

BLENDING JAMEEL

TEAM GREENTOPIA

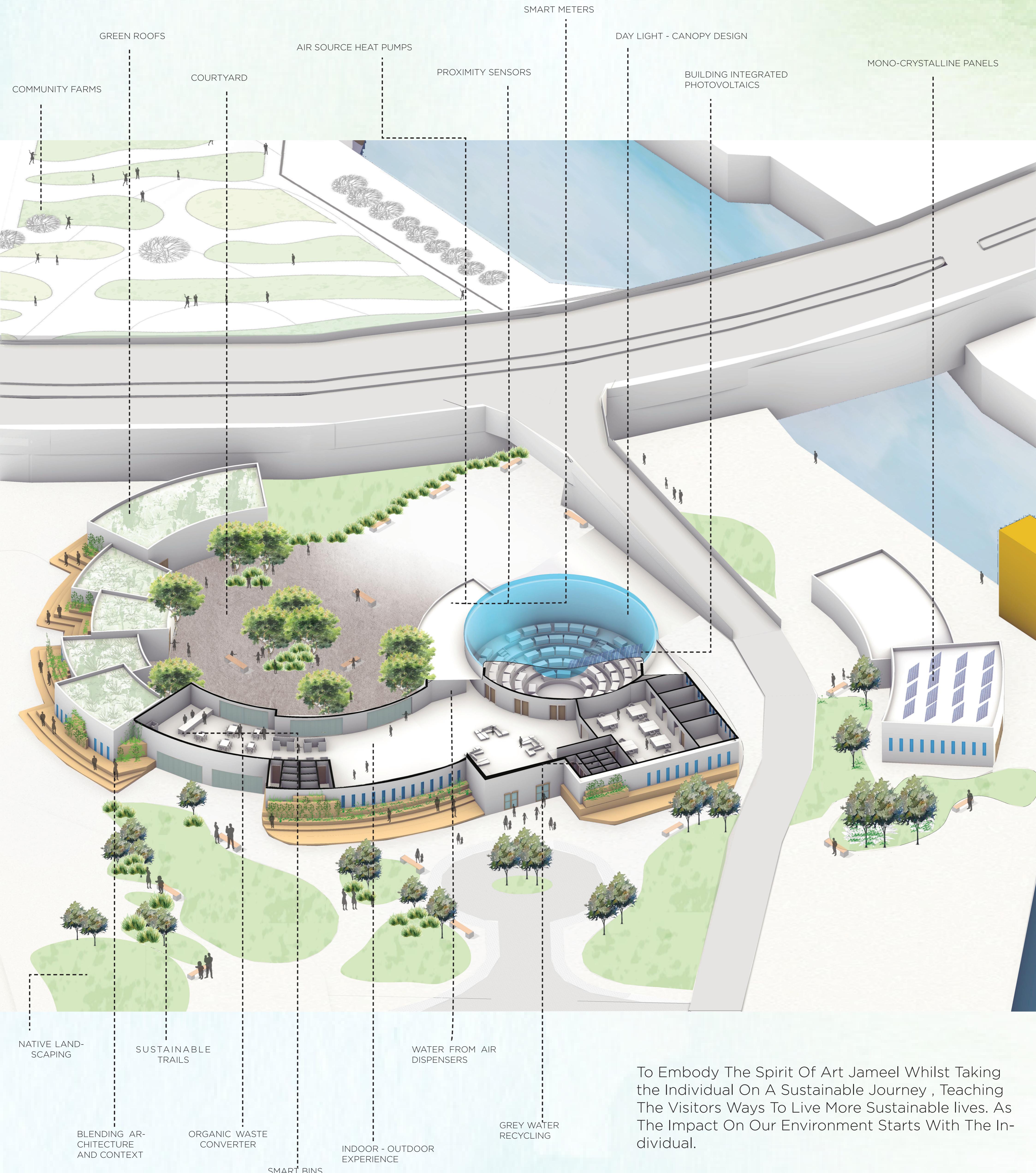
TEAM GREENTOPIA

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HERIOT
WATT
UNIVERSITY

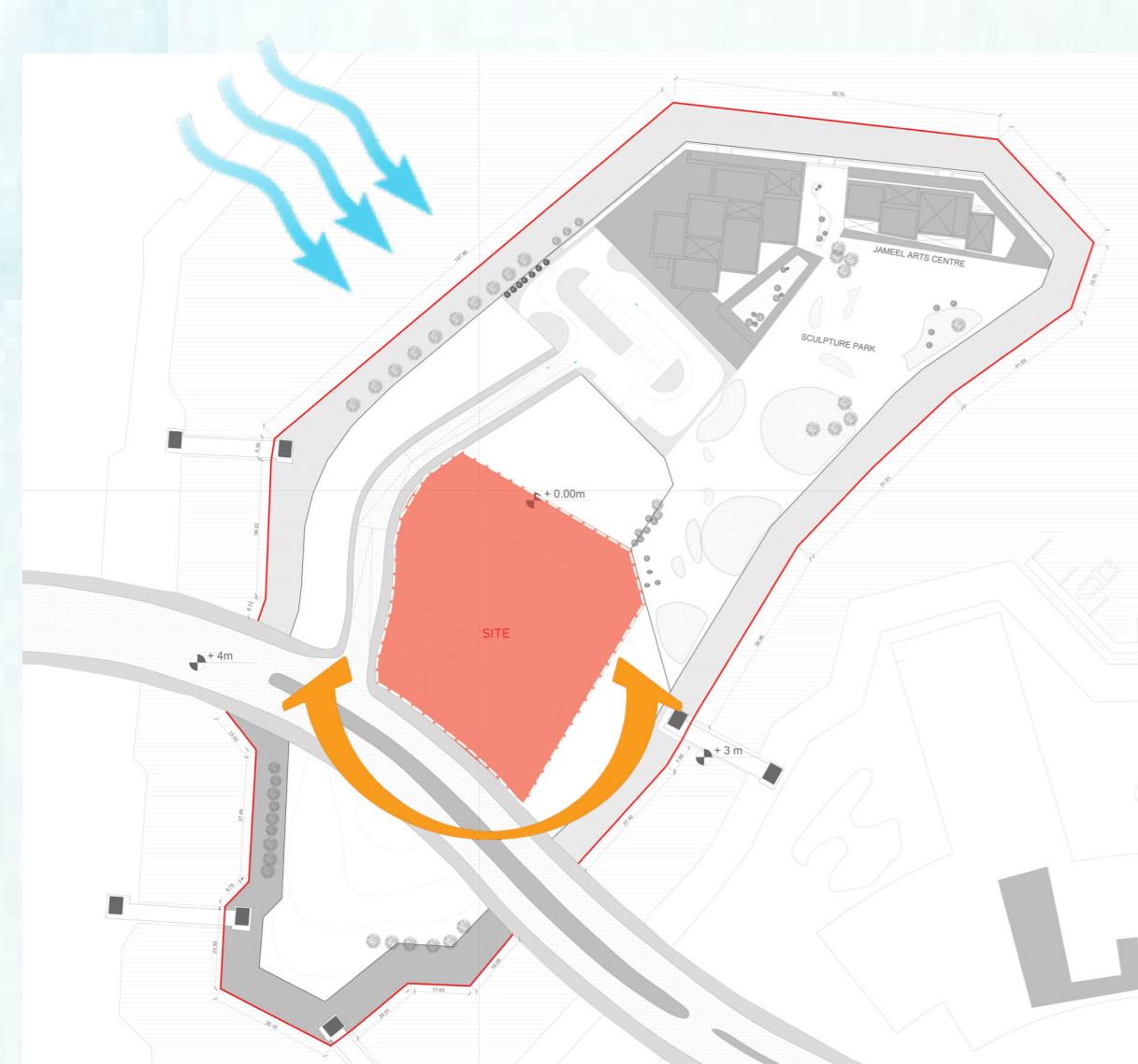
Jacobs
Challenging today.
Reinventing tomorrow.



To Embody The Spirit Of Art Jameel Whilst Taking the Individual On A Sustainable Journey , Teaching The Visitors Ways To Live More Sustainable lives. As The Impact On Our Environment Starts With The Individual.

DESIGN DEVELOPMENT

SITE LOCATION



Reclaimed land; sand and rocks (Hajar mountains)
Surrounding water: 10 m depth
Retaining walls
Average wind speed: 12 km/h



Sustainability programmes

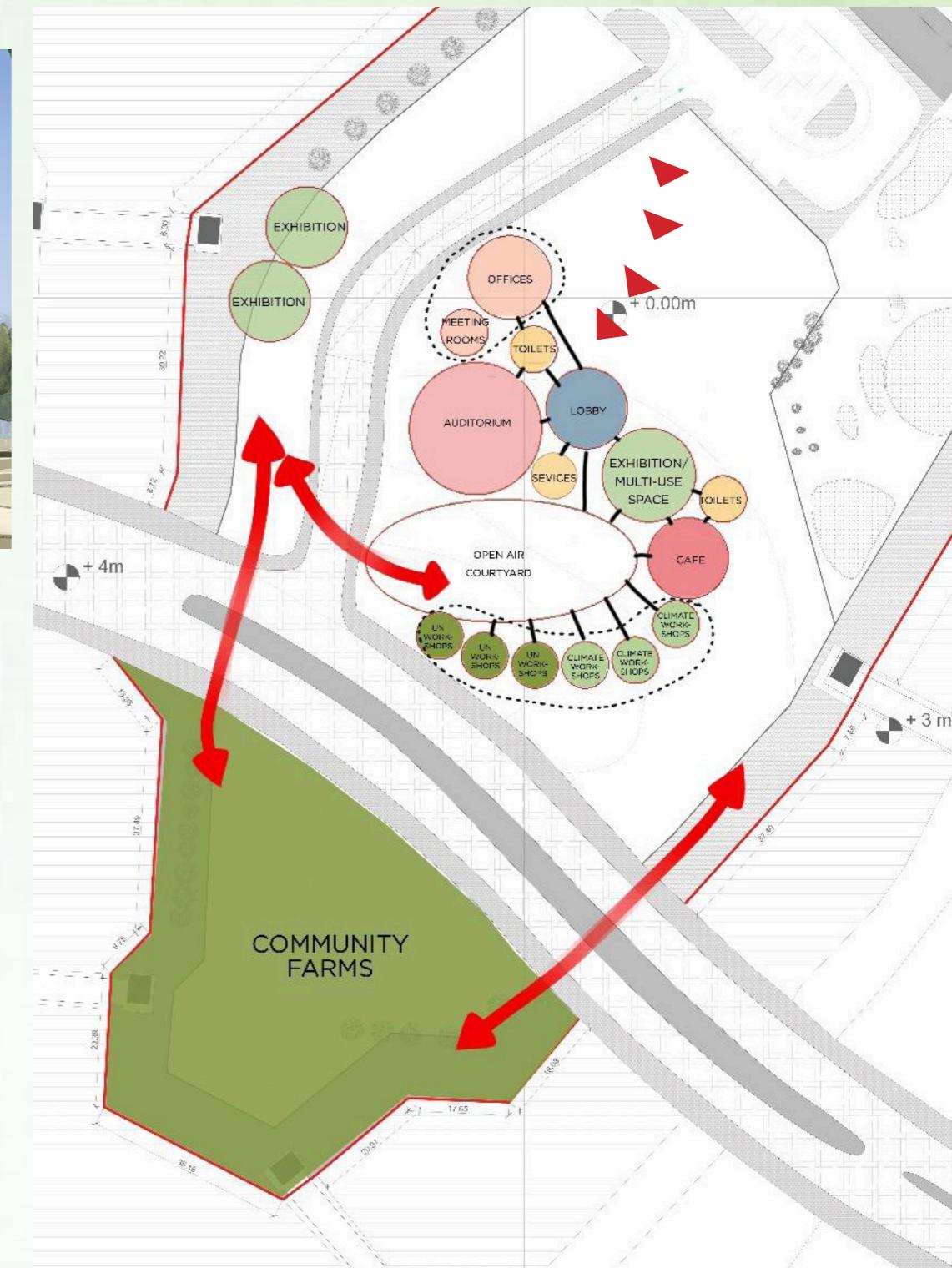


Blending Landscape

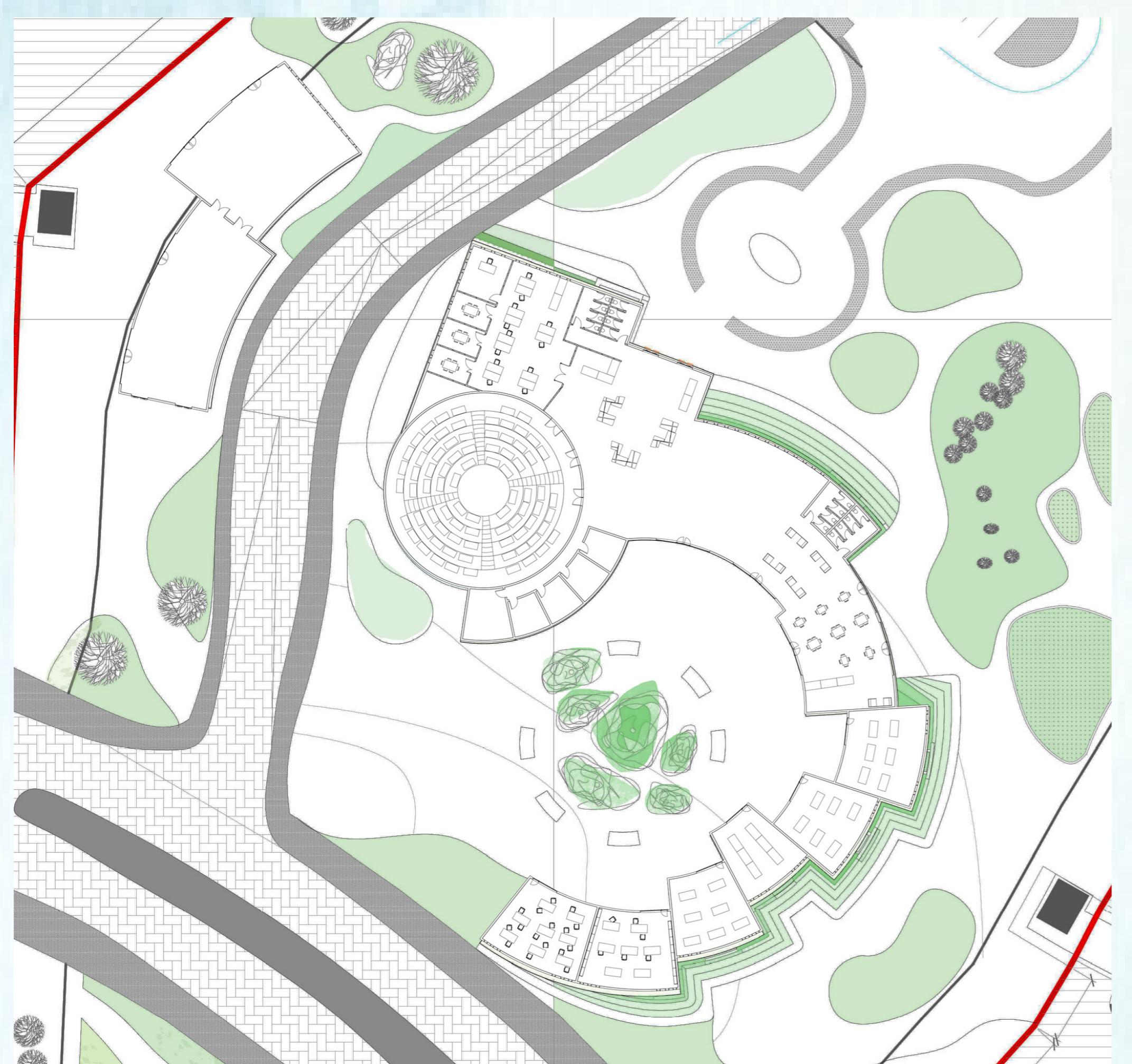


Honoring Jameel

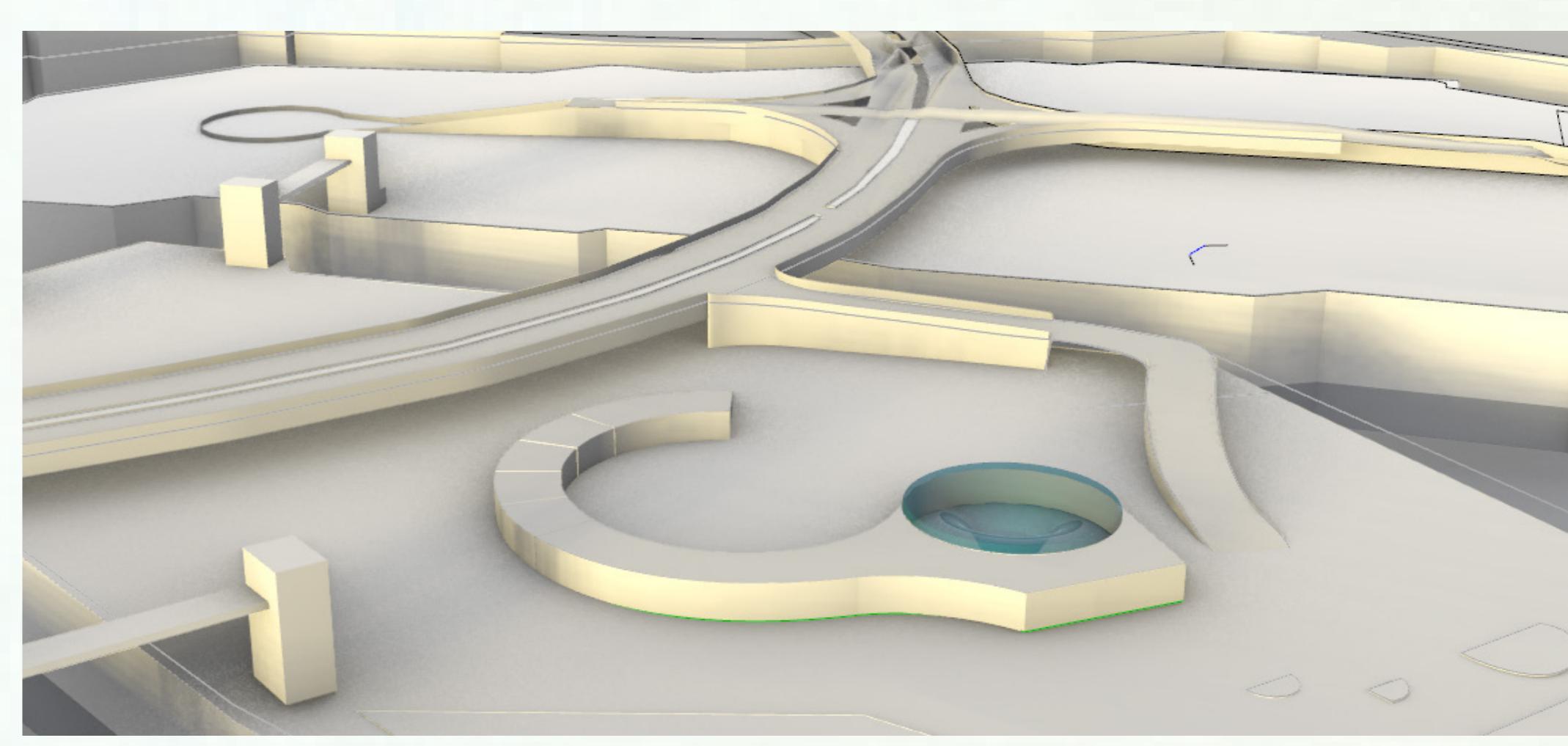
SPATIAL ARRANGEMENT



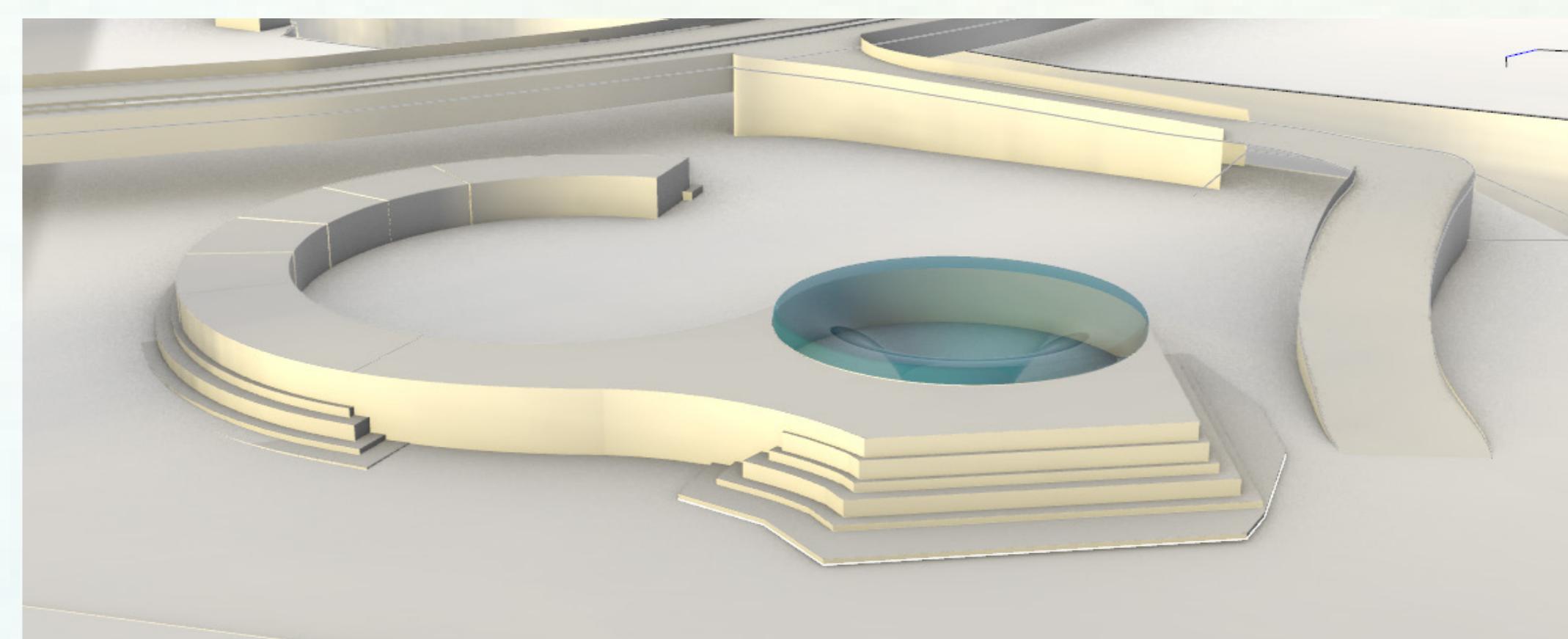
SITE PLAN



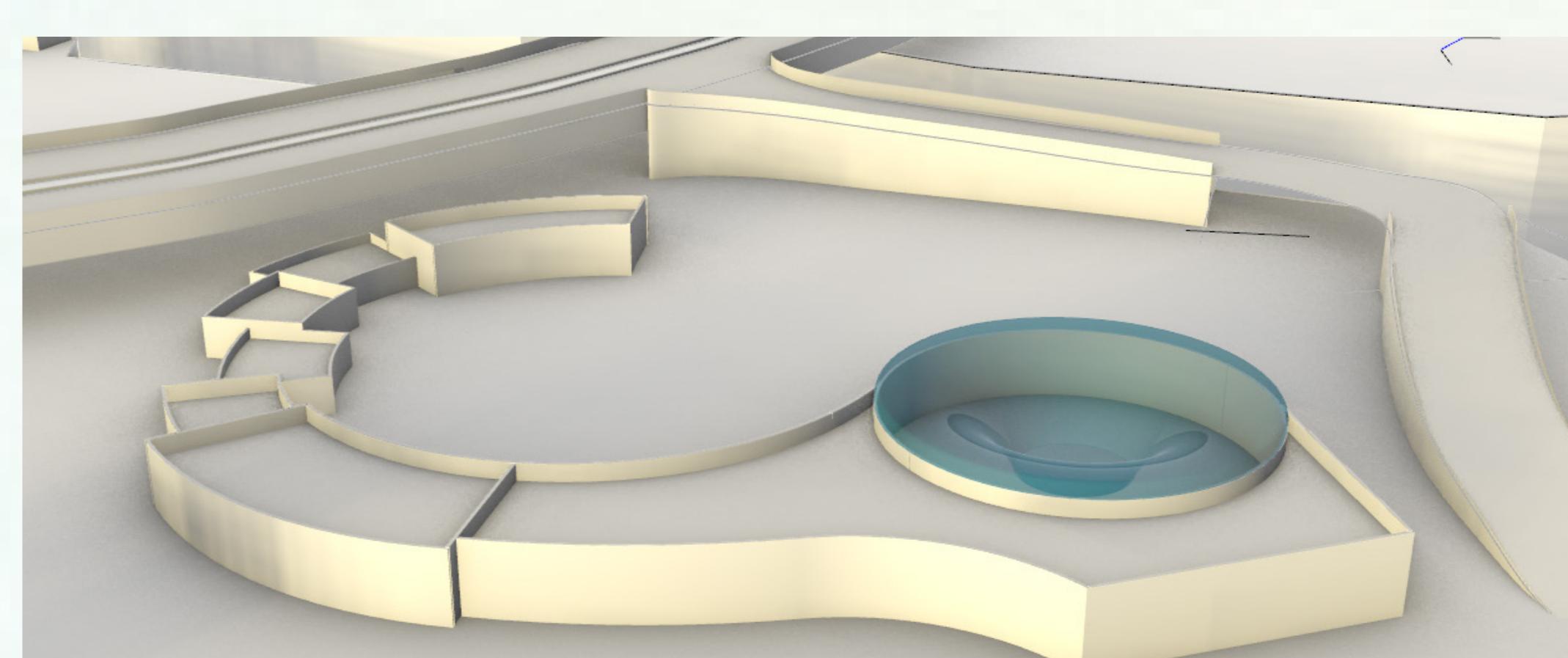
FLOOR PLAN



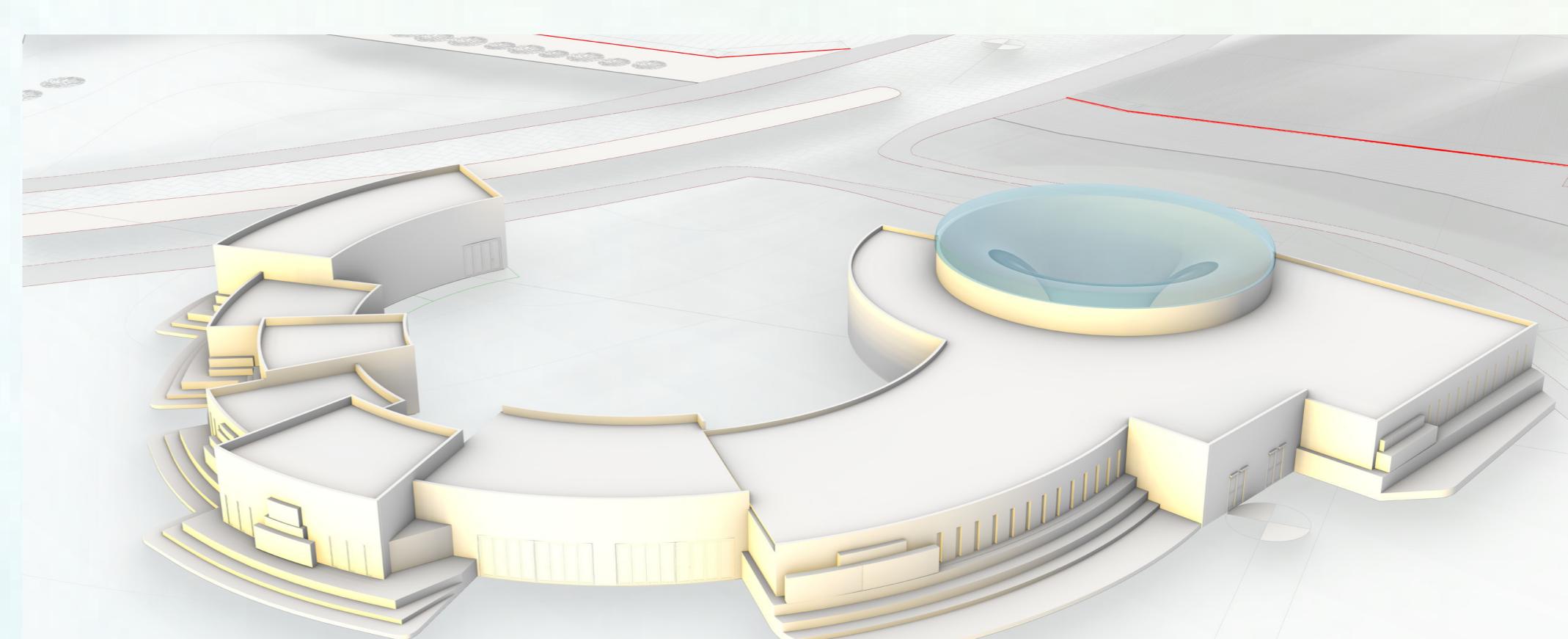
ITERATION 1



ITERATION 2



ITERATION 3



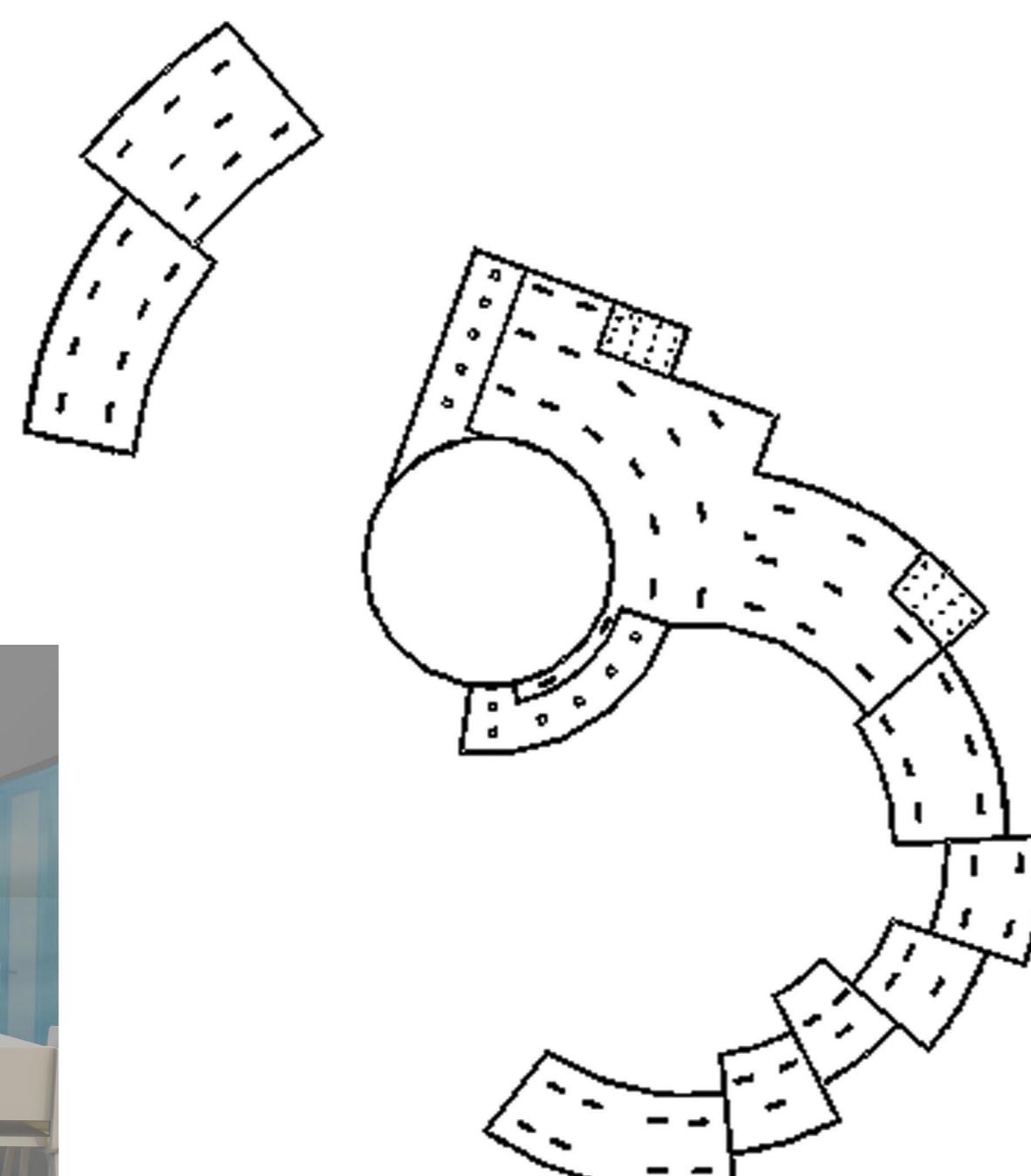
ITERATION 4- THIS WAS A COMBINATION OF ITERATION 3 AND 4

ENERGY AND MEP

ENERGY MANAGEMENT

LIGHTING

An essential part of reducing energy consumption within a structure is using LEDs. This structure has a TRI-LUX LED lighting system built throughout it. Energy.gov claims that LEDs consume 90% less energy than standard incandescent light bulbs and last over 25 times longer, which means that investing in LED lighting can significantly reduce annual electricity consumption. In order to achieve optimum efficiency, TRI-LUX LEDs were employed, which offers a maintenance benefit since the lights would come from the same supplier as opposed to having various suppliers for each room. LED layout throughout the whole building. The auditorium receives the most amount of daylight with a glass dome, concluding that the auditorium requires the least amount of lighting throughout the day.



| LEDs used from TRILUX | Lumens/Bulb | Colour Temp (k) | Location |
|-----------------------------------|-------------|-----------------|--|
| ArimoFit Sky M59 PW19 53-840 ETDD | 5300 | 4000 | Lobby, Auditorium, Offices and Exhibition Spaces |
| ArimoFit M84 PW16 30-840 ETDD | 3000 | 4000 | Meeting Rooms and Service Rooms |
| Avelia C09 OA 2600-830 ETDD 01 | 2550 | 3000 | Bathrooms |

SUSTAINABILITY

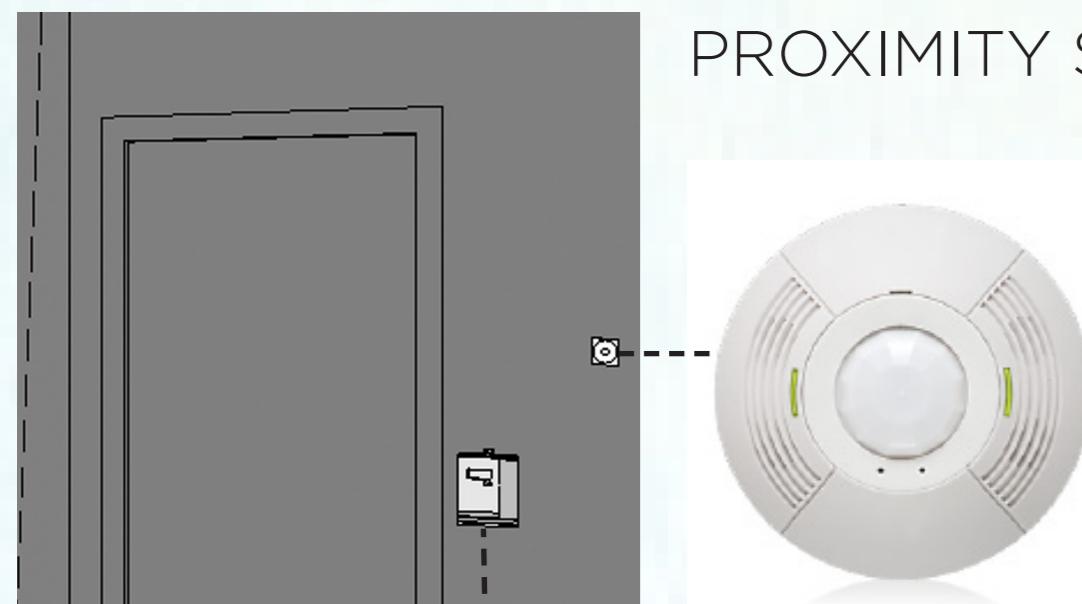


We decided to mesh Art Jameels landscaping with our own creating these very fluid patches whilst respecting the very linear nature of the build through the planted steps , located towards the south of the site under the bridge , we have allocated for local farming

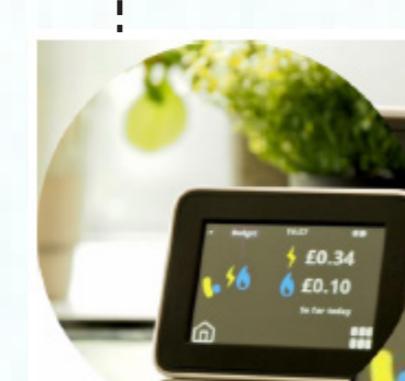
NATIVE PLANT LANDSCAPING

| Plant name | Water consumption |
|---------------------------------|----------------------------------|
| Damas tree | 0 litres per day |
| Ghaf tree | 10 litres per day |
| Neem tree | 0.2 litres in every 12 days |
| Arabian jasmine | 0.2 litres in every 5 days |
| Aloe vera | 0.03 litres every week |
| Arija (Phantus epa spinosum) | 0.03 litres every week |
| Aswad (Cyclon leachii) | 0.05 litres every week |
| Saltgrass (Dipterygium glaucum) | 0.00 litres every week (assumed) |
| Panicum Turgidum | 0.00 litres every week (assumed) |

PROXIMITY SENSORS

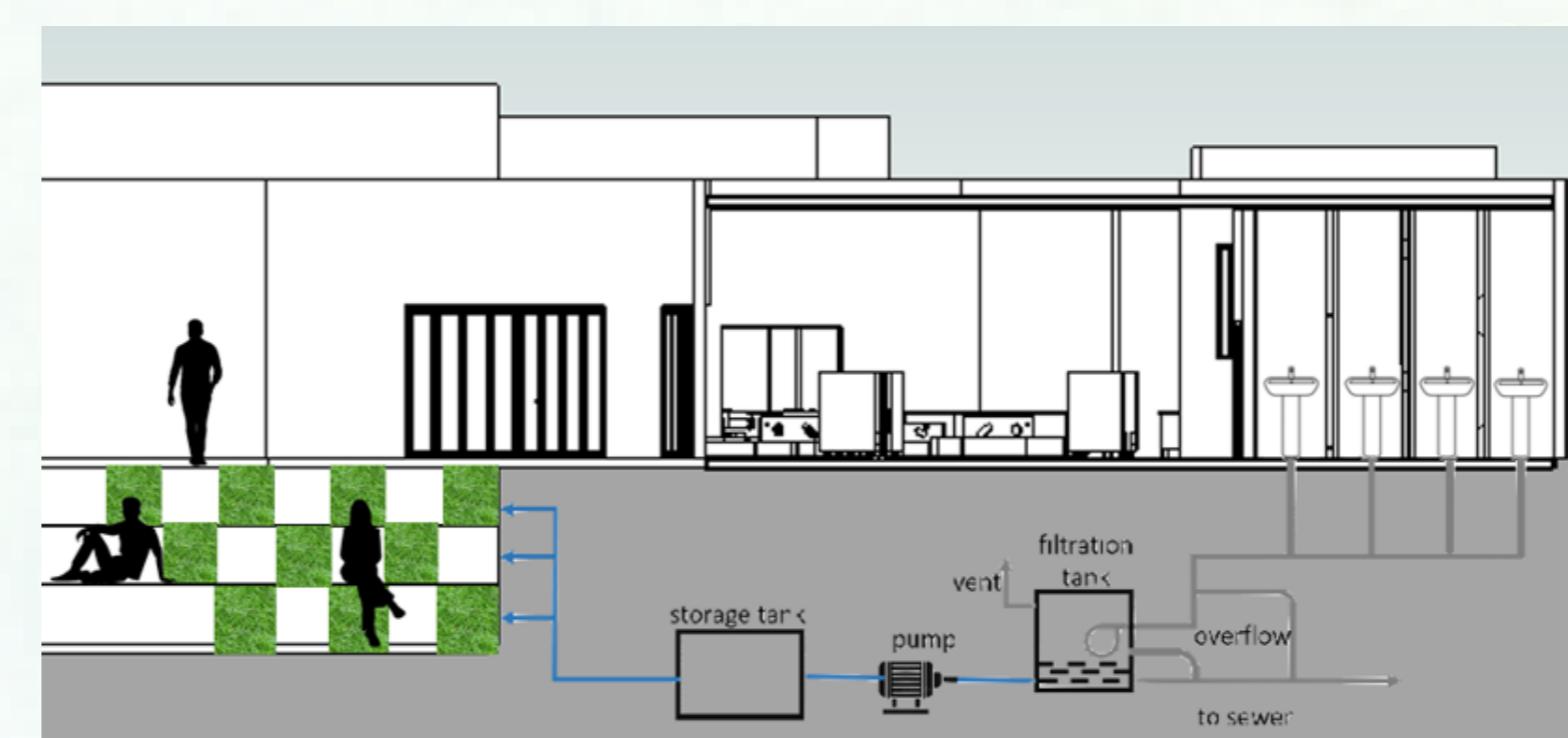


The proximity sensors that are built into each room enable energy-efficient lighting since they prevent the usage of lighting when a room is vacant by turning the lights off automatically.



SMART METERS

A smart meter is placed in the service room located inside the building which annotates the energy consumption of the building monthly or annually. This would help in understanding the room for improvement or any flaws that may occur during the installation phase. It is located strategically as whenever maintenance is required; the smart meter can be repaired without causing any interruptions to the workflow within the building.



ON SITE GREY WATER IRRIGATION SYSTEM

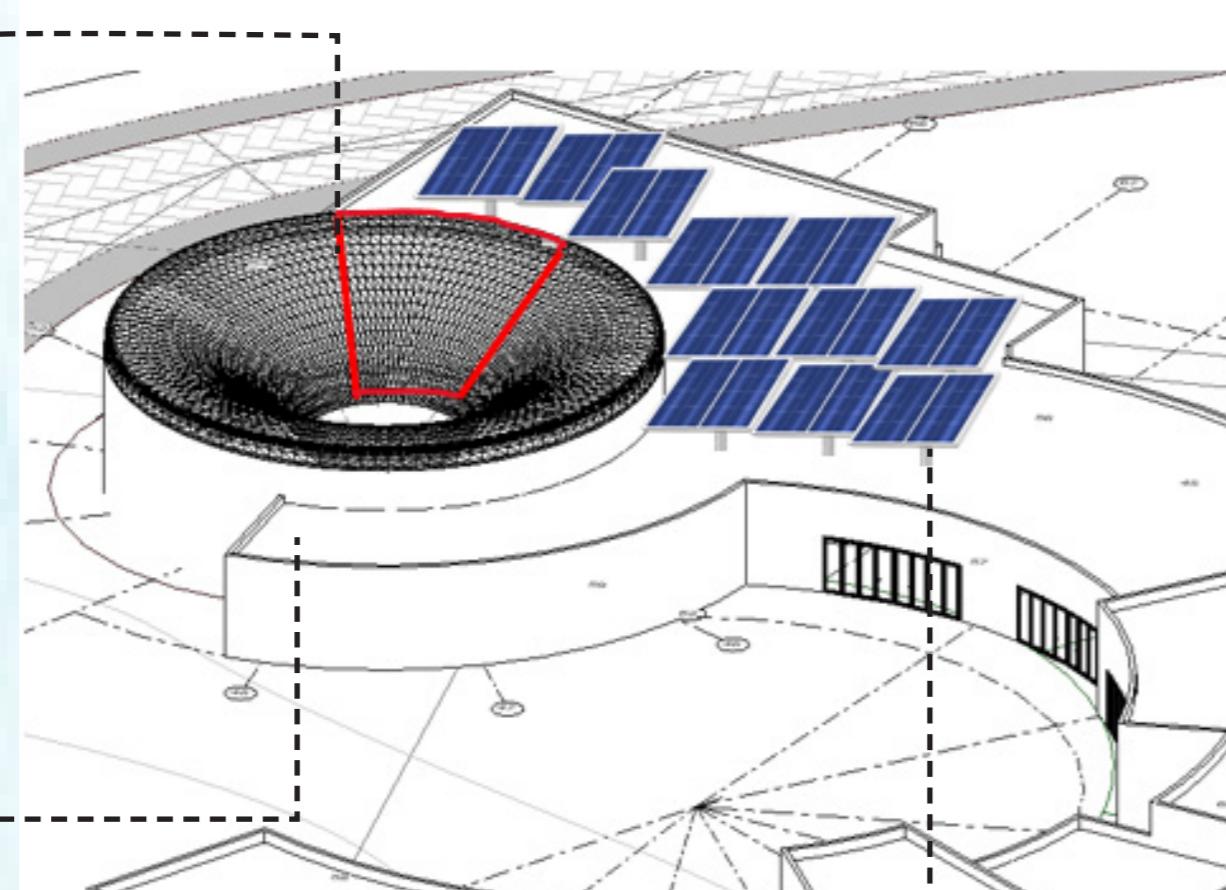
On-site grey water irrigation system
100% greywater from the sinks is filtered and used for irrigation of the surrounding external farm an cleaning open courtyard.

Sustainable benefits: Reduce the need for fresh water, cuts down on the amount of wastewater in our sewer systems

ENERGY GENERATION

Building-integrated photovoltaics(BIPV)

Semi-transparent modules made of Amorphous crystalline silicon Efficiency ranges from 6% - 14% Reduce the area requirement, and they reduce the material and infrastructure costs of the building itself. Provides weather protection, noise protection, and daylight illumination Energy savings due to superior thermal insulation properties

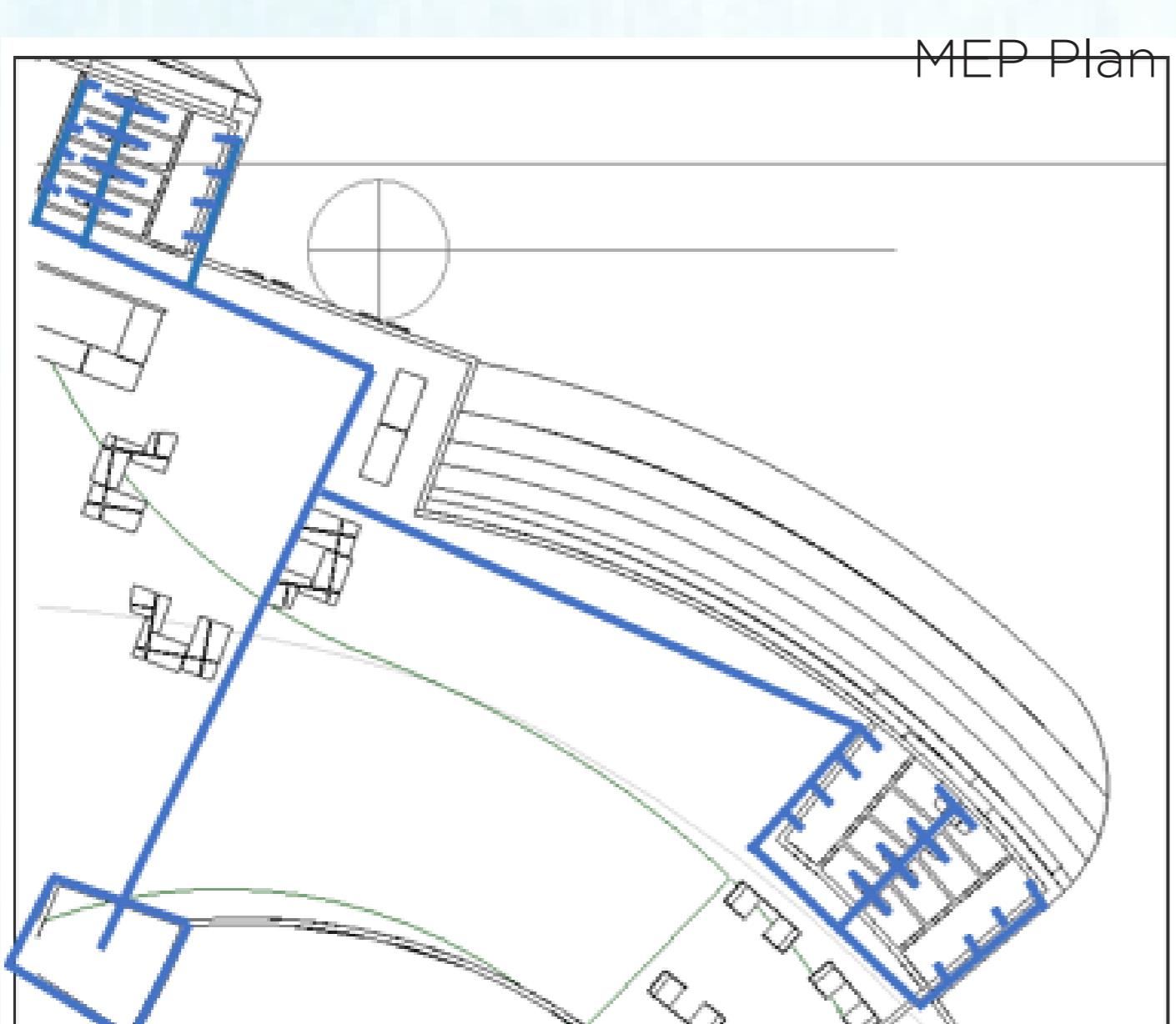


Mono-crystalline panels

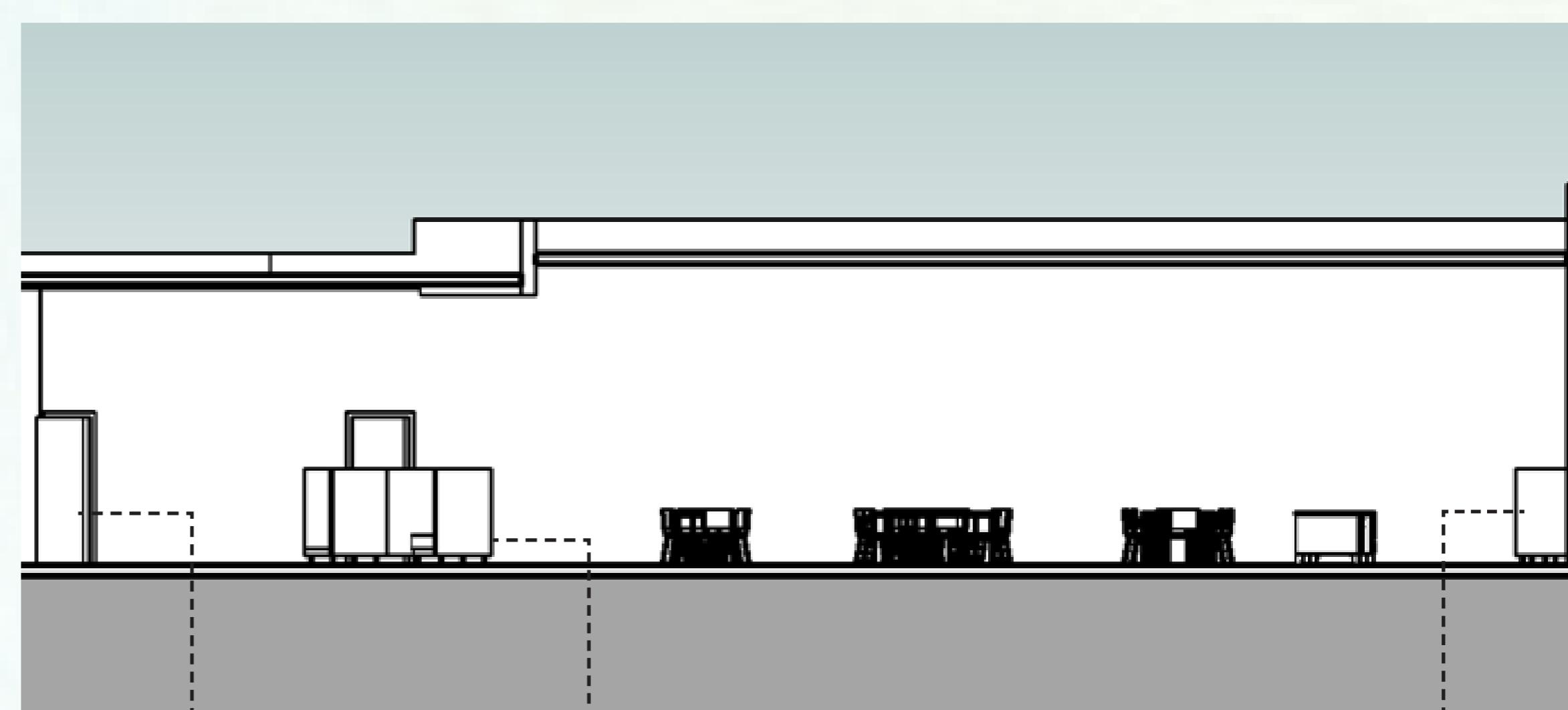
Made from high quality purest silicon, require less space, highest power output, Efficiencies of 15-20%, Reasonably long lifetimes (-25 years), Expensive, Better performance than other materials for low light conditions

Air Source Heat Pumps

Heat source is outside air cheaper than GSHP and more practical to install



MEP Plan



Water from air dispensers



Daily production capacity is up to 30 liters per day
Can produce cold water, as well as hot drinking water.
Up to 5 liters of fresh drinking water by water extraction using 1 KWH
Facilitates significant water production in climates with humidity as low as 20%

Organic waste converter



The unit has the ability to take in up to 6 liters per day of any food waste or up to 15 liters per day of animal manure and turn it biogas as well as organic fertilizer.

Smart Bins



AI-based smart waste bin for recycling waste
Sorts and compresses the waste automatically
Wireless ultrasonic sensors controls the fill level and processes data for convenient waste management.
80% decrease in waste disposal

STRUCTURE

****All the structural information in this poster strictly adheres to Eurocode: British Standard.**

Calculations

Dead loads

pre-stressed concrete structures

Roofing -

- Thickness – 0.2m
- Soil – 1m
- Average length – 7.5m
- Average width – 9.01 m

Auditorium
Roofing-
Thickness – 0.1m
Area – 887.4 m²
Services – 1kN/m²

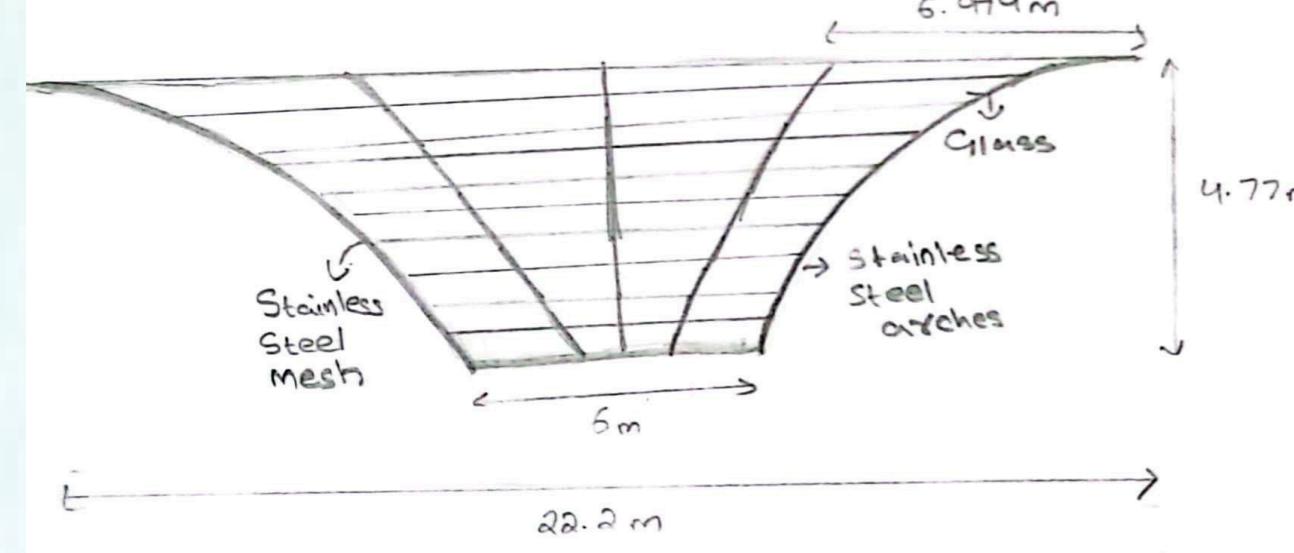
Live loads:

Lounge side – C11 – 2 kN/m²
Workshops – C35 – 4 kN/m²
Auditorium – C21 – 4 kN/m²

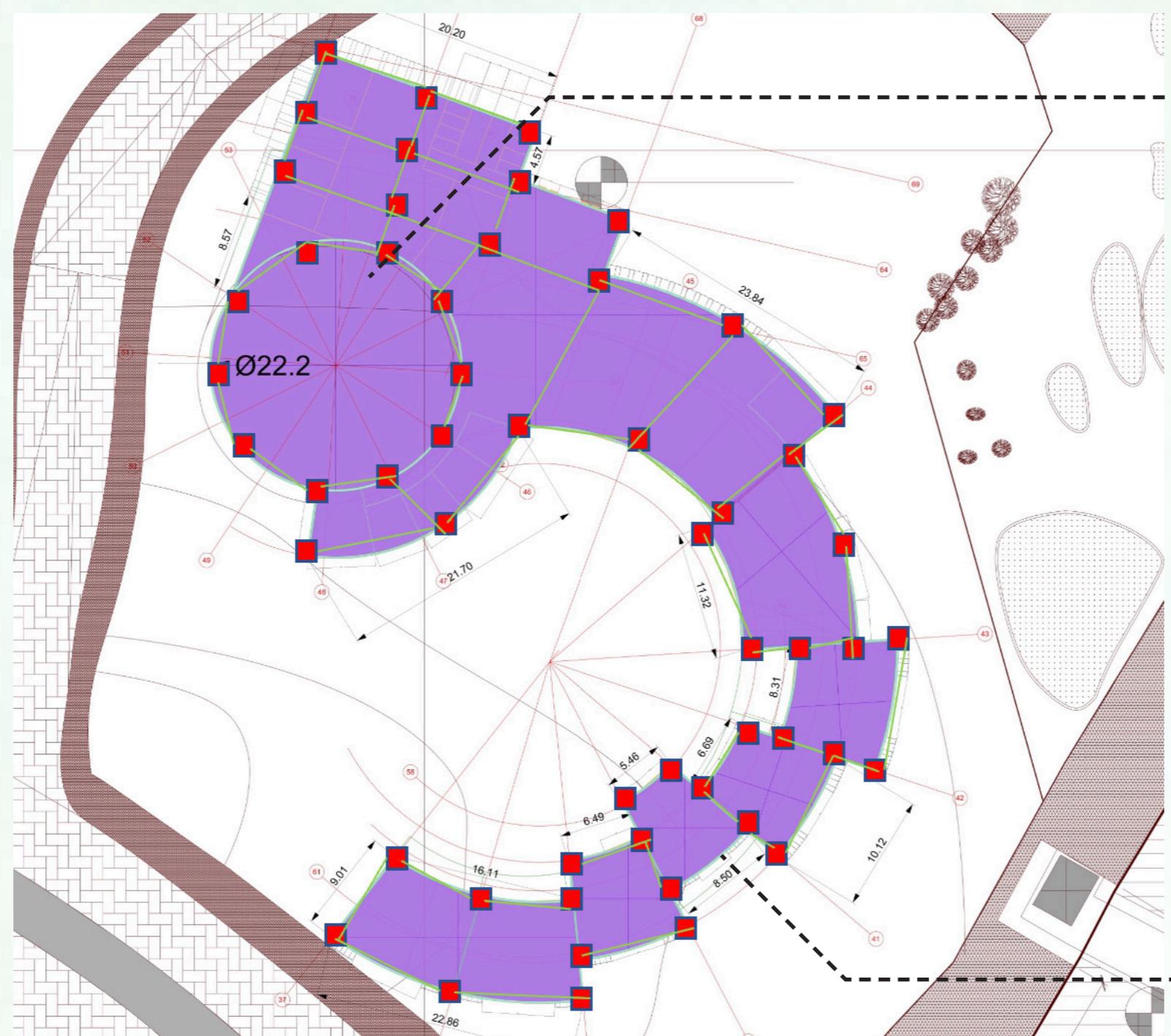
Load assessment -

| Permanent Loads (G _k) | Volume Contributing (m ³) | Density (kg/m ³) | Mass (Kg) | Load (kN) |
|--------------------------------------|---------------------------------------|------------------------------|--------------|-----------|
| Roofing | 0.2 x 7.5 x 9.01 | 2200 | 29773 | 292 |
| Roofing (lounge) | 0.2 x 887.4 | 2200 | 390461 | 3830 |
| Roofing (Auditorium) | 0.1 x 387 | 2600 | 100620 | 987.1 |
| Soil | 229.7 | 1300 | 298603 | 2929.3 |

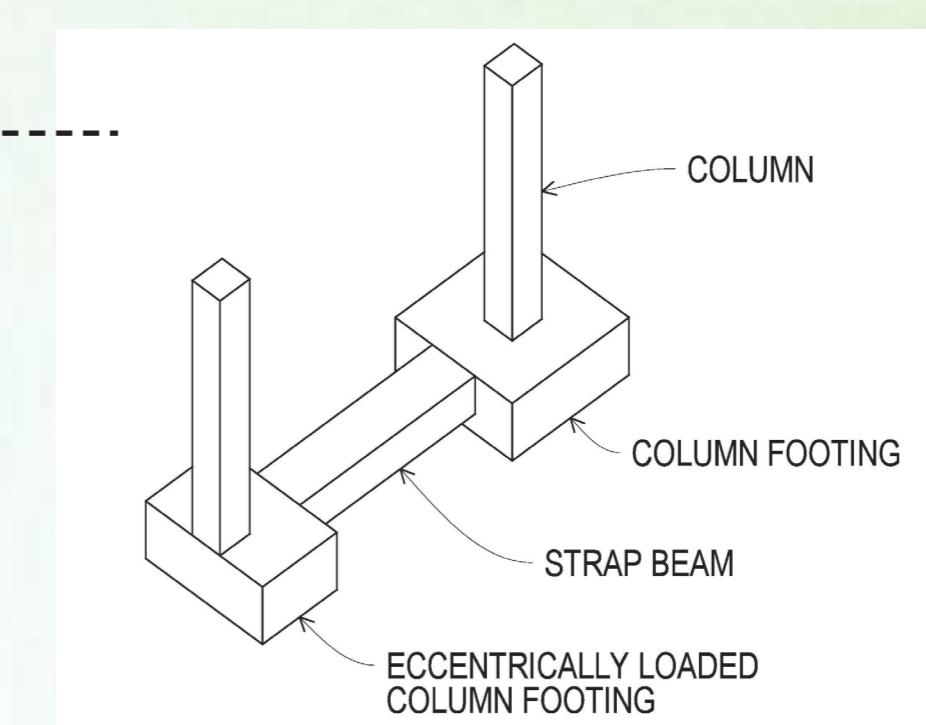
Elevation - Auditorium roof



Structural drawing

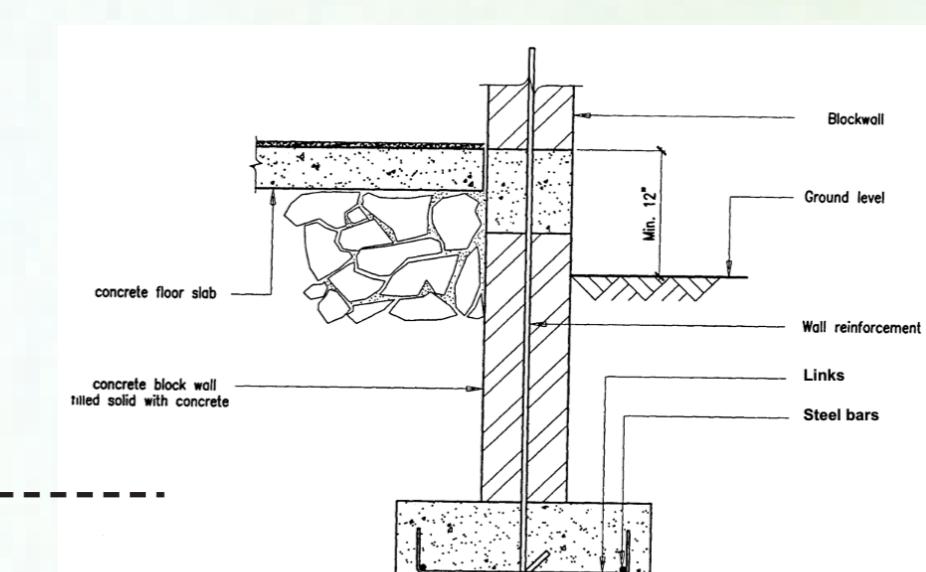


INDIVIDUAL FOUNDATION



Economical Time Saving

STRIP FOUNDATION



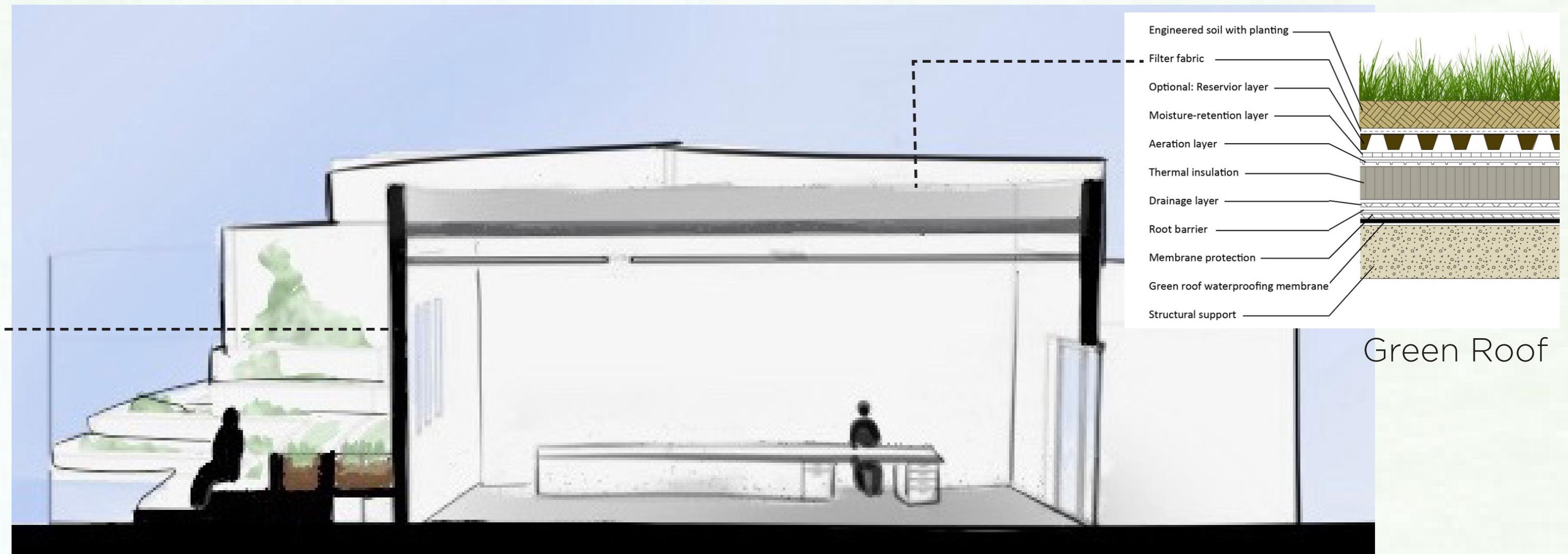
Stabilizes columns
Time Saving
Cost effective

Materiality



Stainless steel

- Reduce waste
 - Saves construction time
 - Quality assurance
 - Highly durable



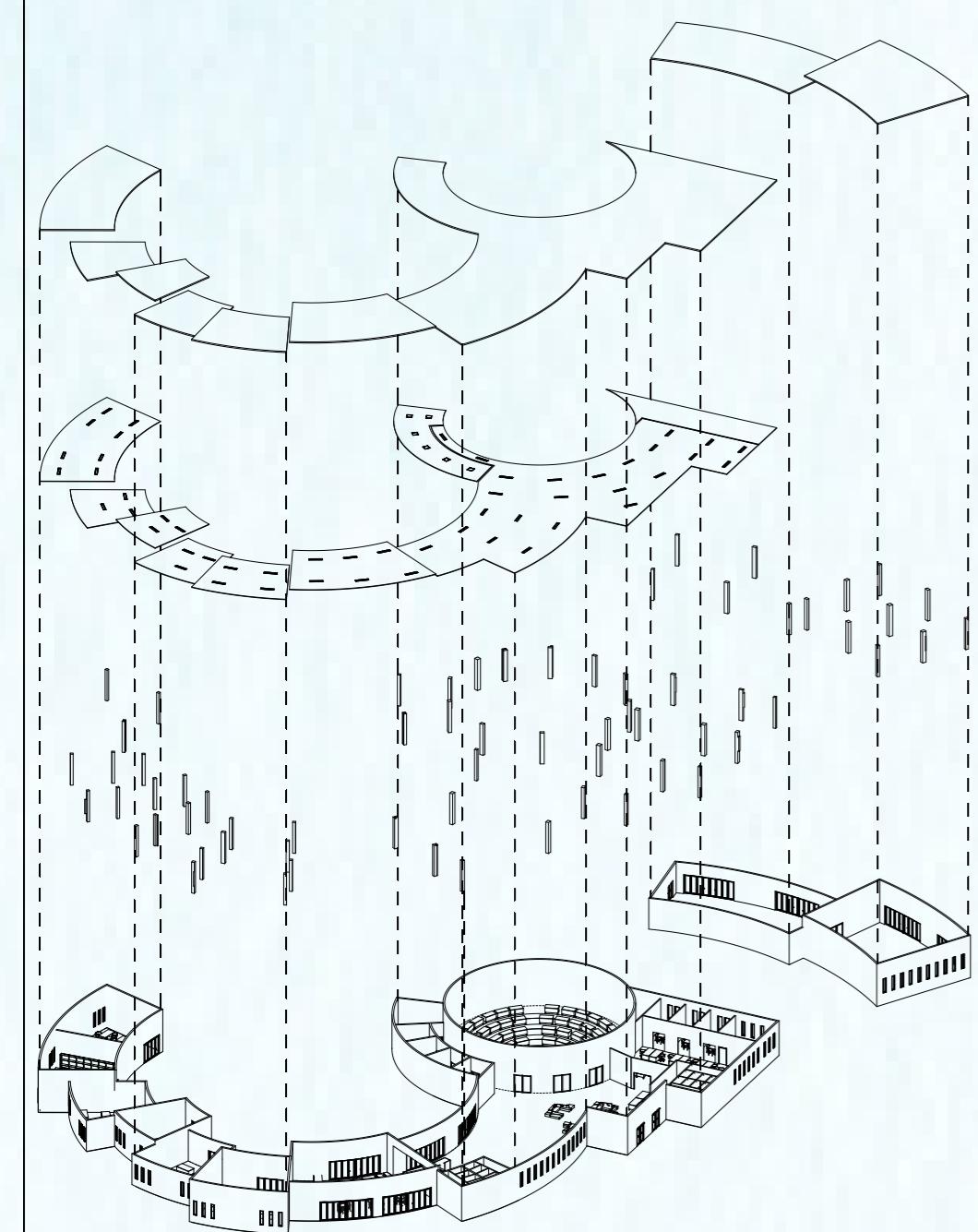
Green Roof



Courtyard View



Trails View



Exploded Diagram - Construction