

VERDANT

Structural Engineers

EMBODIED CARBON ACTION PLAN: April 2025 - March 2026 (Year 5)

At Verdant Structural Engineers, we aim to perform carbon conscious designs. We specialize in projects utilizing optimal and efficient use of conventional building materials, as well as projects utilizing environmentally sensitive methods and building materials such as straw bale, hemp-lime (hempcrete), rammed earth, cob, adobe, super adobe, earthbag, and bamboo. VSE works closely with the natural and green building community to develop standards and procedures for green building practices.

We support the vision that all structural engineers shall understand, reduce, and ultimately reach net-zero embodied carbon in their projects by 2050.

During our fifth year of participation in the SE2050 movement, we commit to implementing and completing the action plan outlined below.

EMBODIED CARBON EDUCATION PLAN:

Our firm's strategy to educate employees about embodied carbon and reduction methods will focus on webinars and short reading assignments, followed by office wide discussions, and application of knowledge learned. The assignments will be selected specifically to aid in the reduction of embodied carbon in our day-to-day design decisions. The ECRC will be implementing the office-wide education plan and will use our office SE2050 slack channel to communicate with the staff about upcoming assignments and discussions.

KNOWLEDGE SHARING PLAN:

We will share our firm's efforts and lessons learned with our clients, the design community, and the public by adding a SE2050 Commitment statement on our company website. We have been and will continue to share our knowledge via social media posts and conference presentations to bring awareness to industry partners of ways to reduce embodied carbon in the built environment. All staff email signatures have been updated to include the SE2050 logo to bring awareness to our collaborators that we have joined the commitment.

In addition, we will share on social media our BEAM LCA data summary, embodied carbon intensity comparison of our projects, and a conclusion of our findings. We will highlight the highest embodied carbon contributors and the benefits of using carbon storing materials, such as straw bale insulation. The findings will also be presented in our all-hands meeting by the LCA team.

EMBODIED CARBON REDUCTION STRATEGY:

Our embodied carbon reduction strategy includes efforts to reduce embodied carbon in our designs by encouraging our engineers to select wood products and steel sections with lower embodied carbon based on EPD data. We will continue to collaborate with contractors to use reduced embodied carbon concrete mixes, and continue our firm's commitment to use and promote the use of biogenic materials and products.

Our general notes have been updated to include specifications with reduced cement ratios and SCM recommendations. Our goal is to continue to engage with contractors for 80% of our projects, request concrete mix submittals, and log received submittals for our use and reference. As the industry and suppliers continue to move in the direction of reduced carbon mixes, we hope to increase the use of mixes with EPDs to better quantify concrete carbon reduction for our projects. We will also explore the use of Limestone Calcined Clay Cement (LC3) as it becomes available in our area.

We encourage the use of lumber that is reclaimed/salvaged and certified by The Forest Stewardship Council (FSC) or The Sustainable Forestry Initiative (SFI) or from locally sustainable harvested sources.

We will also focus our education program on material efficiency and utilization.

EMBODIED CARBON REPORTING PLAN:

We will continue to use the BEAM LCA tool to quantify embodied carbon for A1-A3 (cradle-to-gate) stage. We have selected this tool because it includes embodied carbon data for carbon storing materials such as straw, and uses the latest available EPD information available.

The material quantities to be used/input into the BEAM LCA tool will be calculated with an in-house created spreadsheet using our construction documents, with the understanding that actual material quantities used in construction may vary. In the future, we would like to transition to BIM modeling to extract material quantities more accurately and efficiently.

As LCA tools continue to improve and develop, we are open to trying a different LCA tool in the future.

PROGRAM ELECTIVES

EDUCATION: (2 required)

1. (Required) Embodied Carbon Reduction Champion - Office Engagement:

Nora Murray will continue as the ECRC and the firm administrator for the SE2050 database.

ECRC will continue to implement the office-wide education plan by communicating with the staff using the in-office SE2050 Slack channel. She will continue to share resources, reports, and reading/webinar assignments. Office wide discussions for reading/webinar assignments will take place during all-hands meetings.

This year's reading assignments will continue to focus on the core concepts & skills training tools available in the Resources section on the SE2050 website. We will be focusing on reinforced concrete, optimizing foundation design to reduce concrete volumes, and exploring carbon-conscious detailing practices.

The ECRC will also introduce our SE2050 commitment and embodied carbon action plan to new engineering staff and assign the on-boarding embodied carbon education webinars.

2. (Required) All engineering staff will watch one webinar on the topic of Embodied Carbon and share main takeaways during our all-hands meeting.

Webinar options:

TEDxSeattle: [Change our buildings, save our planet](#) by Andrew Himes - CLF Director of Collective Impact

CLF and SE2050: [Material Efficiency Webinar](#) by Meghan Lewis - CLF Program Director, Fraser Reid - Associate Principal at Buro Happold, Frances Yang - Structures and Sustainability Specialist at Arup, Michael Gryniuk - Founder and Principal at Cora Structural

3. (Recommended) All new engineering staff will be asked to watch the following three webinars as part of the on-boarding process within the first three months of joining the Verdant team.

Boston Society of Architects "[Embodied Carbon 101](#)" sessions listed below:

- Embodied Carbon 101: Basic Literacy

- Embodied Carbon 101: Procurement
 - Embodied Carbon 101: One additional session of choice
4. **(Recommended)** All engineering staff will continue to engage in embodied carbon reduction design skills (SE2050 Resources) with an emphasis on reinforced concrete. Additional resources below will be used.

[National Ready Mixed Concrete Association EPD](#)

[Carbon Smart Materials Palette](#)

5. **(Recommended)** One staff member will engage with a Carbon Leadership Forum (CLF) Regional Hub by attending presentations or working sessions and reporting back to the firm.

REPORTING: (1 required)

1. **(Required)** Submit a minimum of 2 projects to the SE 2050 Database.
2. **(Recommended)** Compare the embodied carbon emissions from multiple projects across your firm. Analyze and document what data or pieces of information are most important and communicate the findings to your firm.

REDUCTION: (1 required)

1. **(Required)** Firm-wide reduction targets:
Short term (1 yr) reduction target: Our short term reduction target is to work with contractors and concrete suppliers to reach an average of 225 lb/yd³ of portland cement in mix designs collected in 2025.
Long term (5 yr) reduction target: Our long term reduction target is to work with contractors and concrete suppliers to reach an average of 175 lb/yd³ of portland cement in mix designs collected between 2024 - 2029.
2. **(Recommended)** Incorporate sustainably harvested biogenic materials on at least one project.
3. **(Recommended)** Update specifications to incorporate embodied carbon performance criteria. This will be focused on strategies to help us reach our reduction targets.

ADVOCACY: (2 required)

1. **(Required)** Describe the value of SE2050 to clients. Collaborate with the design team to reduce embodied carbon.

2. **(Required)** A declaration of our firm's commitment to SE2050 is posted on the company website.
3. **(Recommended)** Engage with local, state, and federal governments to communicate the importance of low-embodied carbon procurement and construction policies.

LESSONS LEARNED:

Concrete Mix Submittals:

We have updated our submittal specifications to include concrete mix designs prior to pouring concrete, however, contractors do not always comply with this request. As an office, we need to improve on following up with this request. The goal of this submittal request is to ensure a low carbon concrete mix is used on all of our projects, particularly those with a high volume of foundation work. There is a local jurisdiction that has adopted the CAL Green requirement for 25% SCM in concrete mixes. This may help increase the responsiveness to our request for mix submittals. We hope to increase the number of mixes we receive in 2025 so we can better track our reduction efforts.