THE MINDFUL GARDEN

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NARRATIVE

The current neighborhood of East Los Angeles is rich in **history** and **culture**, with a vibrant and **connected community** of residents that take initiative in bettering their surroundings through **political activisim**. Unfortunately, their community faces issues of **neglect** due to racist zoning policies, lacking an associated municipal community.

The built environment only **perpetuates** this **inequality**, contributing to an overall **poor health** and well-being of the community. With a lack of facilities and community investment, car-centric infrastructure, **poor air quality**, and **inadequate access to fresh and healthy food**, residents are only made more vulnerable by their surroundings. However, the site location presents a unique opportunity as it is **connected** to the larger developed city. This strategic location along with the prominent **vernacular architectural style** makes it crucial for the proposal to **engage** the broader **community**, while still addressing the needs of the immediate local community.

Firstly, the school outlines potential **green goals** of improving the learning environment, providing **experiential learning,** and preparing students for the green economy. Therefore, the **Mindful Garden** proposes **interactive sustainable** building technologies like **operable cisterns** in order to educate and expose students to green technology early, spark a **growing interest** in the environment, and foster a **culture** of **environmental stewardship**.

Students are already **proactive** in **engaging** with their natural environments, with successful groups like the **student-led Mindful Gardeners**, who engage their fellow classmates to serve the community by raising **mental health awareness** through gardening and mindfully **caring** for the **environment**. Therefore, the proposed Mindful Garden invests in this **resilient community** in a way that **empowers** the student body with a greater **voice** and **potential**, providing them with local opportunities to learn about sustainability and **environmental stewardship** early.

The site is also affected by the **changing climate**, with worsening issues like wildfires, earthquakes, and heatwaves harming residents. These impacts are worse on **marginalized communities** due to **systemic racism**, as they are more vulnerable and have fewer resources to mitigate climate issues. Therefore, the proposed **climate-resilient** Mindful Garden development provides the neighborhood with a means to adjust and **adapt** to climate-related disruptions in a way that **defends** the **health** and well-being of all residents, including students and the surrounding neighborhood.

To deal with the **climate disasters,** the proposal takes advantage of the microclimate and employs several **passive design strategies** to create a building that is energy-efficient and easy on the environment. To minimize the amount of air conditioned space, the building orientation takes advantage of **natural ventilation**, has **shadng devices** to mitigate southern sun, and uses **exterior circulation**. The site also has an issue of occasional yet torrential rain, so the Mindful Garden has a sophisticated, **integrated rainwater collection system**, with angled canopies that collect and store rainfall for the recycled greywater plumbing system and for watering the garden.

SITE ANALYSIS

Griffith Magnet School, located in East Los Angeles, stands in an area historically shaped by the legacy of 1930s redlining, where the neighborhood was marked as undesirable for investment by the Home Owners' Loan Corporation (HOLC). This led to long-term disinvestment and displacement, particularly affecting minority communities who faced systemic barriers to homeownership and economic stability. The school's location in this marginalized district reflects the ongoing struggle for educational equity in a region impacted by historical segregation and limited resources. Over time, the school's role has evolved as a beacon of hope, serving a diverse student body while contending with the socioeconomic challenges rooted in this area's troubled past.

Displacement Typologies

- Low-Income/Susceptible to Displacement
- Early/Ongoing Gentrification
- Ongoing Displacement

Redline Zone

- Hazardous Boundary

"HAZARDOUS" EAST THIRD STREET

"DECLINING" EAST FOURTH STREET

EAGLE STREET

ARIZONA AVENUE

DISPLACED ARIZONA AVENUE

SOUTH KERN AVENUE

SOUTH FERRIS AVENUE

SOUTH LA VERNE AVENUE

FRASER AVENUE

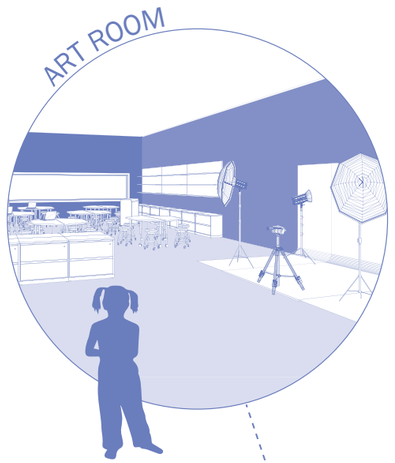
CLELA AVENUE

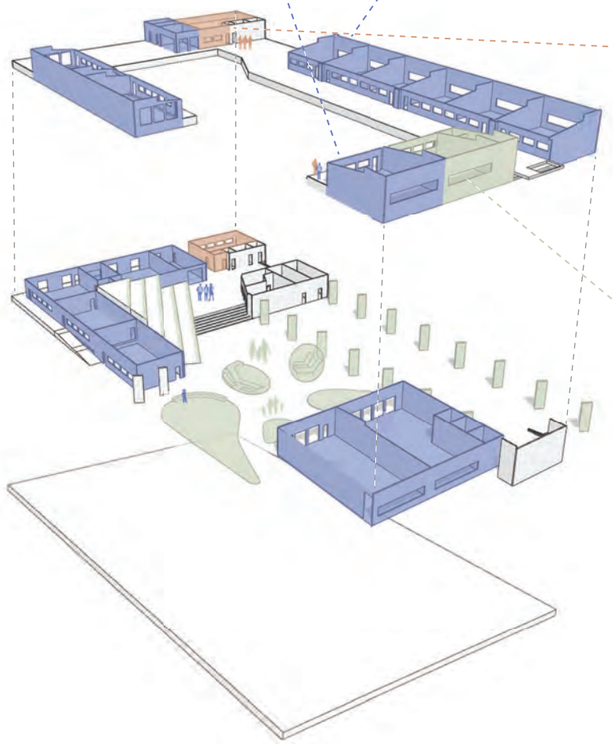
0FT 200FT 400FT 600FT 800FT

2A

SITE PLAN

THE GARDENERS





STUDENT

Arrive to school by bus or car

Walk to science class after first bell

Attend art class after lunch break

Hang out with friends during recess

After-school orchestra practice

■ SCHOOL
□ HOME

USAGE OF OUTDOOR SPACE

TEACHER

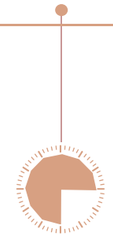
Arrive to school, set up classroom

Teach first period english class

Work on lesson plan after lunch break

Teach last english class of the day

Help with after-school tutoring



■ SCHOOL
□ HOME

USAGE OF OUTDOOR SPACE

COMMUNITY MEMBER

Arrive to school for community event

Mindful Gardener's farmer's market

After-school community meeting in maker space

Student-led art exhibit open to community

■ SCHOOL
□ HOME

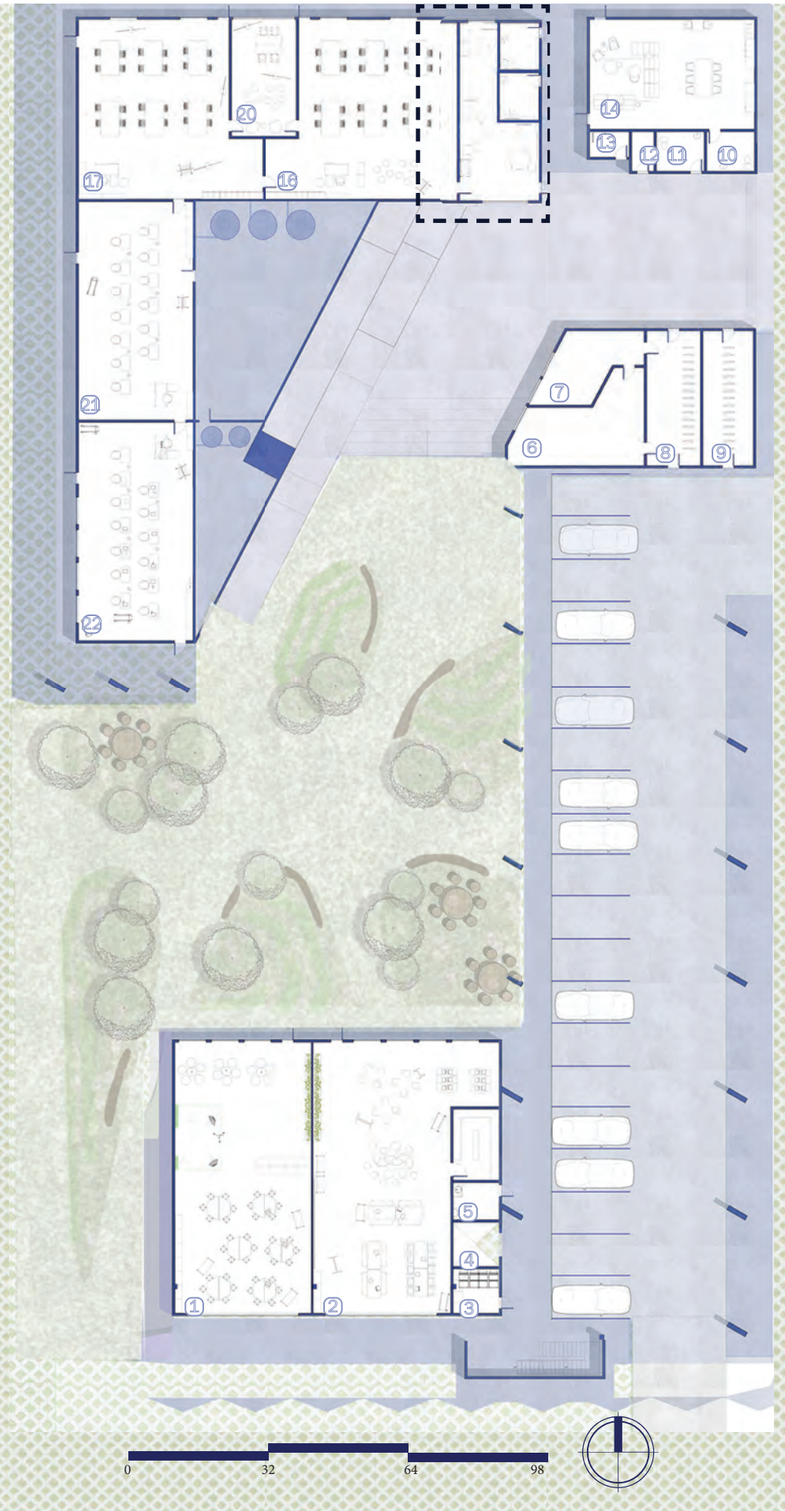
USAGE OF OUTDOOR SPACE

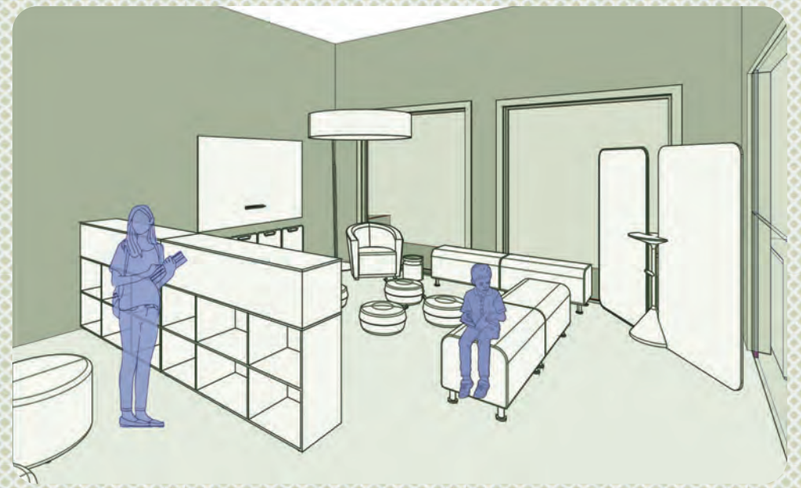
3A

FLOOR PLAN

FIRST FLOOR PLAN PROGRAM

1	Art Classroom	1706 SF
2	Indoor Maker Space	2021 SF
3	Janitor Closet	94 SF
4	Bathroom	94 SF
5	Elevator	74 SF
6	MEP	424 SF
7	PV Inverter Room	253 SF
8	Battery Storage	333 SF
9	Bike Storage	313 SF
10	Bathroom	100 SF
11	Bathroom	100 SF
12	Elevator	50 SF
13	Janitor Closet	54 SF
14	Teacher Breakroom	858 SF
15	Collaboration Space	494 SF
16	Science Lab	1370 SF
17	Science Lab	1370 SF
18	Bathroom	96 SF
19	Bathroom	96 SF
20	Flex Lab	373 SF
21	Classroom	1100 SF
22	Classroom	1000 SF
	NET AREA	11,103 SF





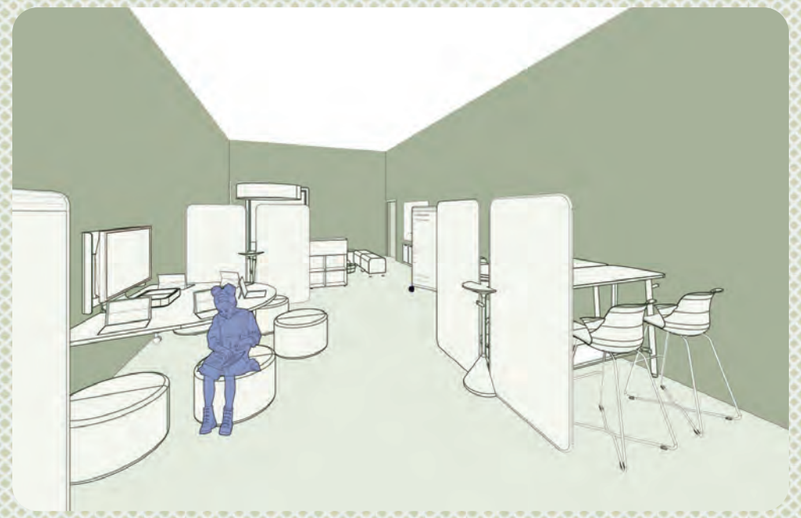
FIRST FLOOR Collaboration Space

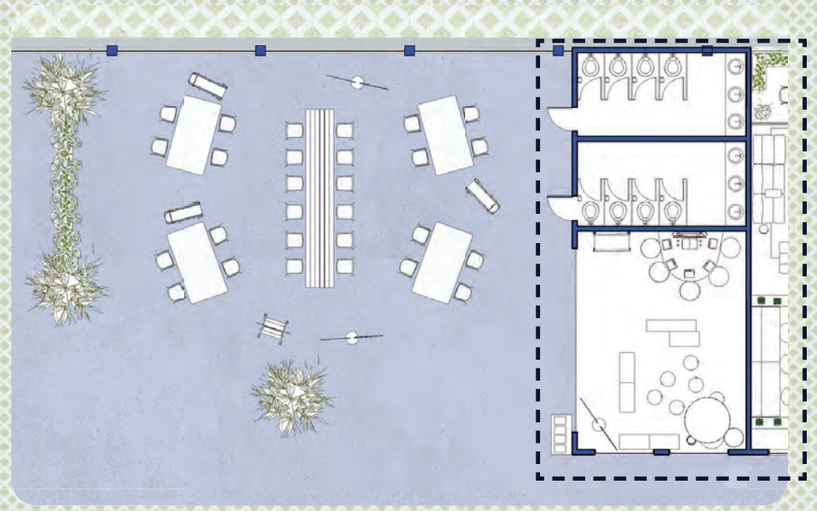
FLOOR PLAN

SECOND FLOOR PLAN

PROGRAM

1	Classroom	941 SF
2	Classroom	937 SF
3	Storage	148 SF
4	Bathroom	94 SF
5	Elevator	74 SF
6	Classroom	949 SF
7	Classroom	949 SF
8	Classroom	949 SF
9	Classroom	949 SF
10	Classroom	949 SF
11	Classroom	949 SF
12	Bathroom	88 SF
13	Bathroom	88 SF
14	Elevator	40 SF
15	Teacher Breakroom	1317 SF
16	Collaboration Space	379 SF
17	Bathroom	148 SF
18	Bathroom	148 SF
19	Outdoor Classroom	1000 SF
20	Outdoor Maker Space	1000 SF
21	Science Lab	1287 SF
22	Flex Lab	360 SF
23	Science Lab	1287 SF
	NET AREA	15030 SF





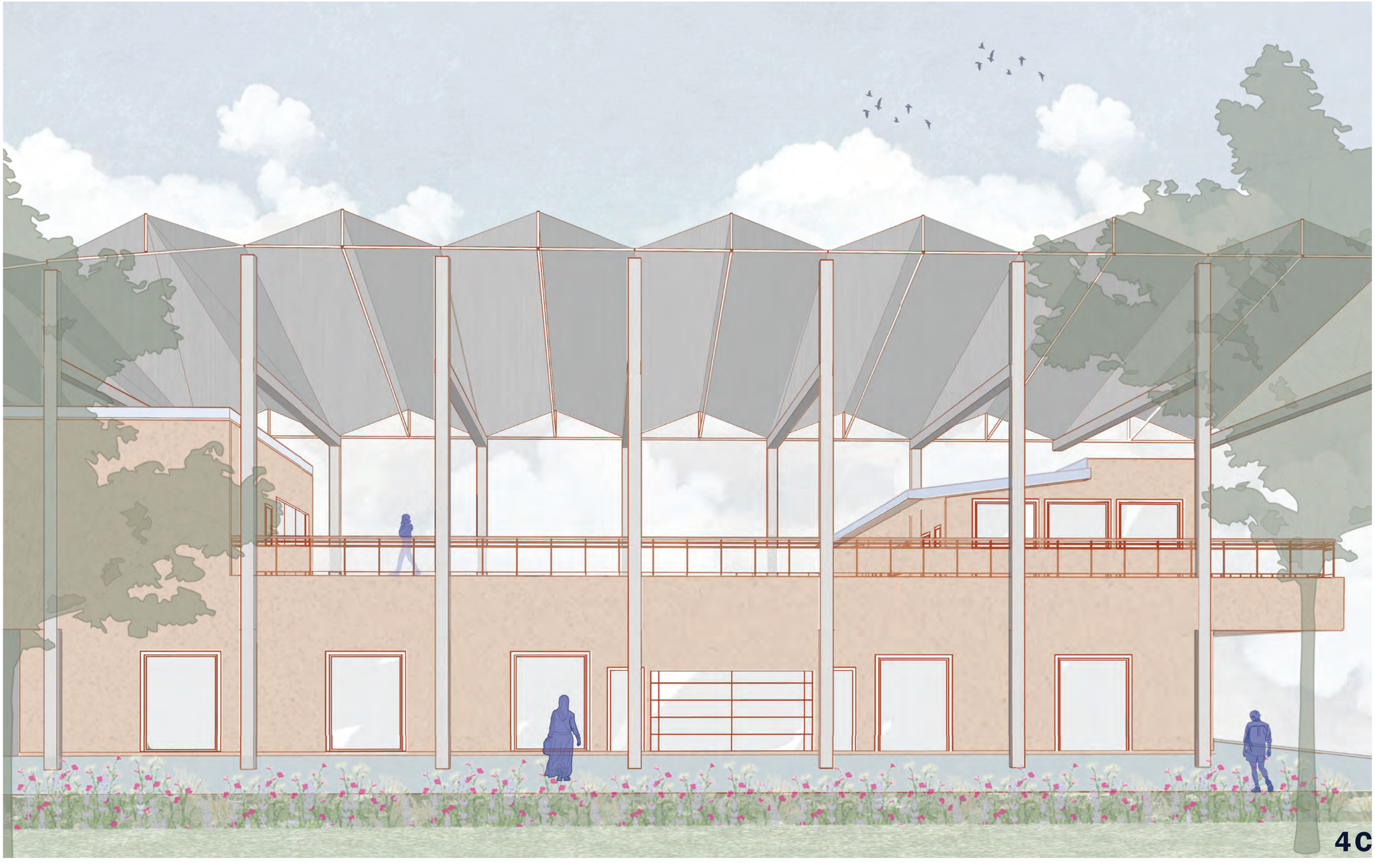
SECOND FLOOR Collaboration Space

PERSPECTIVE

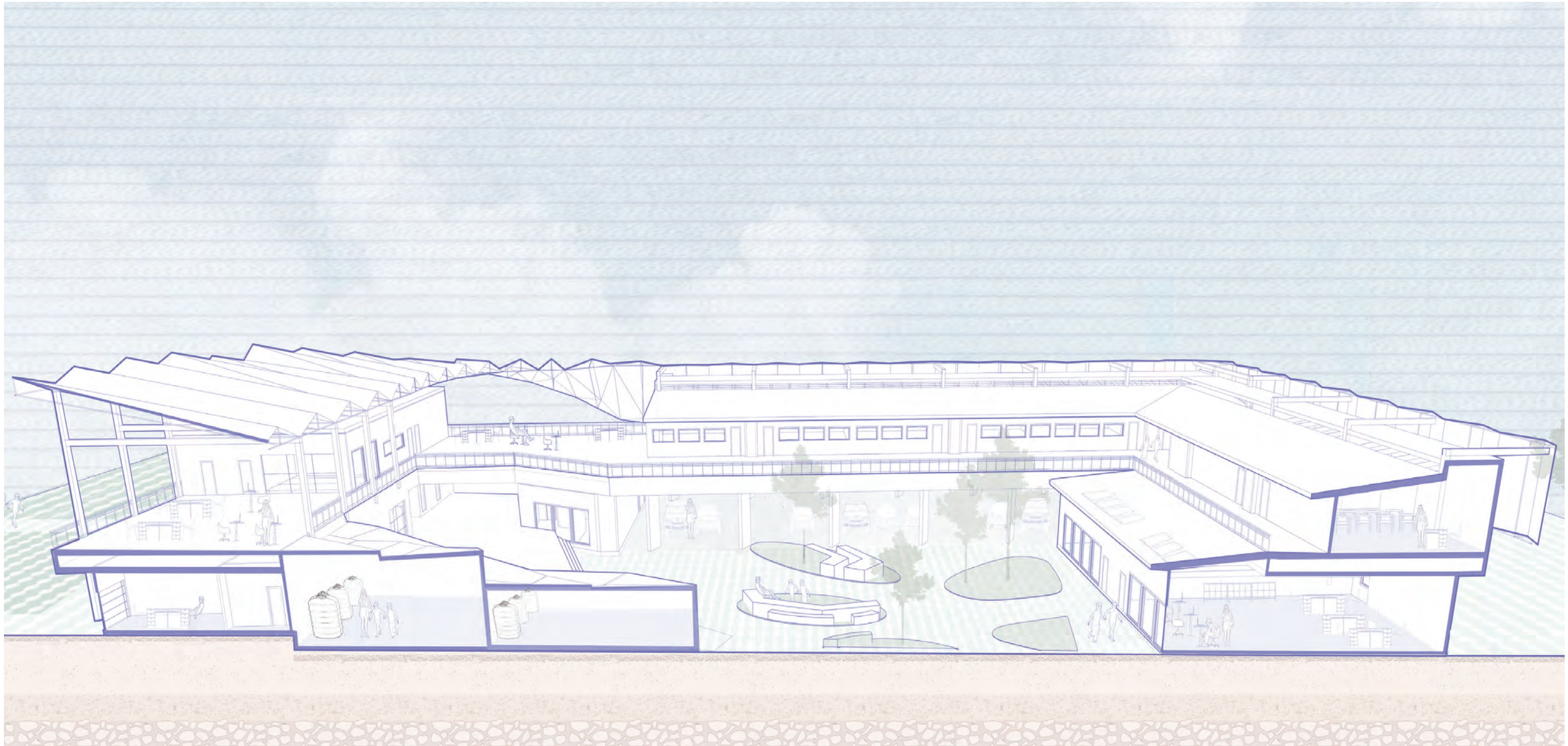
PERSPECTIVE

4B

PERSPECTIVE



ILLUSTRATED SECTION

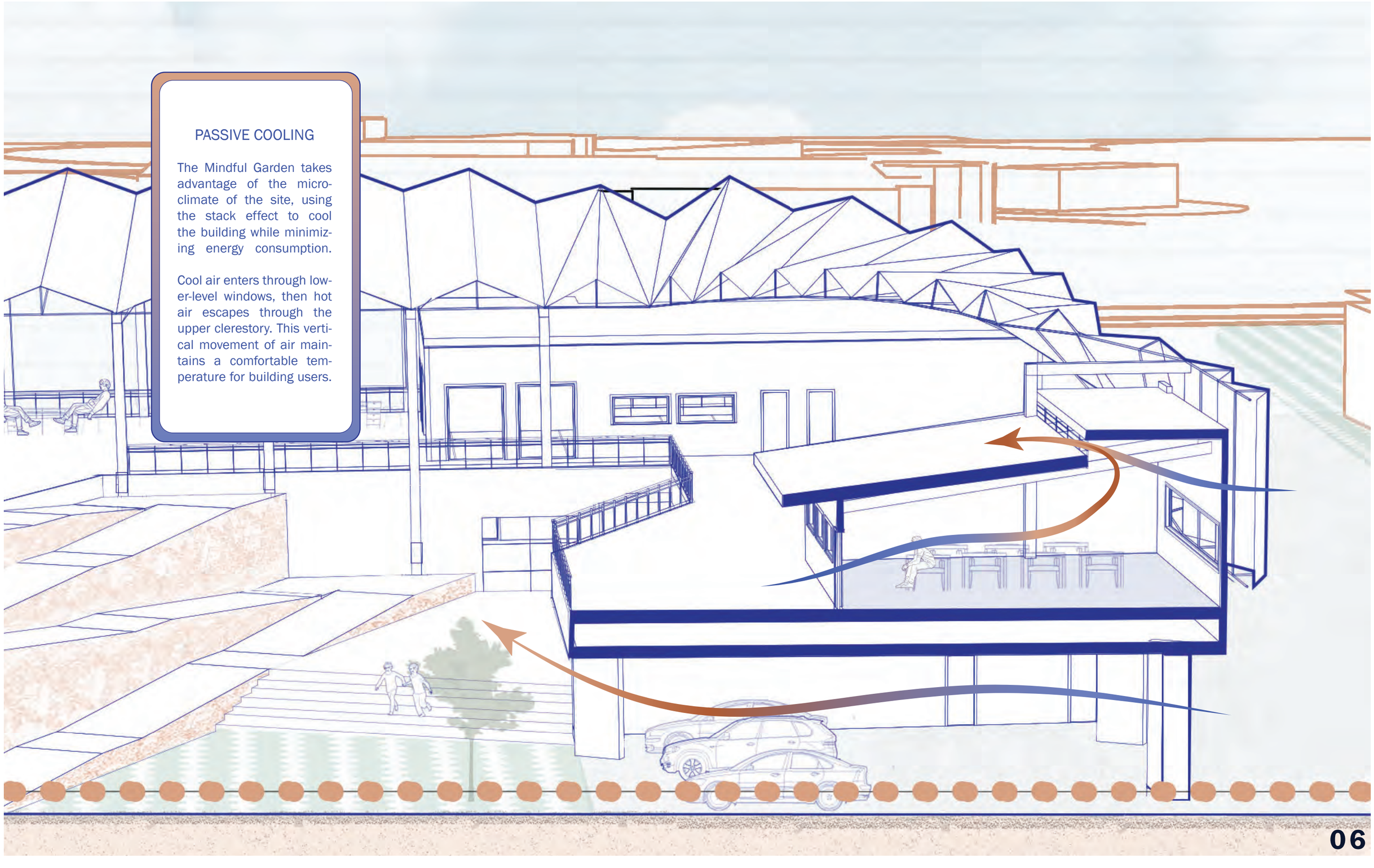


The second-floor outdoor maker space at the Mindful Garden seamlessly connects the adjacent agriculture lots to the learning garden ramp. This visually dynamic space fosters creativity and hands-on learning, allowing students to engage with both the natural environment and agricultural practices. The design integrates the garden's educational areas, creating a flow between the outdoor spaces and offering a unique opportunity for students to collaborate, experiment, and connect with nature through sustainable projects.

PASSIVE COOLING

The Mindful Garden takes advantage of the micro-climate of the site, using the stack effect to cool the building while minimizing energy consumption.

Cool air enters through lower-level windows, then hot air escapes through the upper clerestory. This vertical movement of air maintains a comfortable temperature for building users.



Monthly End Use Consumption vs Production Chart

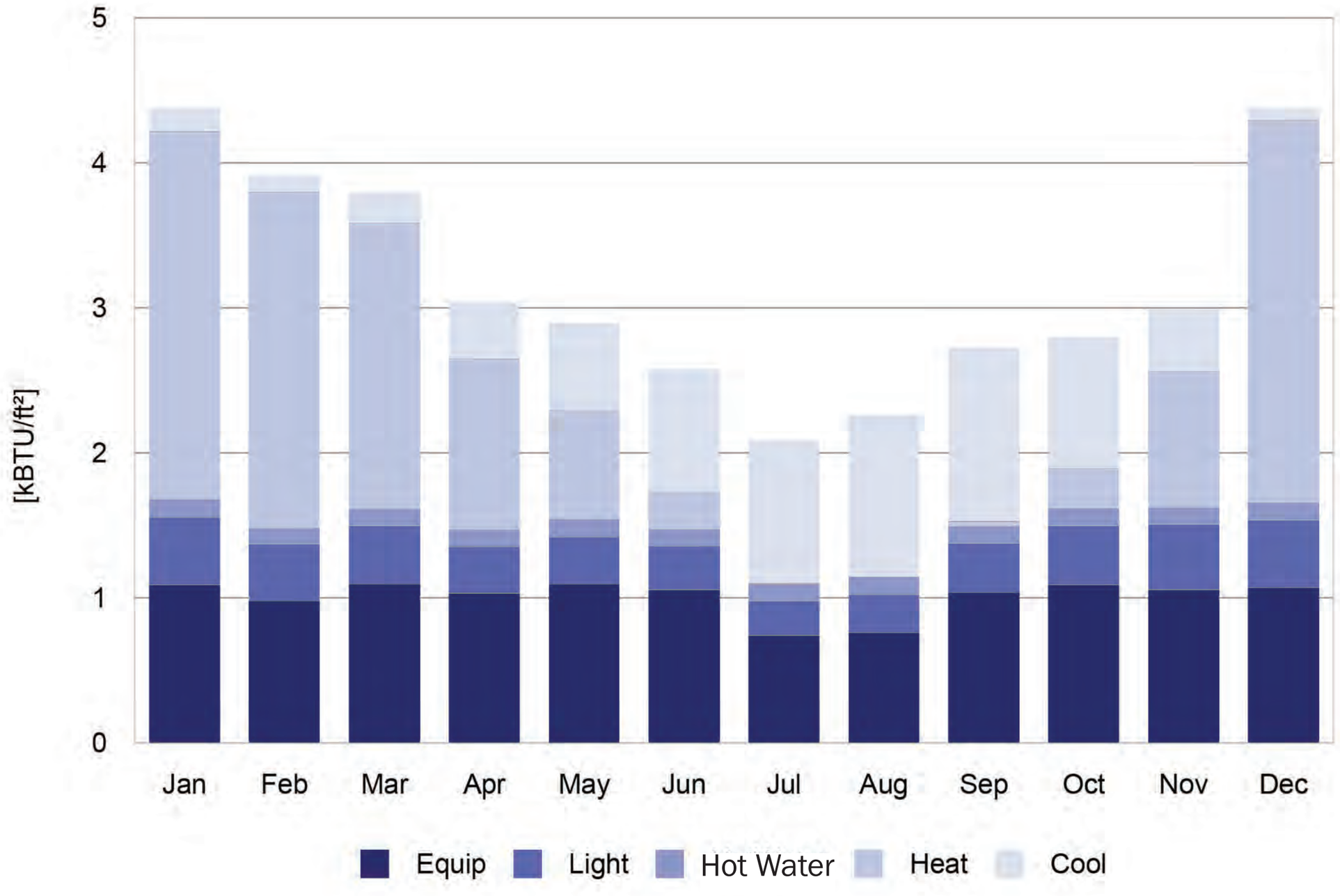
Month	Lighting Energy	Equipment Energy	Water Heating	Total Energy Consumption (kWh)	Total Energy Produced	Total Energy Saved
January	3.69	8.20	0.91	12.80	29.54	16.74
February	3.21	7.67	0.85	11.73	32.70	20.97
March	3.12	8.10	0.91	12.13	45.38	33.25
April	2.62	7.91	0.88	11.41	52.11	40.70
May	2.60	8.25	0.91	11.76	56.79	45.03
June	2.38	7.78	0.88	11.03	57.63	46.59
July	1.93	5.67	0.91	8.51	64.48	55.97
August	2.03	5.52	0.88	8.44	60.69	52.26
September	2.78	8.05	0.91	11.74	48.24	36.49
October	3.18	7.96	0.88	12.02	40.62	28.60
November	3.66	8.25	0.91	12.82	31.34	18.53
December	3.53	7.76	0.88	12.18	26.14	13.96
Total:	34.72	91.11	10.73	136.57	545.66	**409.10**

Annual Energy Data:

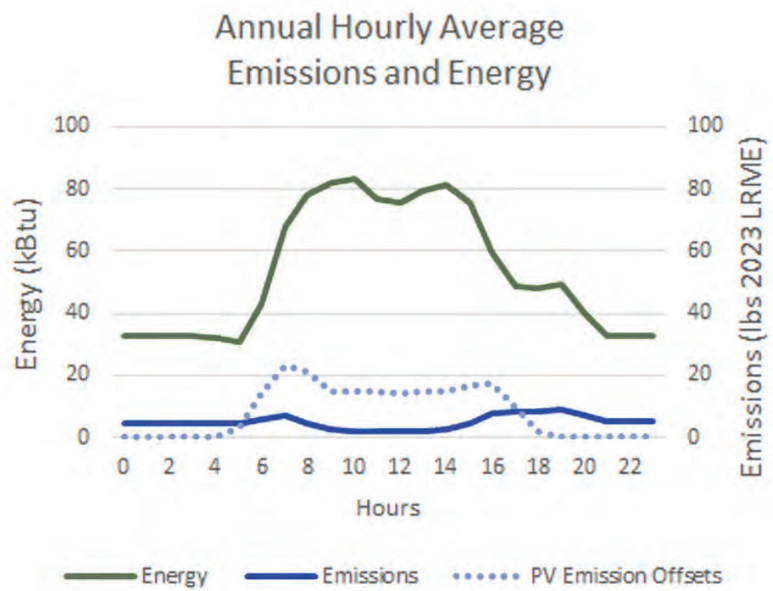
- 136.57 [kWh (x000)] of energy are consumed
- 545.66 [kWh (x000)] of energy are produced
- **409.10 [kWh (x000)] of excess energy is saved**

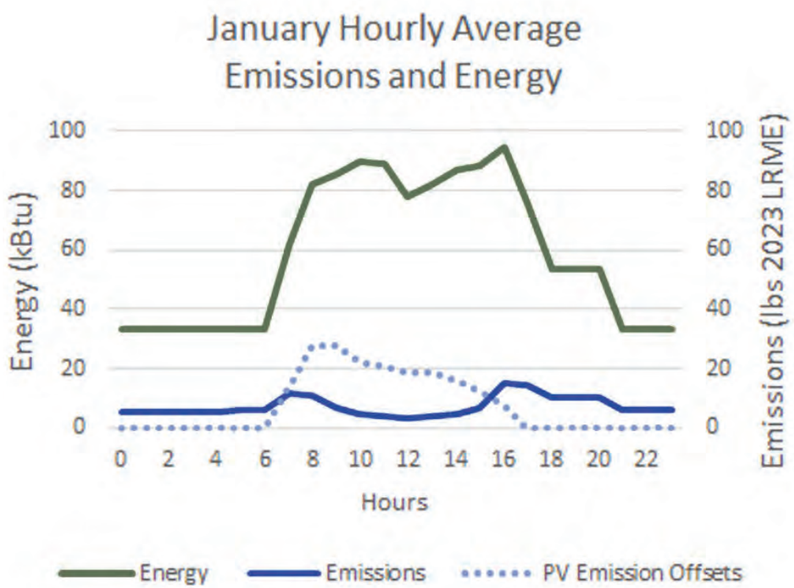
With a surplus of 409.10 kWh produced annually, The Mindful Garden has extra energy to the power not only its own footprint, but it can also power the rest of the school and some houses in the surrounding neighborhood.

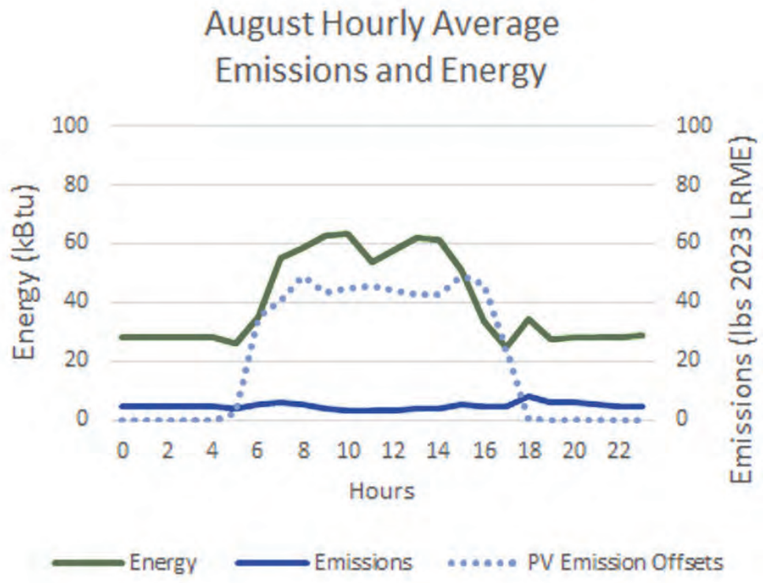
MONTHLY END USE ENERGY CONSUMPTION BAR CHART



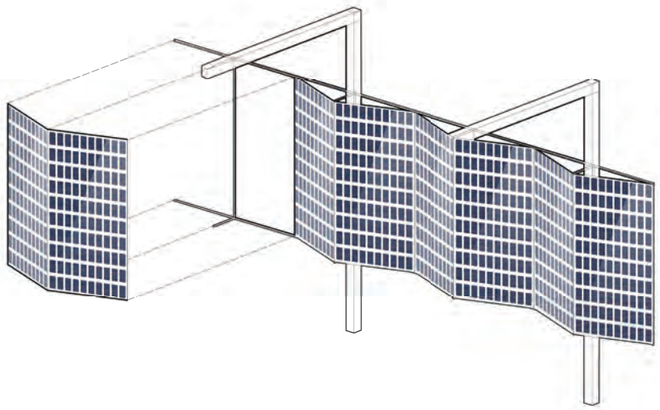
HOURLY LOAD SHAPES FOR ENERGY AND EMISSIONS





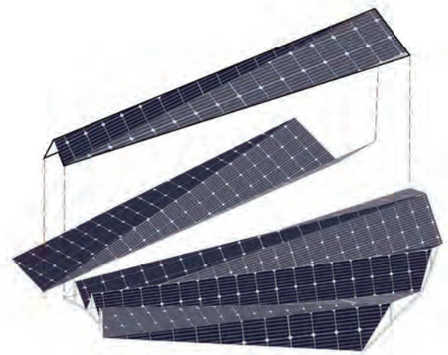


A Crystalline Silicon Photovoltaic Panel



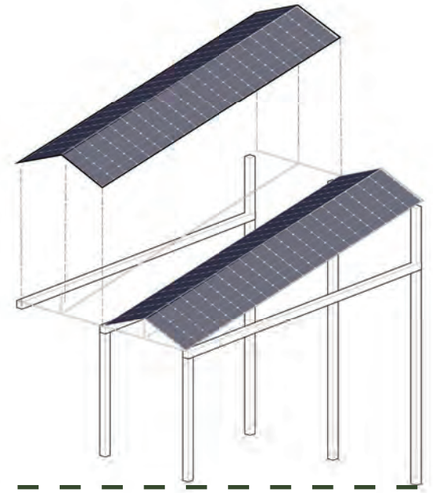
Modules built using crystalline silicon solar cells with efficiency reaching up to 20% with a higher power output per unit area.

B Cadmium Telluride Solar Panel

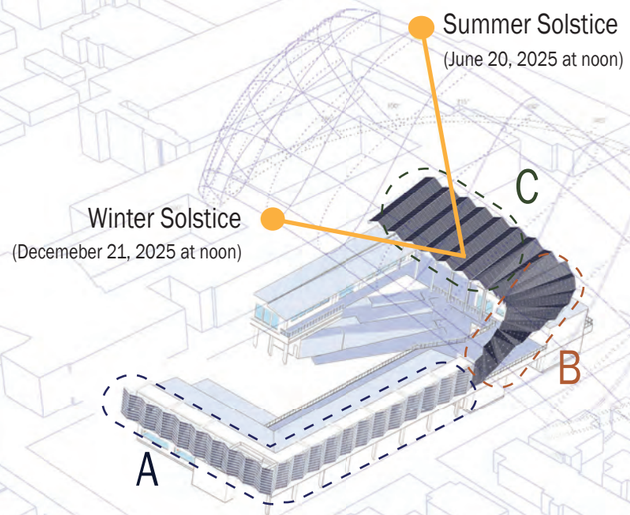


A type of thin-film solar panel that utilizes cadmium telluride as the semi-conductor material to convert sunlight into electricity with efficiency reaching up to 22.1%.

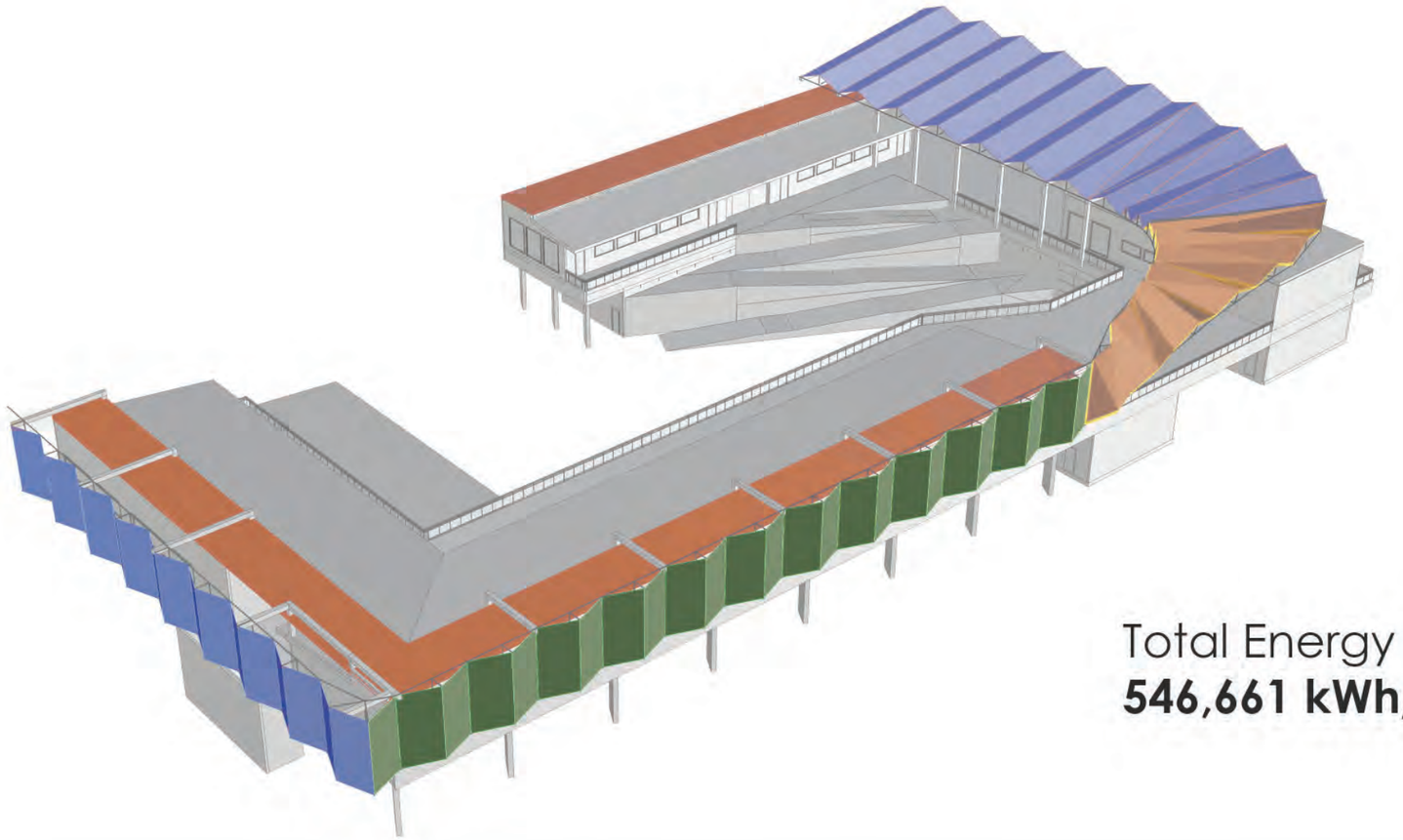
C Photovoltaic Panel



Converts sunlight into electricity using semiconductor cells typically with an efficieny ranging from 15% to 20%.



DETAILS OF RENEWABLE ENERGY SYSTEMS



Total Energy Produced:
546,661 kWh/Year

PVWatts Inputs Table

Groups	Groups	DC System Size (kW)	Module Type	Array Type	System Losses (%)	Tilt (deg)	Azimuth (deg)	Energy Produced (kWh/Year)
Classroom Roofs	Flat	130.50	Standard	Fixed	14.08	0	0	194,442
Facade	Twist	37.76	Standard	Fixed	14.08	45	44.8	30,536
	South Facing A - E	17.95	Standard	Fixed	14.08	90	143.7	16,592
	South Facing A-W	17.95	Standard	Fixed	14.08	90	185.9	17,860
	East Facing A - S	23.94	Standard	Fixed	14.08	90	95.9	17,773
	East Facing A - N	25.93	Standard	Fixed	14.08	90	53.7	12,227
	Flat A - E	86.11	Standard	Fixed	14.08	10	74.8	122,752
	Flat A - W	87.01	Standard	Fixed	14.08	10	254.8	133,478

Solar Energy Production Example Calculation

SYSTEM INFO

Modify the inputs below to run the simulation.

DC System Size (kW):	130.5
Module Type:	Standard
Array Type:	Fixed (open rack)
System Losses (%):	14.08
Tilt (deg):	0
Azimuth (deg):	0

RESULTS

194,442 kWh/Year*

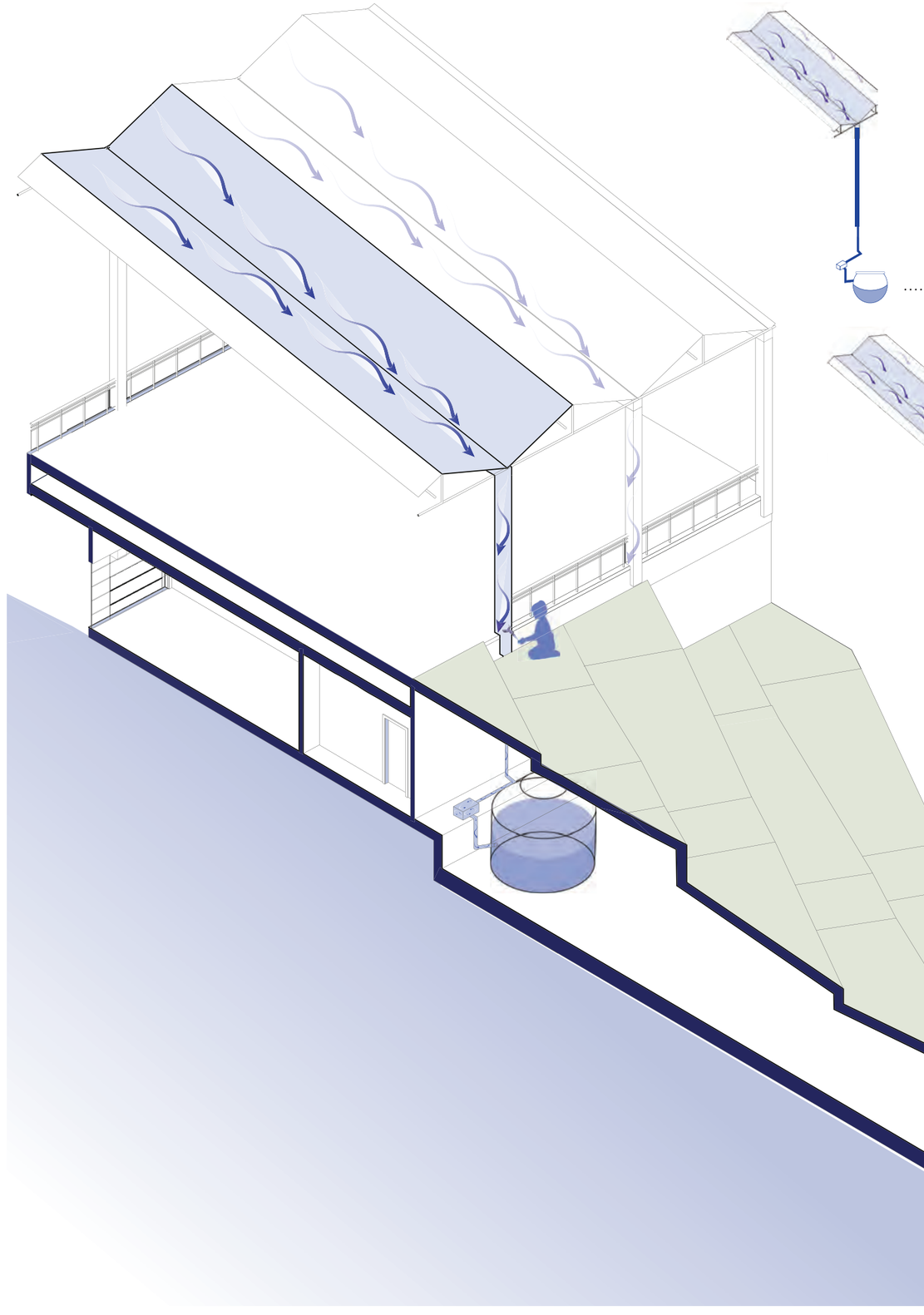
System output may range from 188,959 to 197,339 kWh per year near this location.

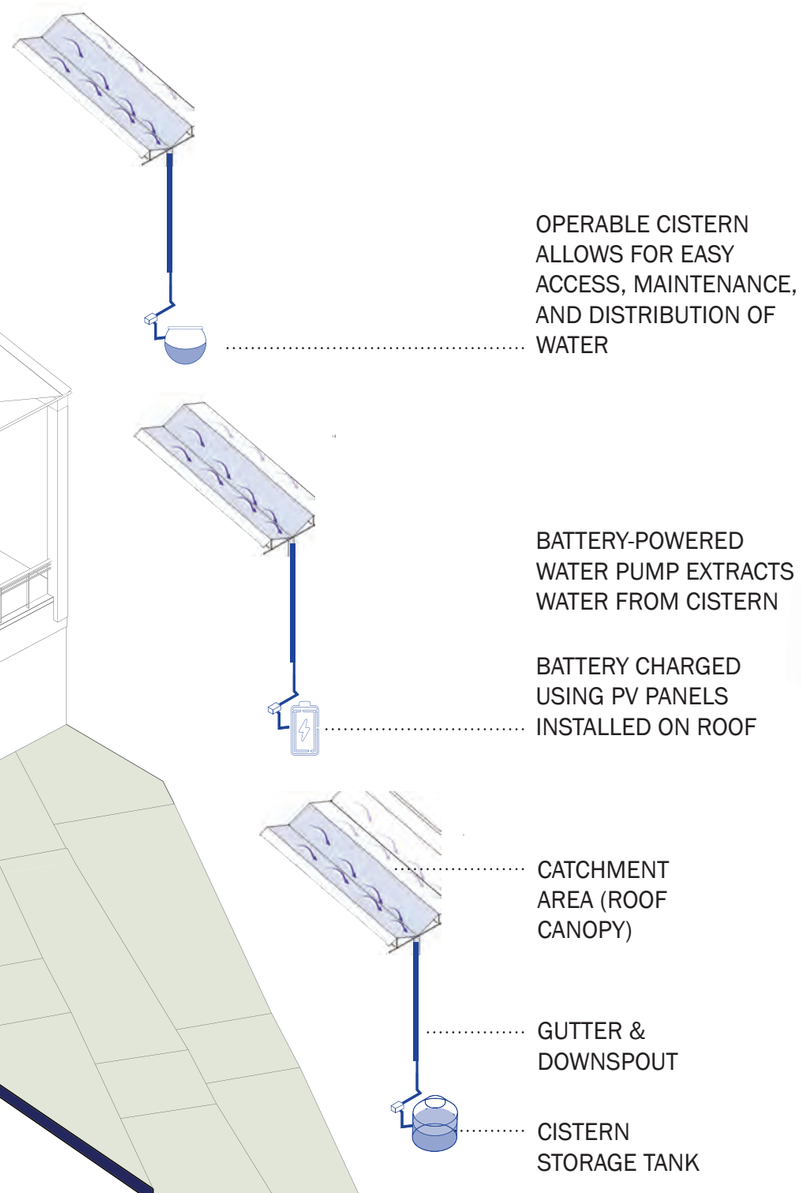
Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	3.16	9,979
February	3.96	11,356
March	5.11	16,056
April	6.30	18,823
May	6.68	20,509
June	7.17	21,144
July	7.83	23,534
August	7.32	22,040
September	5.94	17,383
October	4.62	14,173
November	3.55	10,710
December	2.75	8,736
Annual	5.37	194,443

Example data input and output using PVWatts Calculator

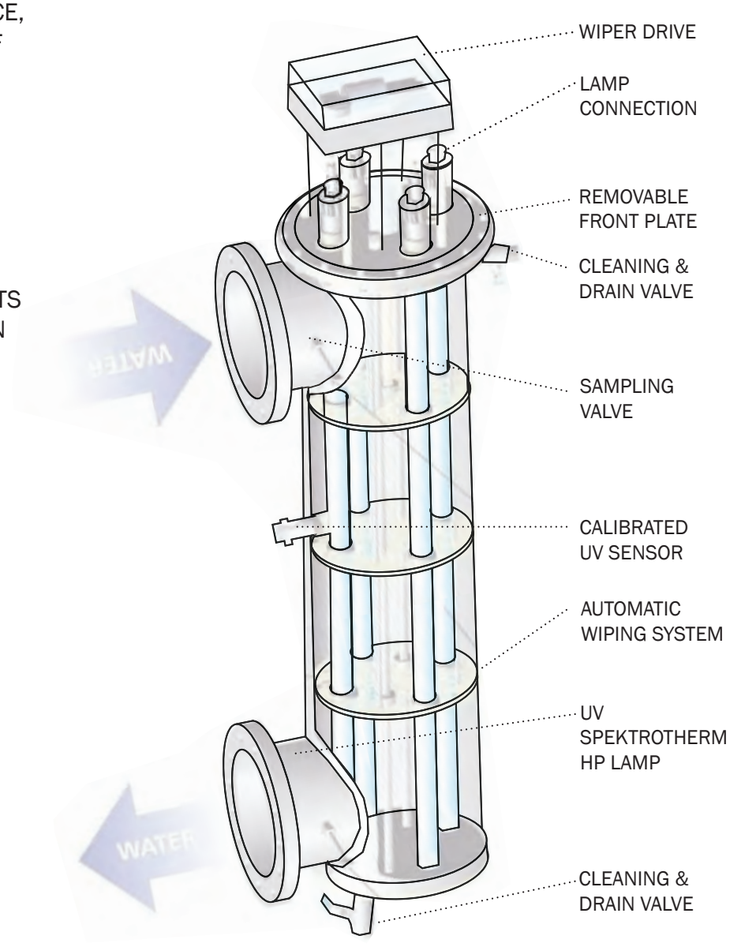
All solar energy production data was produced on the website PVWatts Calcultor using the solar panel group properties and orientations shown on the previous page

STORAGE SYSTEMS

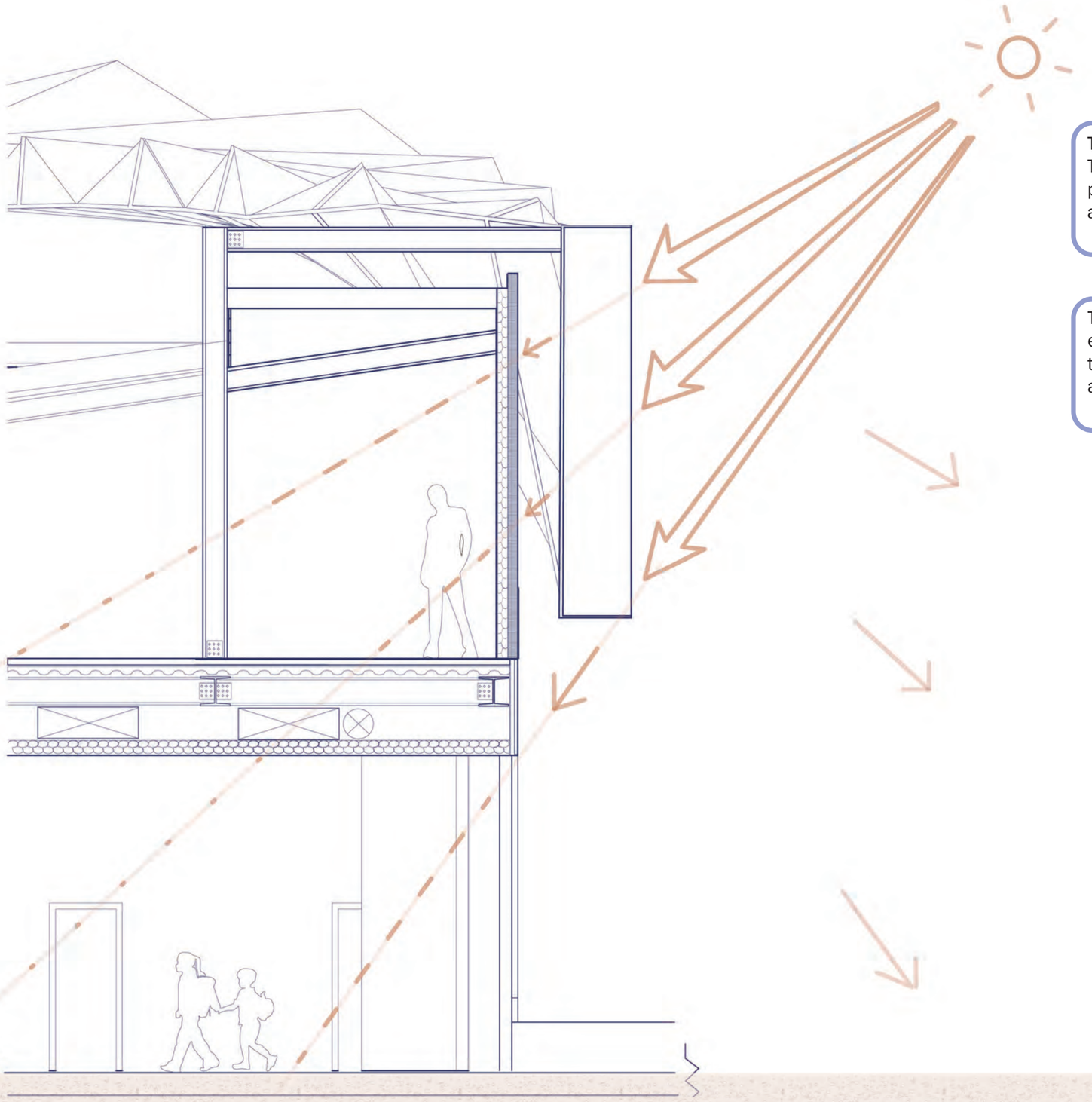




UV FILTER SYSTEM

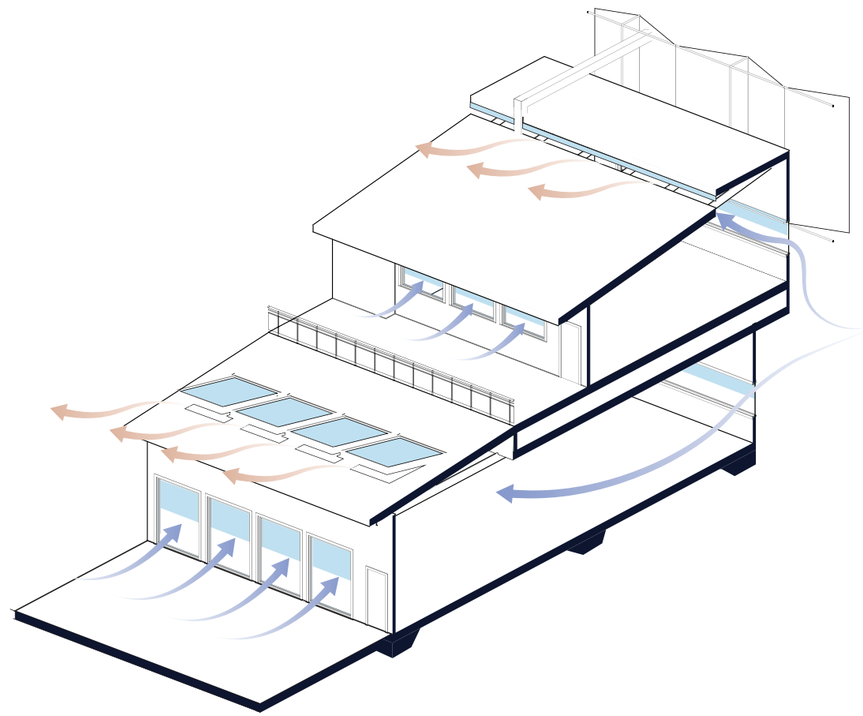


DECARBONIZATION STRATEGIES



The Mindful Garden utilizes crystalline BIPV panels to decarbonize its design. These panels allow natural light into classrooms while generating clean energy and providing passive heating, reducing reliance on traditional energy sources. This approach lowers the building's carbon footprint and enhances energy efficiency.

The Stack Effect optimizes ventilation at the Mindful Garden. Warm air rises and escapes through openings in the upper floors, creating a pressure difference that pulls in cooler air from the north and south-facing facades. This natural airflow improves air quality and reduces the need for mechanical ventilation.

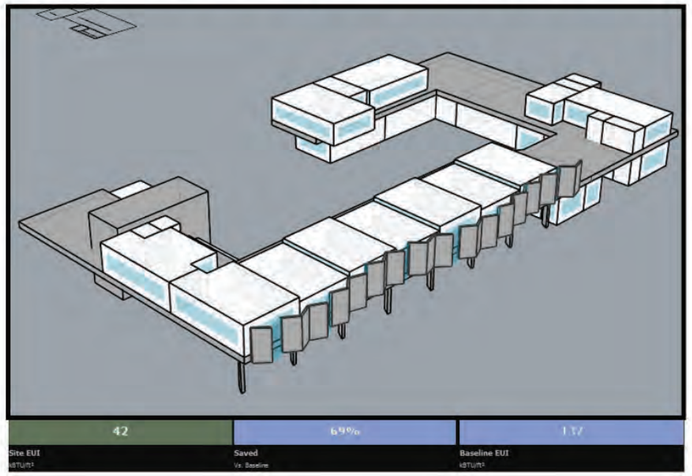


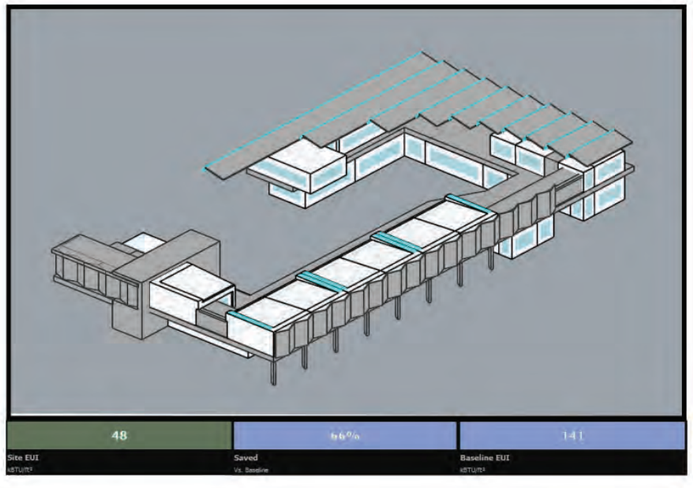
CLIMATE ADAPTATION ASSESSMENT MATRIX

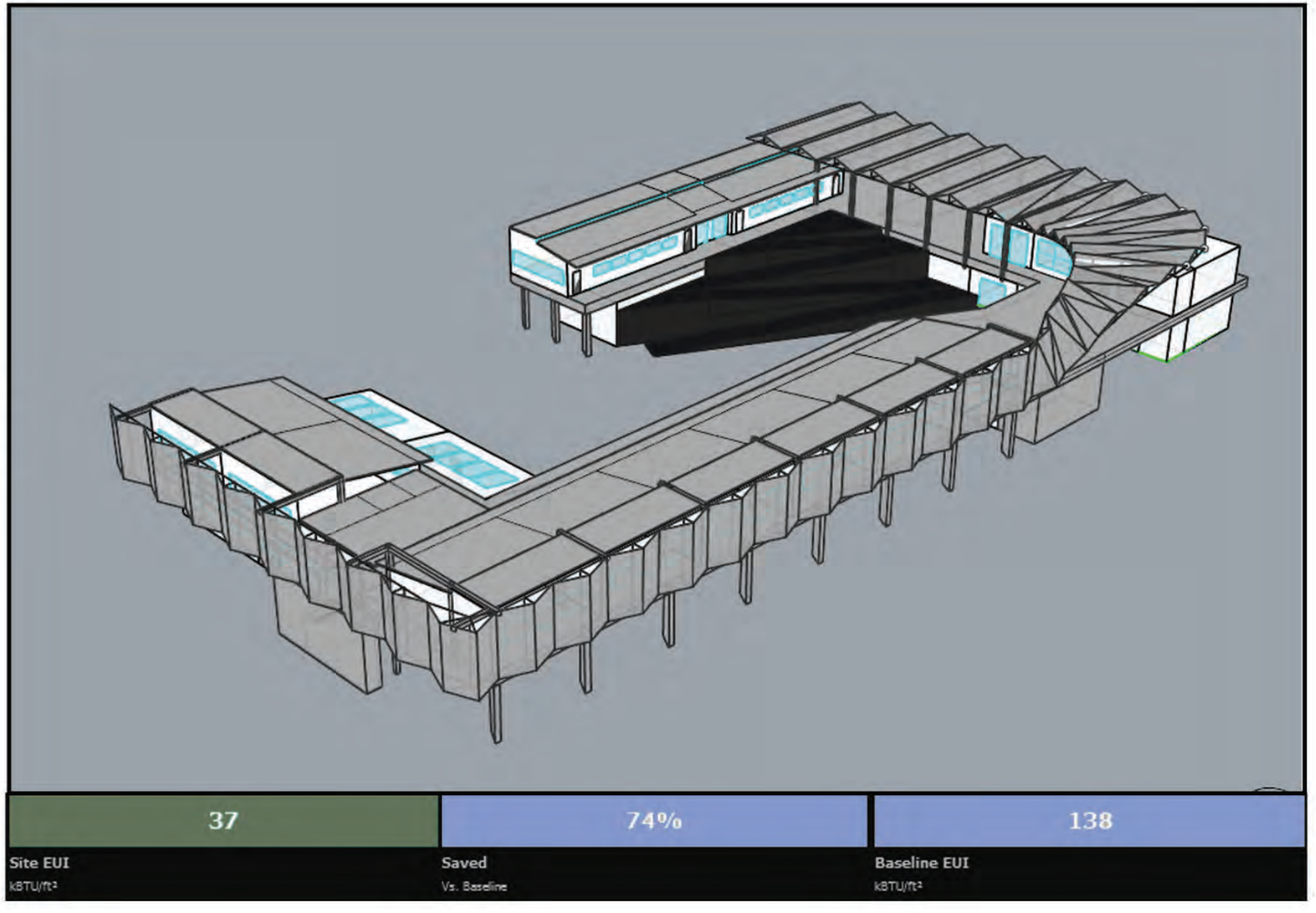
PROJECT NAME: The Mindful Garden

IMPACT	ADAPTIVE MEASURE	USING THIS MEASURE? (Y/N)	IF THE PROJECT IS EMPLOYING THIS MEASURE, BRIEFLY DESCRIBE TECHNICAL SPECIFICATIONS
HEAT	Is the project planting trees that will provide shade to buildings, homes, sidewalks, streets, or parking lots?	Y	Trees are planted along the southern greenspace between the road and the building. They are also planted in planters in the courtyard and along the length of the ramp.
	Is the project enhancing insulation levels?	Y	Insulation levels are optimized using Climate Studio by comparing the resulting energy usage results with a baseline model.
	Is the project installing cool roofs?	Y	The flat classroom roofs are composed of solar panels that will absorb light energy. The shed roofs angled inwards are not covered in panels, but instead will be composed of materials with a low thermal mass and light coloring.
	Is the project reducing electrical grid demand and household costs associated with cooling?	Y	The HVAC system is optimized using a coil heating and cooling system provided by Climate Studio. The first floor parking and second floor classroom designs utilize the stack effect for natural ventilation.
	Is the project providing a community cooling center?	Y	The Mindful Garden provides large air conditioned classrooms connected by a flex space that will have movable walls that can make a large indoor cooling center for the classes or community events.
	Is the project adding permeable land cover?	Y	The learning garden ramp will create garden space and will be both a conduit for drainage and a storage area for water collection on site located directly below the ramp. The courtyard will also have raised planter boxes throughout.
	Is the project replacing agricultural lands (croplands, rangelands, or pasturelands) or natural land cover (trees, grasslands, shrublands, watersheds, or wetlands) with pavement or buildings? *(Negative co-benefit.)*	N	No.
	Please add any additional measures employed to address this impact.	Y	The conditioned spaces utilize double glazed windows along all faces of the building. Unconditioned exterior circulation wraps the perimeter of the first and second floors. The photovoltaic fan acts as a shading device for classroom windows facing south and east.
PRECIPITATION CHANGE *(e.g. drought, extreme precipitation events)*	Is the project setting up an ongoing mechanism to conserve water?	Y	Water collection will be present on the roofs and will be fed through a system of exposed clear pipes to promote student interest in the subject. The ramp acts as a rain collection area with an assortment of small cisterns on the north adjacent face of the ramp. These smaller cisterns channel controlled water to the hydroponic walls of the ramp, while also feeding into a larger cistern below the ramp where the water is UV filtered.
	Is the project promoting improved soil health, soil quality, or soil stability?	Y	By planting a wide variety of local plants on campus, the Mindful Garden promotes a healthy soil ecosystem. Lining the green space along the south face of the building increases the overall site's soil stability.
	Is the project restoring wetlands, watersheds, or riparian buffers?	N	No.
	Is the project planting native, drought-tolerant vegetation?	Y	Yes, native plants such as Purple Sand Verbena (*Abronia umbellata*), Big Leaf Maple (*Acer macrophyllum*), and the California Box Elder (*Acer negundo californicum*). are planted in the stairs and planter pods across the campus.
	Is the project changing permeable surfaces to paved surfaces? *(Negative co-benefit.)*	N	No. The original site is almost entirely impervious surface. Permeable surfaces will be added to the ground floor walkways for torrential rain water mitigation.
	Is the project increasing water use? Negative co-benefit.	N	No. Water saving measures such as sensors on sinks, foam flush toilets, and UV water filtration are employed. Similarly, water collection and storage offsets the increased water usage from having additional green space and gardens on site.
	Please add any additional measures employed to address this impact.		
AIR QUALITY	Is the project using materials and systems that have reduced impacts on indoor air quality?	Y	The Mindful Garden uses locally sourced and safe materials, such as cementitious fiber paneling. This type of paneling is made of recycled sustainable materials and contains no chemicals or volatile organic compounds that contribute to indoor air pollution.
	Does the project address air quality from wildfire smoke? Although the site is in a urban area, the effects of wildfires can still impact the air quality of urban areas.	Y	In the first floor large maker space, an aluminium air filtration wall covered by a faux green wall channels polluted interior air into clean air that is directed via HVAC.
	Please add any additional measures employed to address this impact.	Y	Air flow through the site ensures that clean air circulates through the site. The prevailing wind direction is from the South and the southern facade has a permeable facade to filter out large airborne objects and particulates.
OTHER	*Please add any additional measures employed to address other climate or natural disaster impacts not already listed.*		
	Please add any additional measures employed to address other climate or natural disaster impacts not already listed.		

Climate Studio in the Design Process







Main Design Considerations:

- Window sizes were reduced.
- Circulation is all routed externally, greatly reducing the amount of conditioned space.
- PV panels provide shading to exterior spaces and reduce cooling costs.
- Window type was selected based on the optimization of the model.
- Operable windows allow for reduced heating and cooling costs.

Despite seeing a reduction in building our predicted EUI, our energy modeling software (Climate Studio) does not consider the benefit of passive systems such as stack effect. As such, the actual EUI for our building can be expected to be lower.

Considering only the building's energy usage:

$$\text{zEPI} = \frac{\text{pEUI}}{\text{baseline EUI}} = \frac{37}{138} = 74\%$$

One of the **fundamental priorities** of the Mindful Garden is to **engage** the **broader** community while still catering its function to the needs of its students. For this reason, integrating a **public school** space within a **private residential** area was challenging due to the varying needs of different users, but architecture must address all potential users if it aims to be equitable. Therefore, the first floor and maker space of the Mindful Garden are **open** to the **community**, **extending support** and **outreach** by acting as a **place of refuge** during climate-related disasters. The Mindful Garden is **proactively inclusive** of neighboring residents while still maintaining **enclosure** and **privacy** to ensure personal **safety** for students.

Schools act as **central communal** spaces for residents to **gather, connect, and share,** which continues the ongoing process of **community development**. The garden acts as a **central unifying program** space in the courtyard, and the maker space is **open** to the community, providing **access** to technology and educational resources. The Mindful Garden is also **well-integrated** with the surrounding neighborhood, promoting a **sense of belonging** in the overall community and extending **support** to all of its users, whether they are students, faculty, or visitors. This sense of belonging promotes residents to find social and emotional **comfort** for one another and build **strong, resilient communities**. The **diversity in function** of the Mindful Garden reflects the **unique** and **resilient** east Los Angeles community and provides for them an **inclusive, accessible, sustainable** space that increases the equity of their environment.