

Green Building Design

THE TEAM:

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THE PRESENTERS:

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Objective

- Explore the practical application of green building techniques and technologies in modern construction
- Apply these concepts and ideas in a theoretical building project
- Create a viable design solution to the current energy crisis

Energy Concepts

Passive energy solutions

- Double skin facade

Active energy solutions

- Fuel cells
- Solar panels
- Wind turbines
- Geothermal pumps

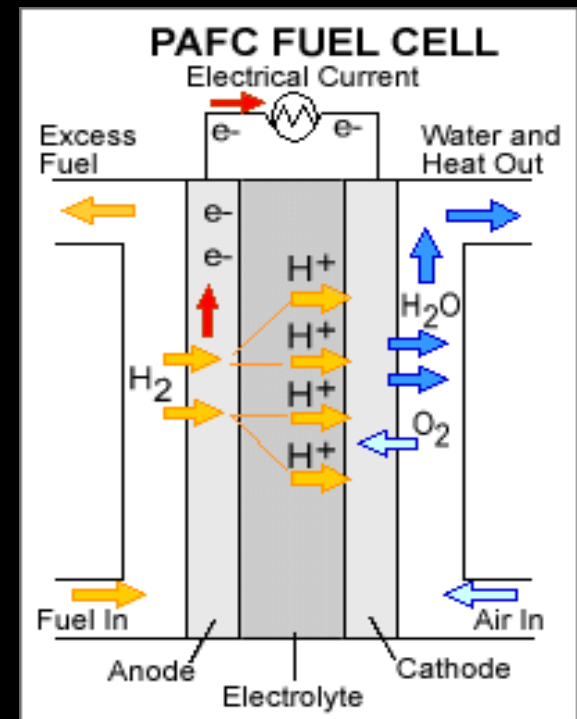
Energy Concepts

Double Skinned Façade

- Create space for hot air to rise out in summer, cold air to sink in winter
- Provide more space to insulate building

Fuel Cells

- Molten Phosphoric Acid fuel cells
- Commonly used in hospitals and manufacturing plants
- Expensive



Energy Concepts

Solar Panels

- Panels on building facades
- Panels required to be in series
 - if one cell isn't working, properly, entire row is out

Wind Turbines

- Requires more studies of wind profiles through area

Geothermal Heat Pumps

- Heat pumps using heat exchangers below building to heat and cool building

Project Selection

-Building Type

Residential

Green Living

High Rise

Theoretical LEED Certification

-Site

Local Community

Personal Interest

Familiar Climate

Team Breakdown

- A. Architecture Design
- B. Structural Analysis and Design
- C. Foundation Analysis and Design
- D. Water Use, Plumbing System and Drainage
- E. Electrical and Communication Systems
- F. Building Energy Sources, Solar Panels and Wind Turbines
- G. Building Envelope
- H. HVAC System
- I. Landscaping
- J. Fire Protection System
- K. Security System

Design Influence



Hearst Tower

Folsom/Dore Apartments



Atrerra

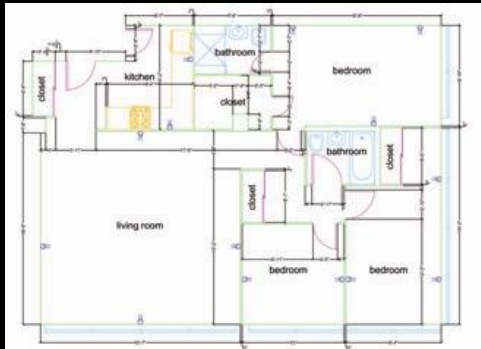


Pearl River Tower

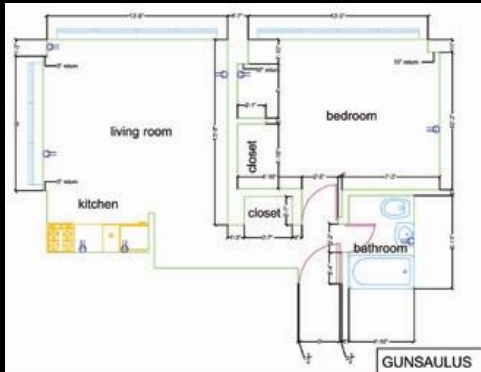


Mission Creek Senior Community

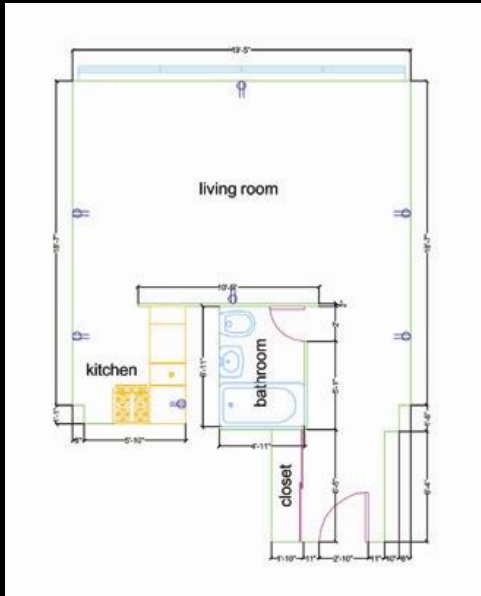
Current Program



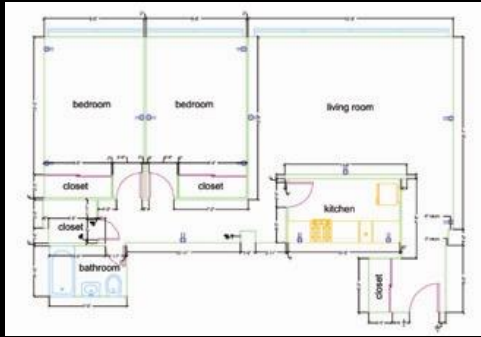
3 Bedroom



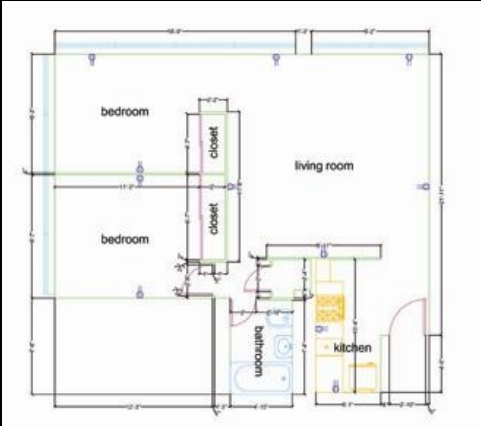
1 Bedroom



Studio



2 Bedroom



2 Bedroom

Program Outline

Residential Floors

Approx 100 units (4 per floor per tower)

Studio -	600 sf	x2
1 Bedroom -	800 sf	x2
2 Bedroom -	1000 sf	x2
3 Bedroom -	1200 sf	x2
Laundry room -	500 sf	
Common Space -	1500 sf	
Elevator -	500 sf	
Mechanical -	200 sf	
Closets -	100sf	
TOTAL	10,000 sf	

Retail Floor

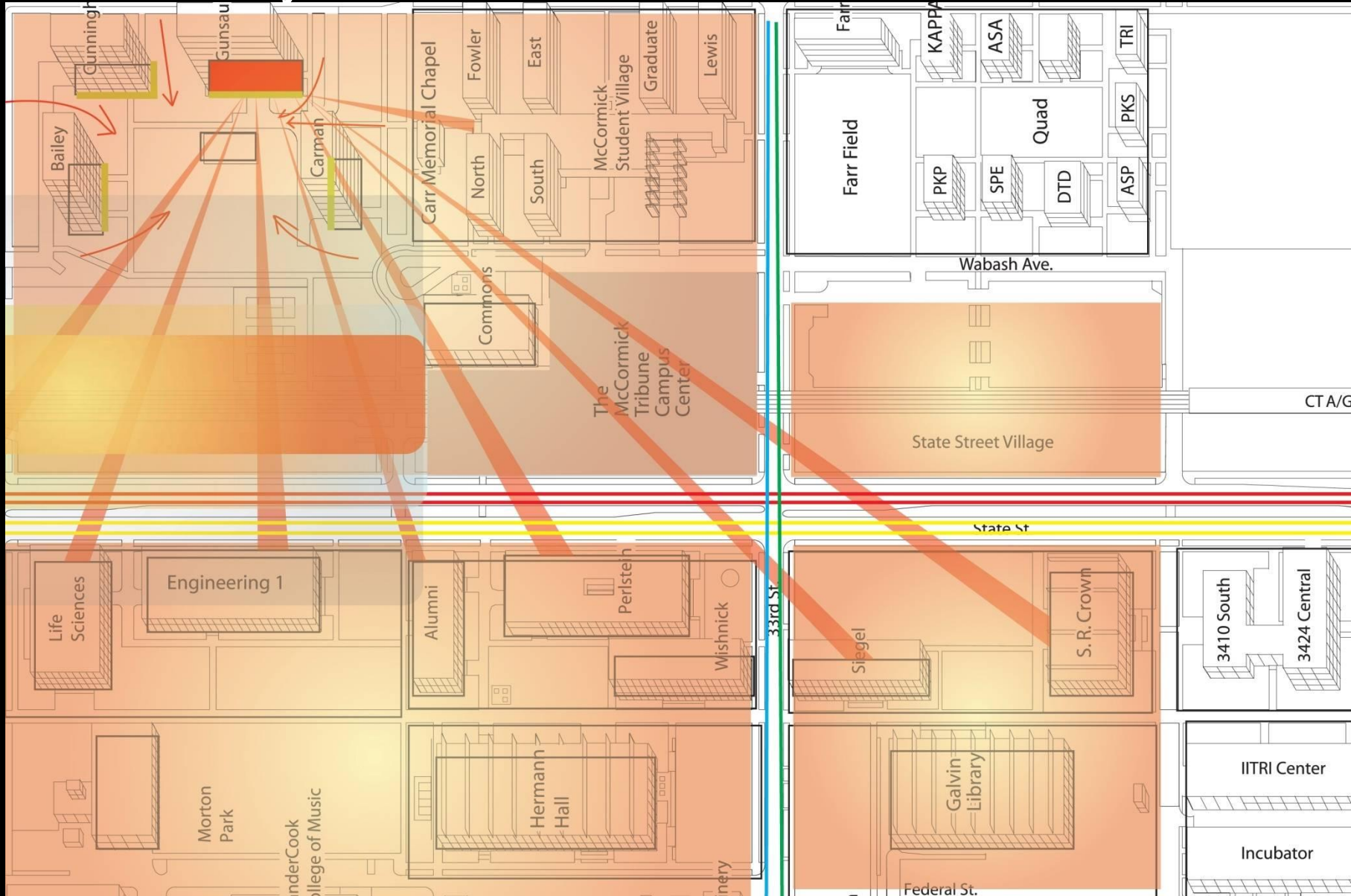
Multiple Retail Units

Common Space -	2000 sf
Retail Units -	9000 sf
Entrance Lobby -	1500 sf
Security Desk -	200 sf
Bathrooms -	600 sf
TOTAL	13,300 sf

Site



Site Analysis

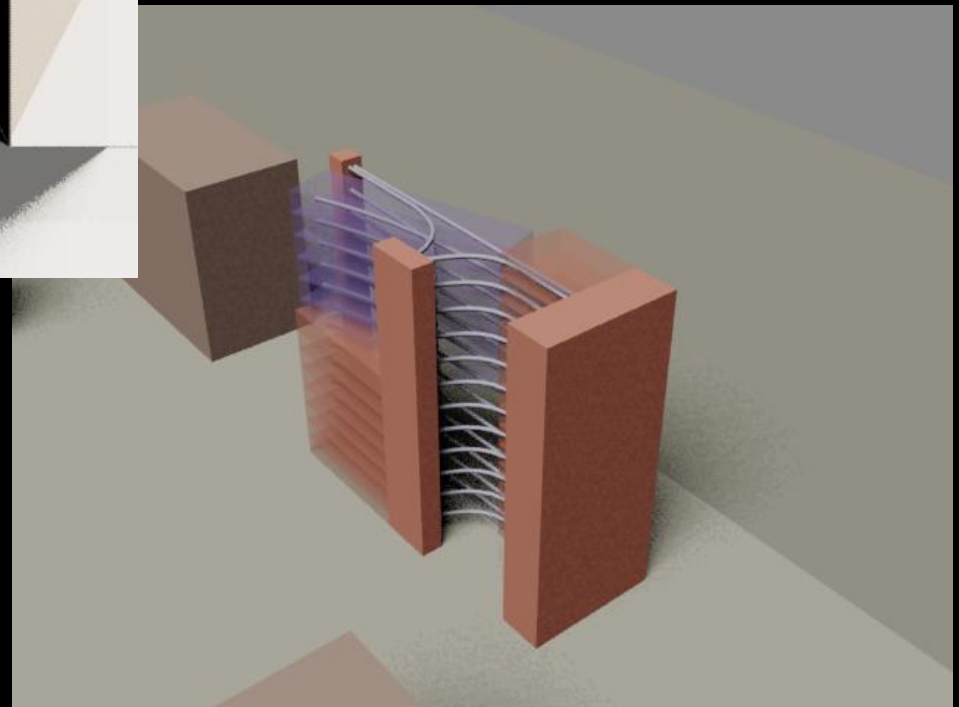


Site Studies

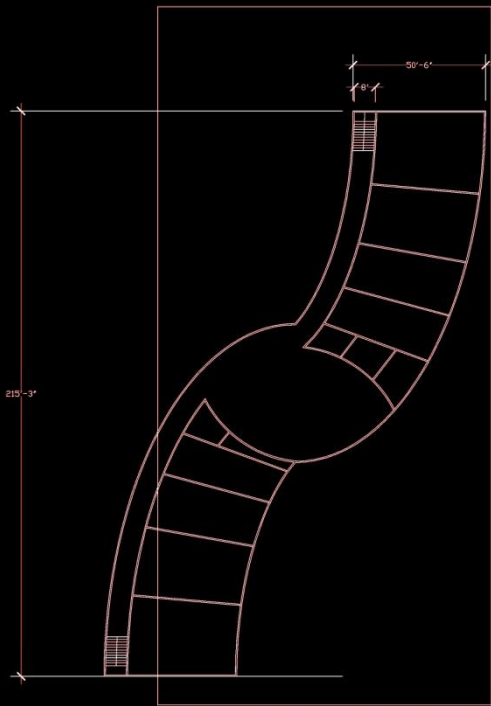


Lighting/Shadow

Building Circulation

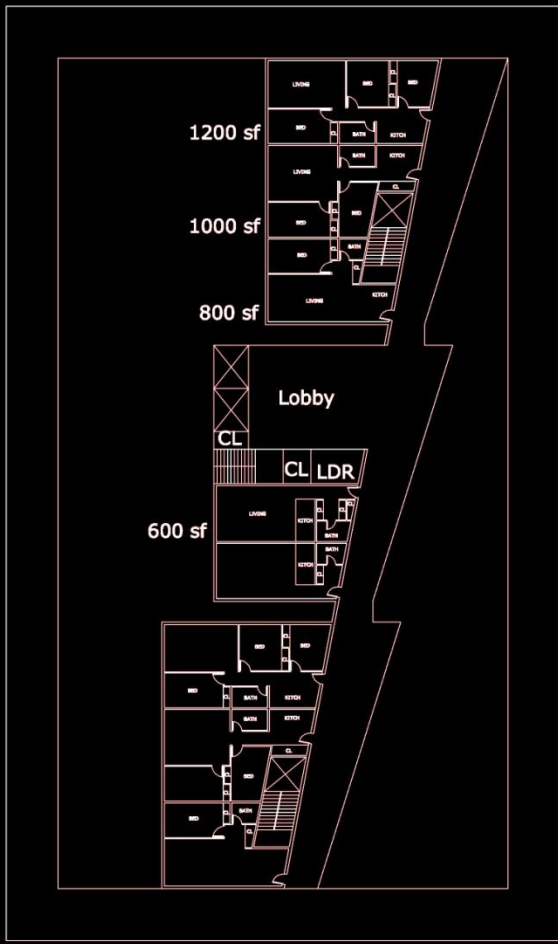


Plan Development



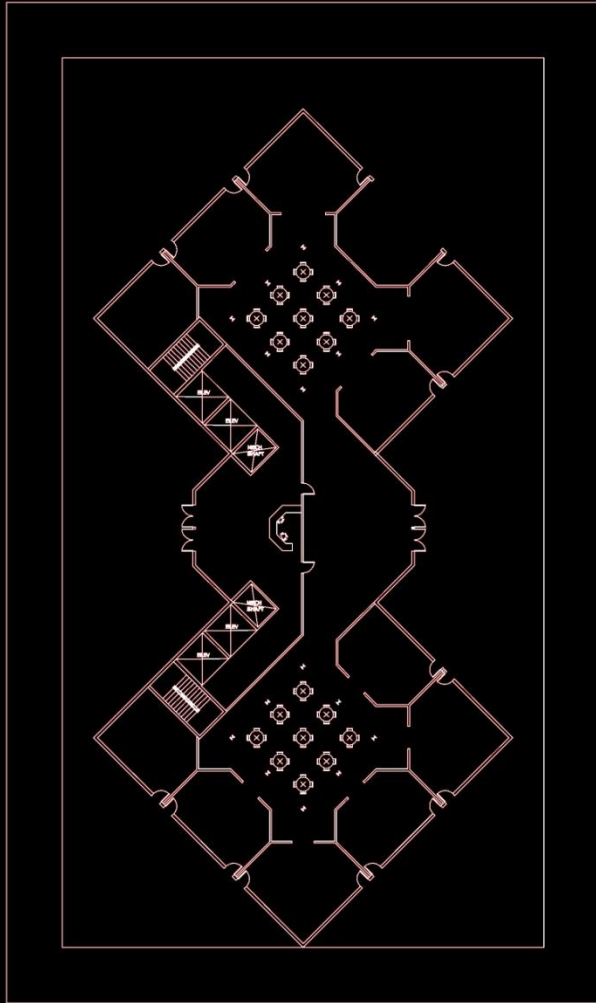
Design 1.1

Elevation 2.1

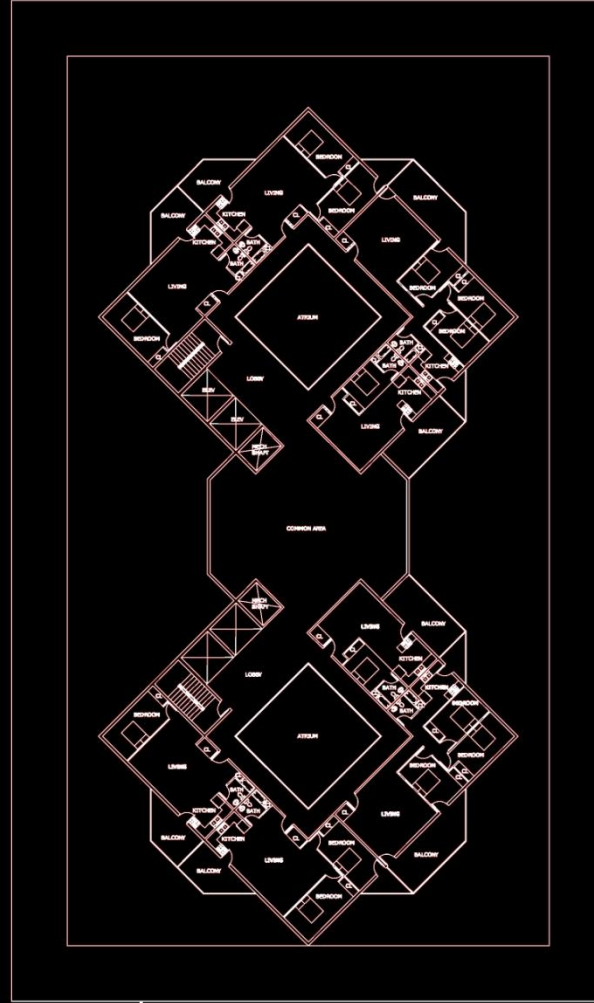


Design 2.1

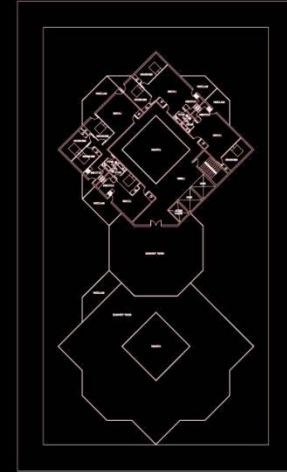
Plan



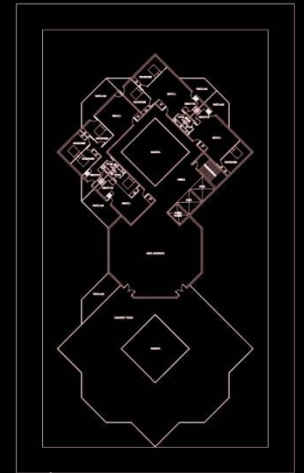
1st Floor



3-13th Floors

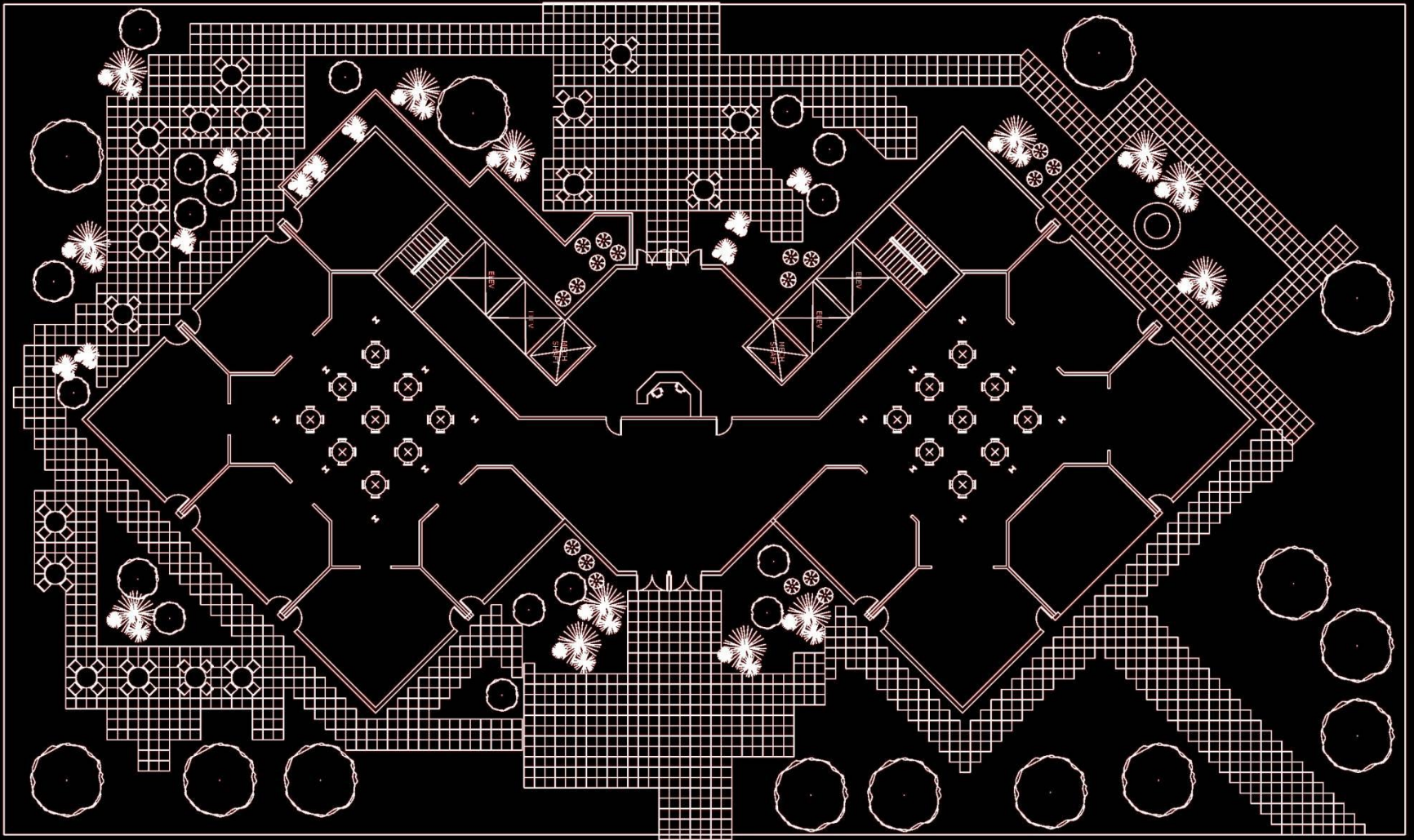


15-17th Floors



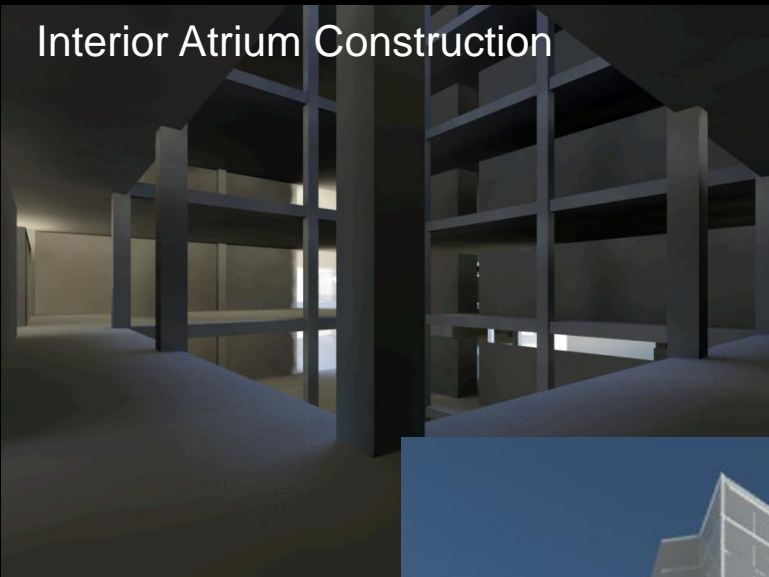
14th Floor

Plan



Landscaping Plan

Renderings



Interior Atrium Construction



South Elevation



West Elevation

Collaboration

Design must take into account engineering properties in the initial design to fully embrace the ability and usefulness of energy savings.

As a group we are working closely as Architects and Engineers early on in the project.

This is a shift from the traditional process of design, and illustrates the shifting dynamic of the building industry.

Mechanical

Green Concepts

- Geothermal Heating and Cooling
 - Uses heat of subsurface to heat or cool water
- Solar Cooling
 - Converts solar radiation to cooling energy
- Natural Convection
 - Using the Chimney effect, air is naturally drawn through the structure

Electrical

Green Concepts

- Lighting
 - Daylight
 - Controls
 - Sensors
 - Dimming Ballasts
 - Light wells
- Energy Efficient Fixtures and Appliances
- Power generation
 - Photovoltaic Cells

Plumbing

Green Concepts

- Greywater and Rainwater collection
 - Reuse of wastewater
 - Treat water to be useable
 - Cisterns for storage of water to be used:
 - Toilets
 - Irrigation
- Reduction of water load
 - Low flow and water efficient fixtures

