

# ONEPULSE MUSEUM & MEMORIAL

Orlando, FL



## INTRODUCTION

PULSE was a gay bar and nightclub located at 1912 South Orange Avenue in Orlando Florida. A tragic event on June 12, 2016 when a lone gunman opened fire in the club. 49 people were murdered and 68 were left injured.

The onePulse foundation was formed soon after by club owner Barbara Poma as a way to rally the community of Orlando against hate and complete its mission to:  
“create and support a **memorial** that opens hearts, a **museum** that opens minds, educational programs that open eyes, and legacy scholarships that open doors.”

# PROJECT BACKGROUND - DESIGN COMPETITION

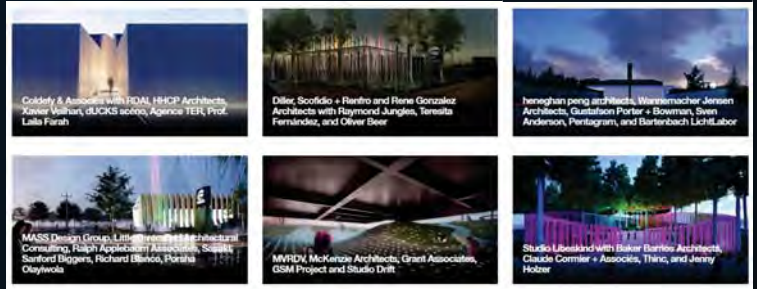


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-South of Downtown Orlando



# PROJECT BACKGROUND - SITES



- Two Sites: Museum site sits on west near Interstate 4. Memorial site on east near S Orange Ave (actual location of the club and shooting.) Sites separated by approx ½ mile
- Orlando Medical hospital campus lies about ½ mile to north
  - road between memorial and hospital known as "survivors walk" to represent victims walking to hospital due to lack of available ambulances.
- Climate in Orlando, FL is subtropical. The temperatures are greatly modified by winds from seas
- The summers are long, warm, and humid, interspersed with frequent thunderstorms.
- Winters are short and mild with a little precipitation.

# OUR ASSIGNED PROPOSAL - TEAM LIBESKIND

Studio Libeskind + Baker Barrios Architects  
With Claude Cornier et Associes, Thinc Design, Jenny Holzer



## MUSEUM





# MUSEUM

-440' memorial tower (one of tallest structures in Orlando)

-Symbolizes **the human figure** and **standing tall, upright, and unified** against violence and hate.

-First three floors houses most of program:

- Museum
- Classrooms
- Library
- Auditorium
- Offices
- Parking structure



-Structure: CLT wall and floor panels, CLT post and beam, steel (tower)

-Materials: Ventilated Red Cedar Siding (Charred), Channeled Glass curtain wall panels, Perforated Steel Shading device.



# MEMORIAL



# MEMORIAL

The concept as a **human heart**.  
-a "broken heart and a sacred place"

**Meditative walk and park** through a series of colorful physical frames.  
-Each frame represents 1 day out of the 2016 year (366)  
-arches/frames cut through the original night club to show "glimpses"

Inscribed **names of victims**



## PROJECT GOALS

-Architecture 2030

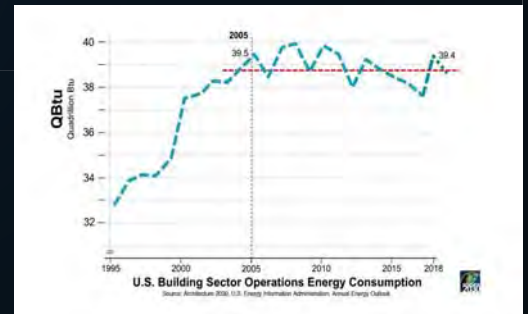
-AIA Declared Climate Crisis

# AIA DECLARED CLIMATE CRISIS



Since late 90's, building energy consumption has skyrocketed

Intent: "To provide a framework for the AIA to prioritize and support urgent climate action to exponentially accelerate the 'decarbonization' of buildings, the building sector, and the built environment"



## 2030 CHALLENGE

"All new buildings, developments, and major renovations shall be **carbon-neutral by 2030.**"

-All new buildings, developments and major renovations shall be designed to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 70% below the regional (or country) average/median for that building type.

These targets may be met by implementing innovative **sustainable design strategies**, generating **on-site renewable energy**, and/or **purchasing (20% maximum) off-site renewable energy.**



# GOALS FOR PROJECT

**#1 DURABLE**

**#2 CARBON NEUTRAL**

**#3 ENERGY POSITIVE**

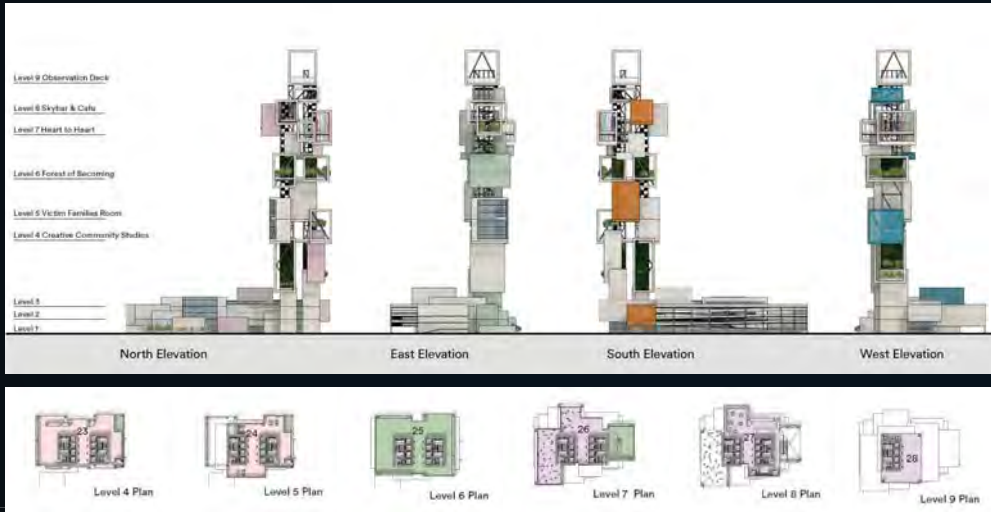
**#4 STORMWATER NEUTRAL**



## OVERVIEW OF OUR DESIGN

# CONCEPTUAL DRAWINGS

- We opted to make no changes to the programmatic elements of Libeskind's project, and instead focused on technical aspects



**OURS**

**VS**

**LIBESKIND'S**





# BUILDING ENVELOPE

## WALL + FLOOR ASSEMBLY

CLT FLOORS AND CLT CAVITY WALLS 7PLY [9"]



GLU-LAM BEAMS [24"]



TIMBER COLUMNS [10"]

HIDDEN POWDER COATED STEEL/ LOW CONDUCTIVE FASTENERS



RAISED FLOOR SYSTEM WITH FINISHED SLATE FLOORING

## EXTERIOR FINISH

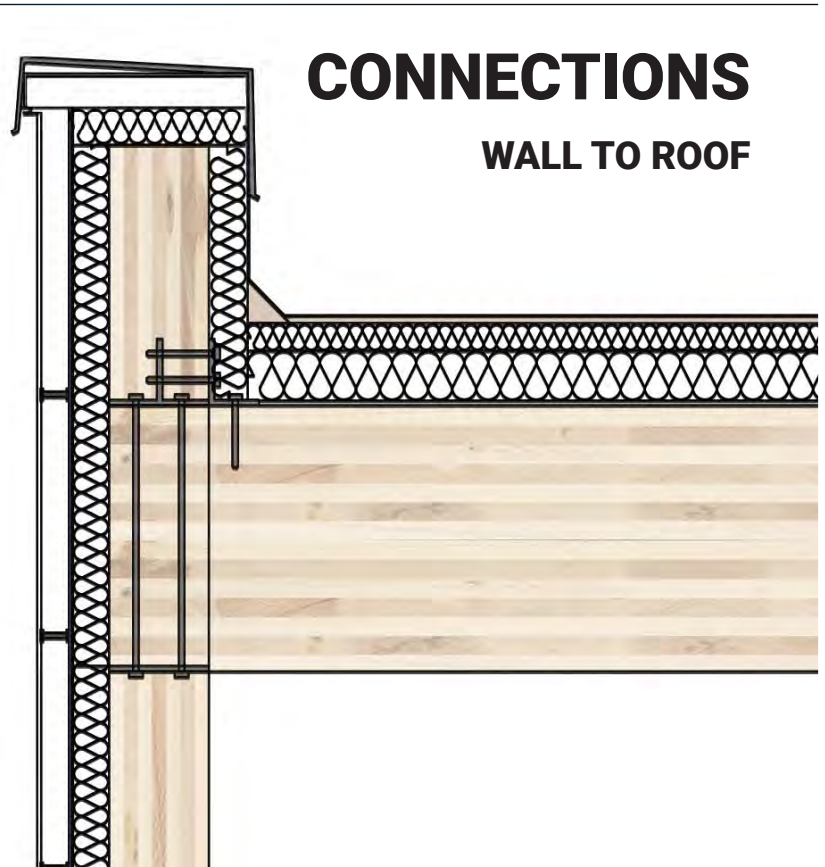
VENTILATED RED CEDAR SIDING [CHARRED]

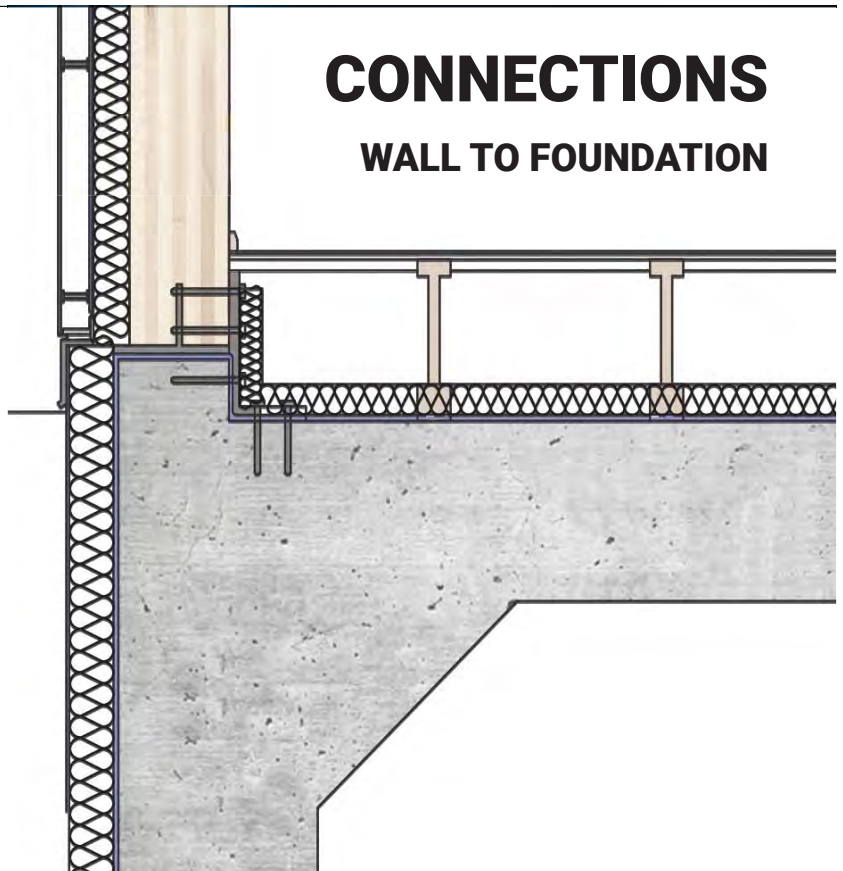
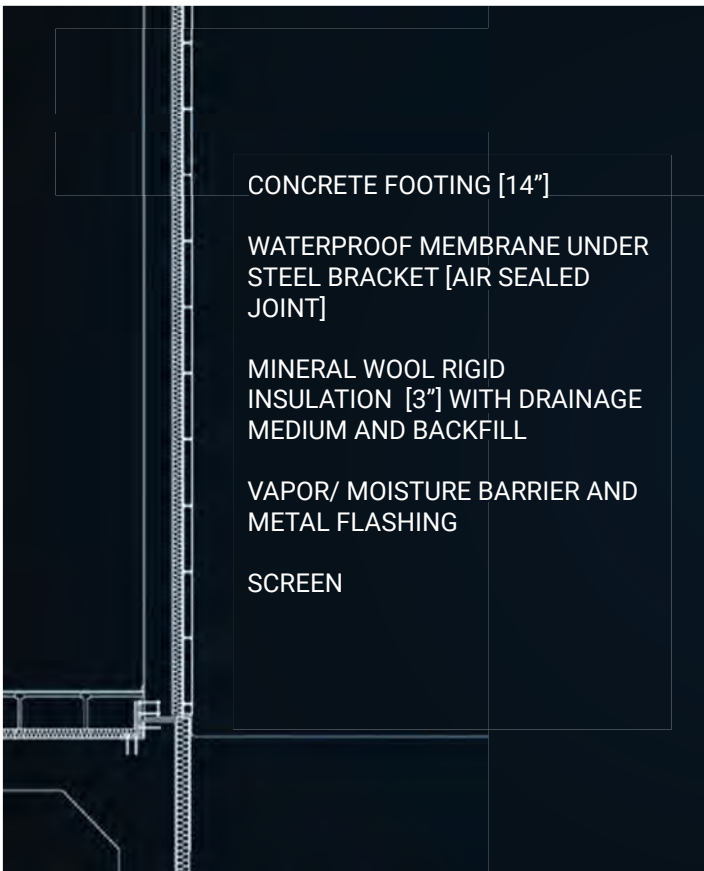
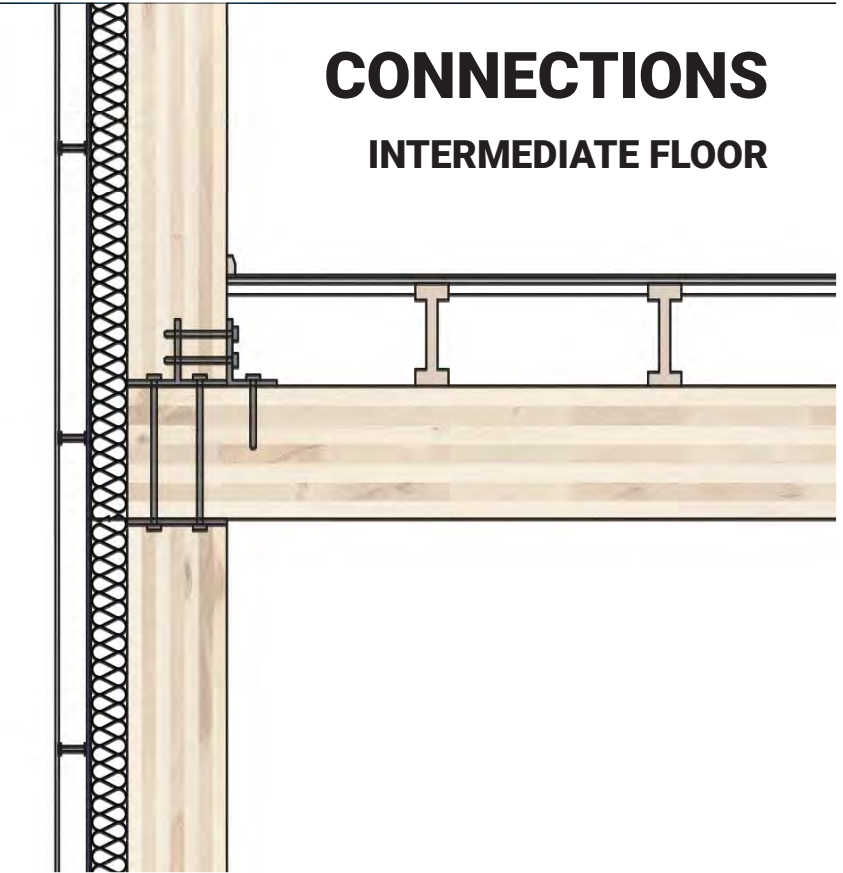
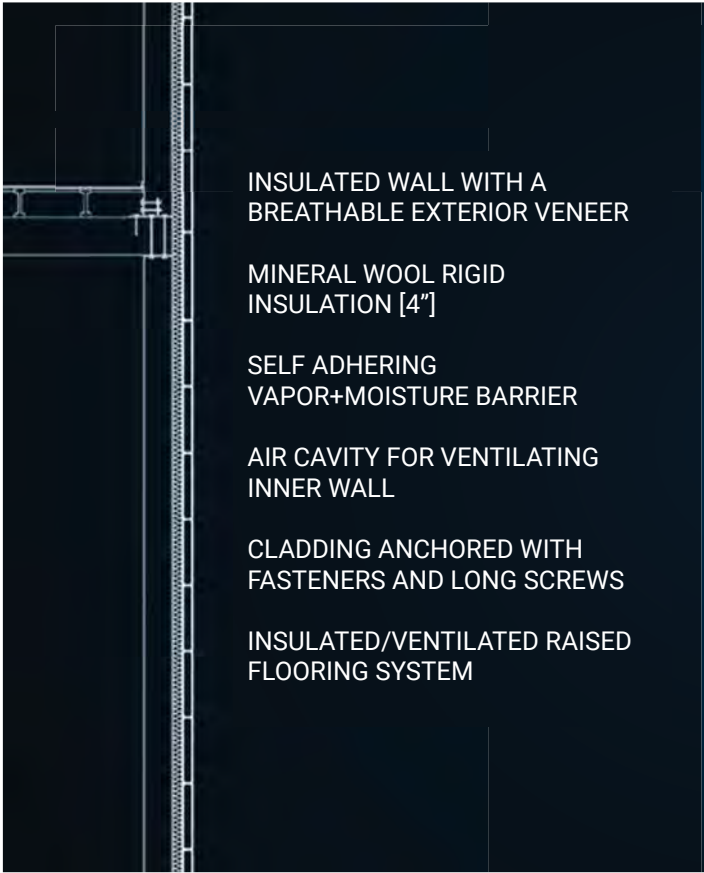


INSULATED CHANNELED GLASS CURTAIN WALL PANELS 6' [SLIM LINE TEXTURE]



PERFORATED STEEL SHADING DEVICE





# GREEN ROOF

Sloped cap-flashing

Self-adhered membrane over top of parapet and lapped over top of roof and wall membranes

CLT wall assembly

Self-adhered air and vapor barrier membrane

CLT roof panel

Rigid insulation

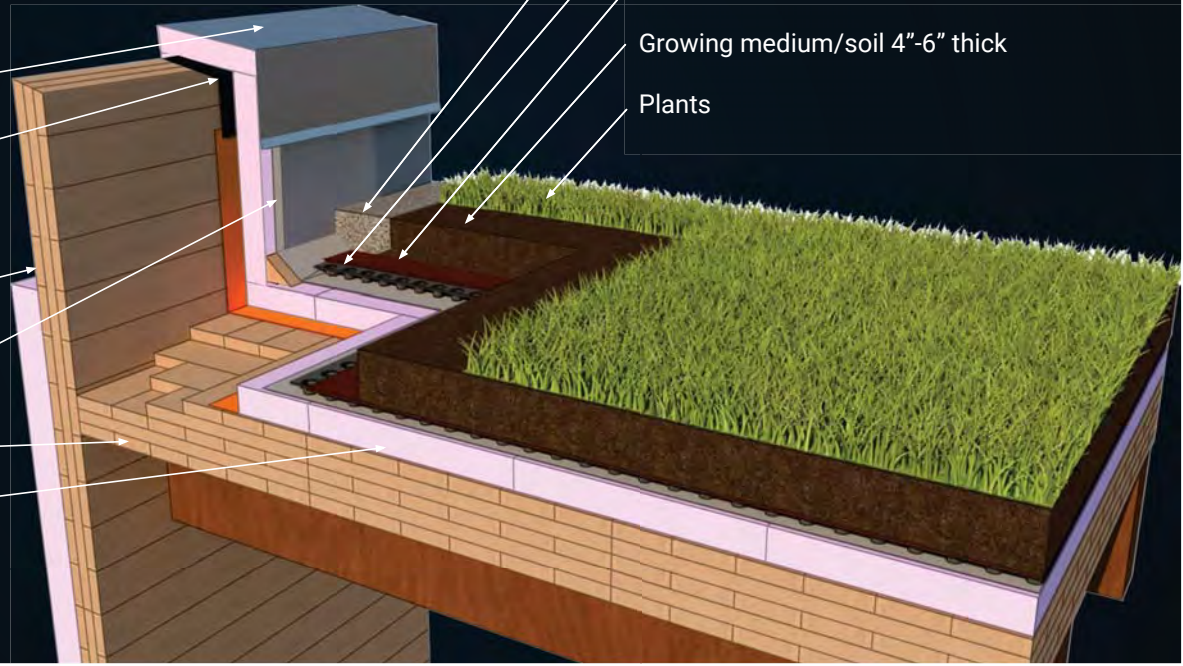
Gravel boundary of green roof

Drainage/Storage Layer

Filter Fabric

Growing medium/soil 4"-6" thick

Plants

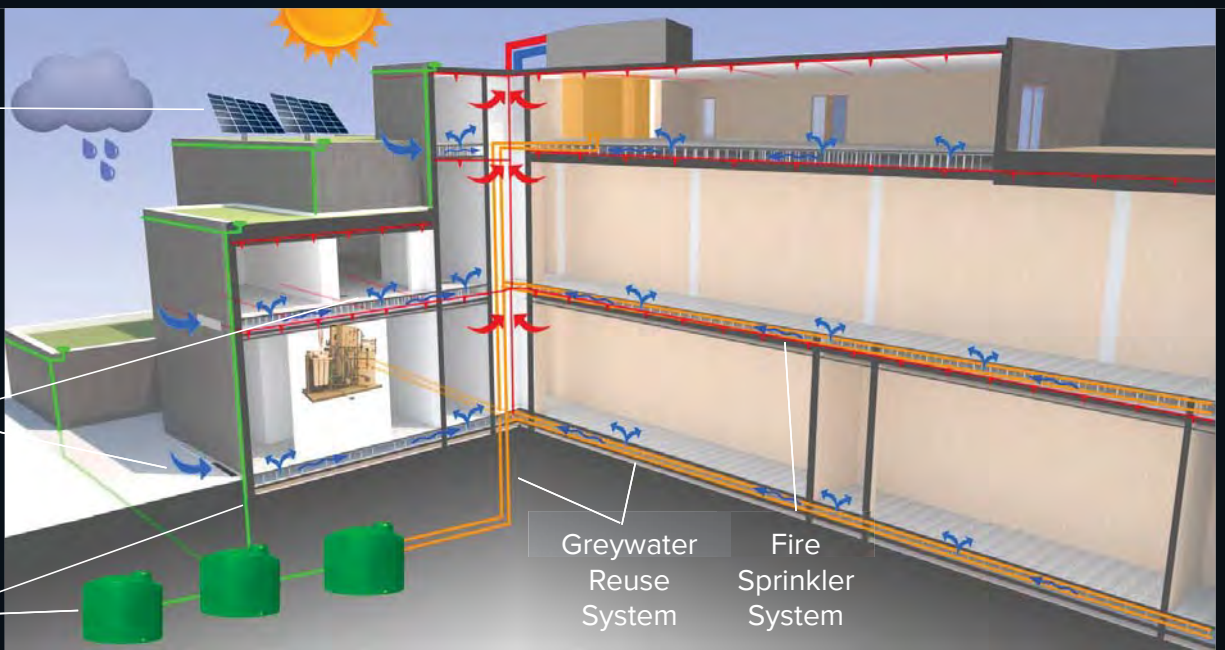


# INTEGRATION

PV Array System

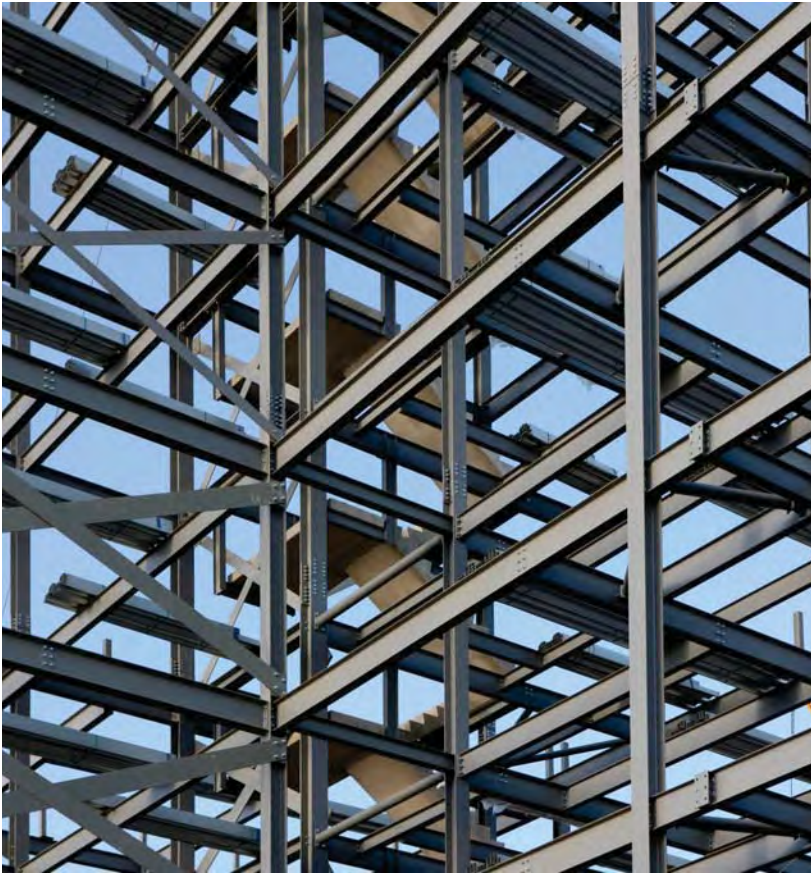
HVAC System

Water Capture System



Greywater Reuse System

Fire Sprinkler System

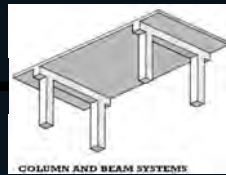
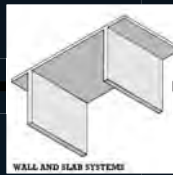


# GOAL #1: DURABLE

## THE STRUCTURAL SCHEME

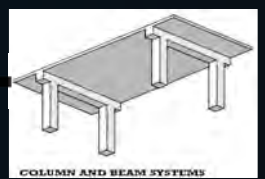
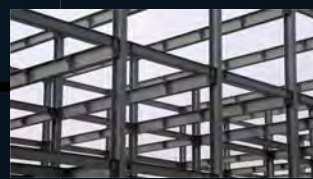
### Museum Bottom 3 Floors:

Medium Load  
Wood (CLT Panels)  
Structural System:  
Wall and Slab  
Post and beam



### Museum Parking Garage:

Medium Load  
Steel members  
Concrete slab (post tensioned)  
Structural System:  
Post and beam



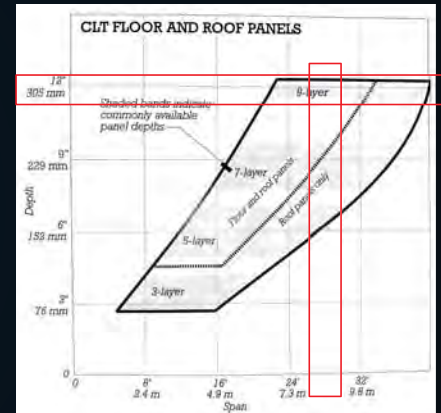
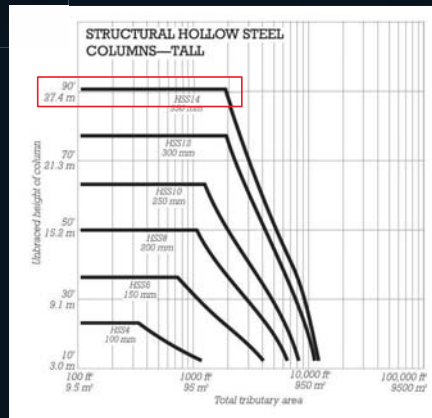
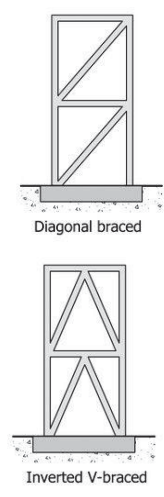
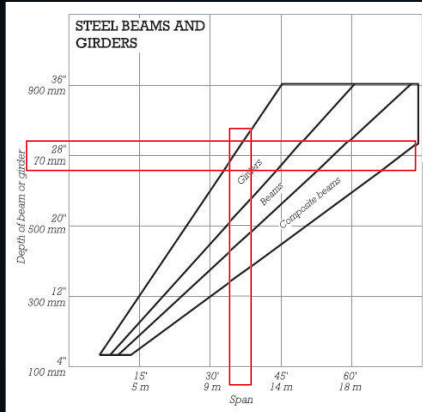
### Tower:

Light Load  
Wood (CLT floors)  
Steel members (2 cores)  
Structural System  
Core structure



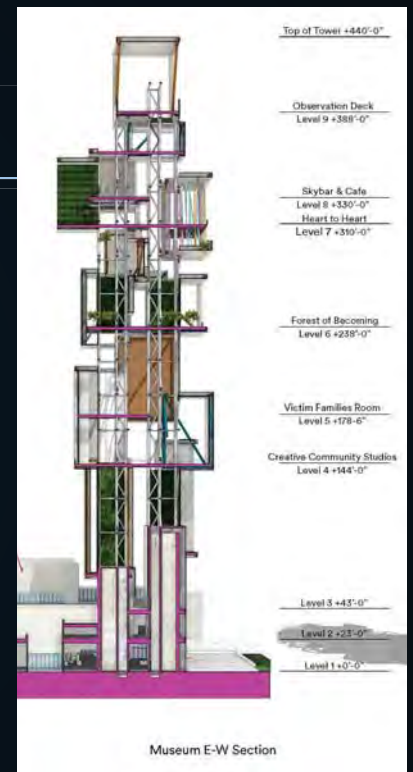
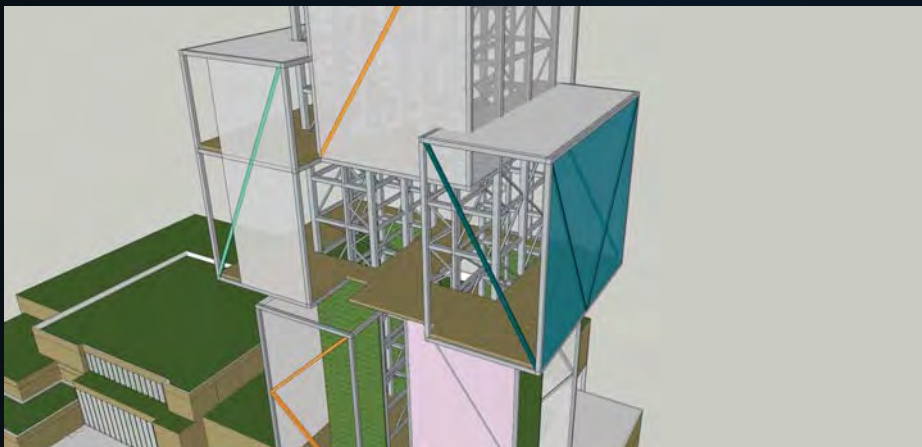
# TOWER STRUCTURAL SIZING

- 18"x18" hollow steel columns
- 28" steel girders
- 440' tall steel cores
- 12" CLT floor/roof panels



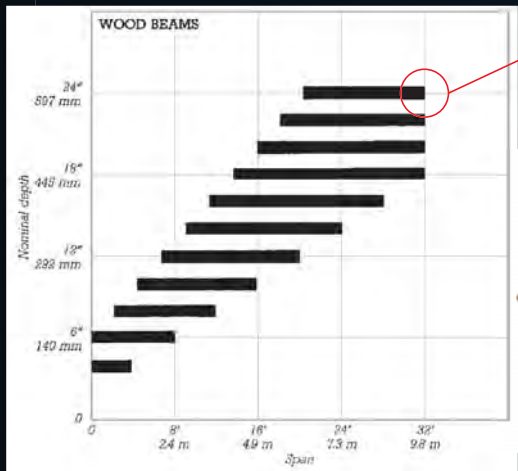
# TOWER STRUCTURE

- Uses structural 'boxes' to provide large scale truss type system



# LOWER FLOORS STRUCTURE

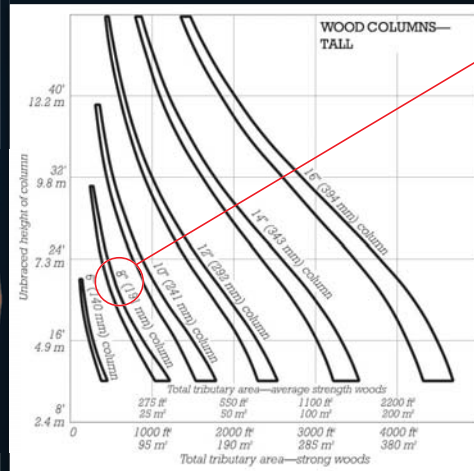
## Wood Beams



32 ft span requires 24 inch deep beam



## Wood Columns



20 ft tall wood column  
-Average tributary area ~500 sqft= 8" column (or 10" to be on safe side)

CLT Floor panels at 7 ply (9 inches thick) have structural span of 24 feet. (Studio Companion p. 75)

# LOWER FLOORS STRUCTURE

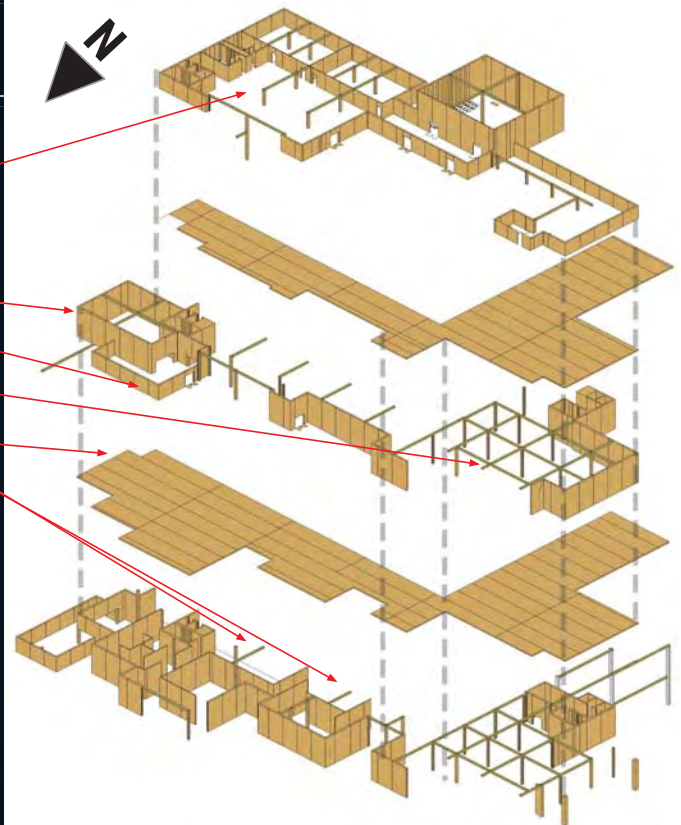
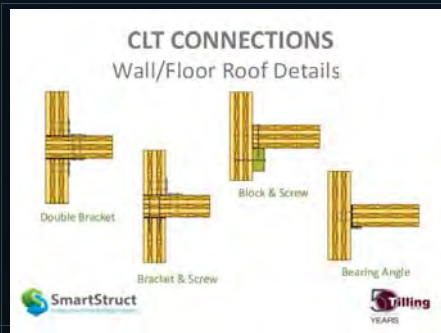
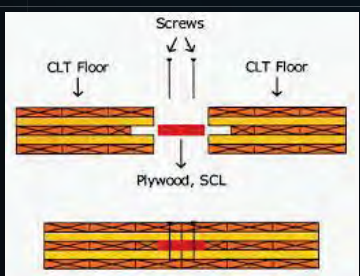
Upper floor classrooms supported by parking garage structure.

CLT load bearing walls (10ft-20ft high)

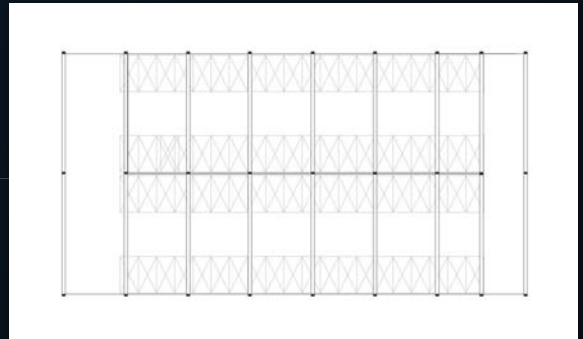
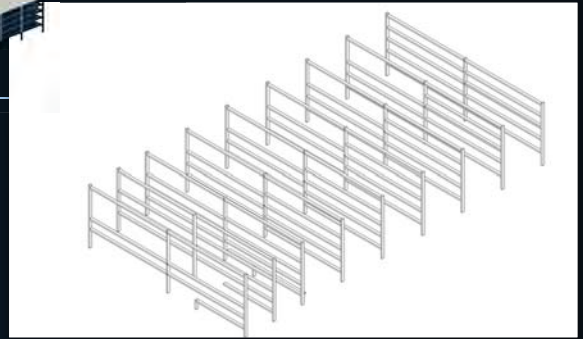
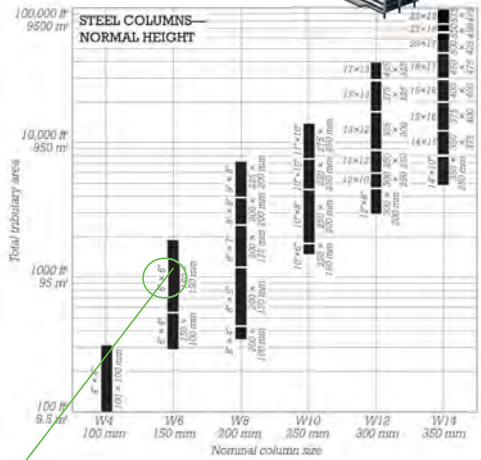
Post and Beam for large, open lobby

CLT floor panels (10x50 ft)

Connection from CLT to steel vertical members of parking garage structure



# PARKING STRUCTURE



## Steel Frame

Beams: 60' span = 32" depth of beam  
 Columns: 1,700sf tributary area @ 8-10ft  
 = 6x6" Column  
**Posttensioned Precast Concrete One-way Solid Slab**

Span of ~30ft @ 8" thick



## GOAL #2: CARBON NEUTRAL

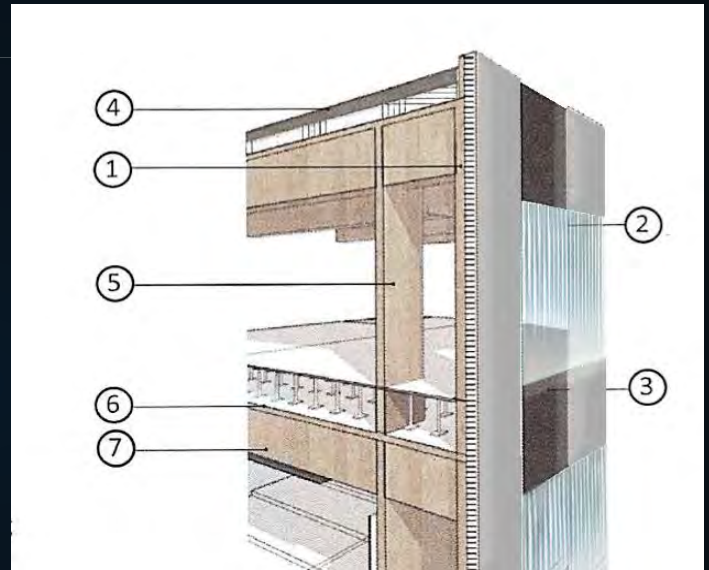
# PASSIVE STRATEGIES

LIGHTWEIGHT CONSTRUCTION [WOOD]  
CARBON-SEQUESTERING  
MATERIALS

PASSIVE SOLAR HEATING + MIXED  
MODE VENTILATION  
MINIMIZE SOLAR GAIN  
PROMOTE VENTILATION, RADIANT  
+EVAPORATIVE COOLING

SOLAR PVs TO STORE AMBIENT ENERGY

INSULATE AGAINST THERMAL  
BRIDGING!



SKIN.

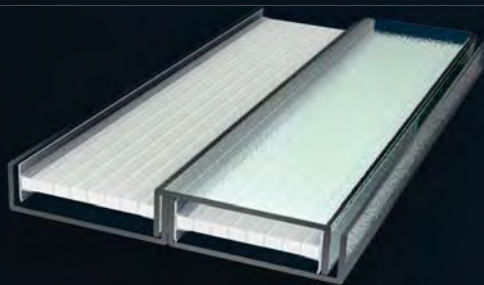
BONES.

1. R24 insulated breathable walls
2. Insulated glazing
3. Shading device
4. Green roofs/ water collection

5. Exposed CLT walls
6. Exposed CLT floors
7. Exposed glulams

# LIGHTING SCHEME

DAYLIGHTING:

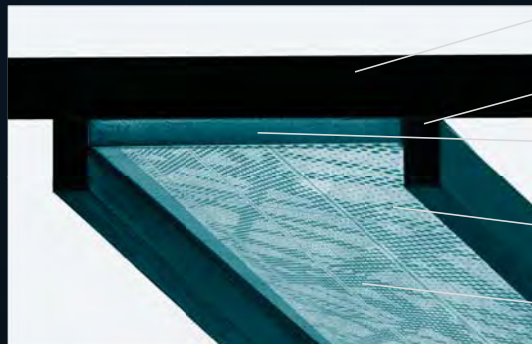


Channel glass w/ aerogel  
insulation  
- low solar transmitter  
- reduces heat gain



ELECTRIC LIGHTING:

LED floodlights are incorporated within  
suspended ceiling which acts as light  
transmitter



CLT FLOOR PANEL

EXPOSED  
GLU-LAM BEAM

SPACE FOR  
ELECTRICAL  
SERVICE

PERFORATED STEEL  
PANEL

RECESSED FLOOD  
LIGHTS



# LIGHTING AND ACOUSTICS

Perforated steel along with acoustic panels are placed depending on program to absorb and diffuse sound.



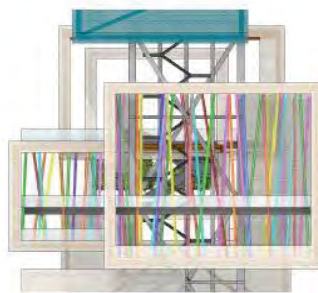
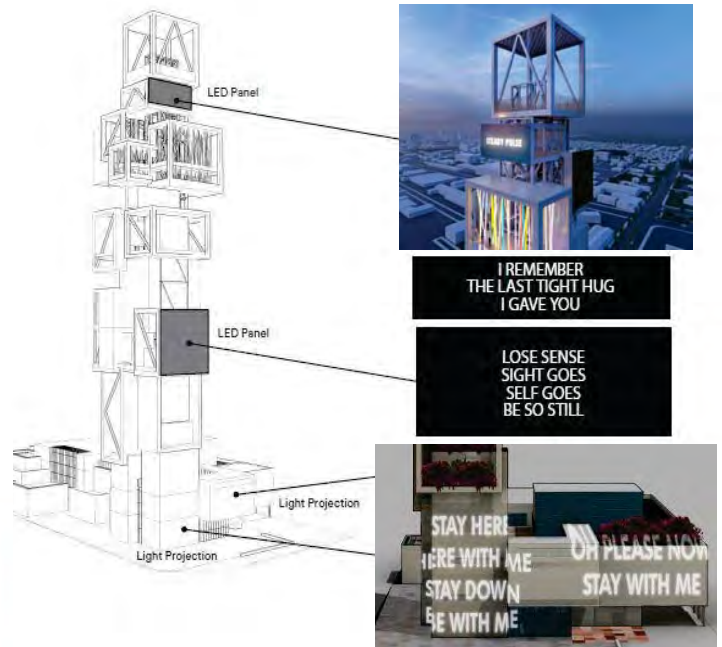
The suspended ceiling comes together to deal with diffusing both light and sound.

- Perforated steel (semi) transmits light and diffuses sound.
- Backlit acoustic panels diffuse light and absorb sound

# CONCEPT LIGHTING

American neo-conceptual artist Jenny Holzer selected for art installations.

- Digital projections and LED displays of quotes in commemoration.
- 49 columns of colored light to be installed in the tower's viewing deck, activated by touch.



49 lights brighten the sky - one for each Angel.

The Heart to Heart exhibition is an elevated open air exhibit that consists of 49 illuminated LED light pillars with interactive qualities.

# BEACON OF SUSTAINABILITY

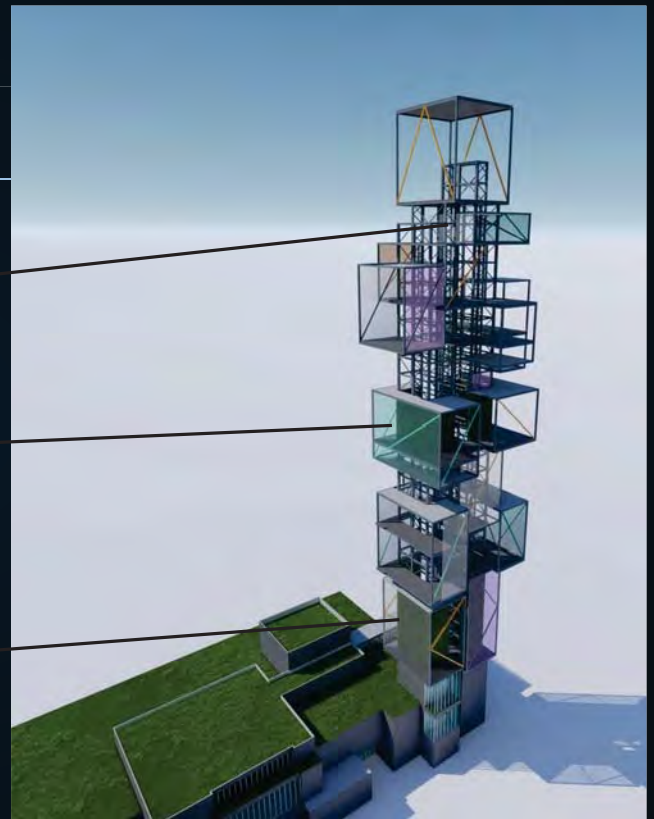
Transparent water collection system



Perforated steel shading devices- eliminates need for electrical cooling systems

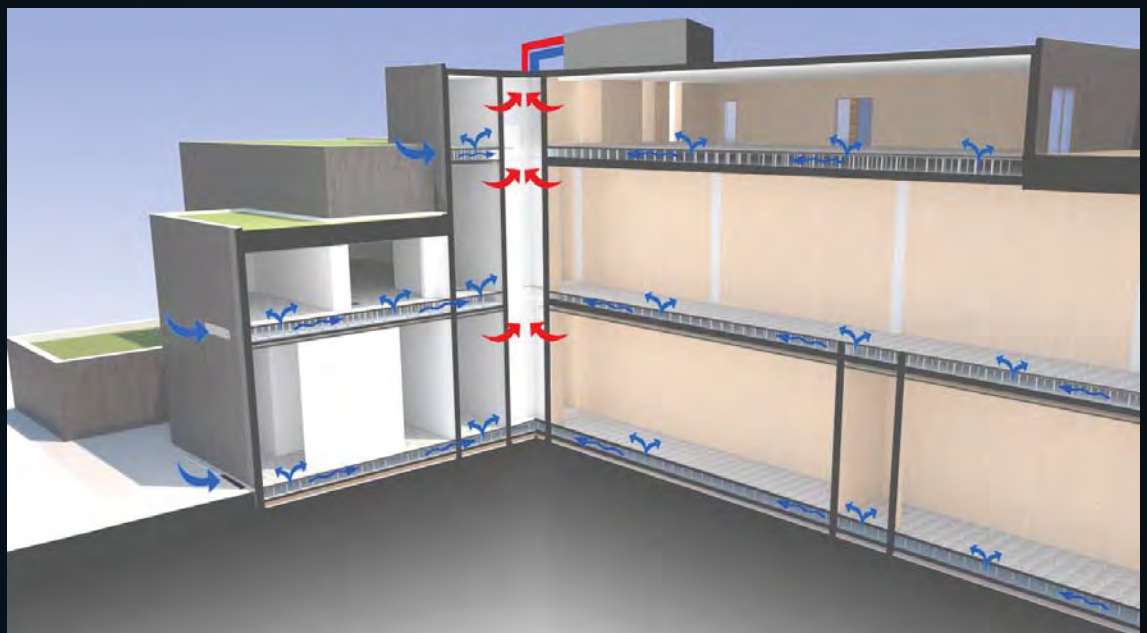


Hydroponic green wall system



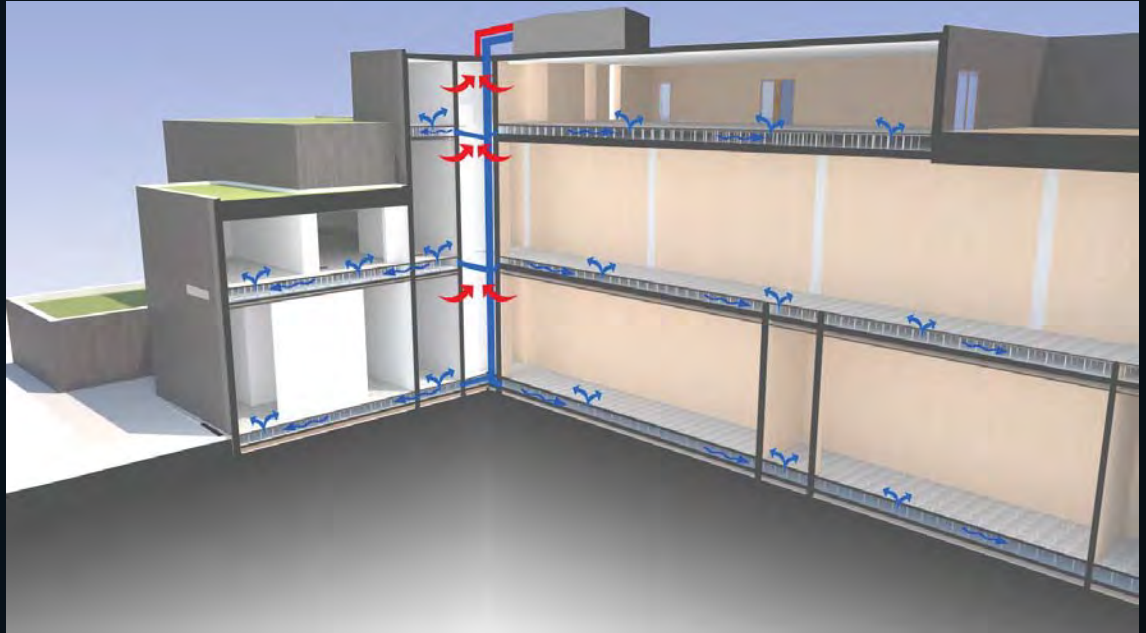
# 'NATURAL MODE' VENTILATION

- Utilizes a mixed mode system
- Allows the system to switch to a naturally ventilated system when the conditions allow
- Achieved through raised floor system with fan-assisted stack ventilation



## 'COOLING MODE' VENTILATION

- Exterior vents are closed and rooftop unit distributes conditioned air through raised floor system
- Warm air is pulled up through the ventilation stack to be reused or released



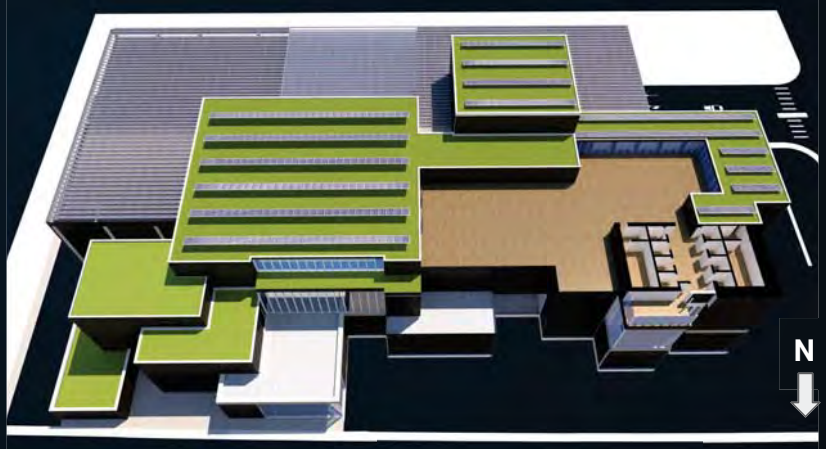
**GOAL #3: ENERGY  
POSITIVE**

# PV ARRAY



## PV Embedded Green Roofs:

Sections of roof include green roof space, PV array, and a hybrid system between the two. Including the trellis shade pv array over the parking garage on the south side of the building



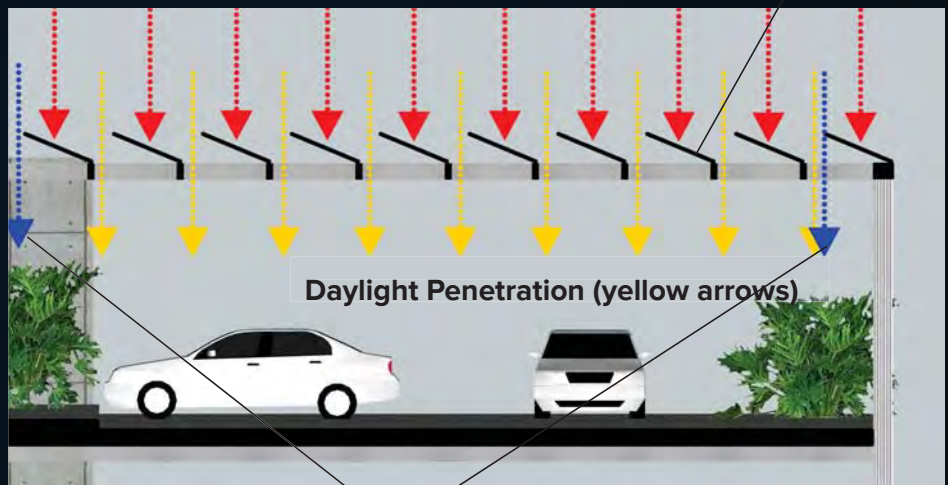
Roof Plan

# SHADED ROOFTOP TRELLIS OVER PARKING GARAGE



Solar Power Generation (red arrows)

PV Panels



Daylight Penetration (yellow arrows)

Rainwater Capture (vegetation)



Over 16000 sqft of potential pv space above the parking garage.

**Stanford Energy Facility Precedent:** Collecting and storing a large amount of solar energy while shading and managing rainwater.

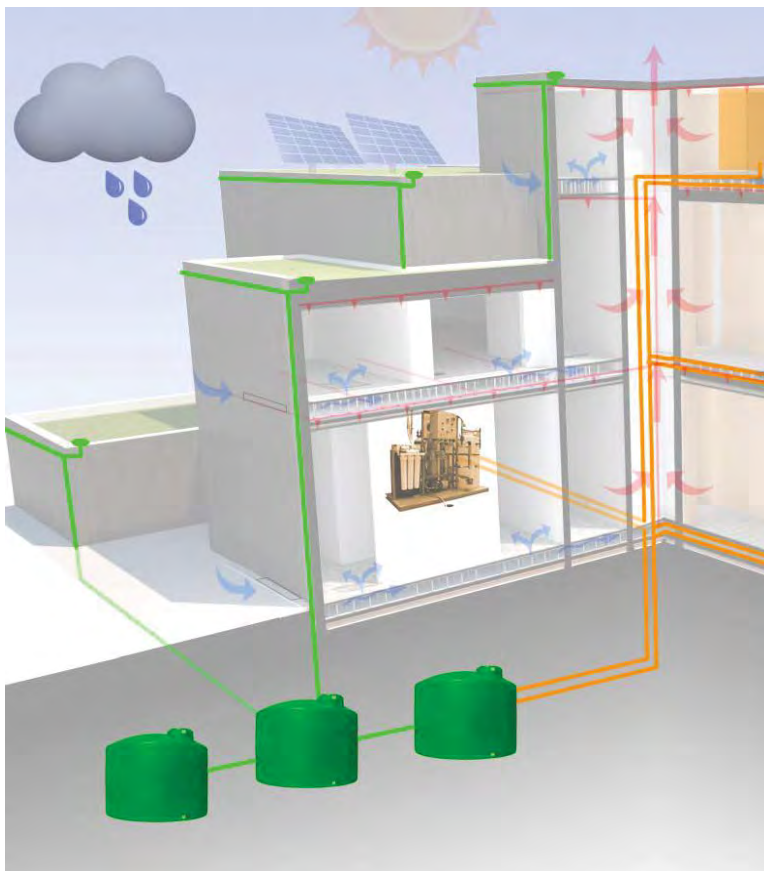
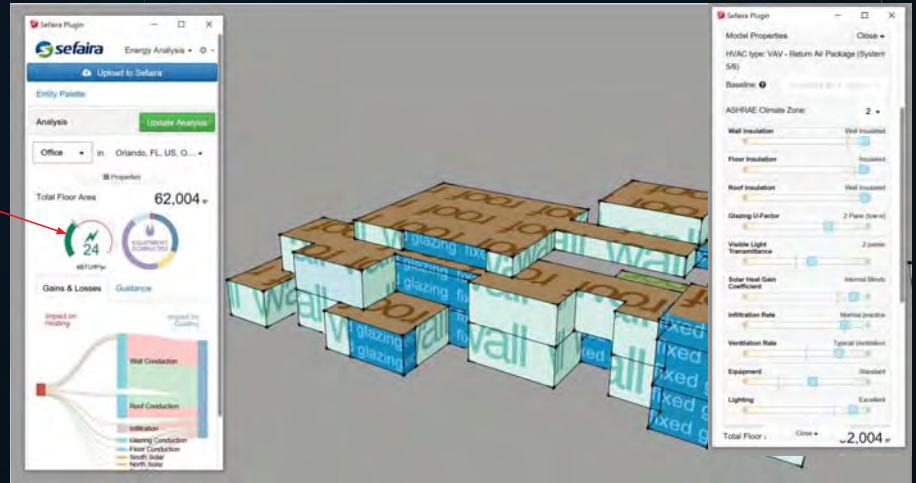
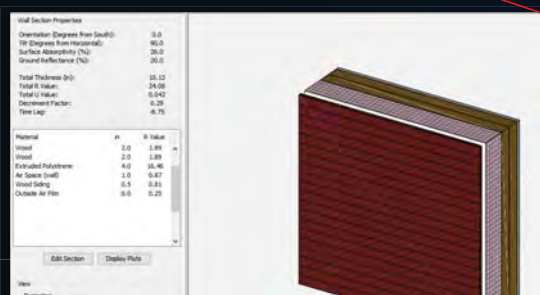
# POWER GENERATION TARGET



Our designed museum PV array of 291 kW (~20,000 sqft of pv panels), with a systems loss percent of approx. 15% yields **450,966 kWh per year** or **1,538,695 kBtus**.

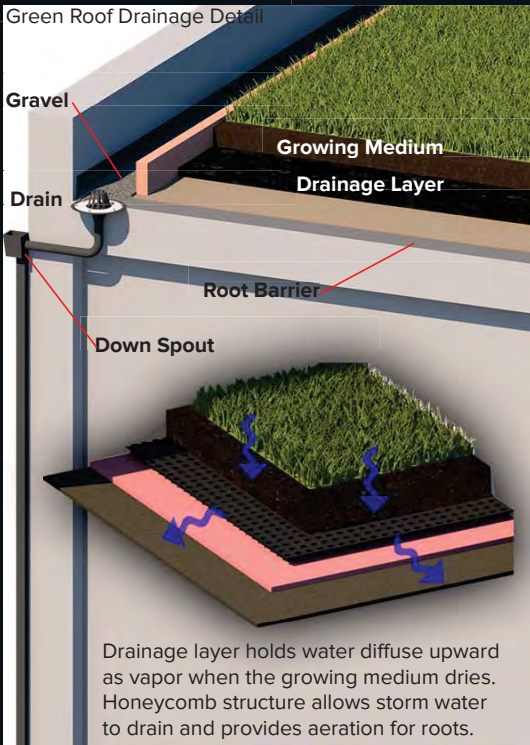
Thus, our target EUI to achieve energy positive is under **25 kBtus/sqft/yr.**

Our design achieves this target by implementing well insulated walls with R values that average around 24, among other passive strategies, putting the actual EUI of our building at **24 kBtus/sqft/yr.**

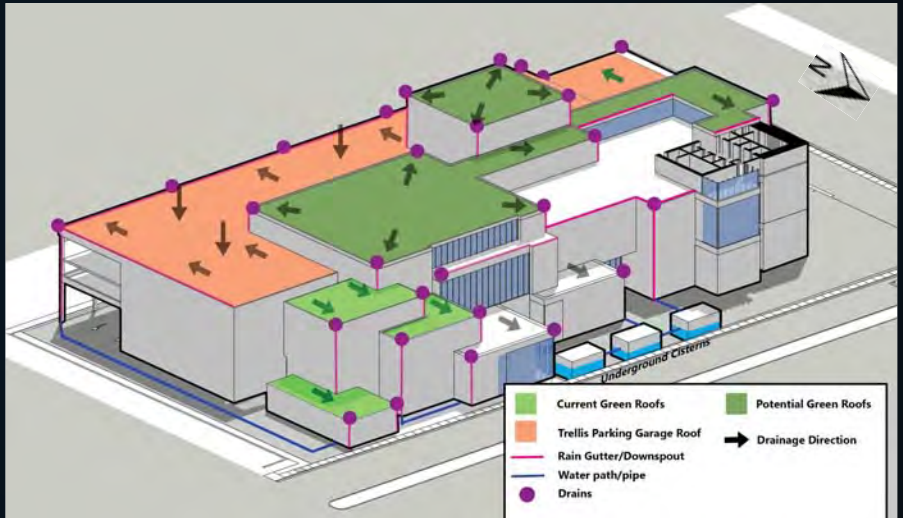


## GOAL #4: STORMWATER NEUTRAL

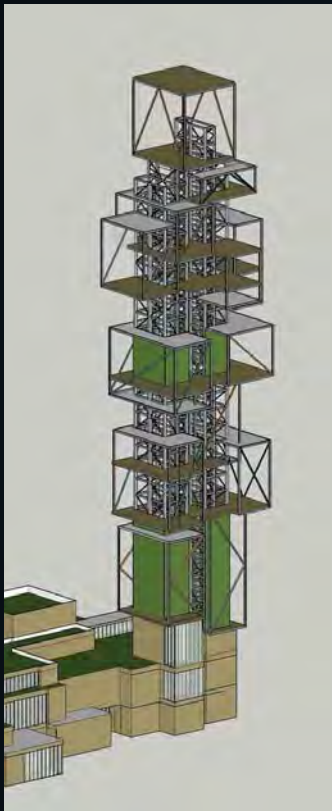
# WATER COLLECTION



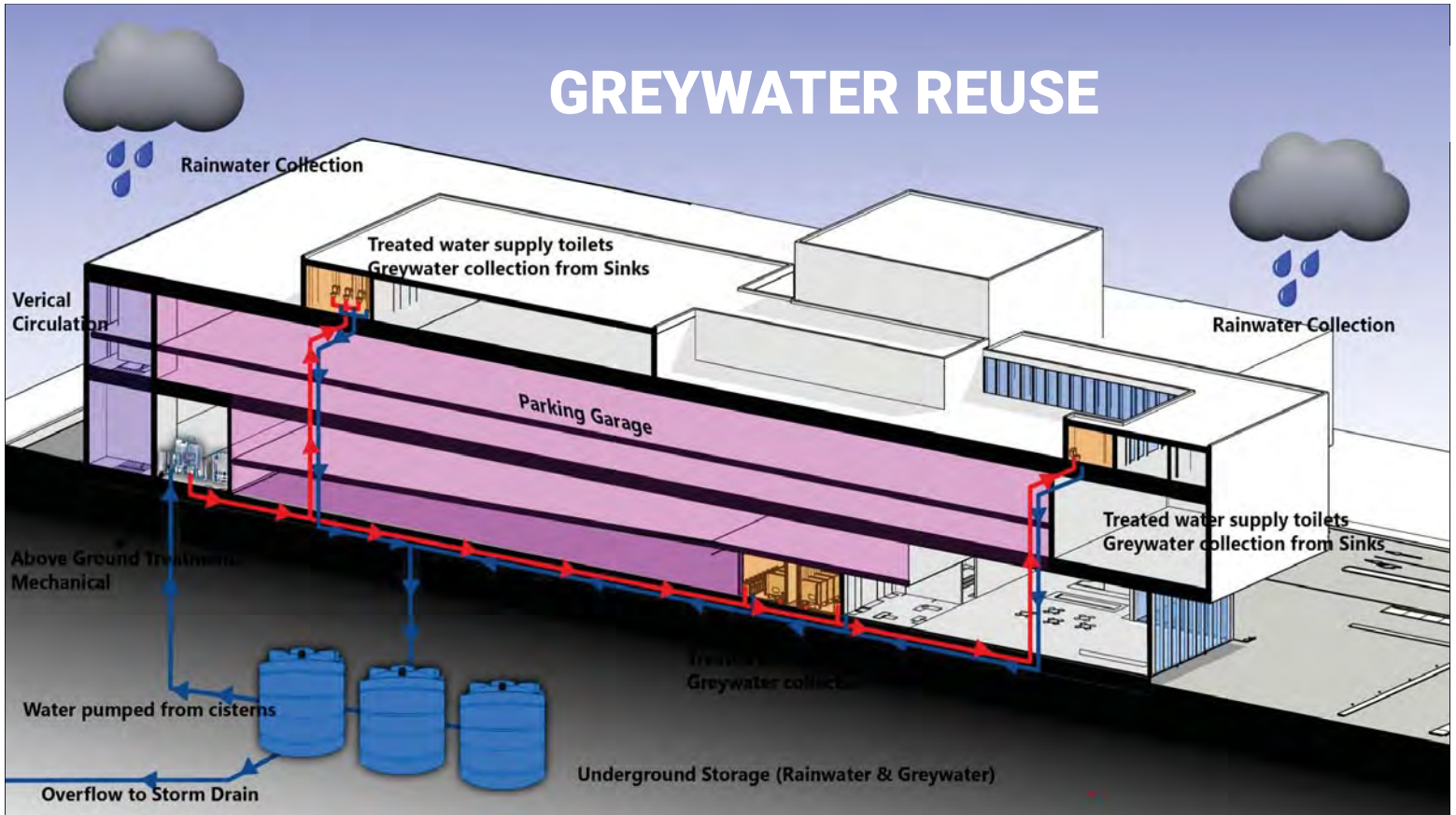
- Drainage path from roof to underground cisterns in back of building.
- Drains located at sloping down corners.



# TOWER WATER COLLECTION & REUSE



- Water is captured and retained in cisterns housed within the robust tower structure
- Green walls are gravity fed from these cisterns
- Green walls employ a hydroponic green wall system, much like the system employed in the Amazon Spheres



## CONCLUSIÓN

### 4 PROJECT GOALS

**DURABLE:** lightweight reinforced construction, double steel core tower using lateral bracing

**CARBON NEUTRAL:** using carbon sequestering materials and passive design strategies

**ENERGY POSITIVE:** generating on site energy and remitting it back to the grid

**STORMWATER NEUTRAL:** capture, make use and reuse and retain stormwater

**THANK YOU!**