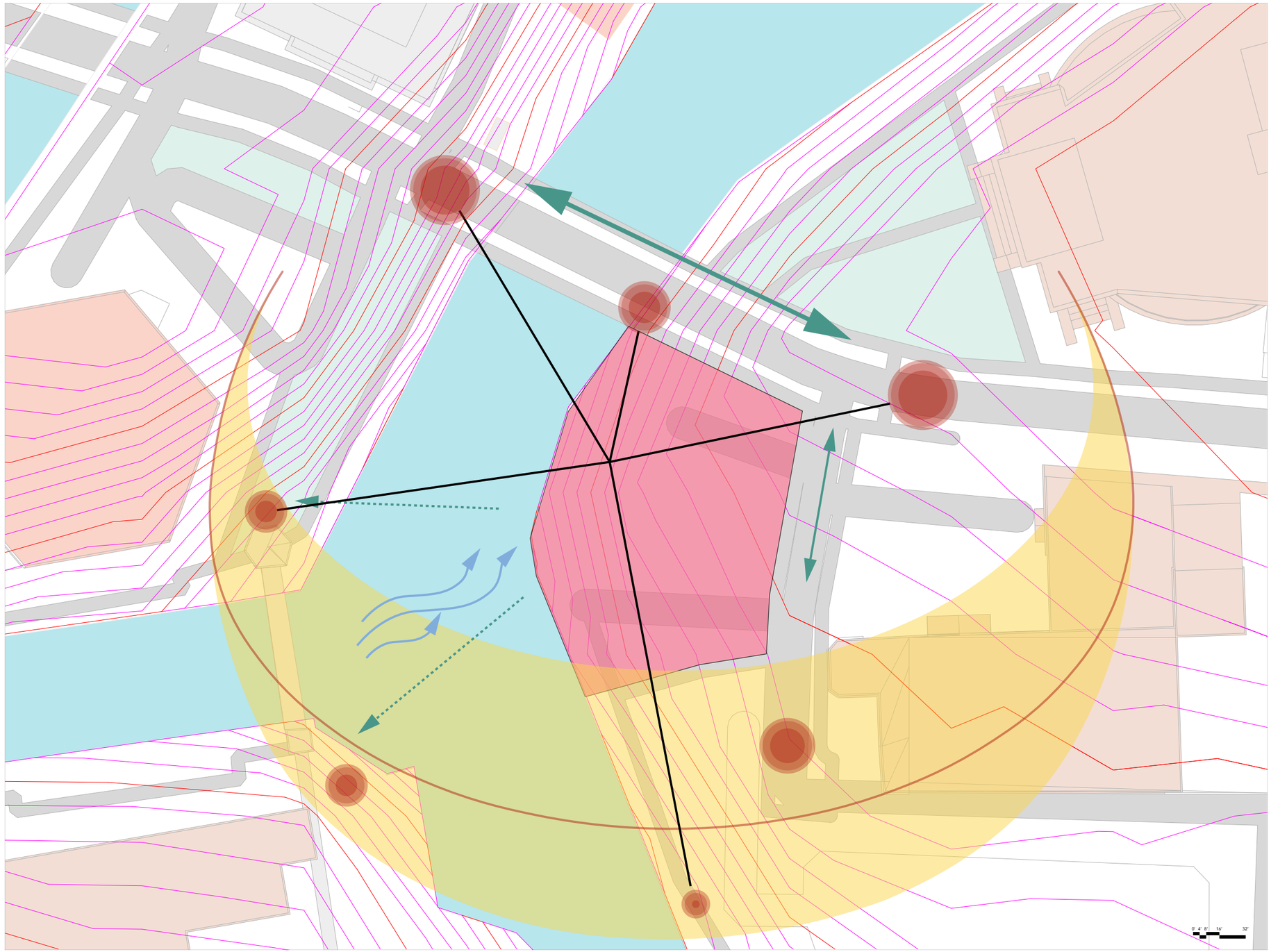
The NOV1ST Center
Lowell's New Makerspace

Duy-Quang Nguyen
Prof. Anthony Piermarini

ARCH 3500 STUDIO 06 - SUMMER 2022

Index of Phases

Phase 1: Site Context
Documentation and Analysis



The site location has an advantage of being adjacent to the Concord River, about the old mill district, and connecting Lowell's Back Central and Belvidere.

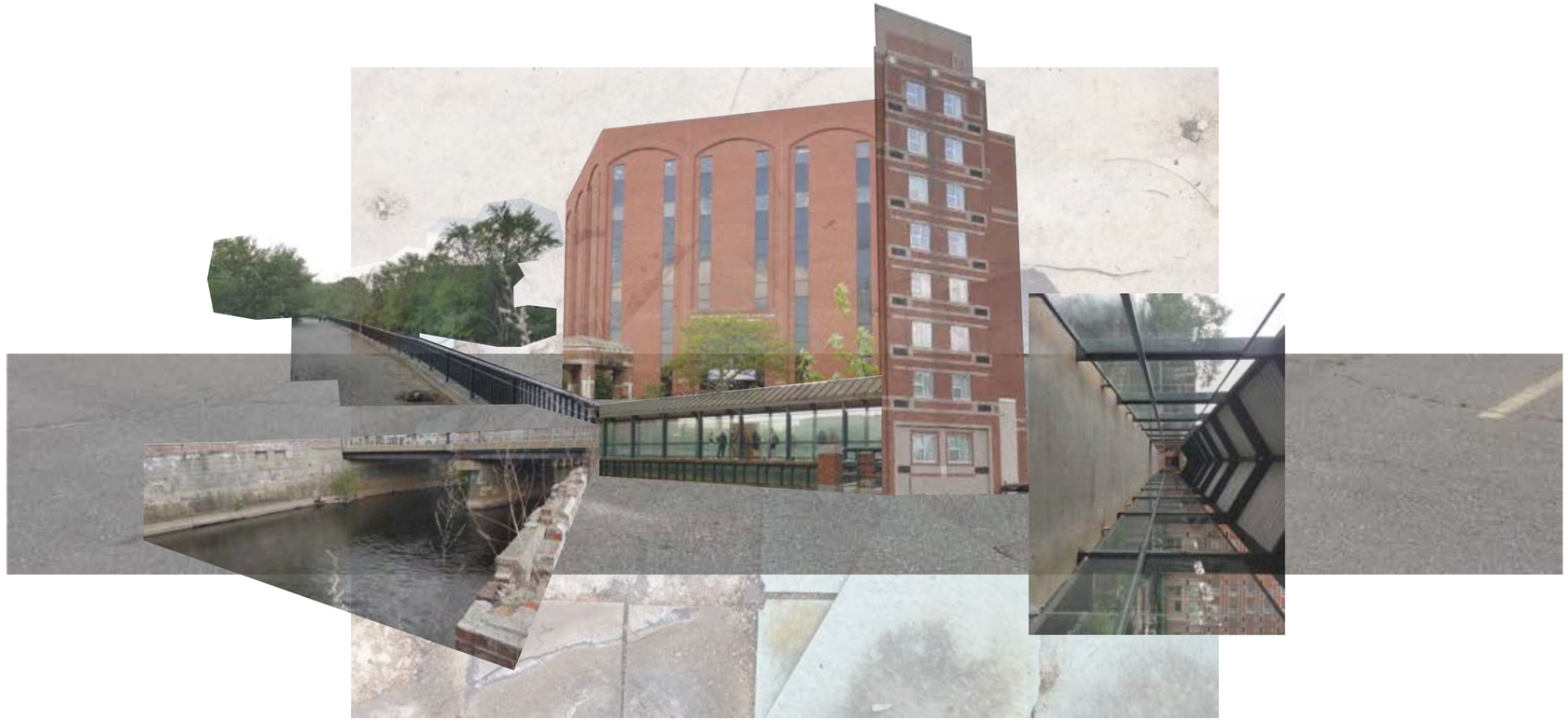
The nature of its lot boundary opens like a fan towards the waterway in contrast with the less traveled Davidson street almost dictate the program suggestion.

Additionally, the site interrupts the pathway from the bridge at the end of E Merrimack St and Kearney Square to Concord River Greenway Park or further south to Eastern Canal Park, while visually connecting to Lowell Memorial Auditorium and Middlesex Community College and UMass Lowell Inn & Conference Center across the river, making it a dynamic potential community space.

However, from observation of the current situation, despite lying on a busy street, the traffic simply passes by, missing this beautiful historical corner. Therefore, the new building (complex) has to capture the opportunity and establish a new checkpoint / landmark for the local community.

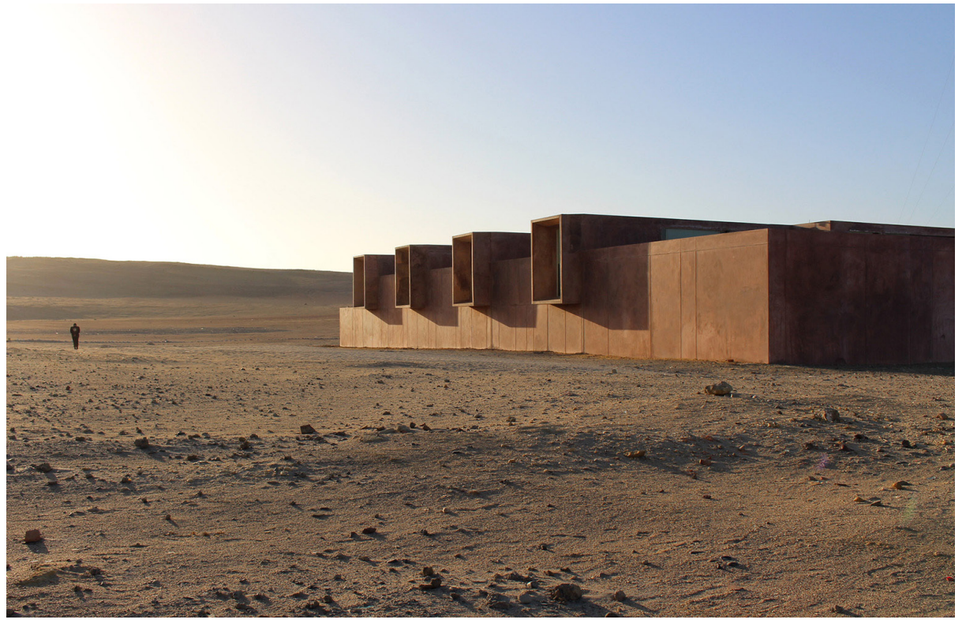
The industrial presence of brick, steal and concrete is undeniable, aspiring the ‘working’ spirit. However, most of the building seems reserved and boxed in, missing transition between the outside and inside. Most notable is the lack of weather-shelters for pedestrian. In order to encourage a less-car-dependent city, we must provide means of convenience, and probably excitement, for those who travel on foot and take public transportation.

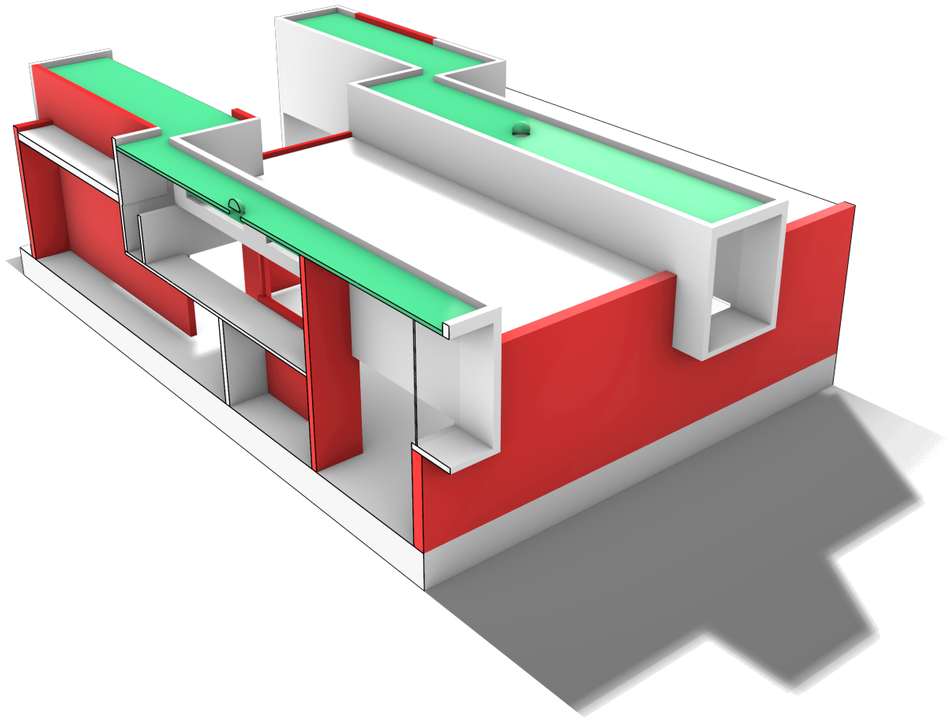
The new building need to show openess to welcome the public and interact with neighbor buildings.
The water is also a major element that needs to be incorporated to schematic design.

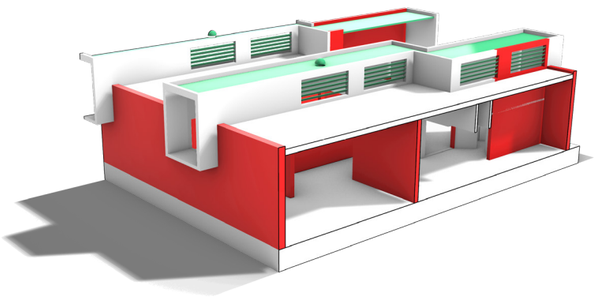


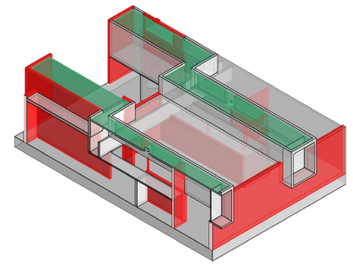
Phase 2: Precedent Analysis
& Inital Concepts
MUSEUM PARACAS

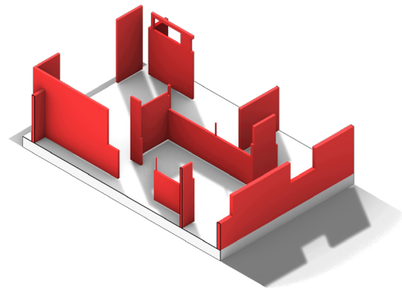
To blend with this surrounding dessert, Museum Paracas was constructed with salt-resistant reddish pozzolan cement. The cement also has a timeless texture that go along with the ancient site.

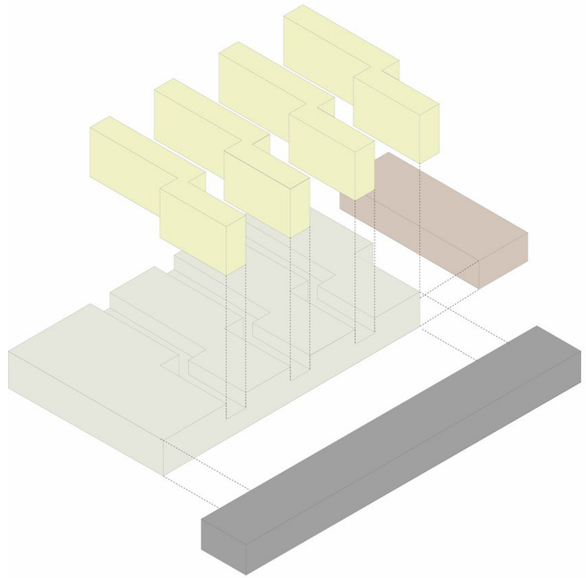


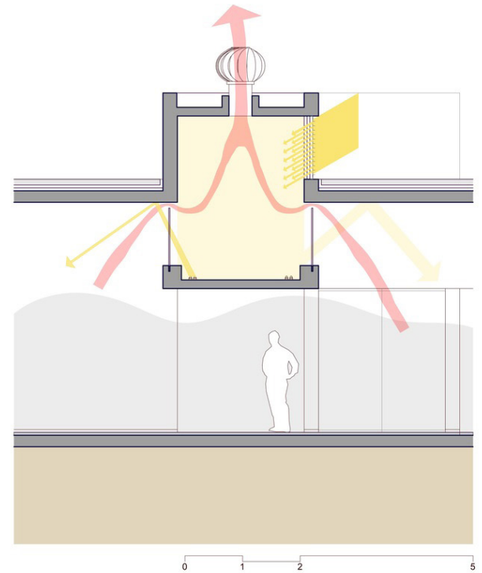










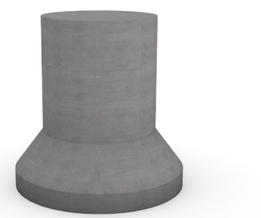


DISPOSITIVO DE CONTROL AMBIENTAL / DIVISORIO ENTRE SALAS

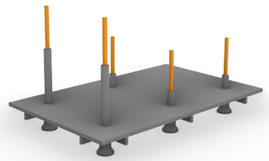
This material also works well with the load-bearing wall structure that also fit with the hot weather and creates a weaving endless corridor without doors that is specifically designed for museum and exhibition venues.

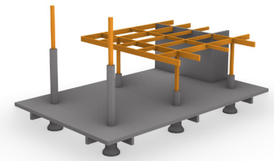
What is more interesting is that the air circulation and lighting systems are combined into one through the overhead channel which allows optimal natural ciruclation and minimizes the demand for mechanical supply.

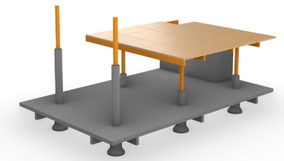
Phase 3: Prototype Design

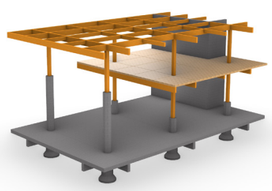


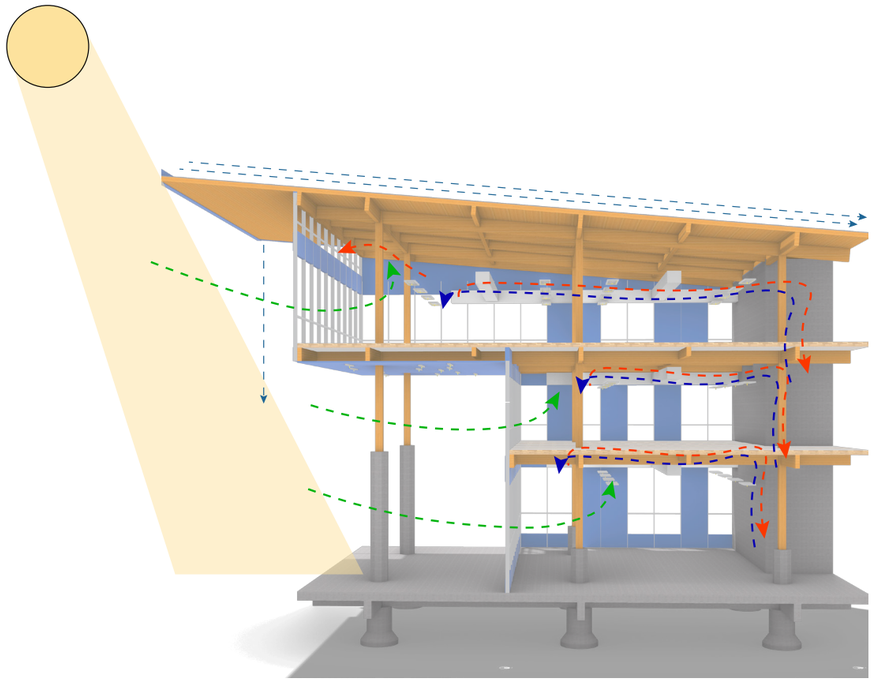
The construction takes on a podium struture. The Concrete base provides solid support while the Mass-timber structure above gives a lighter feel for the space. The columns are smoothly transitioned from round at the bottom to octagon on concrete to square on timber. Both materials can have exposed finish.
Shear-force is resisted using a rigid core which houses HVAC and Plumbing work for the entire building.
The envelope uses curtain walls to wrap around and protect the interior. More glass panes appear on the South elevation to capture most of the sunlight while less openings are shown on the West. The big slanted overhang roof protect occupants from glares and rains, and reduces snow accumulation.

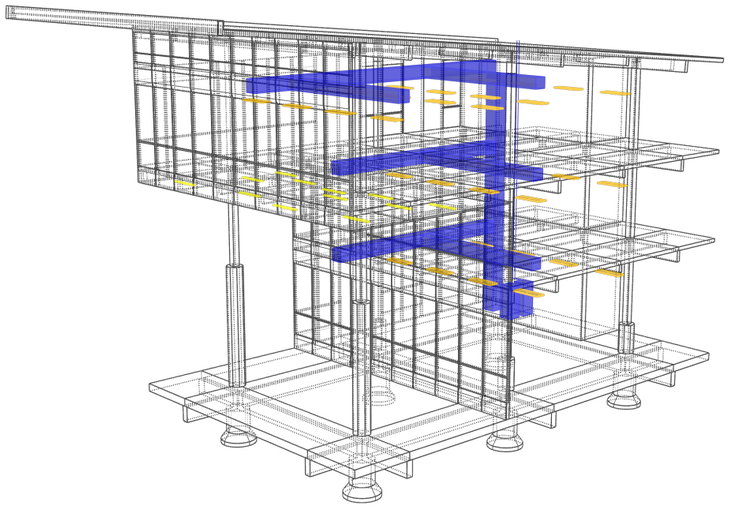


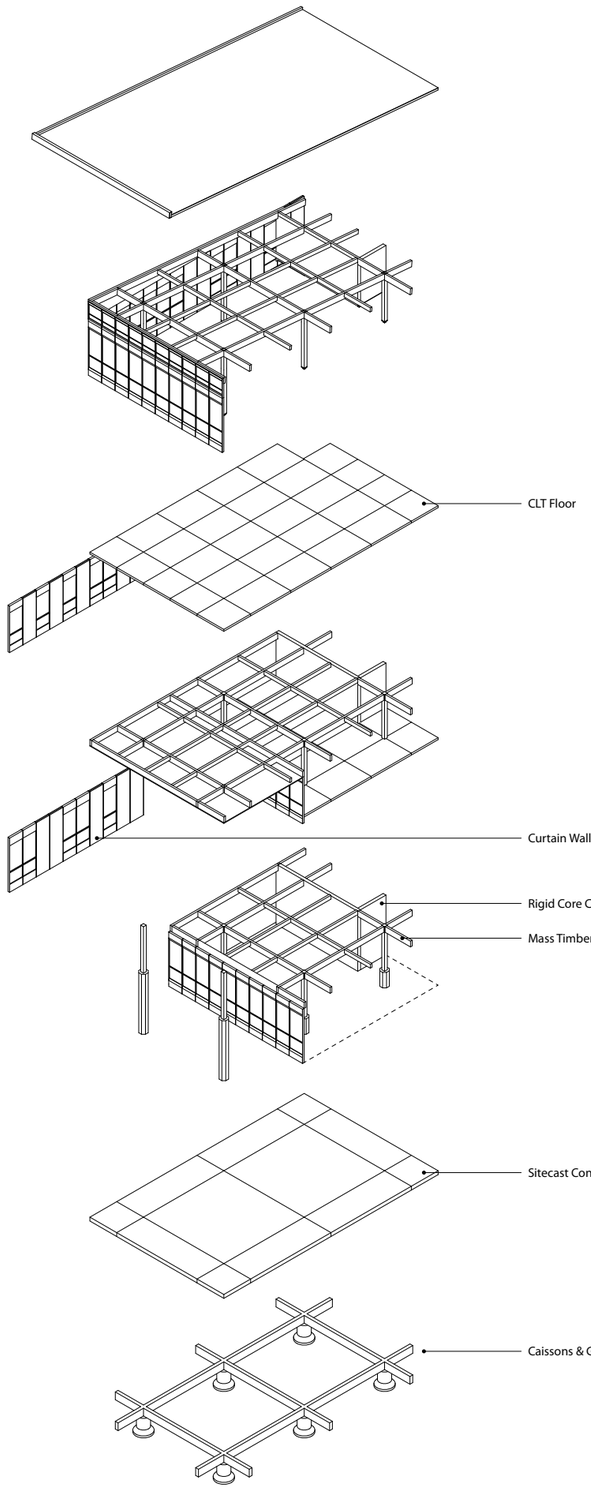


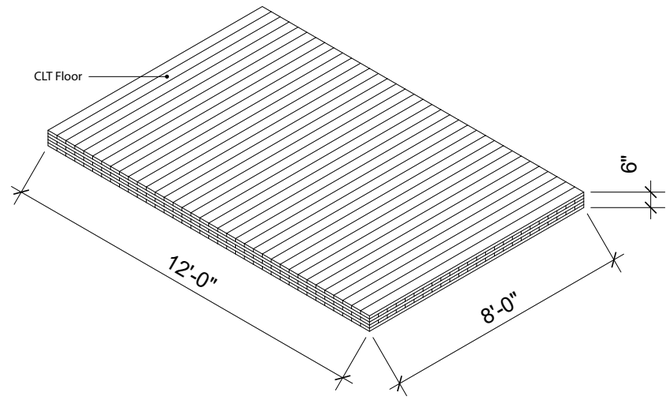


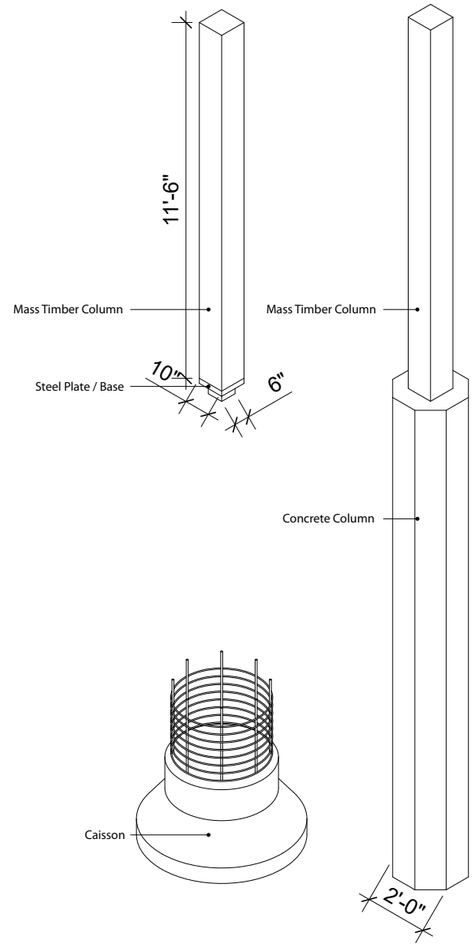




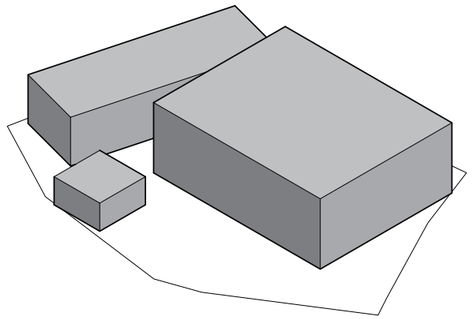


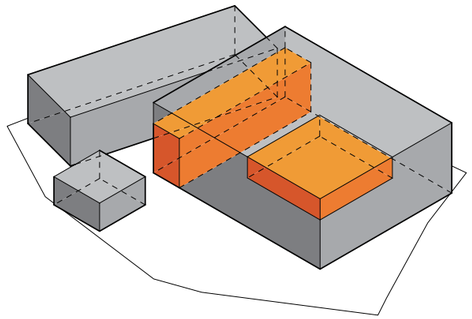

CLT Floor
Curtain Wall
Rigid Core Concrete Wall
Mass Timber Girders & Beams
Sitecast Concrete Slab
Caissons & Grade Beams

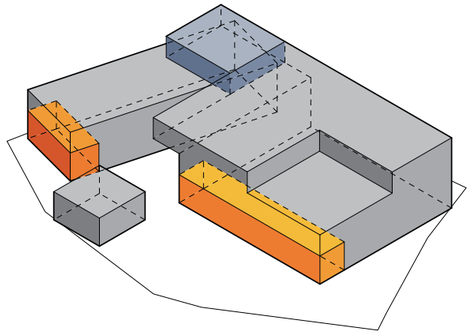

CLT Floor
6"
12'-0"
8'-0"

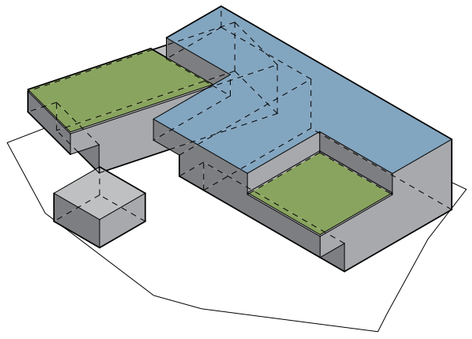

11'-6"
Mass Timber Column
Steel Plate / Base
10"
6"
Mass Timber Column
Concrete Column
Caisson
2'-0"

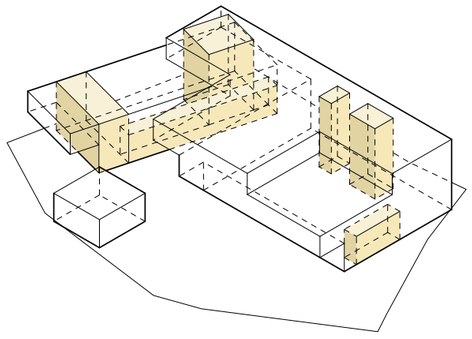
Phase 4: Integrated Design Proposal

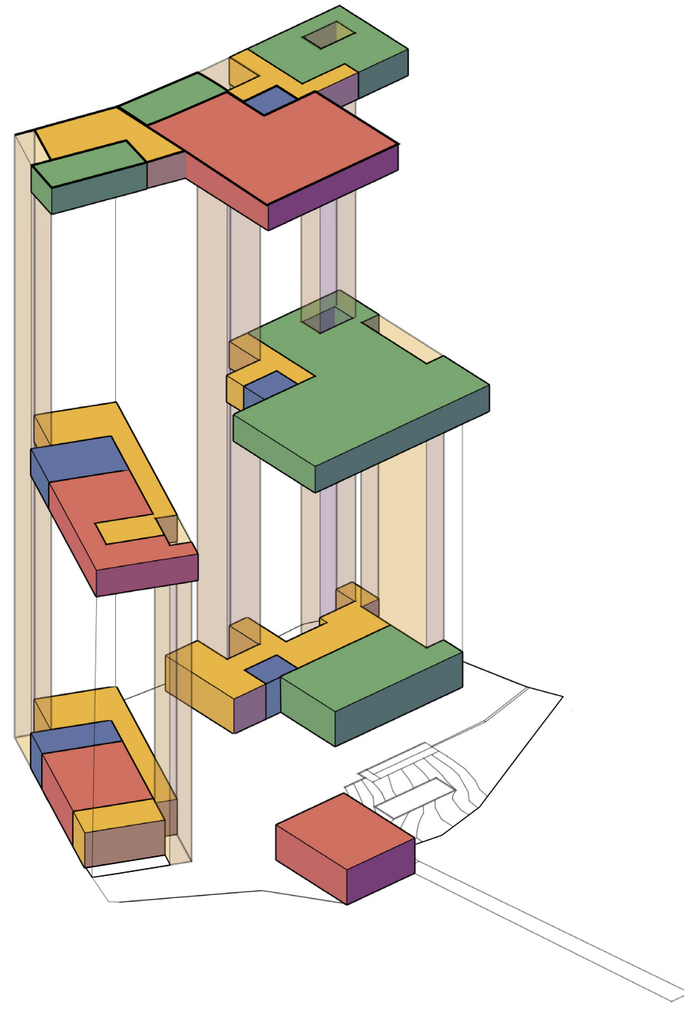












The name NOV1ST comes from the word Novice which suggests this is a place for people at any level, and the 1 or 1ST simply encourages anyone just needs to make the first step to get things going.

This building complex serves more than just as a makerspace. It aims to become a landmark and an important role in the revitalization of Belvidere, Lowell.
Besides a number of essential-skill classes covering 8 different fields, the complex has a wide outdoor area that opens toward the river as an appreciation of the historical rivers/canals that currently lacks human touch. This landscape also leads to the river walk to Eastern Canal Park, making the complex rather a social-physical connection. It connects people from the inside and a larger community from the outside.
Inside, the complex comprises two large buildings connected by a large volume laying on top of them. The larger mass hosts the majority of the makerspaces while the smaller strip on the north along E Merrimack St hosts more supporting programs. Each building has a large roof garden in attempt to compensate for the land lost to building footprint. These gardens both preserve local plant species and provide products for cooking class.
The Cafe, standing on its own, plays as a prototype or showcase of the whole construction. Standing alone also allows it to partially detach from the buildings and reach out to passers-by, hence creating more traffic to the site.

CODES AND SPECIFICATIONS

1. Building Group: Section 304 - Business Group B. Occupancy, Group B - (Further Education and Lab Spaces)
2. Building Type: HT (Heavy Timber), S (Sprinkler)
    i. Max Height = 85 feet.
    ii. Max Stories = 6 stories
    iii. Max Bldg. Area = 144,000 sq. feet.
3. As Built Building Dimensions
    i. Actual Height = 52 feet.
    ii. Total Stories = 3, (Plus Roof Access)
    iii. Total Square Footage = 32,500 sq. feet.
    iv. Total Outdoor Space = 23,300 sq. feet.
    v. Total Site Sq. Footage = 28,000 sq. feet.

PROGRAM GOALS

The main objective of the programs is to help learners become self-sufficient which for us has three levels of meaning.

a. Level 1. - The can begin to learn the essential skills to help provide and support themselves

b. Level 2. - They start to experiment and educate themselves so that they can teach others.

c. Level 3. - If they are ambitious and want to continue on, these classes and spaces can help them become self reliant and even self employed.

2. All the programs and provided classes allow students to utilize a facility and equipment they they wouldn't generally have access to in a residential space.

3. Work spaces are all surrounded by glass so that to help inspire spectators but blinds can also be utilized to provide privacy and improve focus if needed. Different work and atrium spaces can be turned into showcase areas and gallery spaces when needed.

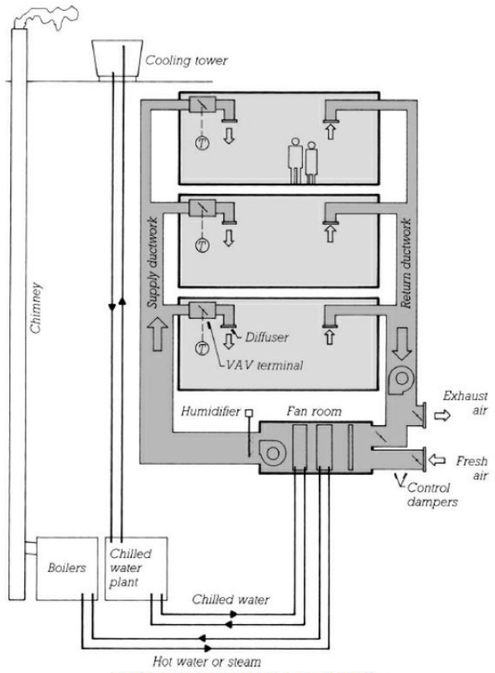
4. The roof garden even improves the green space compared to the current abandoned parking lot.

LIGHTING

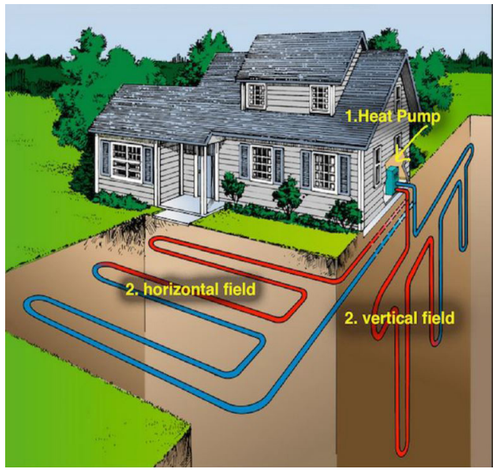
MECHANICAL SYSTEMS

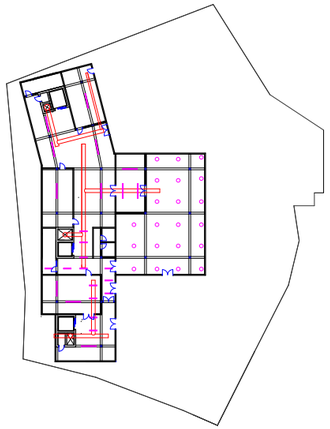
For the Mechanical HVAC system we decided to utilize a VAV (Variable Air Volume) system.

- The advantage: (Studio Companion) - "This system offers a high degree of local temperature control at moderate cost. It is economical to operate and virtually self-balancing."
- The disadvantage: (Studio Companion - "VAV is limited in the range of heating or cooling demand that may be accommodated within a single system. When one area of a building needs heating while another needs cooling, a VAV system cannot serve both areas without help from a secondary system."

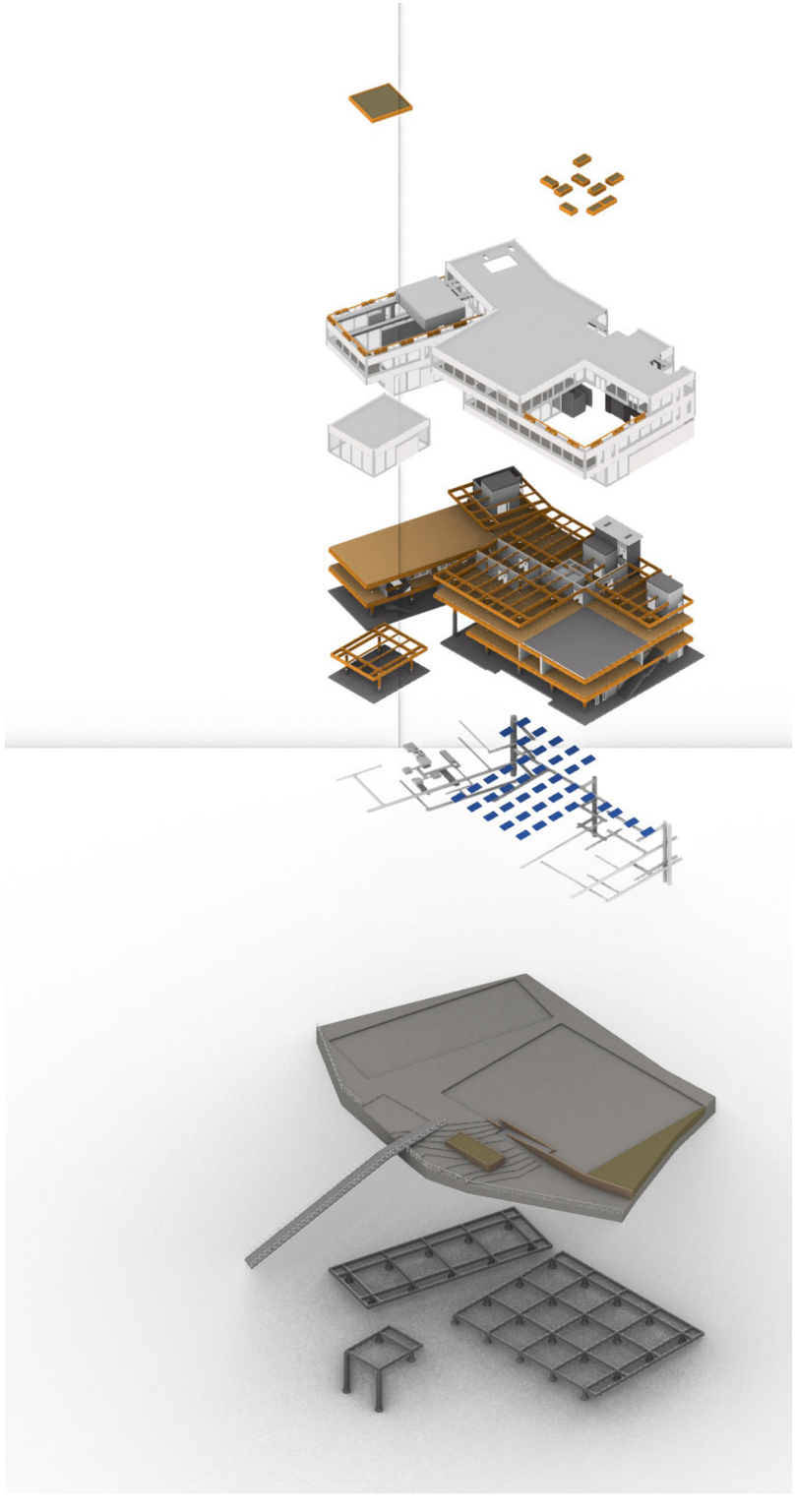


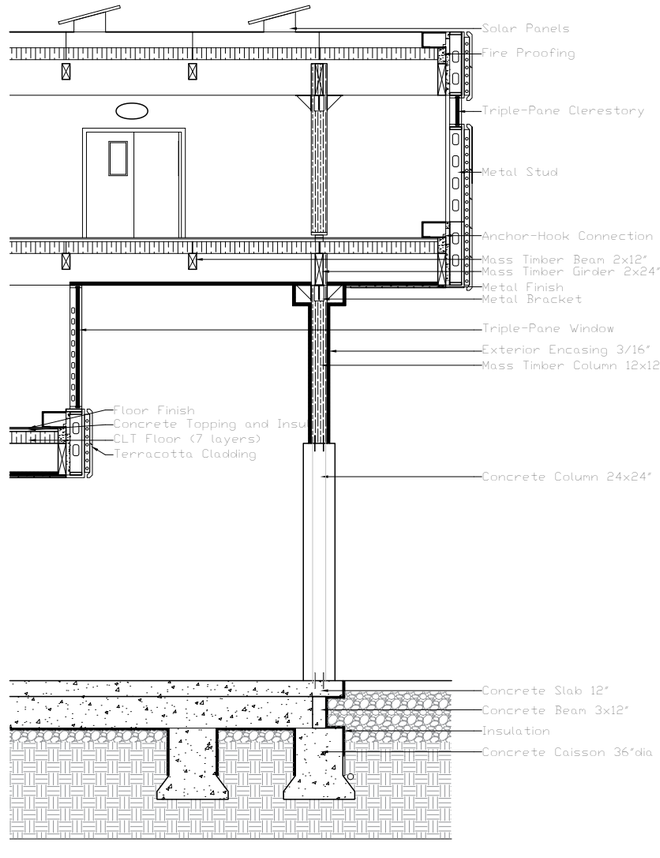
VARIABLE AIR VOLUME (VAV)



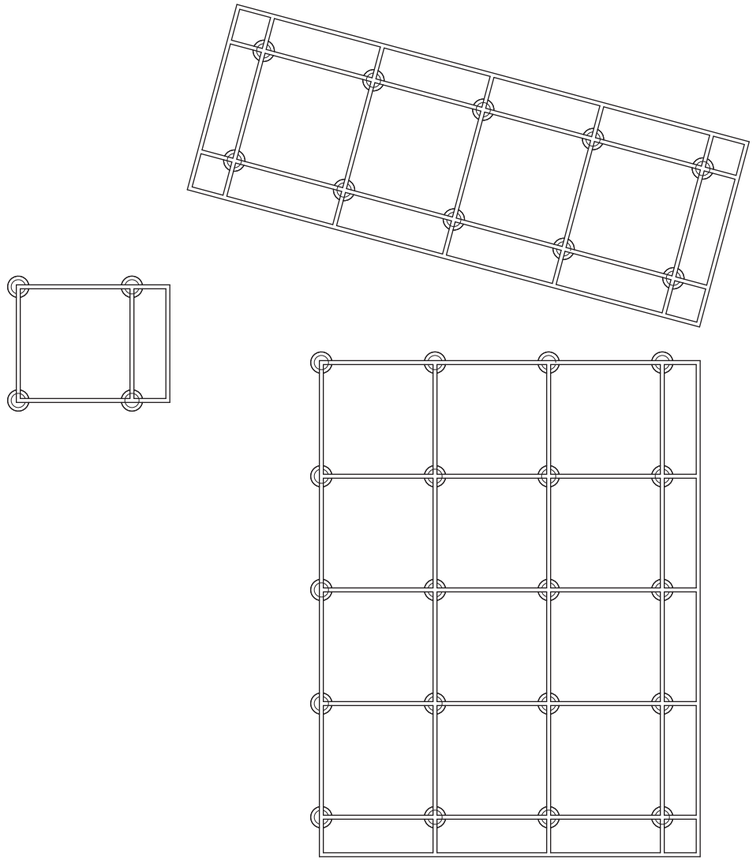


Lighting Plan

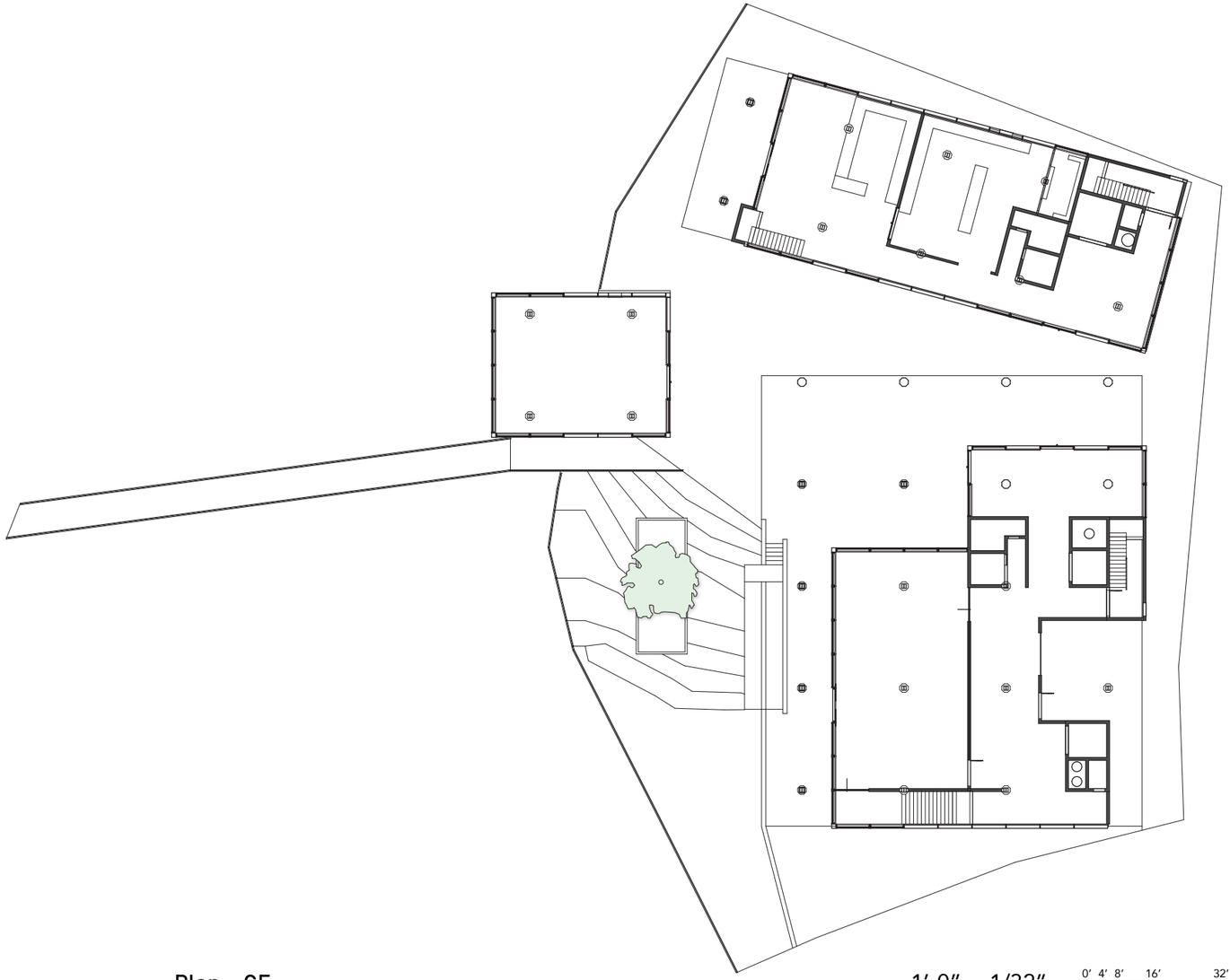




Construction Detail



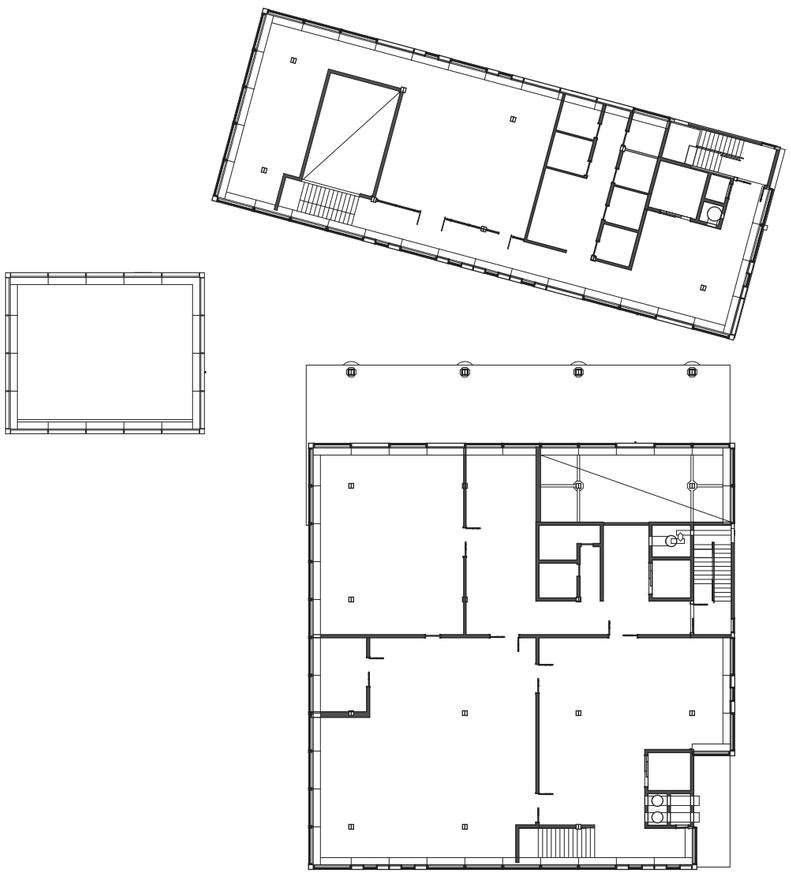
Foundation Plan



Plan - GF

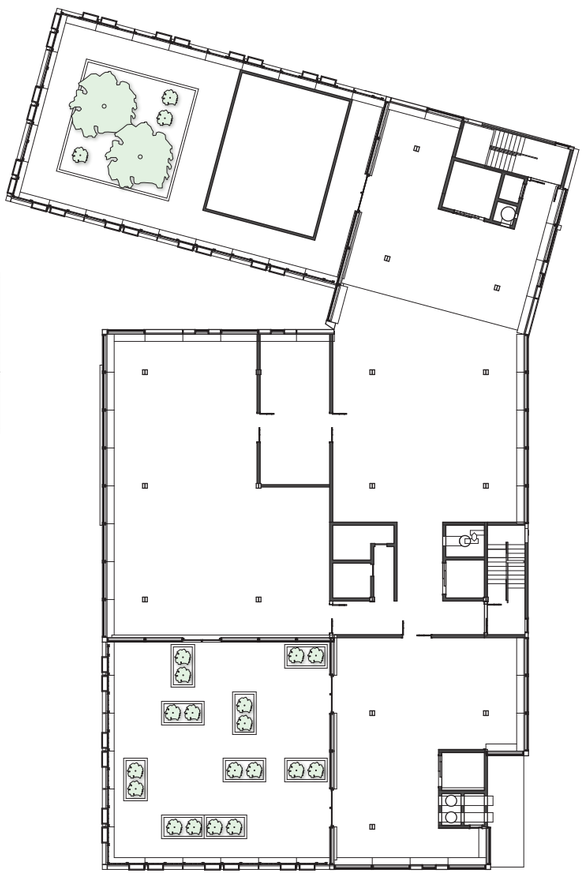
1’-0” = 1/32”

0’ 4’ 8’ 16’ 32’

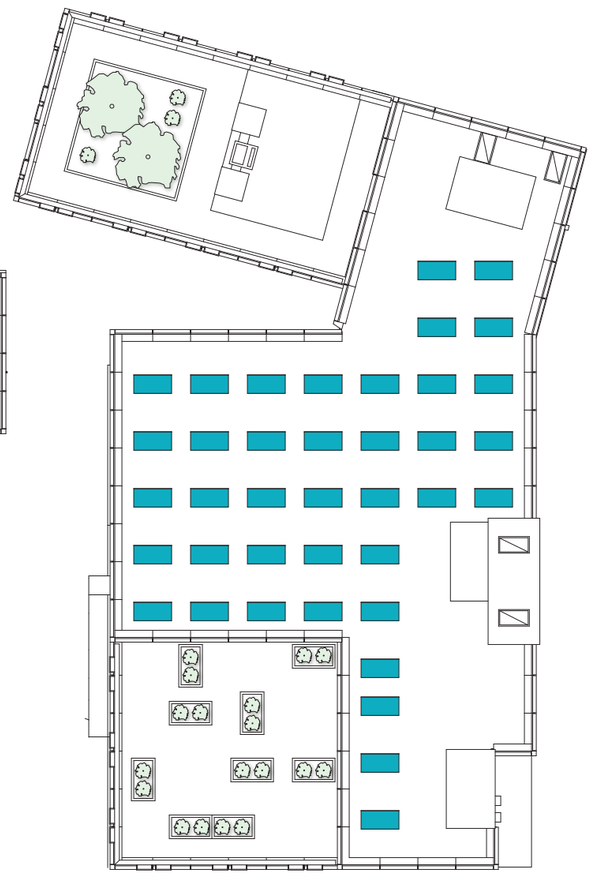


Plan - F2

Plan - F3

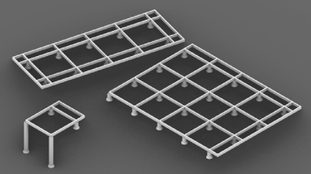


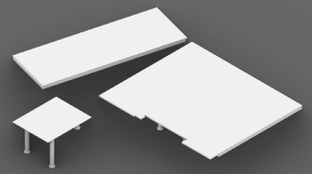
Roof Plan

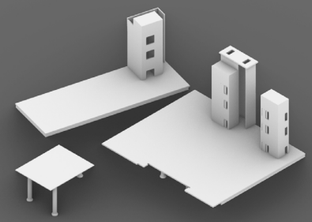


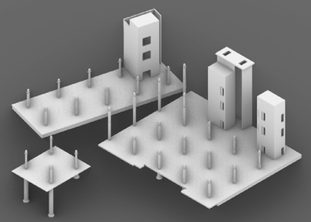
1′-0″ = 1/32″

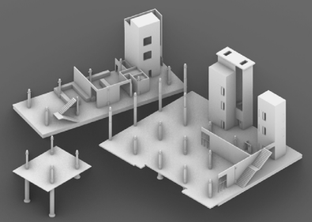
0′ 4′ 8′ 16′ 32′

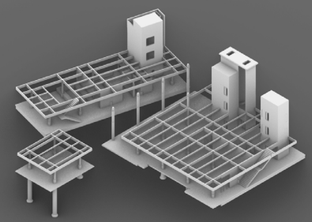


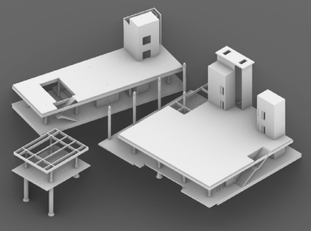


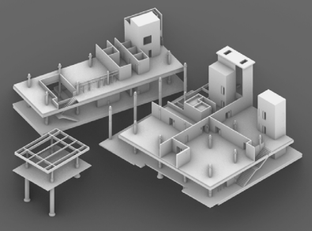


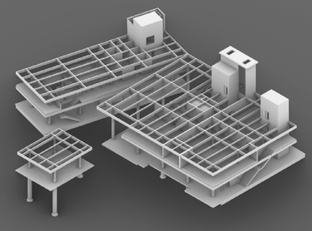




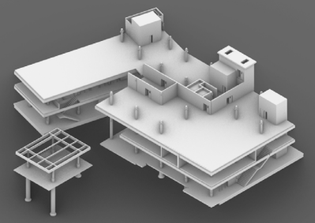


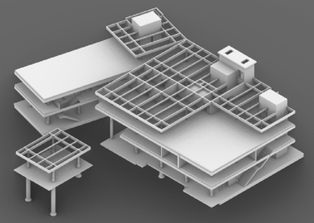


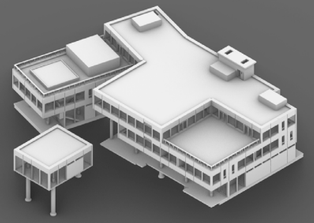


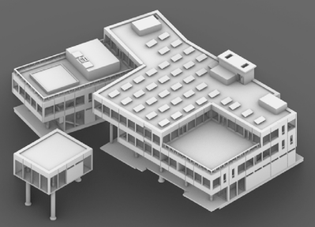


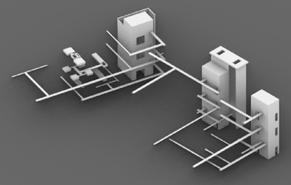
Construction Sequence
1. Caissons & Grade Beams
2. Concrete Slab
3. Rigid Core (Elevator Shaft and Egress)
4. Mass Timber Columns 24ft-span
5. Interior Walls
6. Mass Timber Girders & Beams
7. CLT Floor (2nd Floor)
8. Interior Walls (2nd Floor)
9. Mass Timber Girders & Beams (2nd Floor)

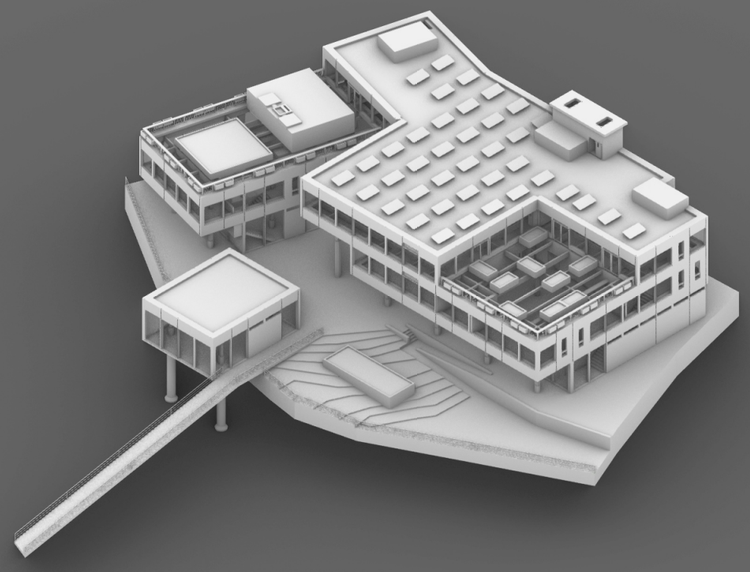








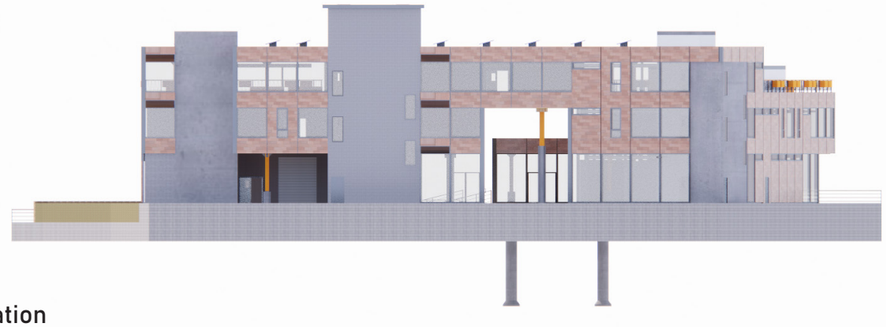




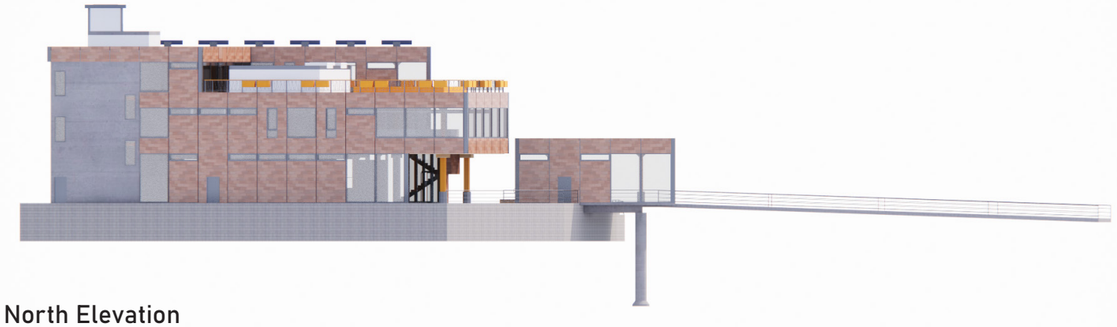
10. CLT Floor, Mass Timber Columns & Interiors (3rd Floor)
13. Solar System
14. HVAC System

11. Mass Timber Girders & Beams (3rd Floor)
15. Landscape

12. Envelope



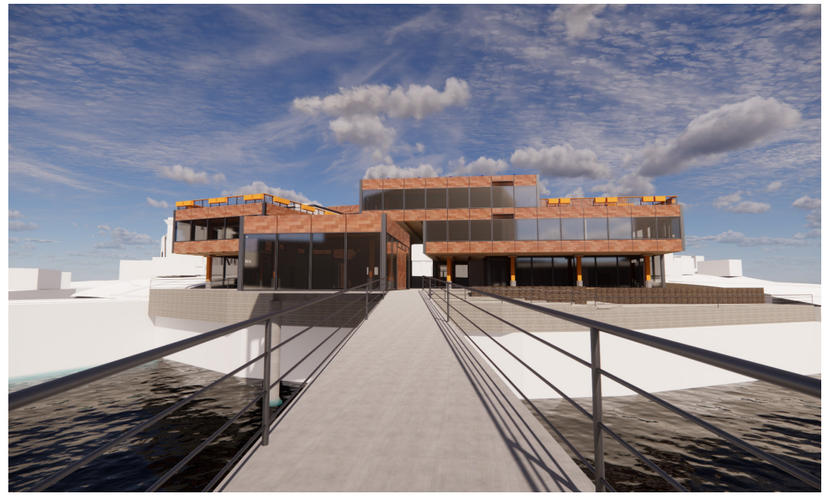
East Elevation



North Elevation

West Elevation

South Elevation



1. View from Cafe

2. Loading Dock

3. Entrance Lobby & Restroom

4. Wood Workshop (GF)

5. Grand Stair from Wood Workshop GF

6. Lobby F2

7. Design Workshop F2

8. View of Roof Garden from inside F3

9. Corridor in the smaller building

10. View from Roof Garden

11. View from Roof Garden (Smaller Building) to the Library

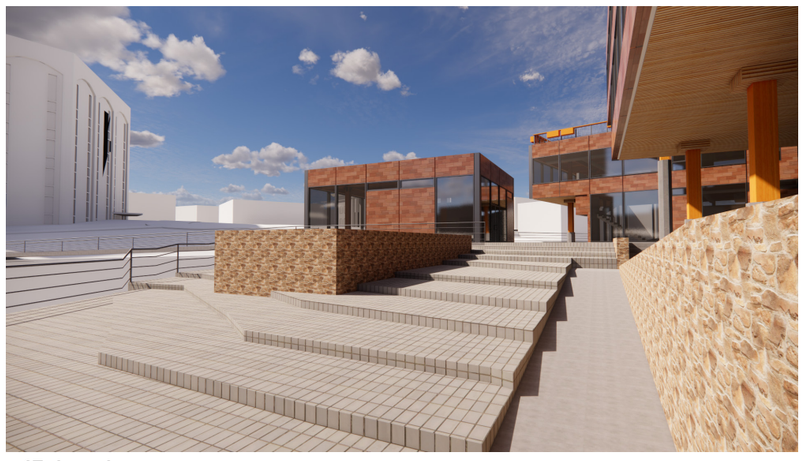
12. Entering the site from the Bridge

13. Entering the site from Davidson St

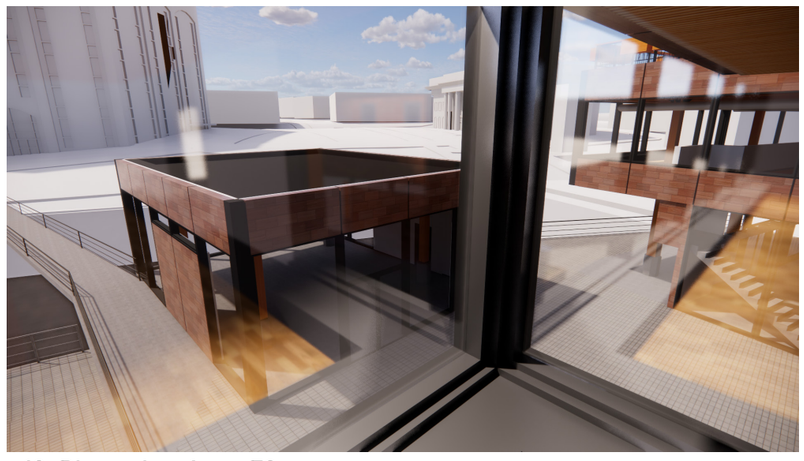
14. Plaza and the Greater Building

15. Plaza view entering from the Bridge

16. Walking towards the Park



17. Landscape



18. Plaza view from F2