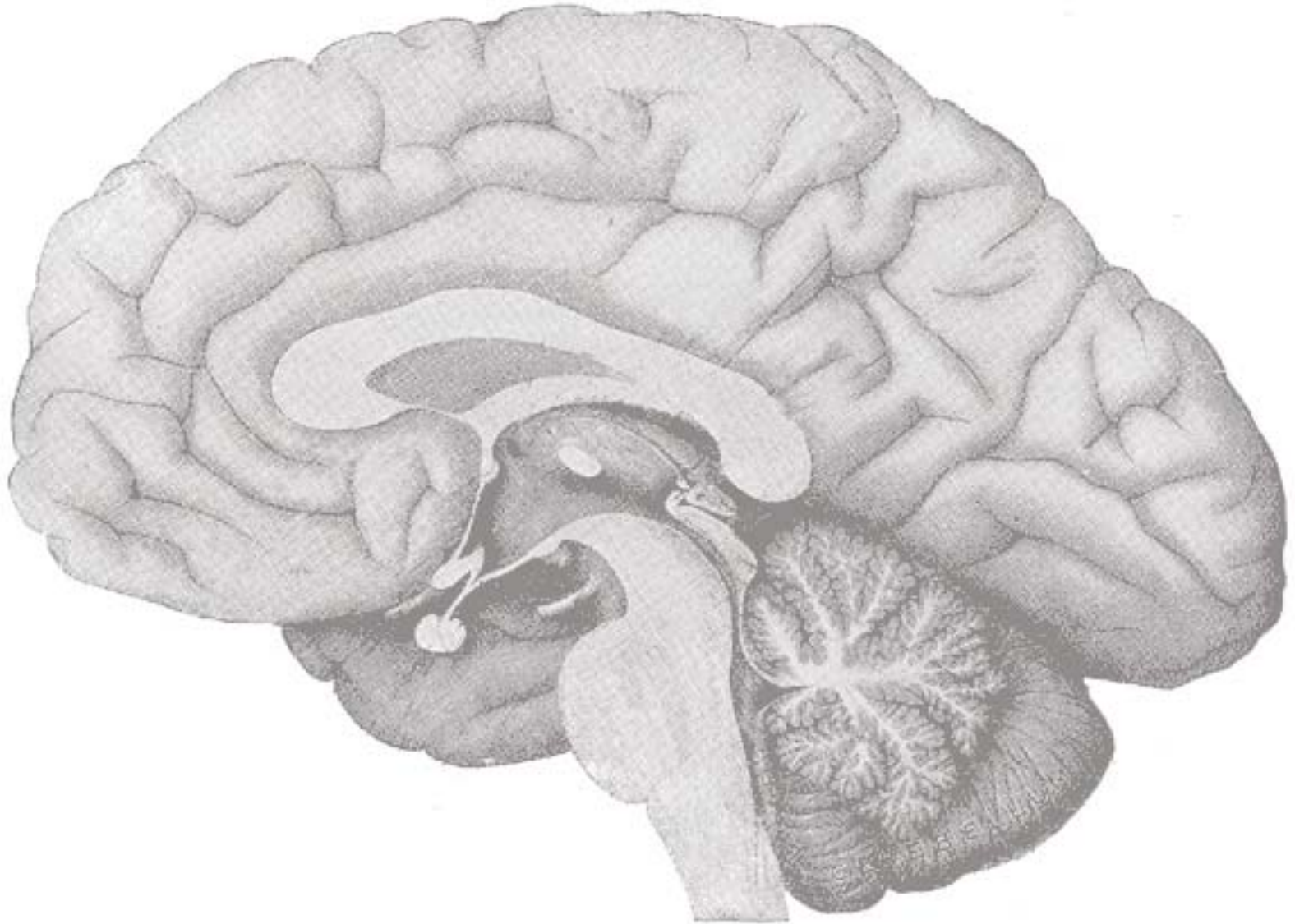


AN ARCHITECTURE OF NEUROSCIENCE



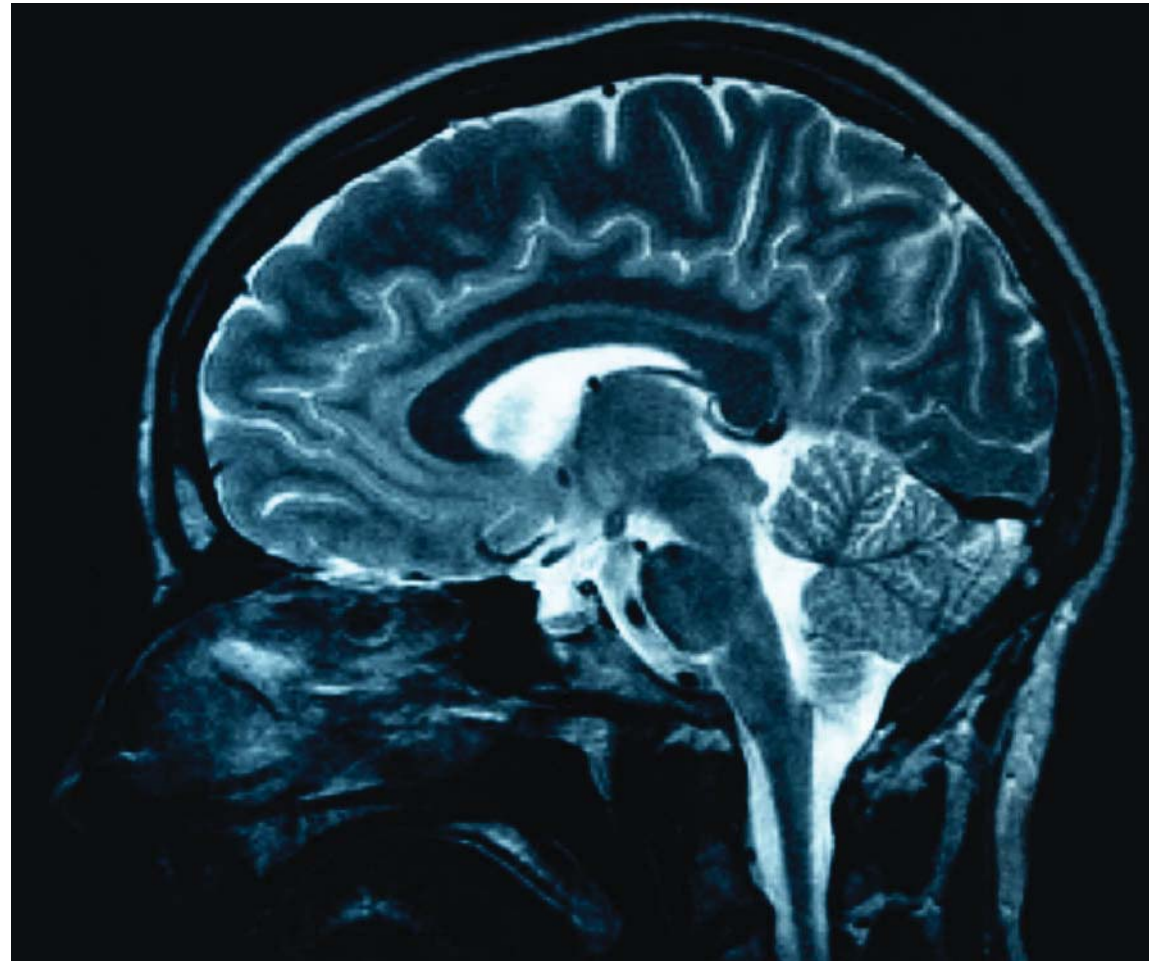
THEORETICAL PREMISE

How can a designer incorporate a knowledge-base of neuroscience in order to better understand the perception of those engaging in it.

Neuroscience (Hard sciences)

Key role of understanding perception of the environment to influence experiences and memories.

“How the body relates to a space can be studied independently of what is going on in the mind (e.g., ergonomics), but how the mind engages space has to include the body and the brain of the individual. The action of engaging a space is key to understanding perception. The levels of conscious experience vary as the body is “registering the environmental variables’ effects on our nervous system -- heat, light, noise, smells, tactile sensations, and our perception of movement and spatial orientation” (Eberhard).



At a deeper level of consciousness we are “simultaneously experiencing space as assembled by our sensory system and combining this experience with memories of places similar to the one we are in” (Eberhard).

Psychology(Social Science)

- perception
- emotion
- attention
- intelligence
- motivation
- cognition
- personality
- interpersonal relationships
- behavior

There are many variables that affect the way we experience space, mainly because of our unique memories of the past. Our perceptions are never constant and continue to adapt to the new situations we encounter. What we can do is find the consistencies of our experience which are based on biological means.



Phenomenology(Philosophy)

What connects this philosophy with both neuroscience and psychology is the goal of making the subjective ideas objective.

Heidegger's work sometimes discussed with architects in mind. Especially his thoughts on dwelling and place.

Husserl's concept of intentionality is defined as "the power of minds to be about, to represent, or to stand for, things, properties and states of affairs"(Jacob). This concept is important as a basis for how the mind creates representations of the environment.



Phenomenology(Architectural theory)

“Our sense of awe is influenced, in part, by having space above our head that is not visible until we move our eyes (and probably our head) upward.” He then explains this by using a suggestion by the neurobiologist Semir Zeki stating “raising our eyes upward to see a spire on a cathedral was transformative—it stirs some primal notions of something ethereal.”

Influence of light in the chapel, “The sensitivity of our suprachiasmatic nuclei (SCN) to light—driving the circadian rhythms—influences our alertness. The play of light and shadow may trigger the SCN to “play with alertness” in a way that we find stimulating.”

“How much better could we serve our clients and the public if we understood how their brains enable perception of their physical environment and generate physiological responses to it?” (Eberhard). These are the types of questions we should be asking in order to further the profession



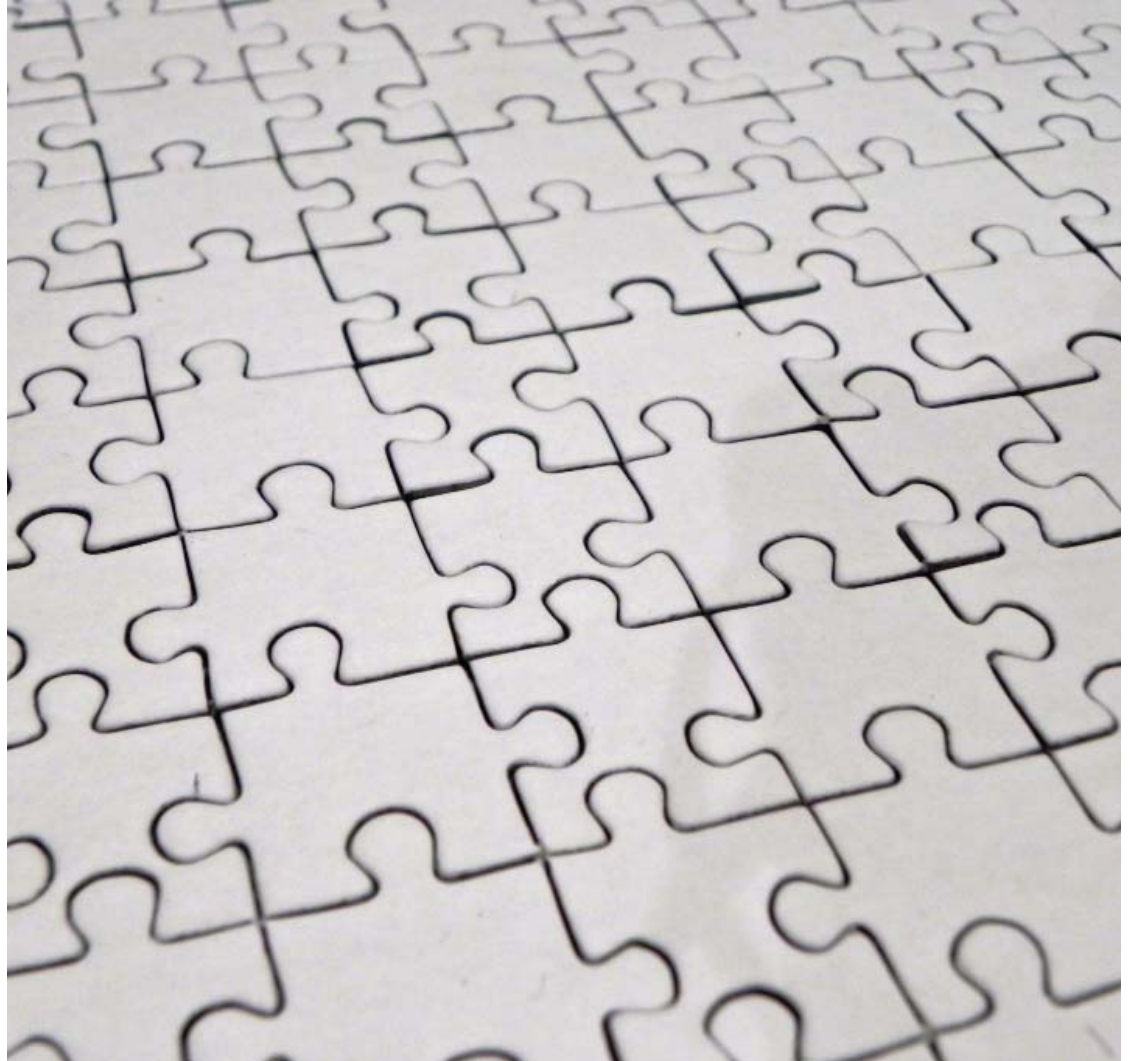
Summary

What is important is combining all of these areas to reach new conclusions which can not be drawn from one area alone.

Architecture in itself is the synthesis of many ideas. Vitruvius was one of the first architects to write about the practice in his book *De architectura*. He spoke on many things that influenced architecture such as astronomy, medicine, and mathematics.

Today there are so many fields of study with great depth that it makes it impossible to be a specialist in another field. Inspiration and guidance can come in many forms which is why the study of other subjects is of importance.

We must be willing to take these leaps, as many architects are doing, if we want to further our understanding of experiencing the built environment.



Neuroscience in Workplace Design

Hypothesis - 1

“Having a view to provide a connection to the outdoors increases the cognitive activity of laboratory scientists.”

Comments: Intuitive design in accommodating view of outside activities, light, and weather. Why does the brain respond to views?

Hypothesis - 2

“Break rooms for rest, conversations, and snacks located in the midst of laboratory spaces impact the brain in a way that provides intellectual refreshment.

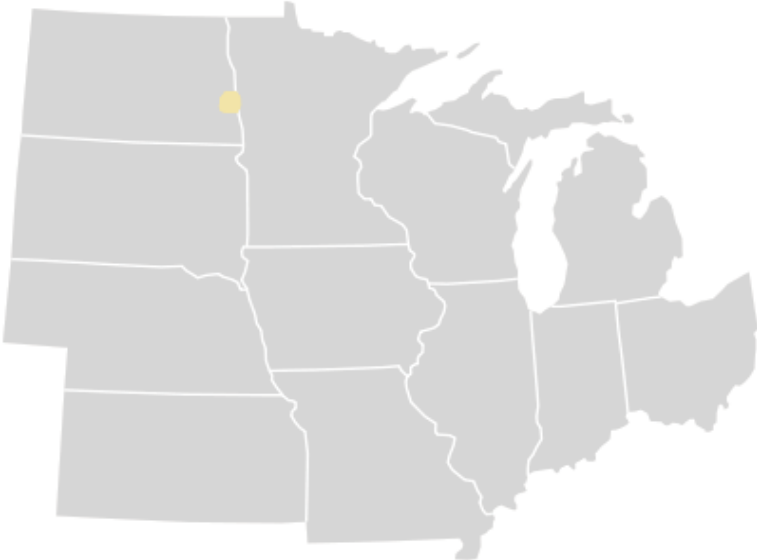
Comments: Integrative spaces to bring interdisciplinary research efforts sown by publications of occupants.

Neuroscience studies

1. Natural daylight increases cognitive capacity(essentially the same hypothesis as the one proposed for school rooms).
2. The location of a research facility in a rural setting - providing isolation and quiet- contributes positively to higher levels of cognitive activity.
3. Offices with views of nature for all who work there increases the quality of the working experience.
4. Interactions between researchers from different disciplines enrich the data stored in the cortex in a manner that is measurable.

“Brain Landscape” John P. Eberhard

Location

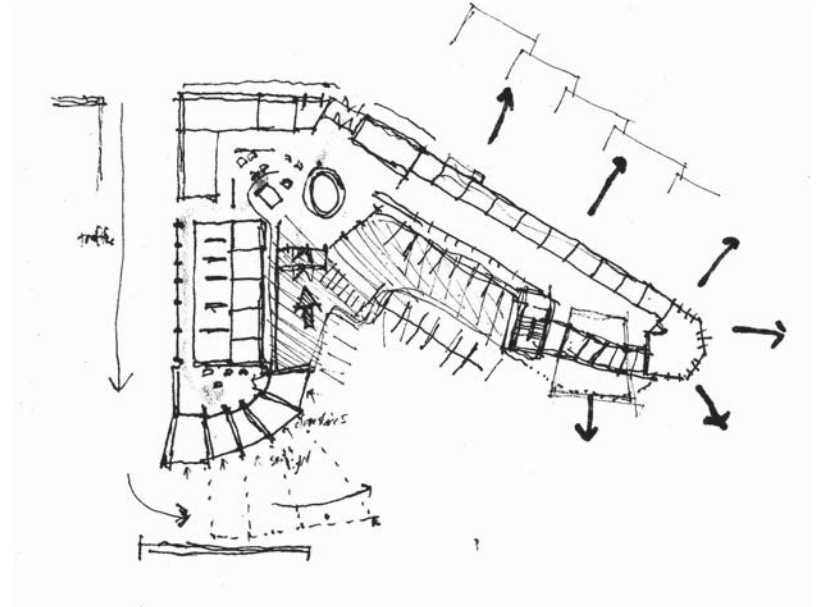
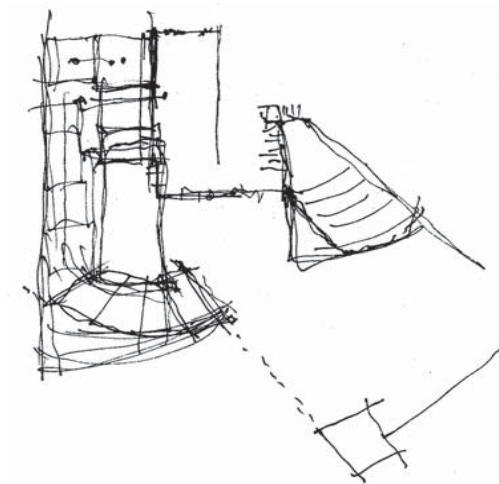
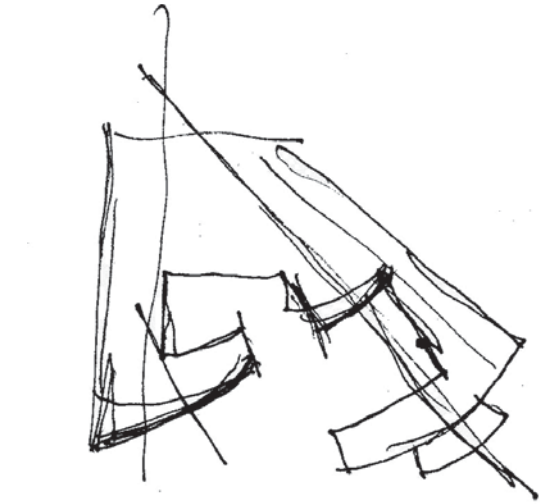
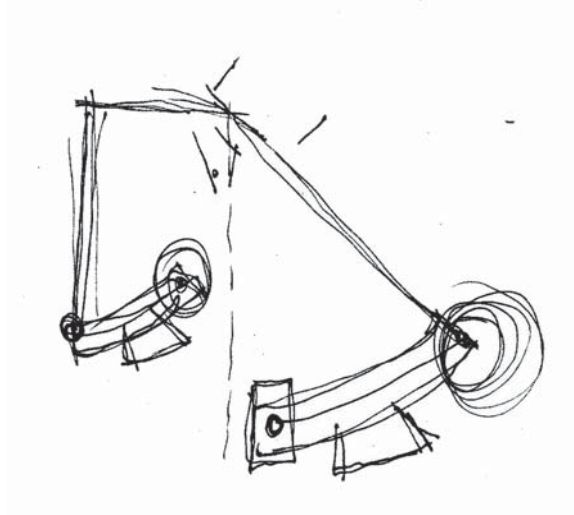


Site Character



Process

- Office views to river
- Nodes for way finding
- Protected courtyard
- Corridor views to outside
- Natural light opportunities
- Integrate existing masonry facade
- Organized along NP AVE.
- Echo of primary node curve
- Tie building corners with materiality

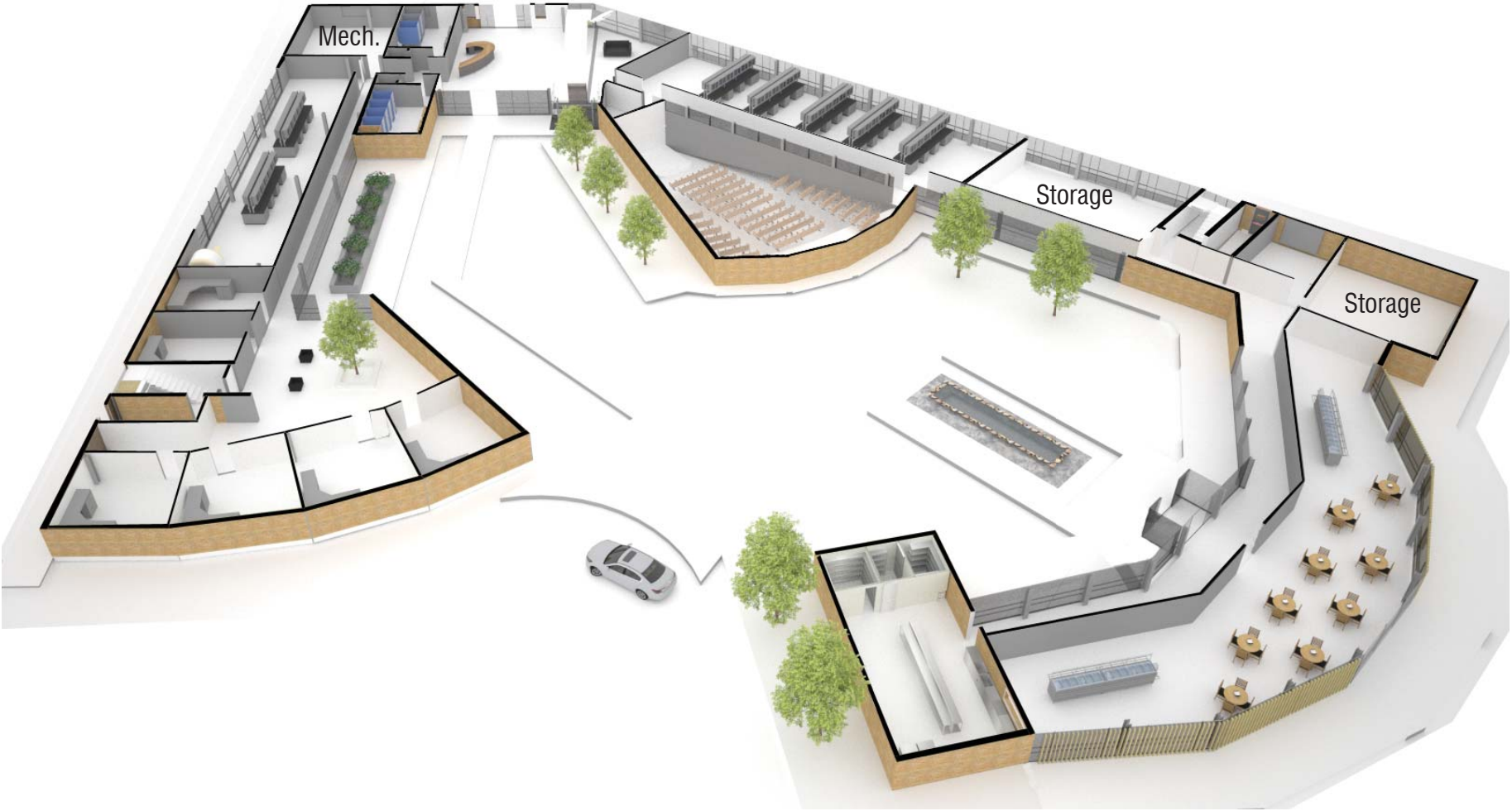




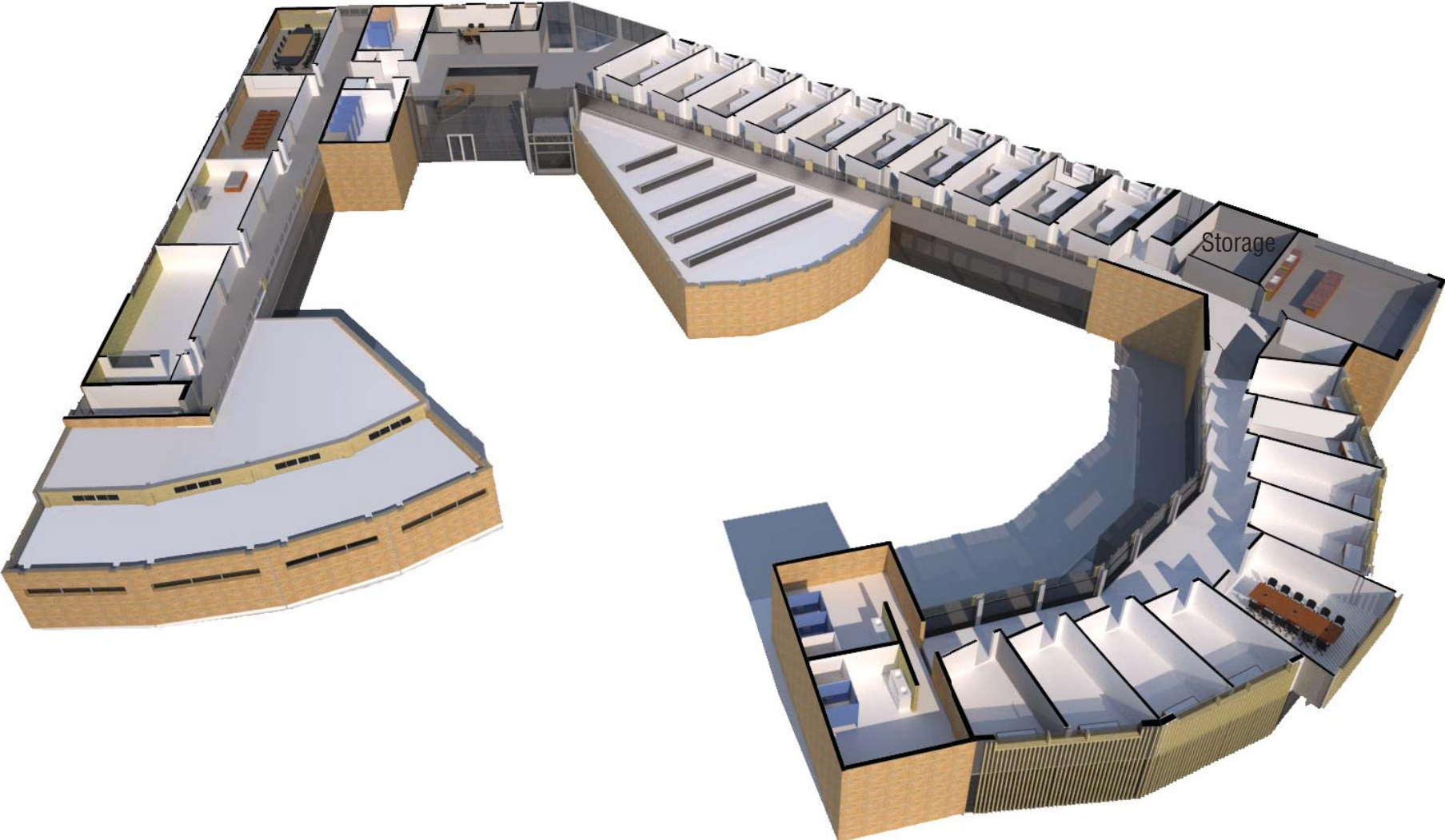
Site



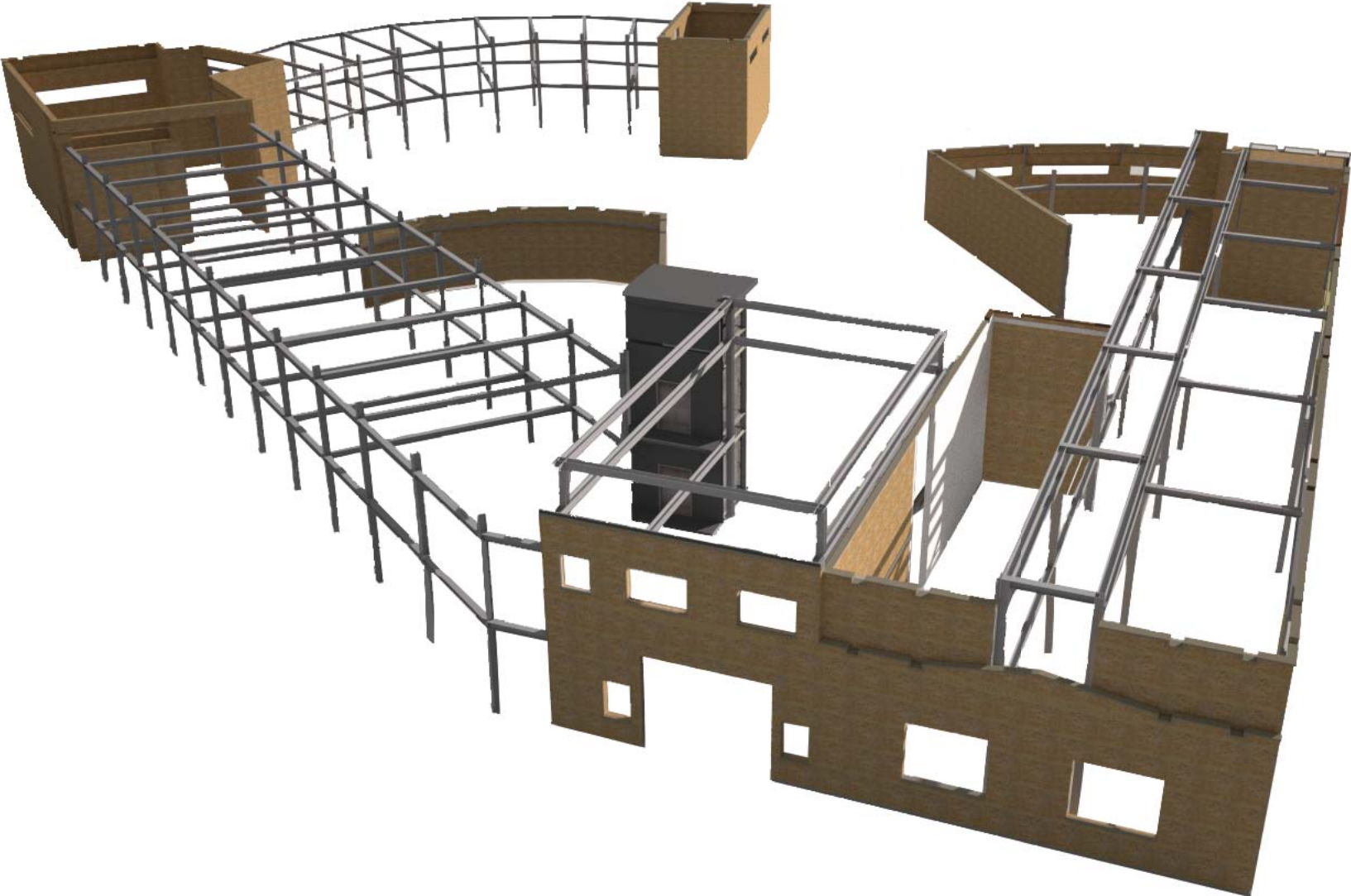
Ground Floor

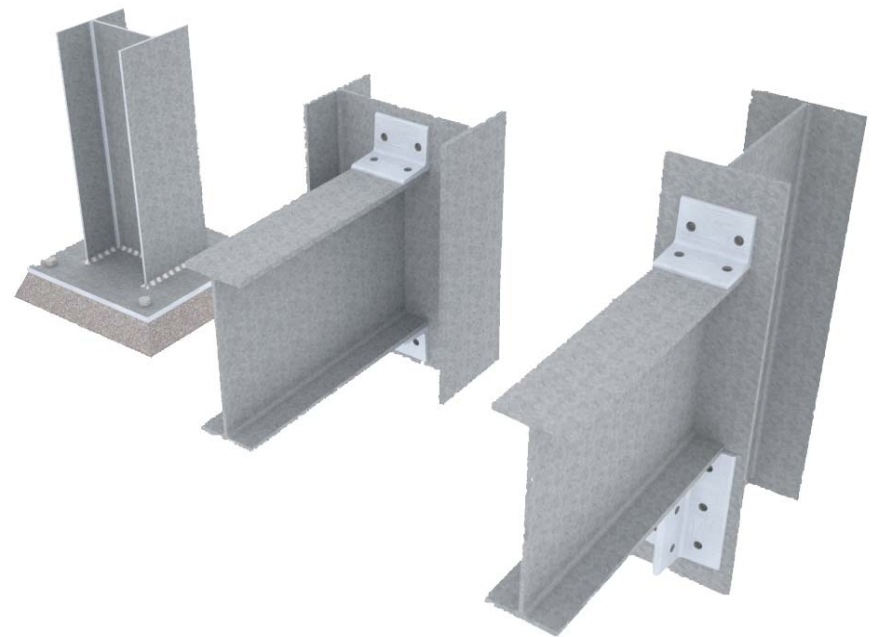
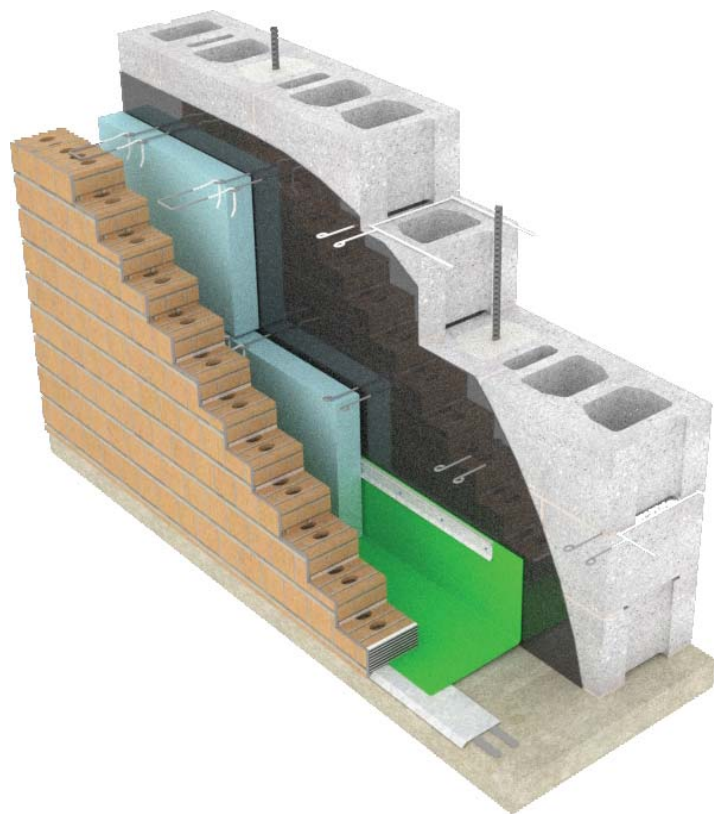


2nd Floor



Primary Framing







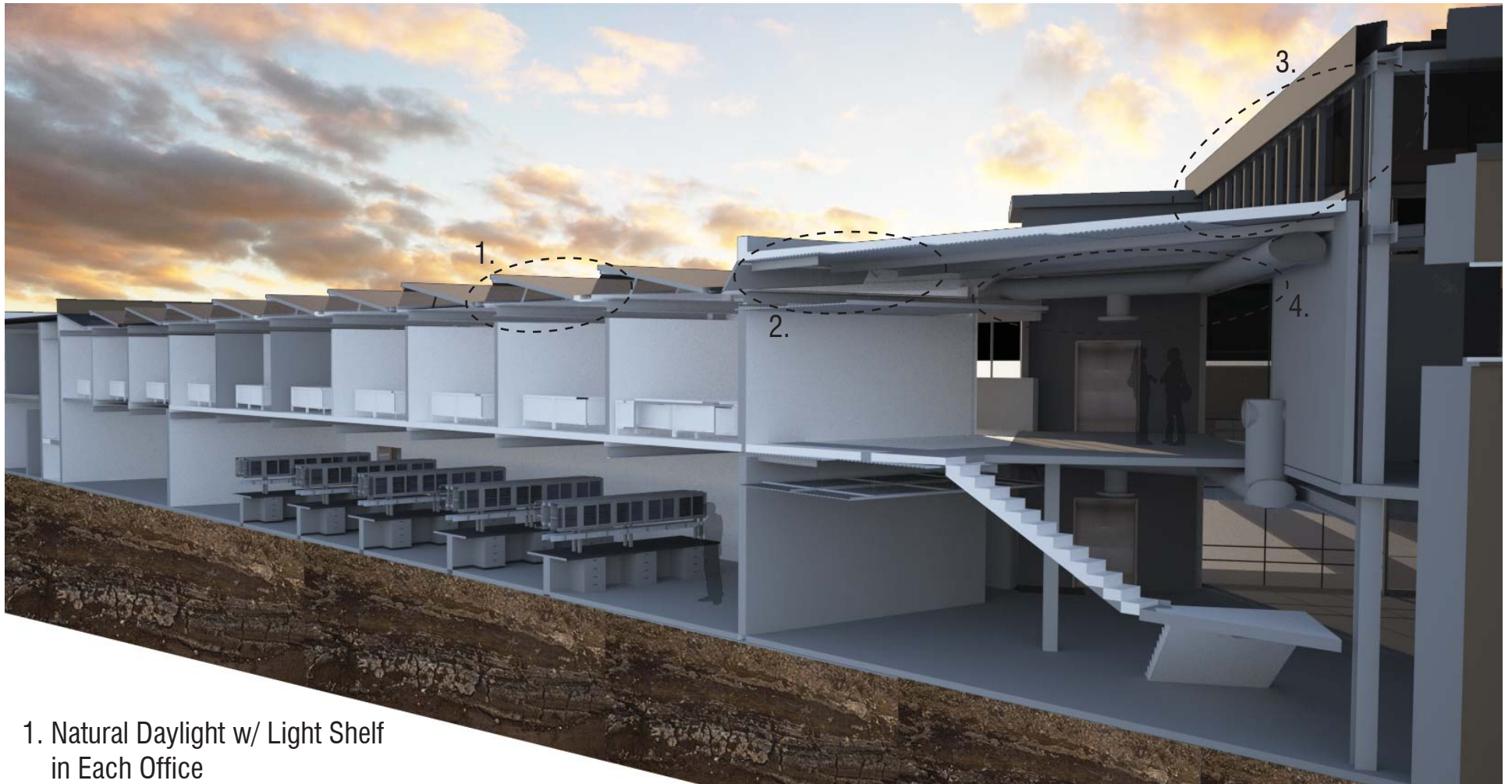




1. Clerestory Along
Corridor Influenced by
Existing Site Gantry

2. Second Floor Addition
Sensitive to Historical
Character

3. Views to Courtyard



1. Natural Daylight w/ Light Shelf
in Each Office

2. Concrete Slab with Metal Decking and Steel Joists

3. Lobby Clerestory as a Beacon to the Community

4. Supply Air Duct through Main Corridor