISON GLOTMAN

Principal





# REPORTING

## TRANSPARENT PROGRESS, TANGIBLE GOALS

At Glotman•Simpson, we use technology to report and affect standards.

Our commitment to automation transcends mere internal efficiency; it aims to set an industry-wide standard. This is exemplified by our suite of tools that provide key embodied carbon reduction data points at the click of a button: STEVIE, CASEY, and CARMA.

This holistic approach to innovation, combined with our desire to share these tools with the larger design community, underscores our dedication to not only enhance our internal practices but also to contribute positively to the industry's broader decarbonization efforts. By leveraging advanced tools, technology, and educational collaboration, we aspire to inspire a collective shift towards sustainable practices, fostering a significant impact on the global reduction of embodied carbon in the construction and design sector.

### DESIGN SPREADSHEETS

WE HAVE ALSO MADE SIGNIFICANT PROGRESS WITH OUR IN-HOUSE DESIGN SPREADSHEETS, EQUIPPING THEM WITH A GWP CALCULATOR (A VALUABLE KNOWLEDGE-SHARING TOOL). In real time, designers can actively assess the embodied carbon impact of the ongoing design. The design spreadsheet becomes a powerful tool, allowing for comparisons between lower carbon alternatives and various options for clients. Ultimately, this empowers our designers to propose alternative low-carbon designs/solutions and effectively communicate their environmental impact.

**With STEVIE, CASEY, and CARMA,  
we transform data into action,  
guiding the construction industry  
toward a sustainable future —  
one decision at a time.**

### STEVIE: FOR EMBODIED CARBON VISUALIZATION

STEVIE, OR THE SUSTAINABLE TECH TOOL FOR EMBODIED CARBON VISUALIZATION OF INTEGRATED EFFICIENCY, IS A BIM-INTEGRATED TOOL DESIGNED TO AUTOMATE THE TRACKING OF EMBODIED CARBON THROUGHOUT A PROJECT'S LIFESPAN. STEVIE uses the project's current Revit model to run an LCA (life cycle assessment), incorporating the latest information on material quantities, and published graphics on the construction documents depicting the current project's GWP intensity and the contributions from various elements. The process is replicated at project milestones and culminates with an embodied carbon tracker at each key milestone. STEVIE creates charts to provide a clear visualization of the carbon intensity of different structural elements, allowing for targeted reduction strategies.

### CASEY: FOR BUILDING LAYOUTS LIFE CYCLE

CASEY, OR COMPARATIVE ANALYSIS FOR SUSTAINABLE EFFICIENCY, IS OUR PROPRIETARY REVIT PLUG-IN TOOL DESIGNED TO ASSIST DESIGNERS IN PROVIDING FOUNDATIONAL BUILDING LAYOUT AND MATERIAL TYPE OPTIONS FOR CLIENTS AND ARCHITECTS DURING THE PROJECT'S PRELIMINARY STAGES. It facilitates a BIM-powered graphical comparative analysis of different materials and structural layouts and offers a bay-by-bay comparison of Global Warming Potential (GWP) intensity so that the client can make more sustainable and carbon-informed decisions. This allows the project team to make more informed decisions at the onset of the project and create a plan to reduce embodied carbon from the chosen baseline layout.

### CARMA: FOR ELEMENT-BY-ELEMENT COMPARISONS

CARMA, OR CARBON ASSESSMENT AND REDUCTION MADE ACCESSIBLE, ALLOWS FOR REAL-TIME ELEMENT-BY-ELEMENT COMPARISONS. Another testament to our decarbonization commitment. This tool provides an analytical comparison of two structural options on an element-by-element basis, considering both GWP and cost impacts and enabling informed decision-making at the project's preliminary stage. It allows the designer to easily provide embodied carbon comparisons for structural elements, such as beams and columns, and report to the project team on the lower-carbon option within minutes.

# STEVIE

(S)USTAINABLE  
(T)ECH TOOL FOR  
(E)MBODIED CARBON  
(V)ISUALIZATION OF  
(I)NTEGRATED  
(E)FFICIENCY

STEVIE creates charts to provide a clear visualization of the carbon intensity of different structural elements, allowing for targeted reduction strategies.

## TOTAL QUANTITY WITH ALLOWANCE:

SLAB AREA: 167,091.0 SF

CONCRETE VOLUME: 9,744.0 CY

FORWORK AREA: 284,583.6 SF

## AVERAGE DEPTH:

+/-18.9"

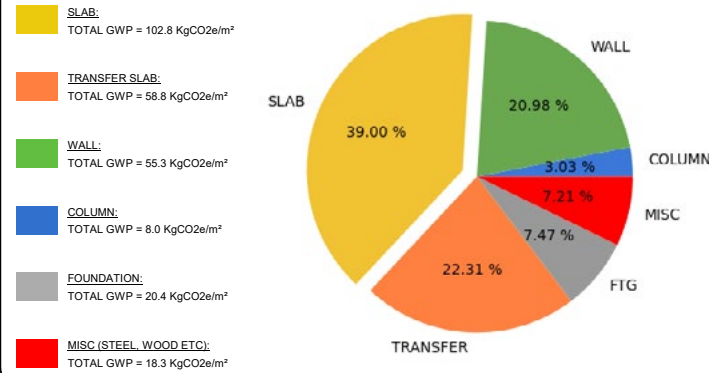
## FORMWORK RATIO:

+/-1.7

## GLOBAL WARMING POTENTIAL:

263.6 KgCO<sub>2</sub>e/m<sup>2</sup>

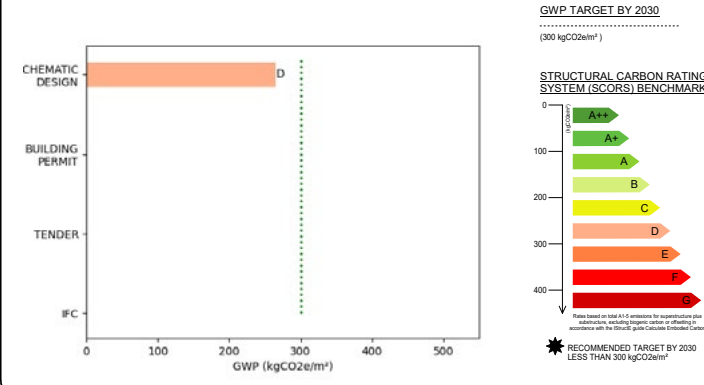
## GLOBAL WARMING POTENTIAL PERCENTAGE BY ELEMENT CATERGORY:



\* THE GLOBAL WARMING POTENTIAL (GWP) ESTIMATES INCLUDE EMBODIED CARBON IN THE CONCRETE AND REINFORCING STEEL. THE CONCRETE MIXES ARE BASED ON THE LOCAL INDUSTRY STANDARDS AND REINFORCING DENSITIES ARE BASED ON HISTORICAL AVERAGES FOR COMPARABLE PROJECTS. THESE ESTIMATES ARE INTENDED TO TRACK IMPROVEMENTS IN GWP OVER THE COURSE OF THE PROJECT, BUT ARE NOT INTENDED TO REPLACE A DETAILED LIFE CYCLE ASSESSMENT BY THIRD PARTIES.

GLOTMAN SIMPSON CAN PROVIDE A MORE DETAILED BREAKDOWN OF THE GWP INPUT ASSUMPTIONS UPON REQUEST.

## EMBODIED CARBON INTENSITY BY PROJECT STATUS PLOT:



## TOTAL CONCRETE VOLUME:

LEVEL	AREA (SF)	VOLUME (CY)	AVERAGE DEPTH
Level 03	22656.0	1118.8	16.0"
Level 02	20722.6	768.0	12.0"
Level 01	32777.5	2166.0	21.0"
Level P1	15168.9	468.2	10.0"
Level P2	28326.8	874.4	10.0"
Level P3	22607.6	553.4	8.0"
Level P4	16854.7	204.8	4.0"
Grand total	159134.1	6153.6	13.0"

LEVEL	VOLUME (CY)
Level 03	2.6
Level 02	109.3
Level 01	158.8
Level P1	492.7
Level P2	470.7
Level P3	370.8
Level P4	327.3
Grand total	1875.2

LEVEL	VOLUME (CY)
Level 02	46.9
Level 01	81.0
Level P1	35.7
Level P2	35.7
Level P3	35.7
Level P4	28.4
Grand total	252.3

TYPE	AREA	VOLUME
F1	3692 SF	679.5
F2	627 SF	77.4
F3	1368 SF	168.9
SF1	280 SF	34.6
SF2	1052 SF	40.1
SF3	23 SF	1.1
Grand total: 49	7072 SF	1001.6

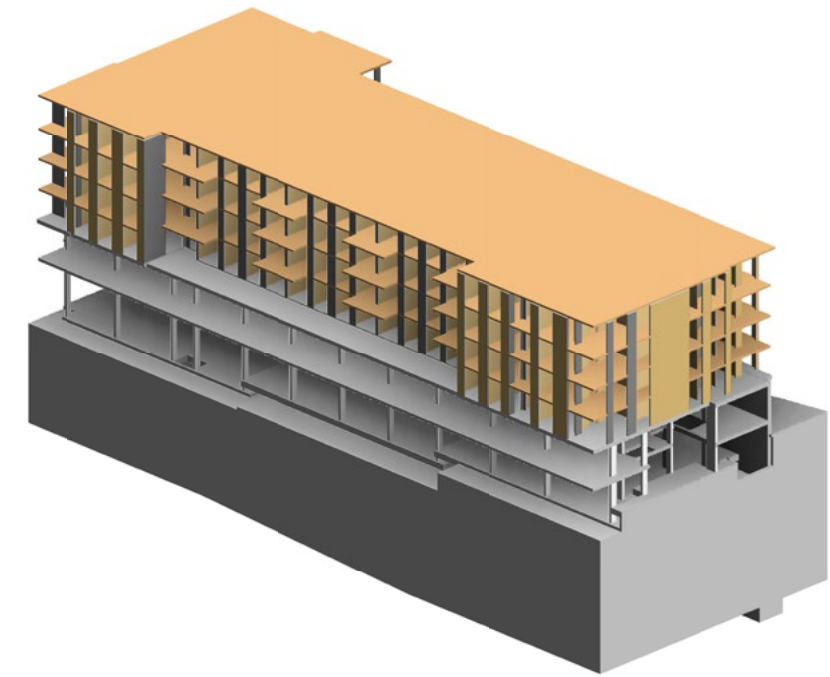
## TOTAL FORMWORK AREA:

LEVEL	HORIZ AREA	VERT AREA
Level 03	22656.0	2214.7
Level 02	20722.6	809.5
Level 01	32777.5	7288.7
Level P1	15168.9	1370.4
Level P2	28326.8	1622.2
Level P3	14890.2	959.3
Grand total	134562.0	14264.8

LEVEL	FORMWORK AREA
Level 03	80.7
Level 02	3346.7
Level 01	4909.8
Level P1	26406.4
Level P2	25744.2
Level P3	20342.4
Level P4	17029.0
Grand total	94616.9

LEVEL	COLUMN FORMWORK AREA
Level 02	3955.4
Level 01	6835.7
Level P1	2774.8
Level P2	2774.2
Level P3	2774.2
Level P4	2207.2
Grand total	20311.7

TYPE	2733 SF	VERT AREA
F1	620 SF	
F2	2153 SF	
F3	500 SF	
SF1	1052 SF	
SF2	22 SF	
Grand total: 49	7280 SF	



\* THE INFORMATION CONTAINED HEREIN IS GENERATED FROM SCHEMATIC MODELS FOR REFERENCE ONLY AND IS NOT INTENDED TO REPLACE DETAILED QUANTITY SURVEYS BY THIRD PARTIES. QUANTITIES ARE LIMITED TO THE PRIMARY STRUCTURAL SYSTEM ONLY AND INCLUDES A 5% ALLOWANCE FOR SECONDARY STRUCTURAL ELEMENTS SUCH AS STAIRS, TOPPING, CRANE FOOTINGS, GROUND SKIM COAT, BUILT-UP CONCRETE FOR SLOPE-TO-DRAIN, BUILT-UP SLABS, ADDITIONAL THICKNESS AT BLIND WALLS, CURBS, PARAPETS, WASTE OR OTHER MISCELLANEOUS ELEMENTS COVERED BY TYPICAL DETAILS OR NOTES.

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Sketches may be issued which augment or alter the information presented on this drawing. It is the responsibility of parties using the drawings to ensure that they are in possession of all such sketches.

Revisions

No.	Date	Description

PERMIT NO. 1903077  
Engineer and Geoscientist  
of British Columbia

Consultant:  
GLOTMAN•SIMPSON  
CONSULTING ENGINEERS

Seal:

Sheet Title:  
TITLE SHEET

Project:  
East Columbia - Third Space

Date: Issue Date

Scale: 12" = 1'-0"

Drawn:

Checked:

Project Number: 223406

Sheet No: S100





### CARMA GWP Calculator

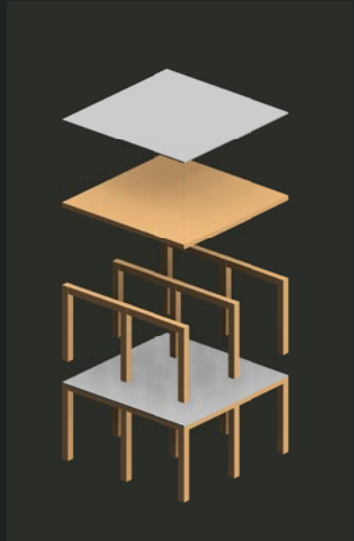
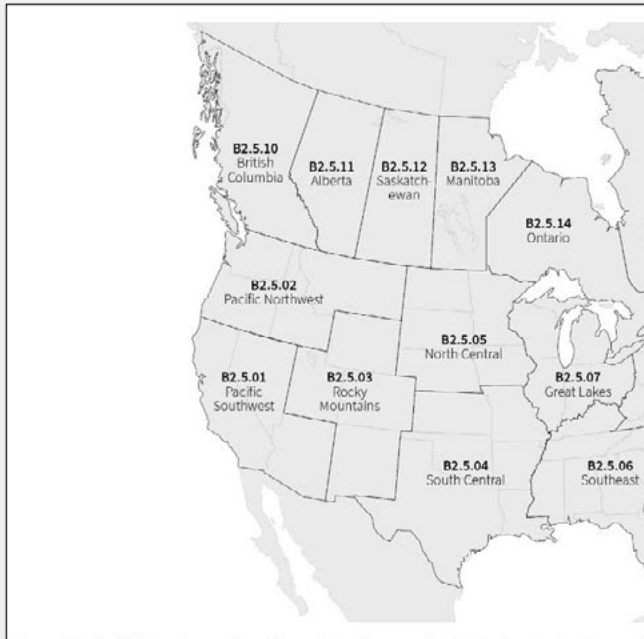
Element:  Units:  Region:  Location:

Option 1		Option 2	
Concrete grade:	5000 psi	6000 psi	
Steel grade:	60 ksi	60 ksi	
Concrete GWP:	378 kgCO <sub>2</sub> e/m <sup>3</sup>	401 kgCO <sub>2</sub> e/m <sup>3</sup>	
Steel GWP:	854 kgCO <sub>2</sub> e/MT	854 kgCO <sub>2</sub> e/MT	
Concrete cost:	111 US\$/yd <sup>3</sup>	111 US\$/yd <sup>3</sup>	
Steel cost:	1 US\$/lb	1 US\$/lb	
Height:	20 ft	20 ft	
Width:	24 ft	20 ft	
Depth:	24 ft	20 ft	
Rebar ratio:	1 %	2 %	

Calculate

Option 2 is better than Option 1

Option 1: Total GWP = 143943 kgCO <sub>2</sub> e	Option 2: Total GWP = 119397 kgCO <sub>2</sub> e
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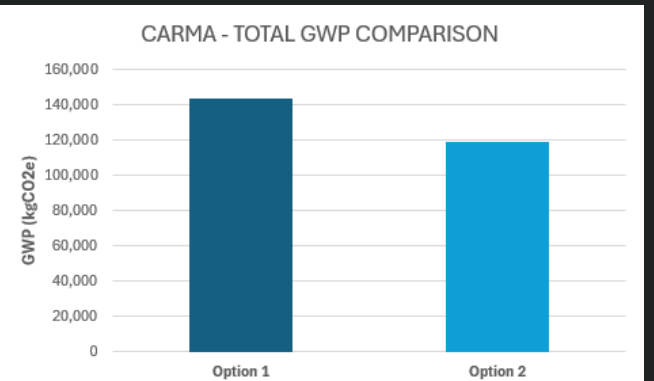
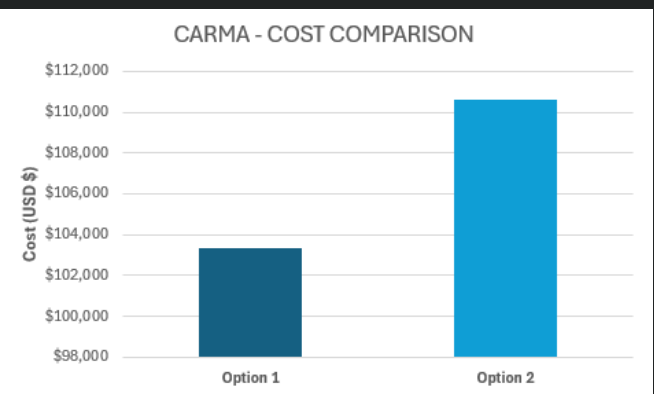
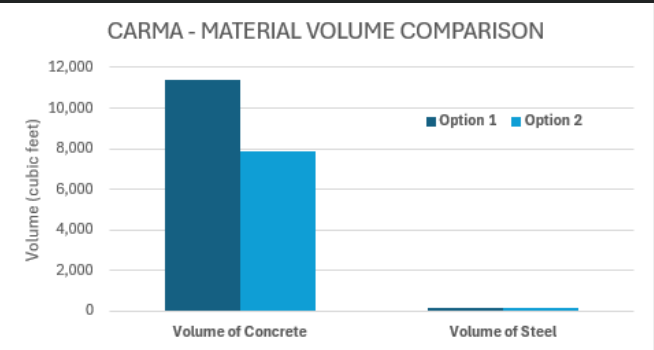
**MASS TIMBER**  
(POST + BEAM + CLT PANEL)

FLOOR HEIGHT: 16 ft  
AREA: 793 sqft  
COLUMN SIZE: 10" x 10"  
WOOD BEAM SIZE: 10" x 10"  
CLT DEPTH: 6 inch  
TOPPING DEPTH: 4 inch

# CARMA

(C)ARBON  
(A)SSESSMENT AND  
(R)EDUCTION  
(M)ADE  
(A)CCESIBLE

CARMA provides an analytical comparison of two structural options on an element-by-element basis, considering both GWP and cost impacts and enabling informed decision-making at the project's preliminary stage. It allows the designer to easily provide embodied carbon comparisons for structural elements, such as beams and columns, and report to the project team on the lower-carbon option within minutes.



# CASEY

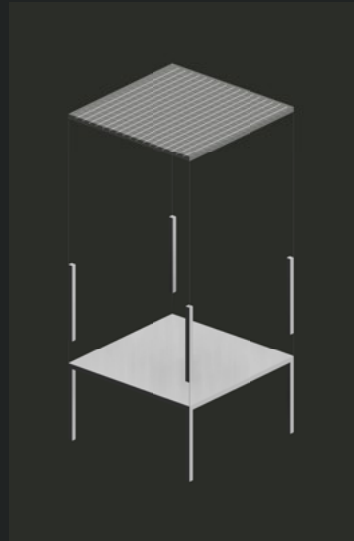
(C)OMPARATIVE  
(A)NALYSIS FOR  
(S)USTAINABLE  
(E)FFICIENCY

CASEY allows the project team to make more informed decisions at the onset of the project and create options for the project team and ownership to make high-level decisions to reduce embodied carbon early on based on the chosen optimized structural layout.



**TIMBER & STEEL HYBRID**  
(STEEL COLUMN / BEAM + CLT PANEL)

FLOOR HEIGHT: 16 ft  
AREA: 793 sqft  
HSS POST: HSS203x203x4.8  
W BEAM: W36x91  
CLT DEPTH: 6 inch  
TOPPING DEPTH: 4 inch



**ALL CONCRETE**  
(CONCRETE COLUMNS + SLAB)

FLOOR HEIGHT: 16 ft  
AREA: 793 sqft  
COLUMN SIZE: 12" x 12"  
SLAB DEPTH: 10 inch



# EMBODIED CARBON REDUCTION STRATEGIES

## INFORMED LOW-CARBON DESIGN DECISIONS

At Glotman•Simpson, we cultivate innovation to help reduce our carbon footprint.

As more embodied carbon policies start to take shape across North America, the construction and engineering sectors face an undeniable challenge to update their methods to comply with policy and permitting requirements. For our firm, at the heart of this transformation is the integration of a comprehensive embodied carbon reduction plan into our design practices and our service offerings. Through in-house technology tools, integrated GWP calculators, continuing education seminars and persistent collaboration amongst professionals in the design industry, we aim to continuously reduce embodied carbon in our designs.

### UNWAVERING COMMITMENT TO REDUCTION

OVER THE PRECEDING THREE YEARS, OUR STRUCTURAL ENGINEERING FIRM HAS EMBARKED ON A TRANSFORMATIVE JOURNEY TO ELEVATE OUR COMMITMENT TO SUSTAINABLE PRACTICES. A growing particularly in the realm of embodied carbon reduction strategies within building design. A cornerstone of our progressive approach has been the seamless integration of a comprehensive embodied carbon reduction plan into our design processes. This strategic initiative not only underscores our environmental responsibility but also positions us at the forefront of sustainable engineering practices.

**By embedding life cycle assessment at the heart of our design process, we empower our projects to speak the language of sustainability, turning ambition into action for a greener tomorrow.**

### LIFE CYCLE ASSESSMENT - TARGETING ANALYSIS AND REDUCTION

AS PART OF OUR ONGOING EVOLUTION, WE HAVE BEEN RUNNING LIFE CYCLE ASSESSMENTS FOR THE MATERIALS AND SYSTEMS WE SPECIFY FOR OUR PROJECTS. This addition enhances our service portfolio, enabling us to provide clients with a comprehensive understanding of the short-term and long-term environmental impacts associated with their projects. By offering this holistic perspective, we empower clients to make well-informed decisions that align with their sustainability objectives and contribute to a lower carbon built environment.

### PROGRESS AND CONTINUED COMMITMENT

OUR COMMITMENT TO INNOVATION IS EXEMPLIFIED THROUGH THE UTILIZATION OF PROPRIETARY TOOLS THAT HAVE REVOLUTIONIZED OUR COMMUNICATION WITH CLIENTS. These tools facilitate the presentation of a diverse range of design options at the onset of a project, fostering a collaborative decision-making process. This not only ensures that our clients are actively involved in shaping the trajectory of their projects but also allows them to explore and choose designs that align with their specific sustainability goals.



# ADVOCACY

## EMPOWERING CHANGE AND VISIBILITY

At Glotman•Simpson, our team has carved out a niche of creative, inspiring engineering feats.

At the heart of our firm lies a deep-rooted belief in the power of advocacy and fostering community to inspire and enact sustainable and meaningful change. Our journey transcends the boundaries of our projects, reaching into the communities and industries we serve. Whether it's through digital platforms, client presentations, or collaborative community efforts, our goal is to ignite, and maintain, a shared vision for a lower carbon future.

### CHAMPIONING THE SE 2050 MOVEMENT THROUGH...

#### ...SOCIAL MEDIA

OUR COMMITMENT TO ADVOCATING FOR EMBODIED CARBON REDUCTION STRATEGIES EXTENDS BEYOND THE CONFINES OF OUR PROJECTS, permeating our engagement with clients and communities alike. We have proactively championed the SE 2050 movement, strategically embedding embodied carbon reduction messaging throughout our online presence. Regularly curated content on our website and social media platforms not only emphasizes the importance of SE 2050 but also serves as an educational resource, fostering awareness and understanding within our digital community.

**Our advocacy goes beyond conversation; it's about catalyzing tangible change in communities and industries, guiding them towards sustainable practices one step at a time.**

#### ...OUR CLIENTS

WE ACTIVELY ENGAGE WITH OUR CLIENTS THROUGH TARGETED PRESENTATIONS, showcasing the feasibility and embodied carbon reductions achievable through various early-on design considerations. Whether that be through the reuse of material, such as existing steel beams in pre-existing structures or through thoughtful re-working on structural layouts and structural systems, we continuously advocate for reductions in embodied carbon in parallel with SE 2050's core tenants. By sharing these insights, we empower our clients to make informed decisions that contribute to the overall reduction of embodied carbon in their projects.

#### ...COMMUNITY

OUR COMMITMENT TO INNOVATION IS EXEMPLIFIED THROUGH THE UTILIZATION OF PROPRIETARY TOOLS THAT HAVE REVOLUTIONIZED OUR COMMUNICATION WITH CLIENTS. Beyond our client interactions, our firm is deeply involved in local communities, particularly in Vancouver and Los Angeles. In Vancouver, we proudly collaborate with the CLF Vancouver chapter, actively participating in community-driven initiatives to promote sustainable practices. Our advocacy efforts extend to Los Angeles, where we submitted a letter to the City of LA endorsing the "Embodied Carbon Motion," a groundbreaking reach code for new CALGreen embodied carbon mandates. Notably, our Director of Sustainability plays a pivotal role in the AIA Embodied Carbon Working Group, which was instrumental in creating the City of Los Angeles's Embodied Carbon Motion. Furthermore, our Director of Sustainability has collaborated with the City of Santa Monica, providing valuable insights and recommendations for the implementation of CALGreen Embodied Carbon reach codes. These multifaceted advocacy endeavors underscore our firm's dedication to not only designing sustainable structures but also actively shaping a more environmentally conscious future in collaboration with our clients and broader communities across North America.

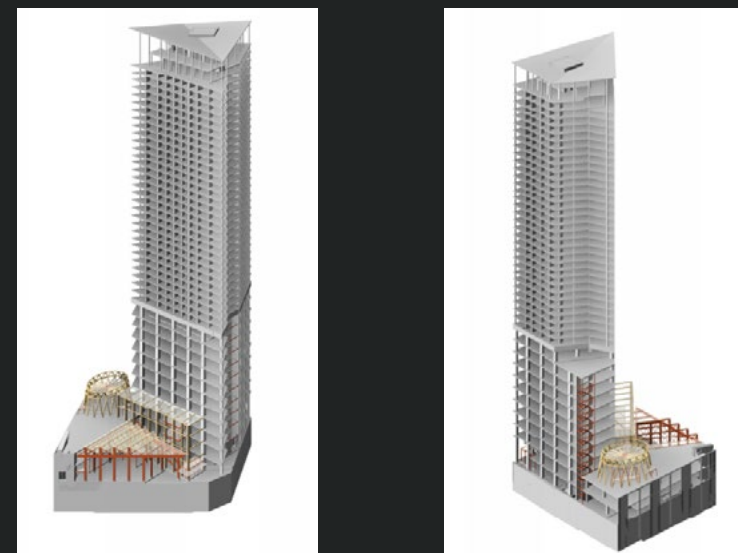


An increasing emphasis is placed on minimizing embodied carbon in new public sector buildings, a trend particularly prevalent in educational institutions. These projects often set specific targets for embodied carbon reduction, demanding a concerted effort from the project design team.

In our recent engagement with a post-secondary school project, we collaborated closely with the Sustainability Consultant and Architect of Record during the Schematic Design phase. Together, we optimized the concrete mix, achieving an impressive 11% reduction in embodied carbon. Additionally, strategic adjustments to the parking column layout beneath the tower structure were made, enabling a more streamlined one-way beam system and further reducing embodied carbon. By addressing these considerations early in the design process, our interventions not only promote environmental sustainability but also align with the project's overarching goals for carbon reduction.

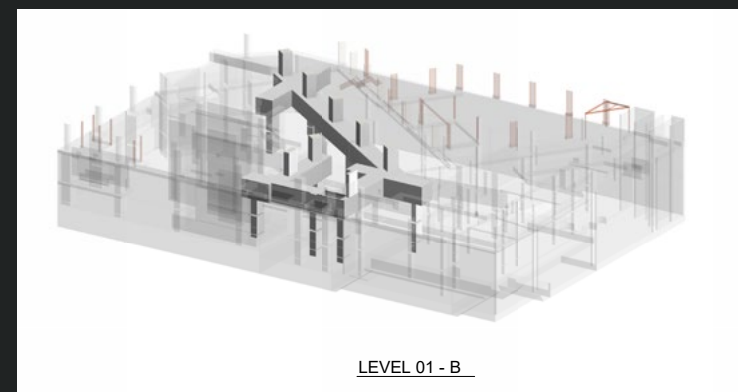
# CASE STUDY

## POST SECONDARY INSTITUTION BASED IN BRITISH COLUMBIA CANADA



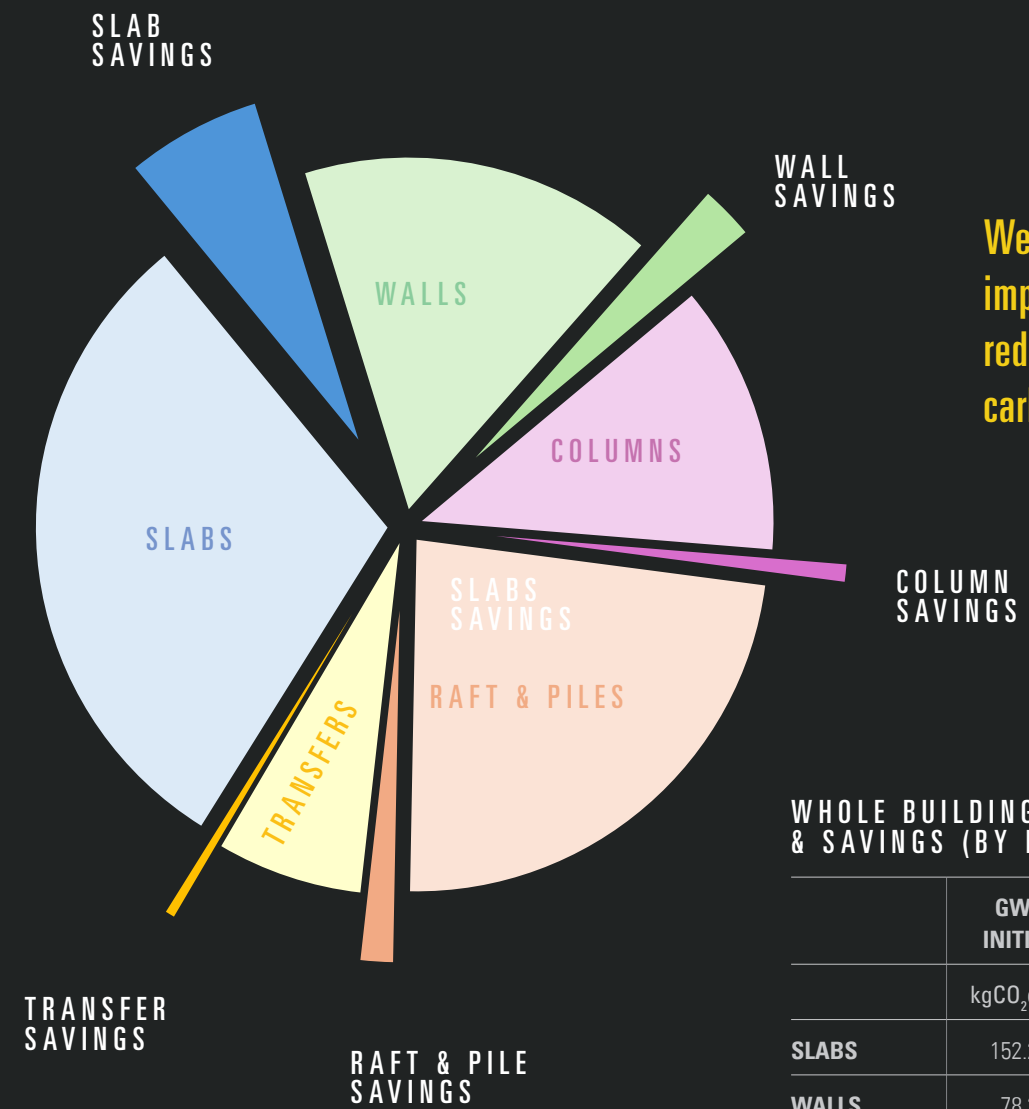
### CONCRETE MIX OPTIMIZATION

We tailored our material specifications and collaborated with sustainability consultant and architect of record to reduce the embodied carbon associated in the concrete structure by 11%. We did this by strategically maximizing GUL cement and increasing the allowable curing time for concrete mixes. This maximized SCM usage, on an elemental basis, so that there was no delay in construction associated with the carbon savings.



### PARKING COLUMN LAYOUT

We made significant changes to the parking column layout under the tower at a very early stage to better suit the tower columns and optimize the structure. This allowed a much simpler and elegant one way beam system at L1, as opposed to the traditional thicker two-way slab system. This may have reduced approximately 300,000 Kg CO<sub>2</sub>e associated with the concrete structure, which is approximately 5 to 10 percent of the building total.



We achieved an impressive 11% reduction in embodied carbon.

WHOLE BUILDING GWP DISTRIBUTION & SAVINGS (BY ELEMENT TYPE)

	GWP INITIAL	GWP FINAL	GWP SAVINGS
	kgCO <sub>2</sub> e/m <sup>2</sup>	kgCO <sub>2</sub> e/m <sup>2</sup>	kgCO <sub>2</sub> e/m <sup>2</sup>
SLABS	152.29	126.4	25.89
WALLS	78.3	68.12	10.18
COLUMNS	55.12	51.81	3.31
RAFT + PILES	103.5	97.29	6.21
TRANSFERS	29.79	28.01	1.78



# ELECTIVES

## EDUCATION

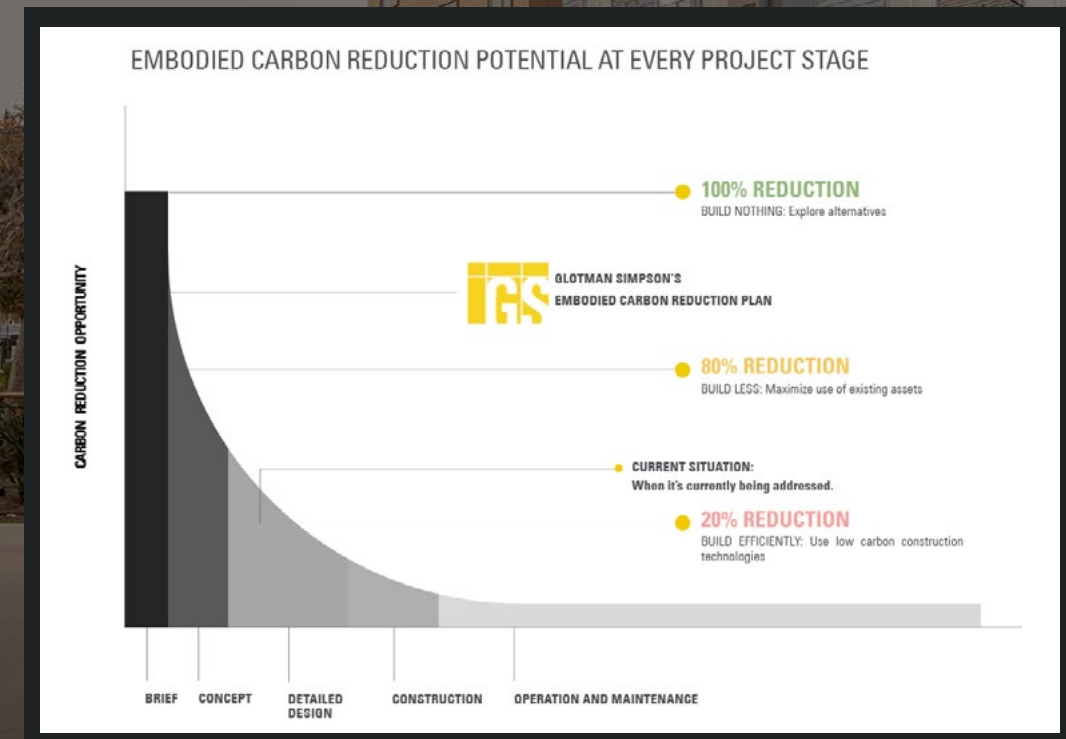
- GS Sustainability Committee and Automation Committee have collaboratively provided multiple webinars firm wide. We have provided webinars and how-to's on the implementation of STEVIE, CARMA and CASEY and GWP calculators embedded in in-house design spreadsheets.
- Continuously train engineers at monthly committee meeting and during bi-annual company-wide technical retreats.
- We have cultivated a mission statement specifically targeting our sustainable design practices and summarizing our values, goals and priorities. We have included this mission statement in our policy manual for all new onboarding, our sustainability page on our website and through our client proposals.
- GS Sustainability Committee focuses solely on measuring, tracking, and finding innovative solutions to reduce embodied carbon in our designs and works on keeping up to date with the latest technology available to seize the opportunity to incorporate it into our sustainable design practices.
- Education is made easily accessible for everybody in the firm – this is accomplished through the use of the GS Sustainability Committee Teams Channel, committee monthly meetings and GS Sustainability folder in the company directory.
- Director of Sustainability is one of the co-chairs and co-policy leads for the carbon leadership forum Los Angeles. GS Sustainability Committee members regularly attend CLF BC webinars and events.
- A minimum of 2 firm-wide presentations are planned for this year on the topic of embodied carbon – one will focus on how to effectively be an embodied carbon champion (how to link embodied carbon, material reductions and project cost) and one will be another teaching seminar on the latest deployment of automation tools.

## REPORTING

- Our offices have a coordinated approach to measure and report embodied carbon through the implementation of STEVIE on most projects moving forward. STEVIE automatically captures embodied carbon data for each project and characterizes each project based on scale and occupancy.
- The use of STEVIE to document and communicate findings across projects will allow the team to compare embodied carbon emissions from multiple projects. Enhanced project data will allow the firm to more accurately assess and target embodied carbon reduction.
- We've focused on timeline of project workflow and at which time we can affect the most amount of embodied carbon reduction. Moving forward, we are targeting implementation of CASEY, STEVIE and the all-encompassing GS Embodied Carbon Reduction Plan to the beginning of projects.

## EMBODIED CARBON REDUCTION STRATEGIES

- Develop and implement a workflow that makes it easier to make early design decisions based on embodied carbon.
- The GS Sustainability Committee is working on fully redeveloping our concrete and steel specifications to target achievable embodied carbon reductions.
- Through the project-based and continual use of STEVIE and CASEY we can communicate the embodied carbon impacts of different design options to clients effectively via data visualization.



## ADVOCACY

- GS continually describes the value of SE2050 to clients through our periodic LinkedIn posts about SE2050 and our involvement. Our sustainability webpage has a permanent and periodically updated segment about SE2050. The GS Embodied Carbon Reduction Plan Summary and our sustainability presentations provide an education section on SE2050, its goals and its importance to the industry.
- We commit to providing an external presentation to a client demonstrating the project successes and lessons learned with embodied carbon reductions and proposals.
- We will continue to engage with local and state governments to communicate the importance of low-embodied carbon procurement. This past year, Glotman Simpson provided support for CALGreen reach codes for the City of LA. Our Director of Sustainability is a part of the AIA embodied carbon working group that continues to work with the Cities of LA and Santa Monica to implement embodied carbon reach codes.



# 2023

## SE 2050 EMBODIED CARBON ACTION PLAN 2023



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