

Reuse and Sustainable Expansion of the Glass Pavilion

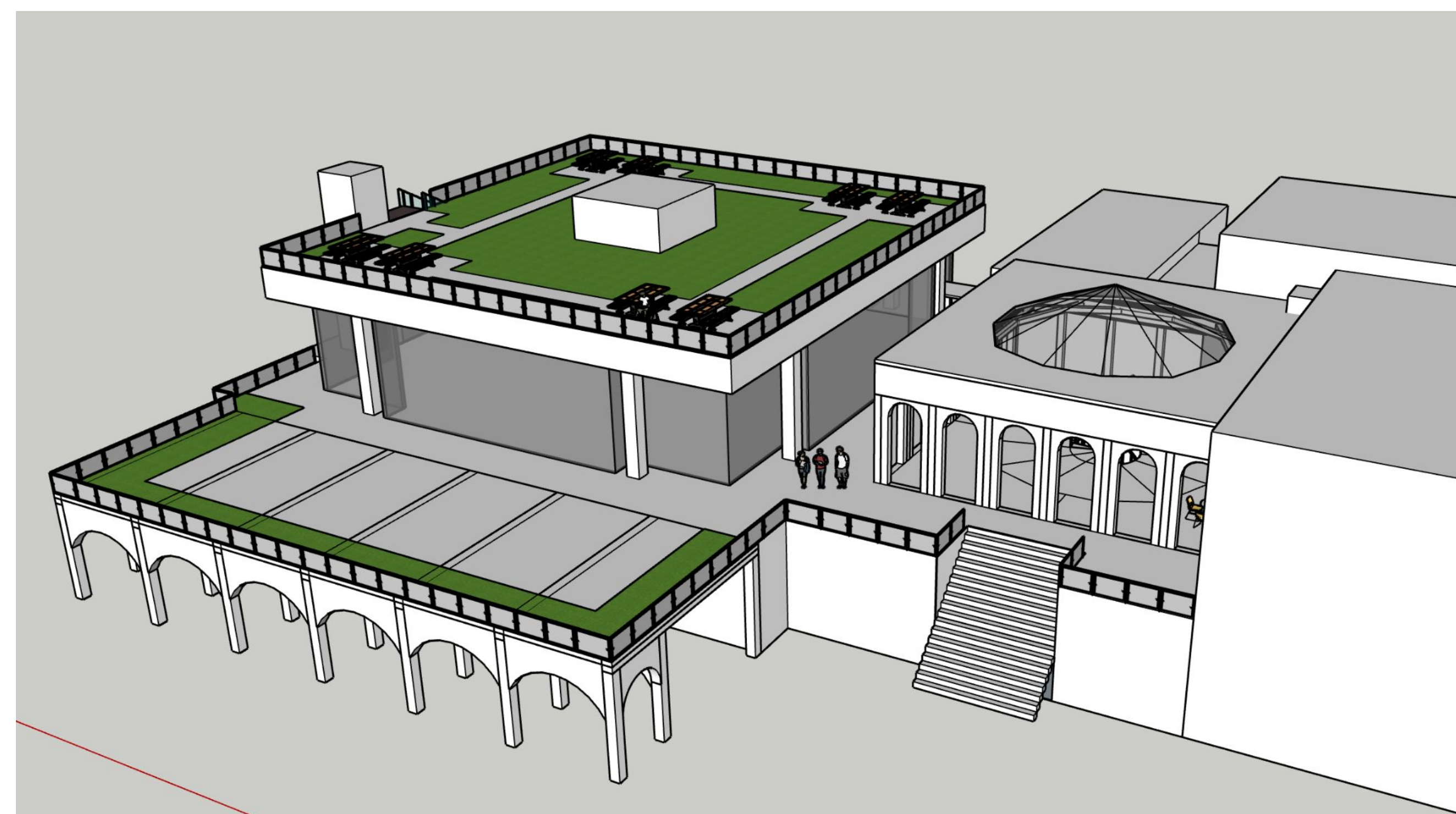
Tim Carlson, Andrés Melendez, Maggie Smith

Johns Hopkins University | Whiting School of Engineering | Baltimore, MD
Design Day 2022



Introduction

The Glass Pavilion and Terrace on the Johns Hopkins Campus were intended to be places of community, with shared dining space below in Levering Kitchens and an assembly space in the Pavilion. However, it does not serve this purpose, as the space is underutilized by the community. This project proposes a design to increase functionality while honoring the existing structure and prioritizing environmental sustainability.



Objectives

The project has two main aims: **increase the usability of the space and transform it into a community hub; and promote environmental sustainability.** This was done by adding:

- 1) A new accessible green roof on top of the Glass Pavilion
- 2) A new pavilion on the south terrace
- 3) Extension of the western terrace

Materials and Methods

The materials used to design our additional structures include **reinforced concrete, steel, brick masonry, and carbon fiber reinforced polymers.** Bricks will be recycled from the demolition of the Mattin Center, and concrete will be made with recycled plastic as an aggregate material.

Methods used to create this proposal include:

- Modeling the existing & additional structures using SketchUp & CAD
- Structural design for both gravity and lateral load-resisting systems for all existing & additional structures,
- Foundation design for extended terrace and glass pavilion

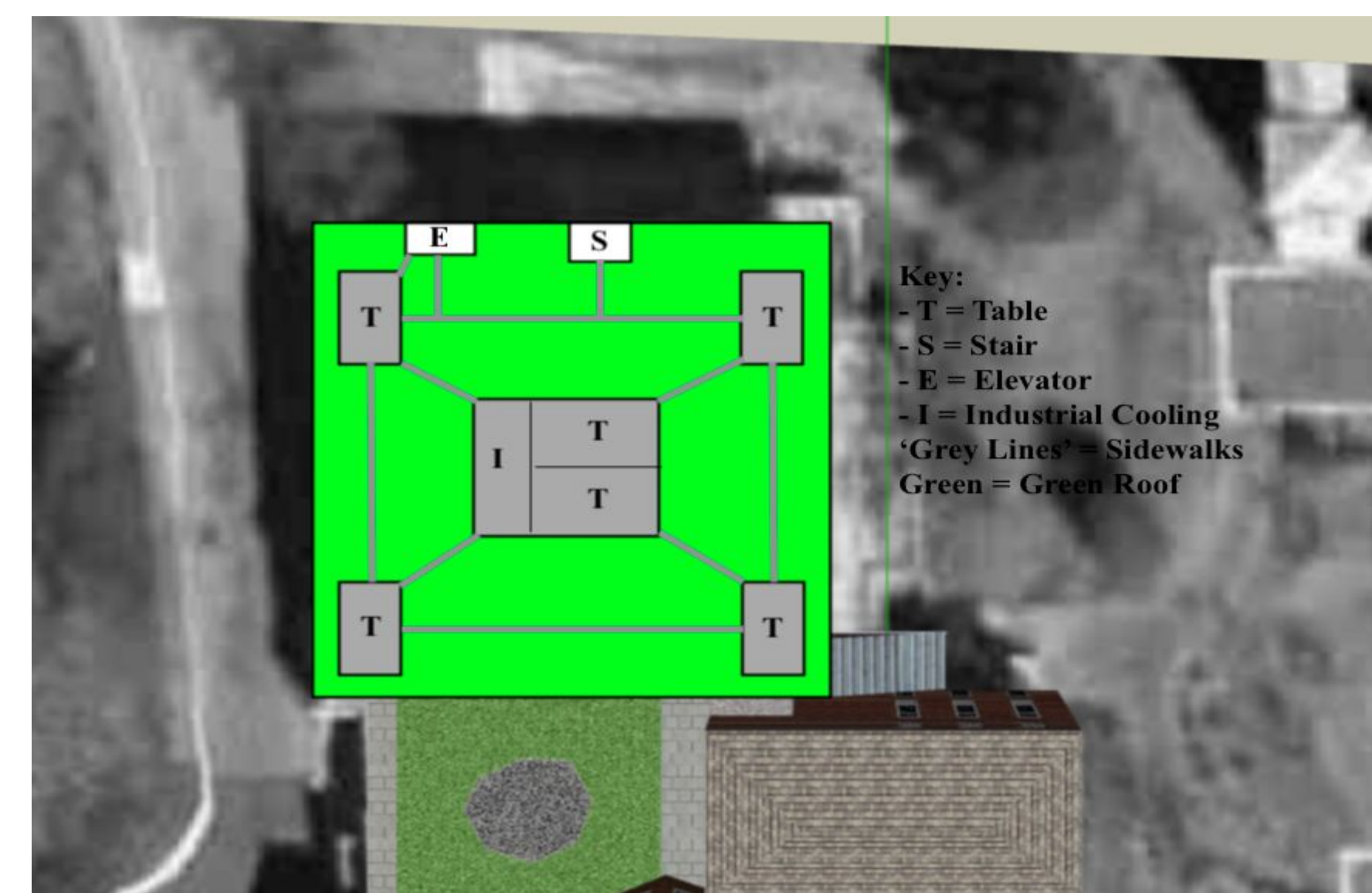
Proposed Design

GREEN ROOF + GLASS PAVILION STRENGTHENING

An issue with the “Glass Pav” is that it does not prioritize environmental sustainability. Our group designed a nonintrusive green roof, an ADA compatible elevator & new staircase to the roof to increase roof utilization. Fortunately, the existing glass pav exterior columns are strong enough and will not need to be reinforced.

Structural Changes to enable the Green Roof:

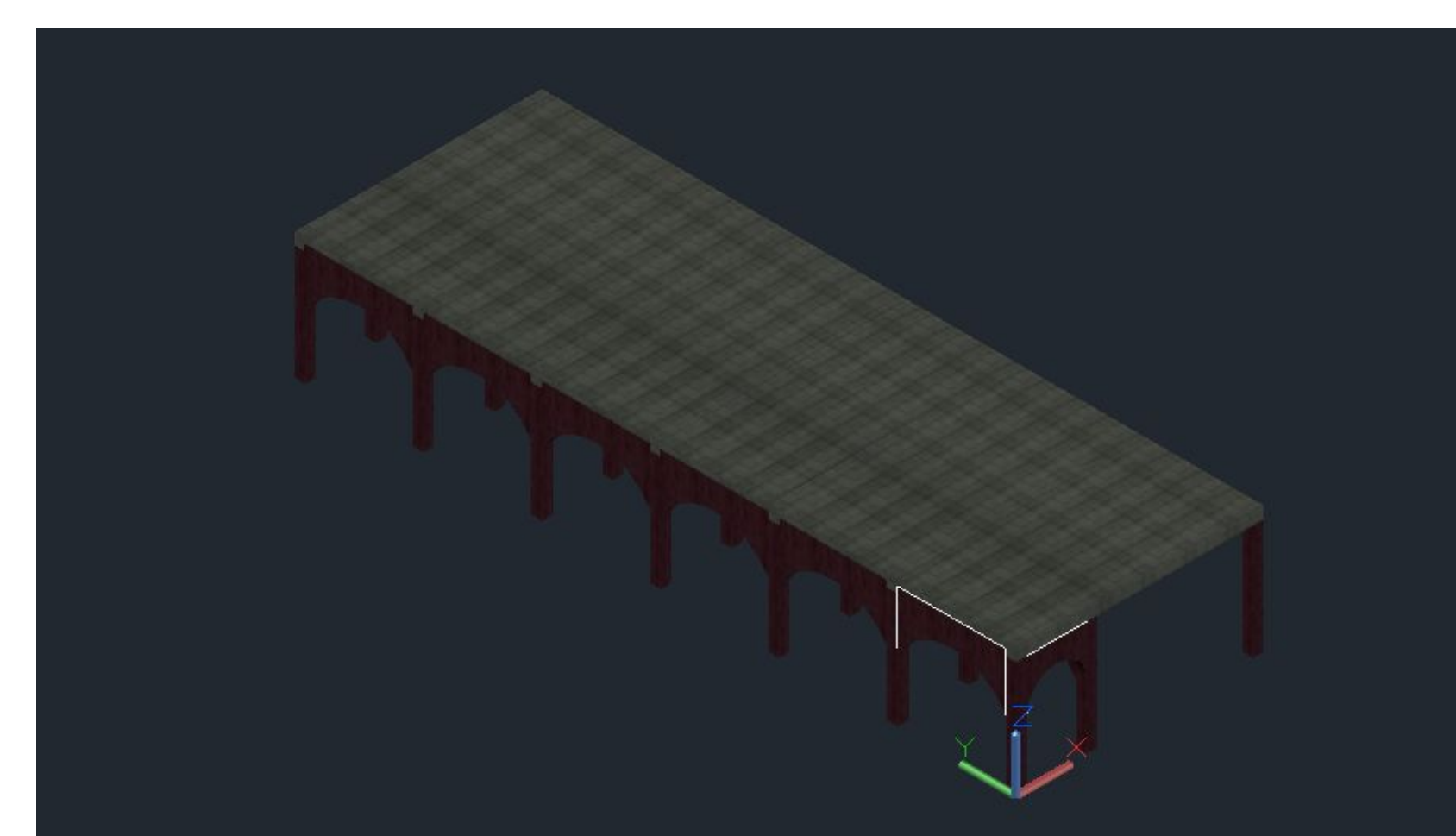
- Existing exterior Glass Pav. beams will need to be reinforced with Carbon Fiber Reinforced Polymer (CFRP) to cope with additional loading
- Increase foundation capacity by connecting the regular square footings together to add area to the overall combined footings



EXTENDED TERRACE

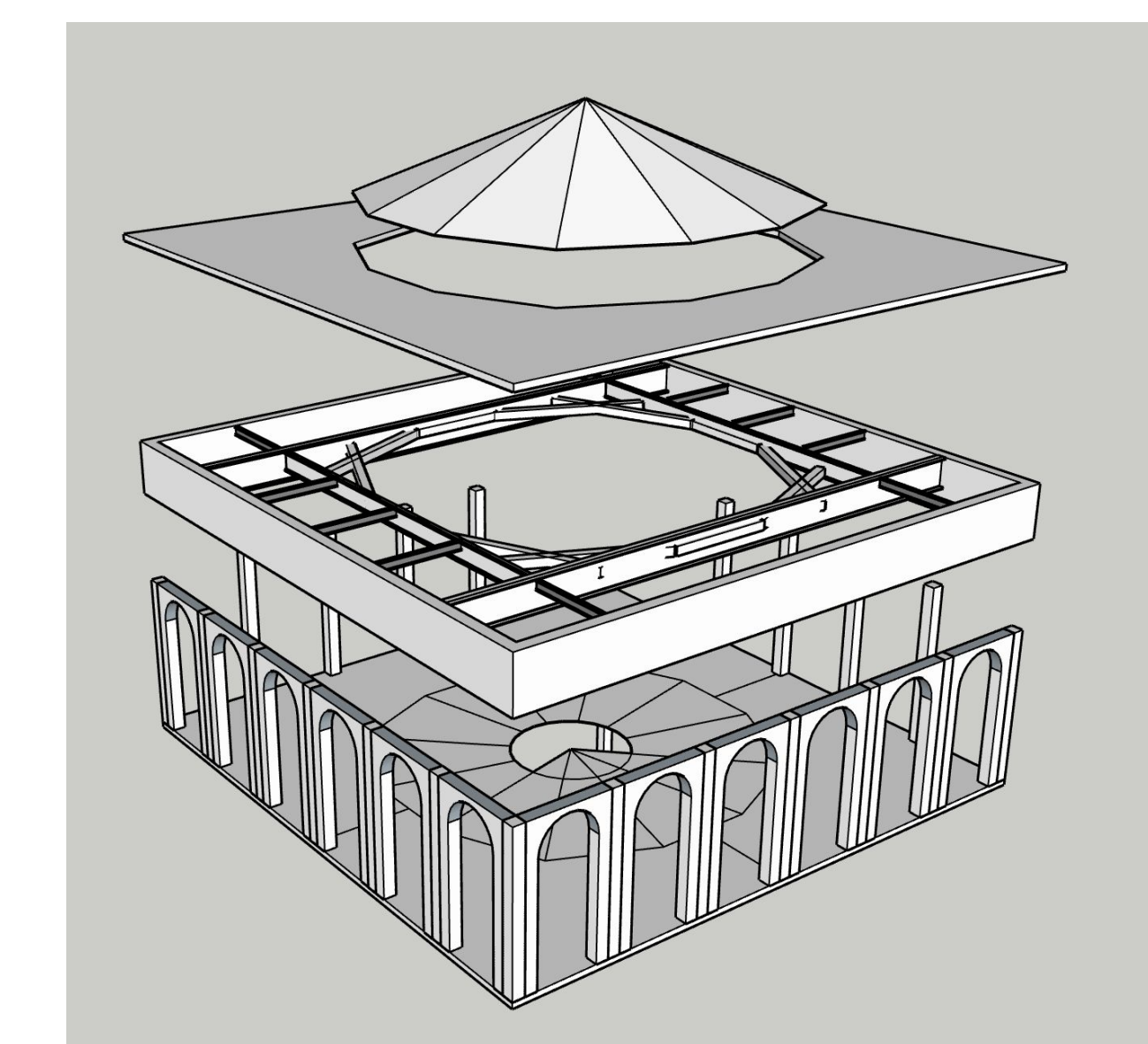
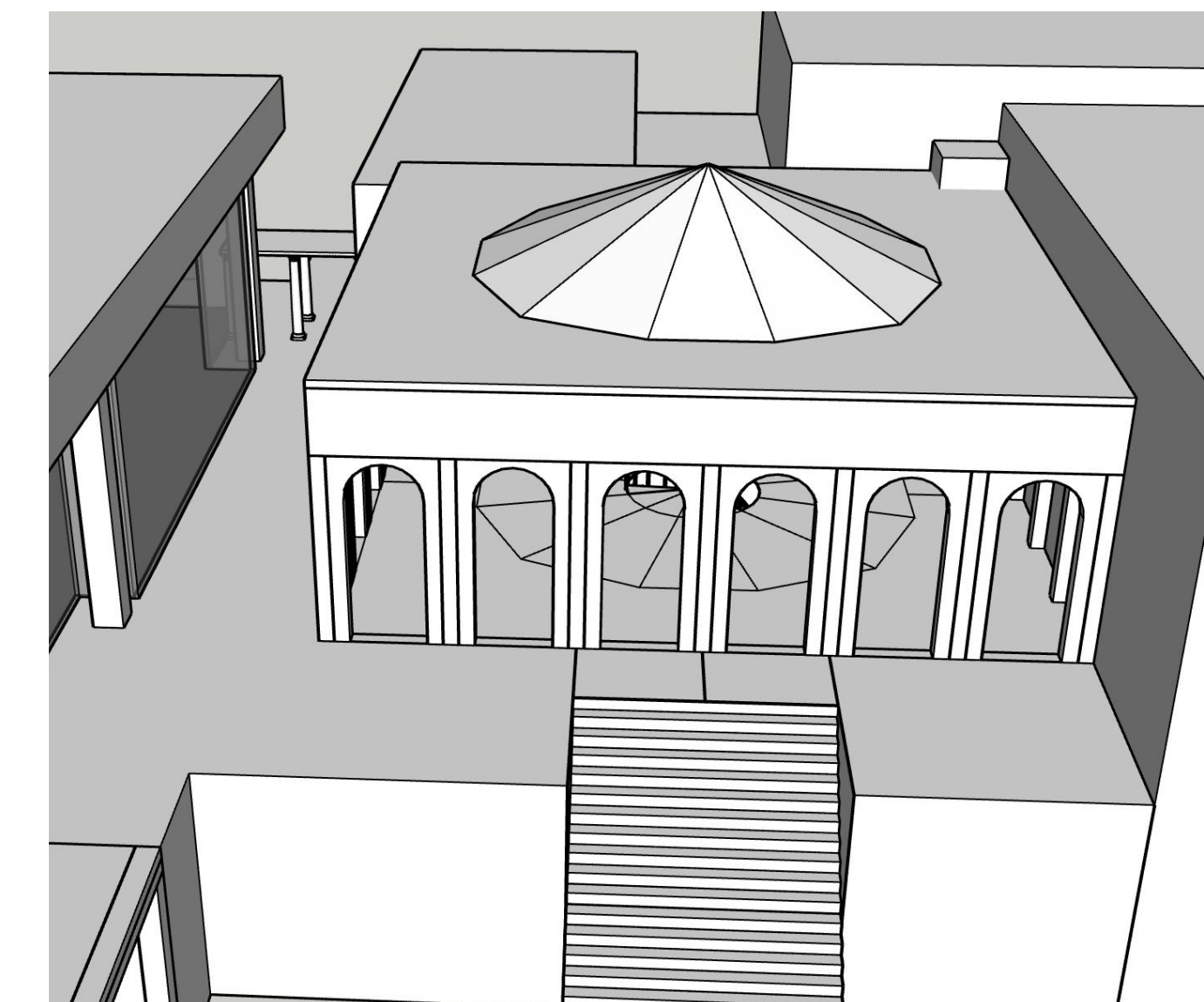
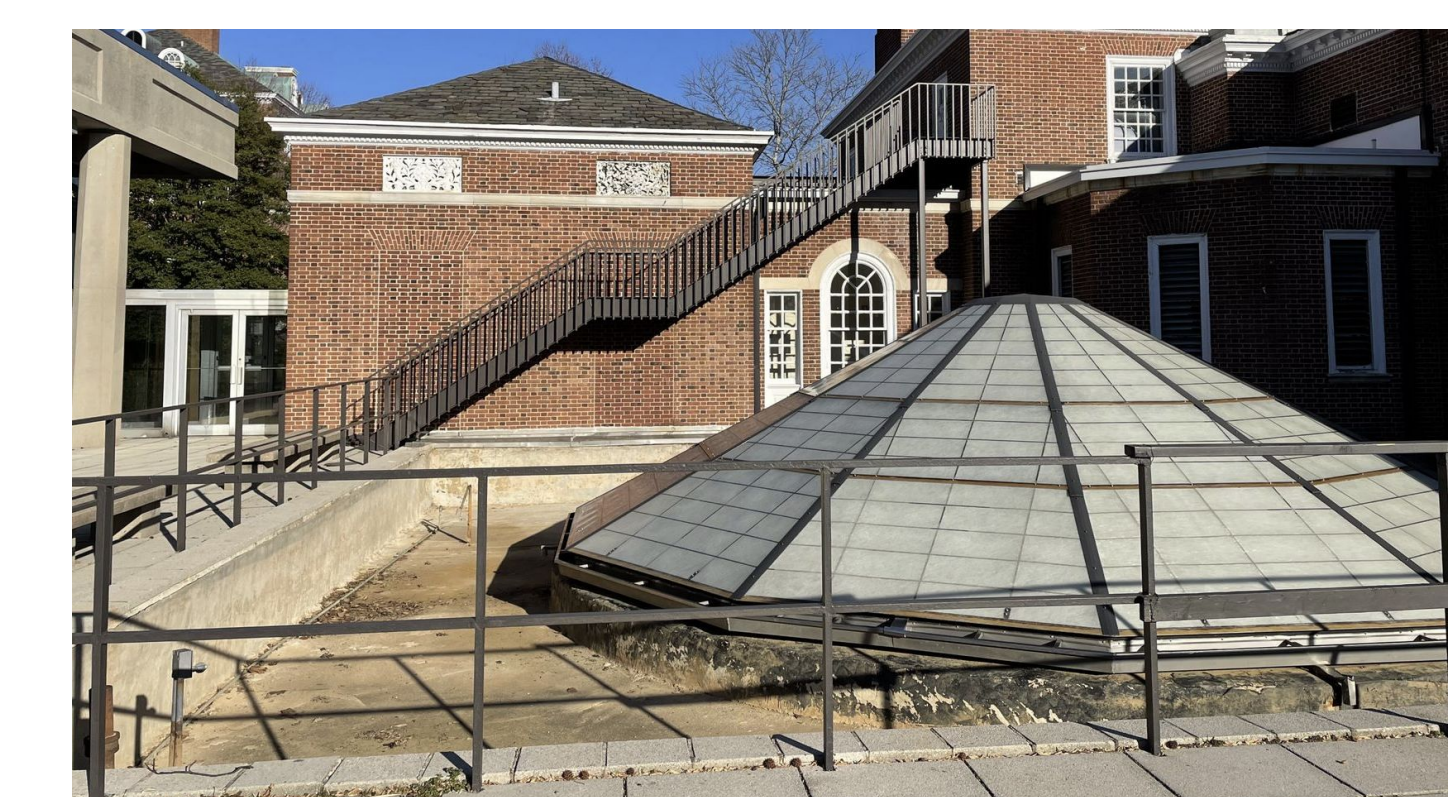
The current area surrounding the Glass Pavilion is small, uninviting, and underutilized. We propose a **30'x 90' extension** to the west of the glass pavilion over the existing road, built with reinforced masonry columns and reinforced concrete slabs and beams.

The columns will be adorned with prefabricated brick arches to imitate motifs common around campus below the terrace, while maintaining the contemporary style of the Glass Pavilion above in the slabs and beams.



NEW PAVILION

Currently, the skylight and sunken area on the south side of the Glass Pavilion take up a large portion of the terrace. By raising up the existing skylight and creating an enclosed pavilion, this space becomes functional and inviting. A spiral staircase occupies the hole left by the skylight to connect the dining space below to the pavilion. Therefore the space can function both as a place for students to meet and study, and to eat. The new pavilion reflects the rest of campus in its style, which connects the area to the surrounding buildings. The addition of a large staircase on the west side of the terrace and the conversion of the enclosed walkway connecting the Glass Pavilion and Levering to a portico creates more connection to the rest of campus and makes it easier to access the space.



Top left: Existing terrace
Top right: Proposed design
Bottom left: Exploded view of the upper floor. The spiral staircase would occupy the hole at the bottom.

Conclusion

By focusing on sustainability and accessibility, our team was able to re-imagine the Glass Pavilion. These designs meet the necessary design requirements for implementation and safety.

Please feel free to reach out to Andres, Maggie, or Tim with any questions!

- Andres: cmelend3@jhu.edu

- Maggie: msmit345@jhu.edu

- Tim: tcarlso9@jhu.edu