VERDANT
Structural Engineers

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EMBODIED CARBON ACTION PLAN

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 building materials and methods such as straw bale, rammed earth, cob, adobe, 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 first year of joining the SE2050 movement, we commit to implementing and completing the action plan outlined below.

EDUCATION: Understanding Embodied Carbon

a. **SE2050 Commitment Announcement**:
A firm wide announcement for our pledge to join the SE2050 Commitment has been completed.

b. **Promoting Firm-wide Education Program**:
To promote firm wide embodied carbon education, we plan to do the following:
    1. Hold a company wide orientation meeting to present the goals for the year and go over the ECAP for 2021.
    2. Create a slack channel specific to the topic where team members can share ideas, articles, or collaborate on carbon conscious design solutions.
    3. Send emails announcing company wide education events such as webinars, lunch & learns, and LCA training sessions.
    4. Company wide events will be posted on the company google calendar.
    5. Add educational resources and tools to our in-house website.

c. **Embodied Carbon Reduction Champion**:
Nora Murray, PE has been selected to be the inaugural ECRC for Verdant. Nora graduated from Cal Poly, SLO with a BS degree in Architectural Engineering and a minor in Dance. She earned an MS degree in Civil Engineering from UCLA. Nora has been at Verdant since 2019. In addition to her experience as a practicing engineer, she taught as an Adjunct

Engineering Instructor for the Los Angeles Community College District and for Contra Costa College in the east bay. Her experience in education and course material development is an asset in aiding Verdant in developing an education program for the team.

d. **Embodied Carbon Webinar**:
We will have our team members watch the Boston Society of Architects "Embodied Carbon 101" sessions listed below:
Required: Embodied Carbon 101: Basic Literacy
Required: Embodied Carbon 101: Procurement
Elective: Embodied Carbon 101: One additional session of choice

e. **Education Electives**: (1 required, 4 recommended)
    1. Have one representative of our firm attend a quarterly education program provided by SE2050, Carbon Leadership Forum, or other embodied carbon resources.
    2. Share the SE2050 library of resources with our staff.
    3. Share the embodied carbon reduction strategies as outlined in "Top 10 Carbon Reducing Actions for Structural Engineers" document produced by SE2050.
    4. Nominate one representative of our firm to participate in a Carbon Leadership Forum Community Hub and/or task force.
    5. Share the document "How to Calculate Embodied Carbon" with our staff.
    6. Attend a presentation or demo of an LCA-based tool used to calculate embodied carbon, specifically Building Emissions Account for Materials (BEAM) and EC3.

REPORTING: Embodied Carbon Data

a. **Getting The Data:**
The first year we plan to use BEAM LCA tool to quantify upfront embodied carbon, A1-A3 (cradle-to-gate). BEAM is currently in beta-testing. We have selected this tool because it provides embodied carbon data for carbon sequestering materials which are used in our carbon conscious projects. We may also incorporate EC3 available resources to find EPDs to inform design decisions, product comparison, and procurement options. The first year we will determine material quantities from construction documents with the understanding that actual material quantities used in construction may vary. In the future we would like to transition to using material quantities from BIM modeling.

b. **LCA Internal Training**:
As part of the education electives, we will be focusing on learning how to calculate embodied carbon using the BEAM LCA tool. The first year, we will

focus on training two members of our technical staff to be LCA specialists in our office.

c. **Reporting Commitment**:
The first year our goal is to submit embodied carbon data for a minimum of two projects to the SE2050 database.

d. **Reporting Elective**: (not required, 1 recommended)
    1. For a project submitted to the database we will ask the architect and owner for a carbon budget or a sustainability goal at the kickoff meeting.

EMBODIED CARBON REDUCTION STRATEGY: Action Steps

a. **Reduction Goal**:
Our embodied carbon reduction strategy will be focused on education and training for our staff and collaborating with contractors for reduced embodied carbon concrete procurement.
Education and Training: Our goal is to increase our technical staff's embodied carbon literacy through the SE2050 Education requirements and electives. All staff will have general knowledge and understanding of embodied carbon impacts, calculating methods, and reduction strategies.
Concrete Embodied Carbon Reduction: Our goal is to engage with contractors for 80% of our projects to collaborate on procuring reduced carbon concrete mix designs from suppliers. We will request concrete mix designs and collect data for SCM percentages used. Our goal is to quantify the carbon reduction using a conventional normal weight concrete mix as a baseline.

b. **Reduction Strategies Electives**: (1 required, 4 recommended)
    1. Collaborate with concrete suppliers to reduce carbon in mix designs.
    2. Work with a contractor during material procurement to meet an embodied carbon performance criteria on at least one project.
    3. Incorporate biogenic materials on at least one project.
    4. Integrate embodied carbon mitigation strategies in our General Notes.

ADVOCACY: Spreading the Word

a. **Marketing**:
We have been and will continue to share our knowledge and data via social media posts, webinars, and conference presentations to bring awareness to industry partners of ways to reduce embodied carbon in the built environment. All technical staff has added the SE2050 logo to our email signatures to bring awareness to our collaborators that we have joined the commitment.

b. **Proposals**:
   Language declaring our commitment to SE2050 will be added to our proposal template.

c. **Advocacy Electives**: (not required, 2 recommended)
   1. Share our commitment to SE 2050 on our company website.
   2. Discuss with the client the option of requiring that some of the structural materials come with facility-specific or product-specific EPDs.
   3. Share education opportunities with clients.