Executive Summary. The structural members of AEI Team 2 have addressed the many challenges facing the design of 350 Mission Street. This submittal includes a project overview, project performance goals, description of design process, rationale for our chosen design, analysis and design modeling summaries, and all associated analyses and justifications. Additionally, the submittal includes appendices and drawings containing supporting documentation of detailed calculations, floor plans, sections, elevations, modeling data and references.

Project Goals, Requirements and Introduction. In accordance with the project guidelines set forth by the competition, the structural discipline was responsible for:

- A design that limits structural damage from earthquake events
- A structure that limits building drift to ½ of the code allowed value
- Solutions that increase building life cycle cost and efficiency
- Consideration of architectural features and the structure's impact on them
- The design and detail of gravity and lateral systems
- A thoroughly detailed design of one typical floor
- Representative drawings and model documentation
- A design of the building enclosure with details to achieve a high-performance standard
- A foundation design

Personal goals were developed around these requirements. These goals are outlined in Section 2.0

Integration. Throughout the course of the project, the structural team used BIM technology, workflow and communication strategies to create an efficient structural solution for 350 Mission, and seamlessly integrate with the other disciplines. Structural design solutions were conceptualized by the structural team, discussed and analyzed by the entire project team, and carried to fruition by the structural designers. The structural discipline was additionally called upon to support the other disciplines in maximizing the potential for the whole building design.

Lateral System. The lateral force resisting system utilizes a concentrically braced frame core, coupled with diagonal exterior bracing. These were designed to reduce building drift and increase seismic efficiency to meet the project requirements. The system meets the ½ Code Allowable drift limit with a total drift of 26 inches at the top of the building, with all floors meeting the ½ Code allowable inter-story drift limit. This design effectively handles the seismic loads and allows the tenant to have immediate occupancy post Maximum Considered Earthquake (MCE). Additionally, the exterior mega bracing mobilizes the perimeter of the building in lateral resistance which relieves lateral loads on the core. This allows the concentrically braced frame core to be thinner and lighter, creating a 9100 sf increase of rentable space in the building over the initial 33-inch concrete shear wall design.

Gravity System. The gravity system was a multidisciplinary effort to design an efficient structure while ensuring the other systems present would not be limited. An efficient gravity system was formulated that limited beam and girder depths to a maximum of 24 inches. This allowed for a large floor-to-ceiling height of 9 feet 10 inches, and a 32 ½ inch plenum space for MEP coordination. Optimized member sizes and placement create open views which enhance working conditions for the tenant and cement the building as part of the urban fabric.

Lobby Area. A major structural consideration in the lobby was the potential for soft story behaviors created by the 5-story high space. Built-up sections were designed in order to handle the 54 foot unbraced column length. The design required custom sections consisting of a W14x730 with 1-inch steel plates welded between the flanges. The structural team also investigated methods of designing the 29 foot South West cantilever in order to preserve the inviting nature of the lobby space.

Façade System. The structural team coordinated closely with the other disciplines to design an attractive and efficient façade system to account for the seismic behavior. This process resulted in an extensive movements and tolerance report as well as in depth glass fracture and fallout drift studies. Ultimately a unitized system consisting of 1 ½ inch double pane glass supported by 2 ½" inch deep mullions spaced at 57 ½ inch intervals was identified and its structural anchorage detailed.

Sustainability. Optimizing the structural member sizes limited fabrication and shipping waste over the project timeframe. The structural team worked closely with the construction team to achieve the least amount of steel weight for the building. Using factors such as steel weight and schedule duration, a carbon efficiency study of the structural design was conducted using SOM's Environmental Analysis Tool.