VERDANT
Structural Engineers

EMBODIED CARBON ACTION PLAN: 2026 - 2027 (Year 6)

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 sixth 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 office champion 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, our company website is a great resource to learn about and see project examples featuring various green building materials. Verdant has also assisted in authorship of a number of recent International Building Code additions and proposed additions for natural building structural systems.

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 an alternative to portland cement 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. We are also exploring the use of Bluebeam as a tool to determine structural element quantities and volume groupings.

For the new SE2050 database requirements, we have adopted our materials quantities spreadsheet to include calculations that align with the material quantities inputs needed for the SE2050 database ECOM LCA.

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 the topics listed in the *Design Guidance for Reducing Embodied Carbon in Structural Systems* resource.

   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) focusing on the topics listed in the *Design Guidance for Reducing Embodied Carbon in Structural Systems* resource.

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 2026. We also would like to increase the number of design projects that incorporate biogenic materials.

   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.

   Several of our design projects include biogenic materials, however, we currently do not have a good way to track the carbon reduction for these projects. Establishing a workflow that tracks this data is something that we hope to incorporate in the future.

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 continue to struggle with the collection of concrete mix submittals. This has been an ongoing challenge for us since our initial year in SE2050. Our primary market sector is custom residential construction, which may be the reason contractors are less responsive to this request. The incomplete concrete mix data has affected our ability to accurately track our annual goal of reaching an average of 225 lb/yd3 of portland cement in mix designs collected in 2025. This will continue to be our reduction goal for 2026, and we will continue our efforts to make concrete mix submittals a normative action in the residential market sector.

Advocacy:

A few years ago, an engineer from another west coast firm asked me questions about SE2050 and the steps involved in joining the commitment. Recently, this firm became a signatory! Encouraging other firms to join the movement doesn’t have to look like a sales pitch, it can simply be a short informal conversation that leaves an open door to join the movement. Earlier this month, a firm from the east coast reached out also asking about SE2050 and mentioned that they searched the active signatories ECAPs on the SE2050 website and found our’s to be a good example for them to follow. It was encouraging to learn that our ECAP served as a resource for a firm considering becoming a signatory, and that it appeared to reduce the barrier to entry by having an example document to model their ECAP after.