Social & Economic Considerations: There is significant appeal to living in an apartment with a lake view in Burlington’s historic Old North End. As the already congested area continues to develop, this style of building is a valuable option for difficult sloping lots. The building includes a garage on the first level, which has a light-scattering fence so car headlights won’t be as distracting for people on the waterfront. The overall layout of the building is such that almost all of the apartments will have some view of the lake.

Meeting and Exceeding the Client/Owner’s Needs: Our client sought an affordable solution to the challenge of building on a steep slope on a tight site. This difficult terrain and the visibility from Burlington’s waterfront presented an ideal location for a bold, stilt-style structure. The angled steel columns could have more easily been straight up and down, but our team was committed to delivering the desired aesthetic. On top of all of this, our services were within the budget set by our client.

New Applications of Existing Techniques/Originality/Innovation: The steel columns are canted mainly for the aesthetics of the building due to its visibility from the waterfront. However, this design choice does serve the lateral stability system of the structure. If the columns had been straight, the design would have needed diagonal bracing or more concrete shear walls. Our solution to this challenge created the look that our client wanted while incorporating structural stability. Geogrid attached to the concrete walls was utilized to hold the retaining walls to the uphill slope. The geogrid was post-installed to the face of the walls to facilitate construction. A combination of the geogrid retaining walls, traditional retaining walls, and piles/pile caps were used to stabilize the building on the slope.

Complexity: This apartment complex is situated entirely above grade on sloped ground. It was designed so that the building is primarily supported on canted steel columns that sit on concrete footings which in turn sit on steel piles driven into the hillside. Our engineers enjoyed figuring out how to make the steel columns look somewhat random, but still make sense structurally. The site itself was a challenge, but to support a four-story building along with all of its contents was another layer of complexity. Slope stability and building stability were particularly challenging. Finding a solution that was buildable and within budget required many iterations of design with the geotechnical engineers and close collaboration with the contractors and developer.

Technical Value to the Profession: Structural engineering design is often an invisible component to a building. This apartment complex is a reminder to the public that a building is more than what it appears from the outside! Not many buildings in Vermont have such a bold appearance, especially apartment complexes. As more development begins in our already saturated city, construction like this could serve as inspiration.