2021

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REGENHUB

REGENHUB

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CONTENTS

OUR ENVIRONMENT IS GOING FROM THE NATURAL ENVIRONMENT TO A BUILT ENVIRONMENT. HOW WE MANAGE THAT IS THE KEY.

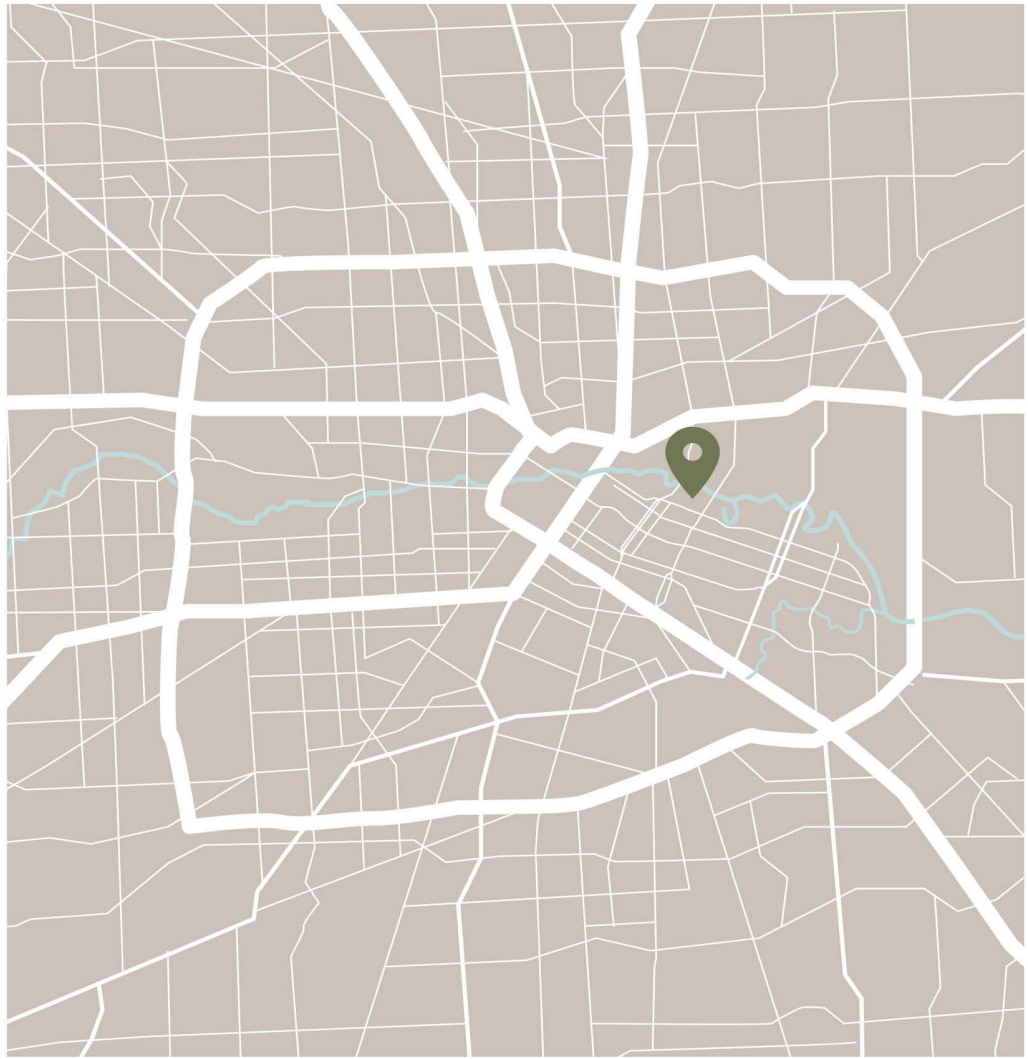
-SAM JONES

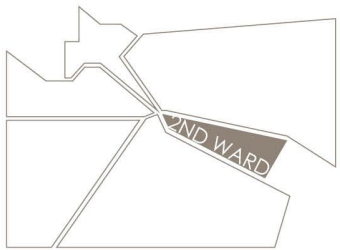
ABSTRACT

The separation we have crafted over the years between the natural and built environment has come with many costs to our environmental and public health. Today, the average human spends about 87% of their time indoors. This separation from the natural environment is connected to obesity, cardiovascular diseases, depression, ADHD and even a lack of creativity. This modern day issue our society faces is clearly exemplified in Houston where the development focused around industry created a car-centric, concrete jungle. It is easy to see why Houston, a city plagued with hot, humid weather, sprawling infrastructure, and little access to green space, creates an environment where health issues skyrocket. Until recent years it has been a place where residents avoided spending time outdoors. Furthermore, the city's sprawling infrastructure did not provide the resources for Houstonian's to live an active lifestyle. Experiencing these issues growing up in Houston sparked my interest in exploring the way in which the built environment affects our health. Through this exploration, I aimed to create spaces that encourage a connection to the natural environment while providing comfort and safety from the harsh elements of Houston. With architecture as the vehicle, Regenhub eradicates the firm boundary between the natural and built environment improving the public and environmental health in this underserved neighborhood.

BACKGROUND

WHY EAST HOUSTON?

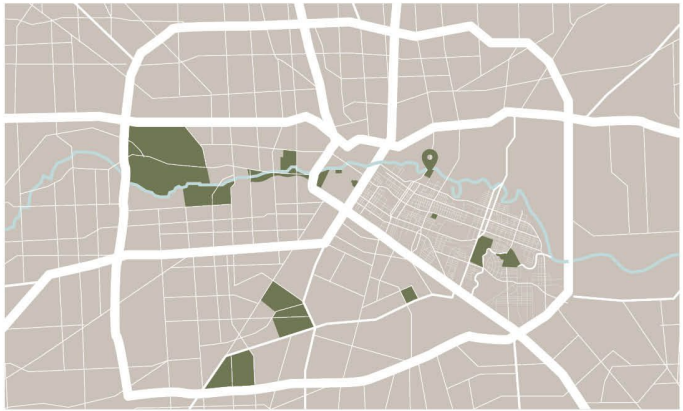




The East End of Houston, historically known as the Second Ward, was the birth place of Harris County. The establishment of Harris County took place in 1836 at Harrisburg, where the East End of Houston meets downtown today. The county's location along the Bayou that fed into the Ship Channel, and eventually the Gulf of Mexico, made a prime place to establish on the premise of commerce. The East End's location along the Buffalo Bayou made it the ideal spot for an industry and warehouse district because of the proximity to trade along the ship channel. It became home to oil manufacturing when it was discovered on the Bayou banks in the early 1900. The abundance of industry, oil and gas, and factory jobs made it the ideal spot for industrial migrant workers to settle. Eventually, the area became known for tenement housing, gangs and criminal activity, a fact that still resonates with people's views of East End today. After the Great Depression, WWII brought life back to the area with many manufacturing jobs providing for the war. However, in the 1940's and 1950's, Houston began to focus on developing the western side of the city. This era became known as the "White Flight" as most of the Caucasian population left for the West leaving behind the majority immigrant population. The decline of high paying industrial jobs left the people in the area unemployed again and unable to pay taxes to be a part of the change happening throughout the rest of the city. This lead to Houston's focus on developing the west side of the city, leaving the East End neglected. Today, it is one of the last inner-city areas that has not seen much development or growth in the last 50 to 75 years. The deep rooted history consisting of minority and low income workers has had a major impact shaping the cultural identity of the East End today. In very recent years, the city has started to take interest in this area because of its rich culture and history, along with its proximity to downtown Houston. In addition, there is nearly 400 acres of deserted industrial areas that could be developed. There has been a lot of development in the area closest to downtown, known as "Eado" or East Downtown. As this area becomes increasingly more popular among Houstonians, interest has been taken on the rest of the East End. It has recently been named a cultural hub because of the history and art spread throughout the district in hopes to stimulate the local economy and promote local identity. Other ongoing projects, such as the Livable Centers Initiative, which started in 2018, are in place to improve the infrastructure of the neighborhood to make it a more sustainable and active place for the existing community and newcomers alike.

LOCATION

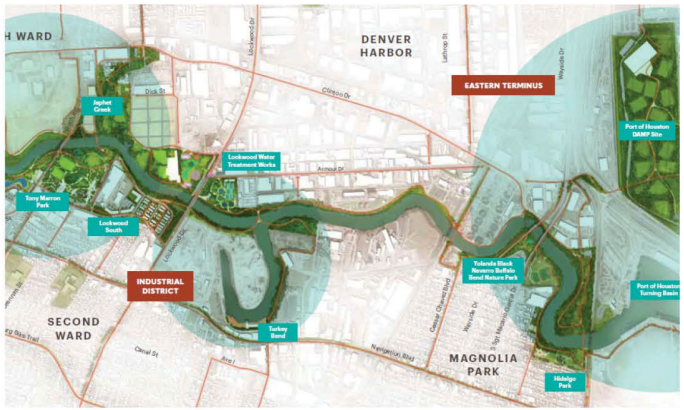
LOCATION



Regenhub is a center for activity to initiate change and meet the needs of the evolving community of the East End of Houston. Houston's car-centric design has defined the city for decades tacitly creating a health disparity in the residents. The existing conditions of the infrastructure have exacerbated an unhealthy, sedentary lifestyle across the city. Regenhub will help to transform a particularly overlooked neighborhood through a series of buildings with health focused functions to encourage education and promote an overall sense of well-being in local residents.

The white flight era in Houston left the East End of Houston neglected because of the stigma of minorities and underprivileged individuals. The decline of industrial jobs left many people unemployed, under served and unable to pay taxes. Because of this, there was no interest in developing this area to provide these people with good amenities and infrastructure. Today, is 400 acres of abandoned industrial areas left unused and open for development. The little interest in this area has left the neighborhood with a serious lack of greenspace and an abundance of unused, unplanned blocks. This combination has provided the community with minimal choices to spend time active and outdoors.

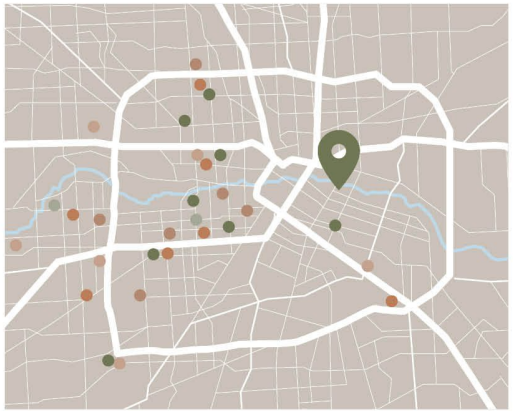
GREEN SPACE IN HOUSTON VS. THE EAST END



Flowing through the middle of Houston is a natural water feature known as the Buffalo Bayou. In 1836, the Allen brothers established Houston at the mouth of the Buffalo Bayou on the premise of commerce. Overtime, the bayou became the vehicle through which Houston imported and exported goods out of the Gulf of Mexico. Shortly after the Galveston Hurricane of 1900, the port of Houston was established leading to the eventual expansion of the Buffalo Bayou to handle the influx of cargo. The Bayou's connection to the Houston Ship Channel made it a core piece of city infrastructure, bringing in business for the booming oil and trade industries of the twentieth century. Today, the city is transforming the Bayou into a piece of green infrastructure Houstonians can enjoy for exercise, recreation and leisure. However, this transformation has not yet extended into the East End of Houston. Located along the banks of the Bayou in this area, Regenhub brings back life and activity to this neglected part of Houston's history. Forming a connection to the existing running pathways and trails along the banks revitalizes a rich piece of history while encouraging physical activity. In a neighborhood with few existing pedestrian paths, enhanced lighting, shade structures, and landscape upgrades make the existing trail feel more attractive, secure, and comfortable.

RESEARCH & CONTEXT

SYSTEMIC ISSUES



KROGER

TRADER JOES

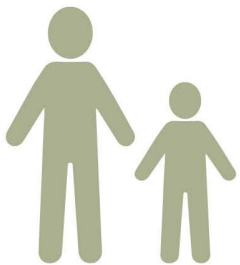
HEB

WHOLE FOODS

WALMART

Today's East End residents have little disposable income and little access to public transportation leading to the habitual purchase of convenient, highly processed fast foods. The area is considered a food desert due to the lack of nutritious, affordable food options. This systemic issue leads to the rise of cardiovascular risk factors such as obesity and diabetes. Regenhub seeks to mitigate these issues by providing a space that supplies these resources that are lacking in this area.

ONE STORE IN A 5 MILE RADIUS



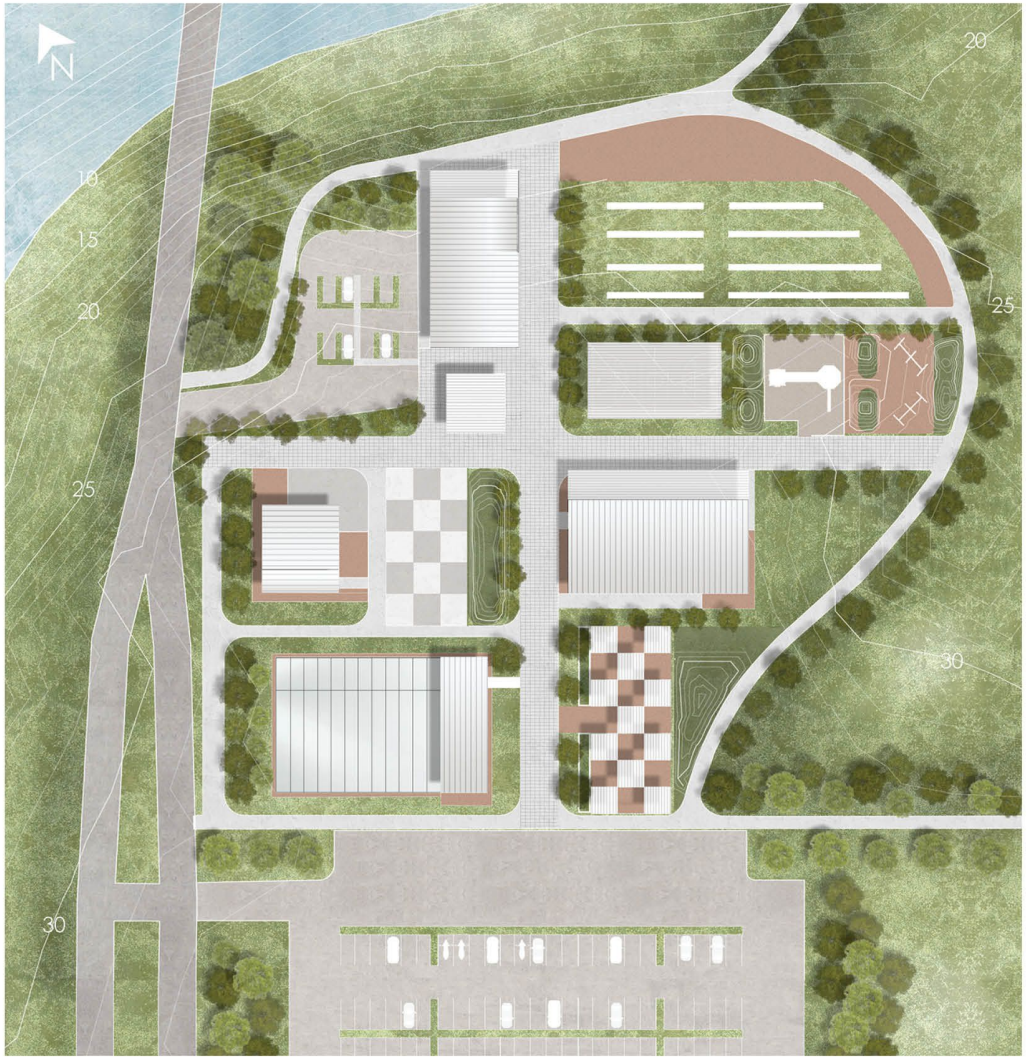
OBESITY RATE OF 63% IN ADULTS & 34% IN CHILDREN

68% OF ADULTS DO NOT GET THE RECOMMENDED AMOUNT OF PHYSICAL ACTIVITY

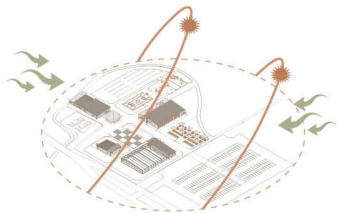
GOALS

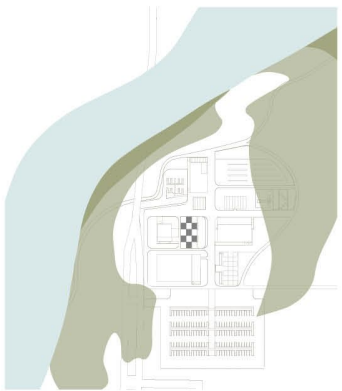
The design of Regenhub's buildings and landscape promotes health and comfort, and preserves the rich history and culture of this area. The goal of the site is to create a space that provides the community with nutrition education, social interaction and outdoor activity. Through growing, learning, consuming and sharing, the East End is provided with engaging activity that will regenerate an underserved, excluded community.

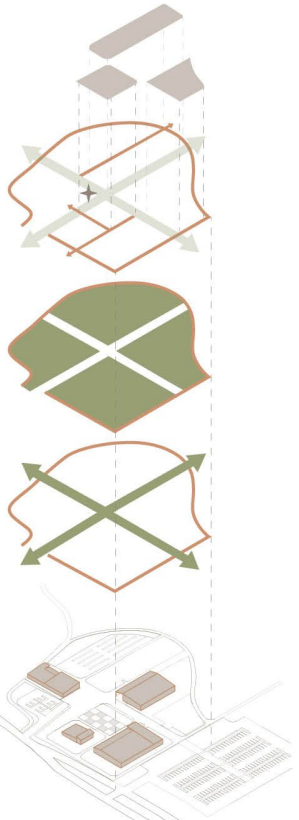
SITE



SITE

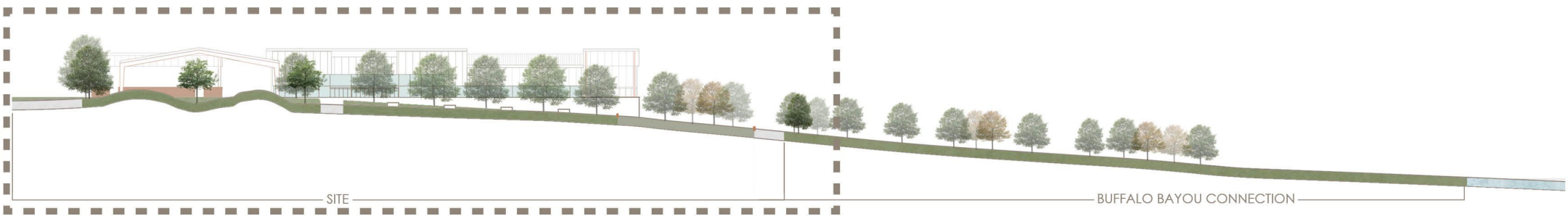


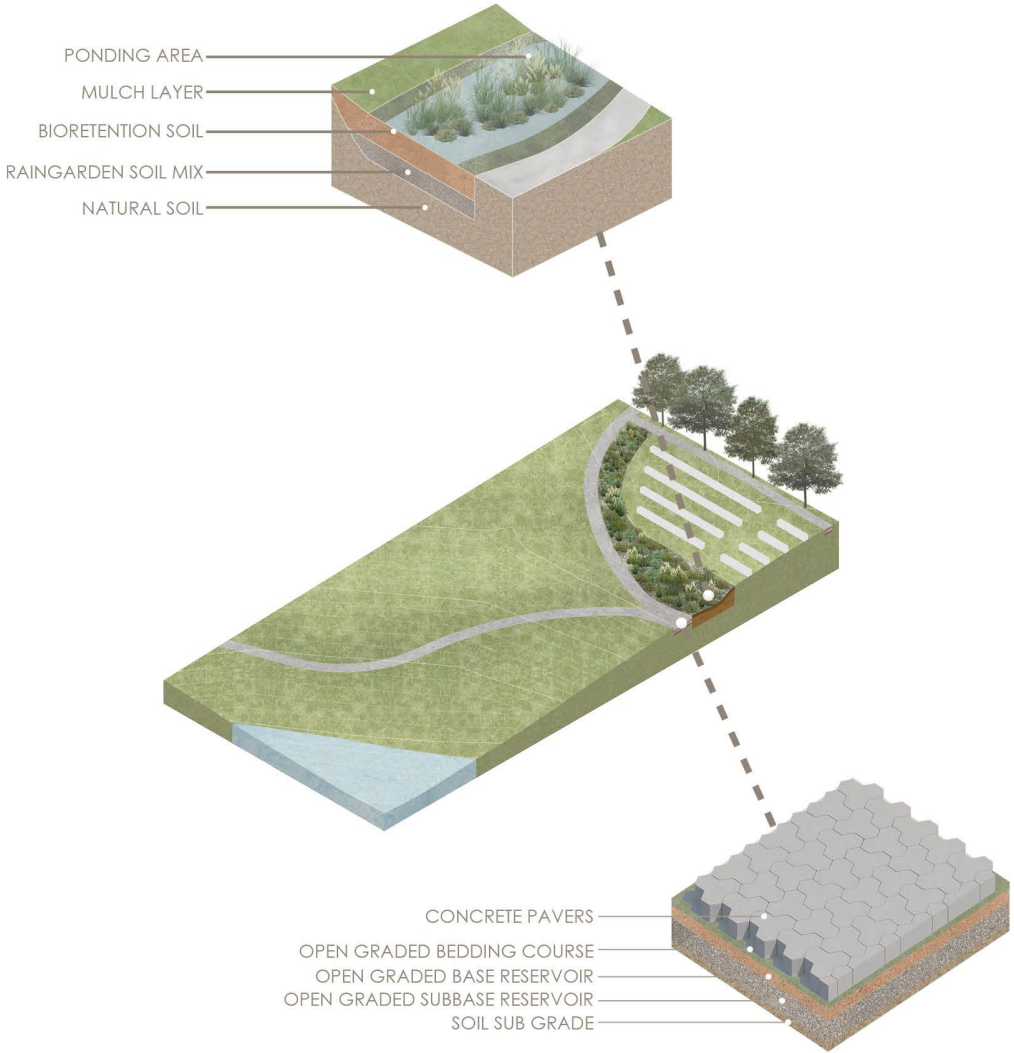




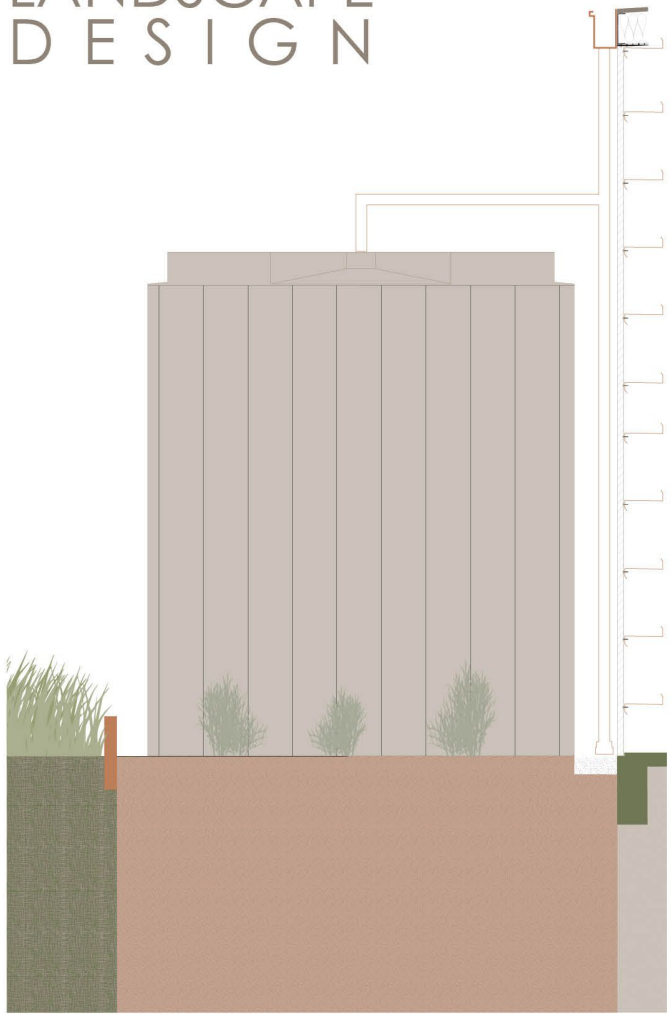
The existing walking path of what was once Tony Marron Park, located along Buffalo Bayou, creates a boundary for the site that allows users to enjoy a journey around all the buildings and activities. Four buildings – a greenhouse, learning center, restaurant, and farmers' market – are placed strategically within this boundary to benefit from the natural environmental characteristics of the site. A central axis connecting the parking on the south side of the site to the north side along the Buffalo Bayou creates a shaded pathway full of sensory experiences for the user to obtain a glimpse of all the activities taking place on site. Interjecting this pathway is a secondary axis running from the west end of the site to the east with an accompanying drop off loop. The intersection of these two paths creates a central plaza with ample seating surrounding a large garden. This dynamic area creates a comfortable environment for lounging or waiting to be seated at the restaurant. In addition, this intersection creates four quadrants of activity. The greenhouse, learning center and splash pad create a space for learning. The northwest quadrant creates an area for social gathering. The farmers market and a food truck park create a space focused around consuming and community engagement. Lastly, the northeast quadrant hosts a variety of outdoor activity for all ages to enjoy at any time of the day.


PERMEABLE PAVING
BERMING
PATH
LAWN
RAINGARDEN
PATH

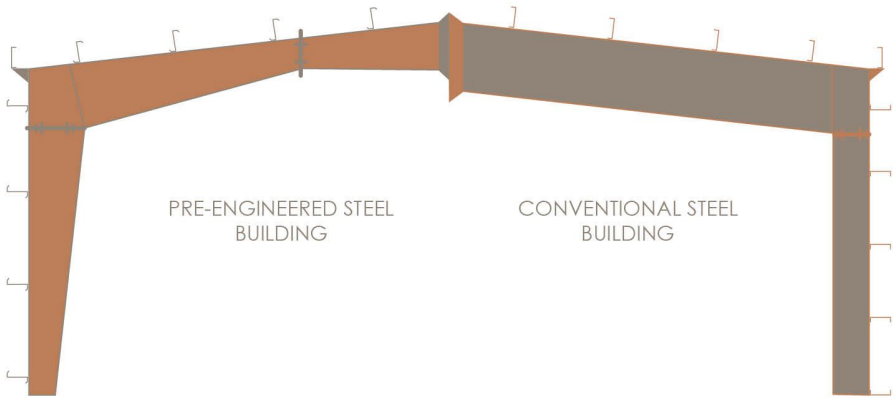

SITE
BUFFALO BAYOU CONNECTION

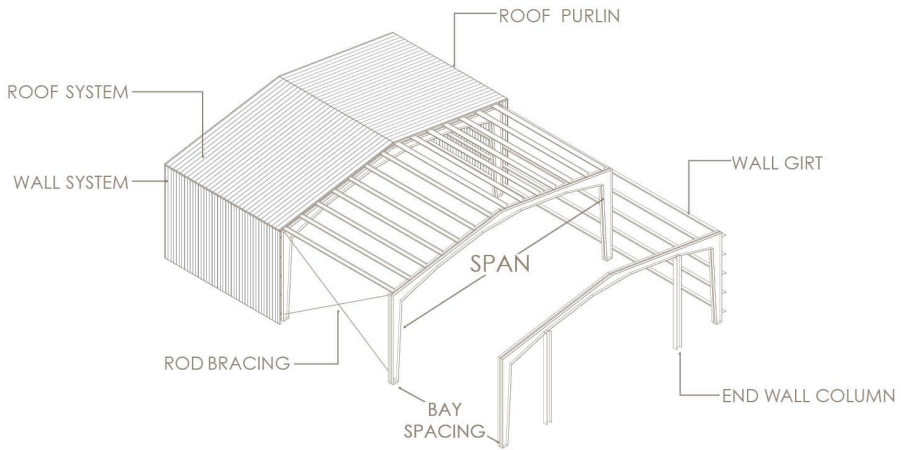


LANDSCAPE DESIGN



Regenhub sits in a neighborhood that has been severely impacted by the floods and tropical storms that have plagued Houston over the years. The lack of planning and over engineering in Houston's infrastructure has only made things worse. The location along the bayou within the flood plain presented opportunities for exploring alternative site detailing. At least one water catchment tank is placed at every building to collect water for plumbing use and all the greenhouse needs. Natural dirt bordering the footprint of the buildings provides strategic space to place the rainwater tanks and exposed mechanical equipment. A corten steel divider separates this space from areas meant for public use and traffic. Permeable paving is used on the main pathways to help with runoff in the case of flooding. The different texture also helps in the case of way finding. A raingarden is placed at the northeast end of the site in the floodplain. This garden helps to collect extra runoff that may flow into the running path bordering the site. Not only does this help to alleviate flooding but it also naturally filters the runoff before it enters back into the bayou and surrounding ecosystem. This high functioning green infrastructure grows native plants to aid in restoring the biodiversity. These plants also help to create a serene environment in the lounge area on the site.





PEMB SYSTEM

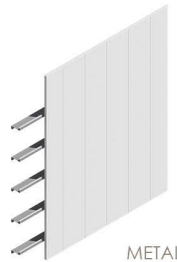
PEMB

PRE-ENGINEERED FRAME

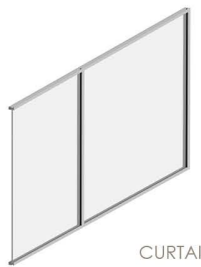
WALL GIRTS & ROOF PANELS

CROSS BRACING

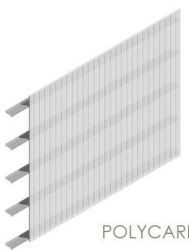
The use of pre-engineered building methods pays homage to the area's industrial history in an efficient, cost effective way. The neighborhood's location was in the center of the industry which included cement manufacturing, cotton compresses, textile plants and oil rigs. With their long history of extensive use in agricultural and industrial industries, modular buildings can be found scattered across the state of Texas. Typically used for their affordability and efficiency, these buildings often time lack a creative architectural language. Regenhub embraces the capabilities of this modular building type by creating buildings that are captivating yet very efficient. A modest off-centered A-frame is the element that provides a connection in the architectural language of the buildings. Ample glazing in all the buildings blurs the boundary between interior and exterior spaces while allowing plenty of natural daylighting into interior spaces. This dynamic system creates spaces that keep up with the rate of change of today's society. Space can easily be added to buildings by ejecting additional structural bays. The broad span of pre engineered frames creates large spaces without the need for intermediate columns. Therefore, interior spaces can easily be transformed to meet the needs of an evolving society. In addition, this type of large span construction allows for large overhangs that create intermediary spaces. These spaces allow for one to be outside but be protected from the elements, therefor blurring the boundary of interior and exterior spaces.



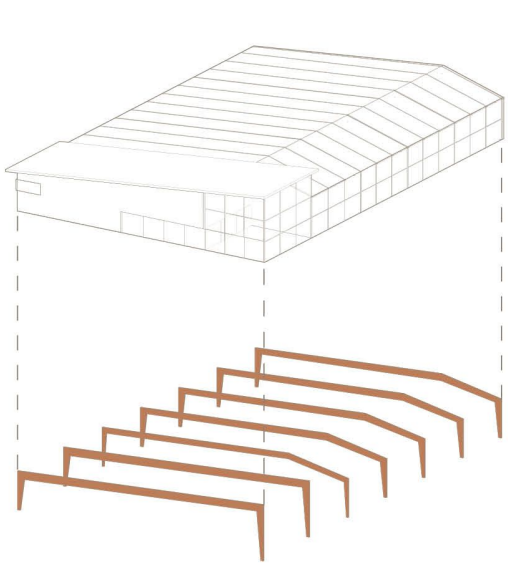
METAL PANEL

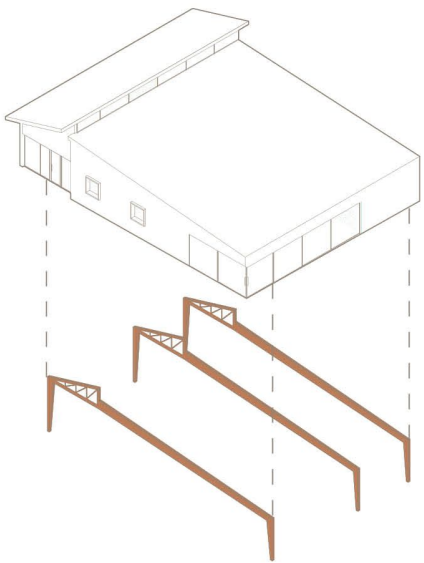


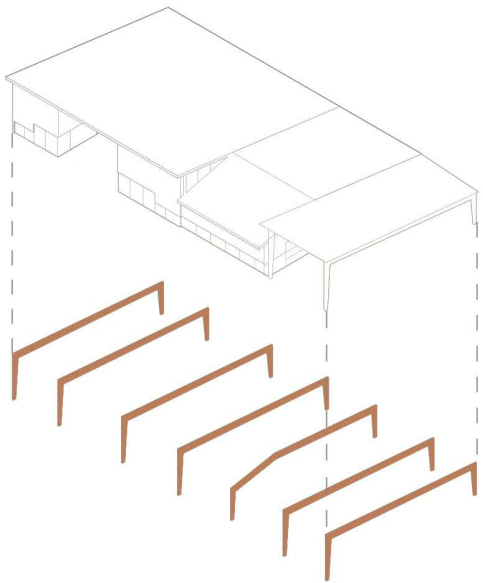
CURTAIN WALL

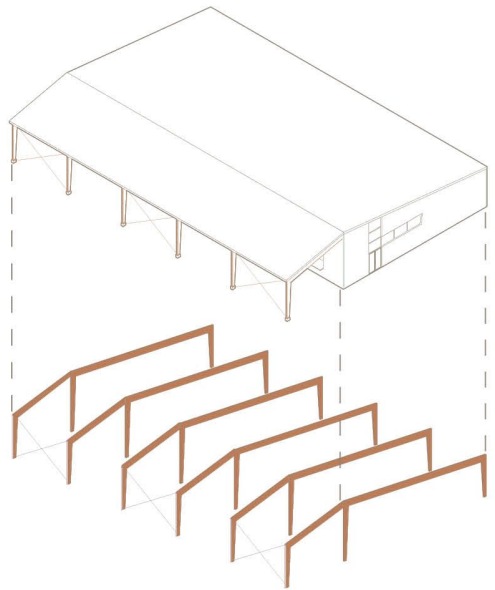


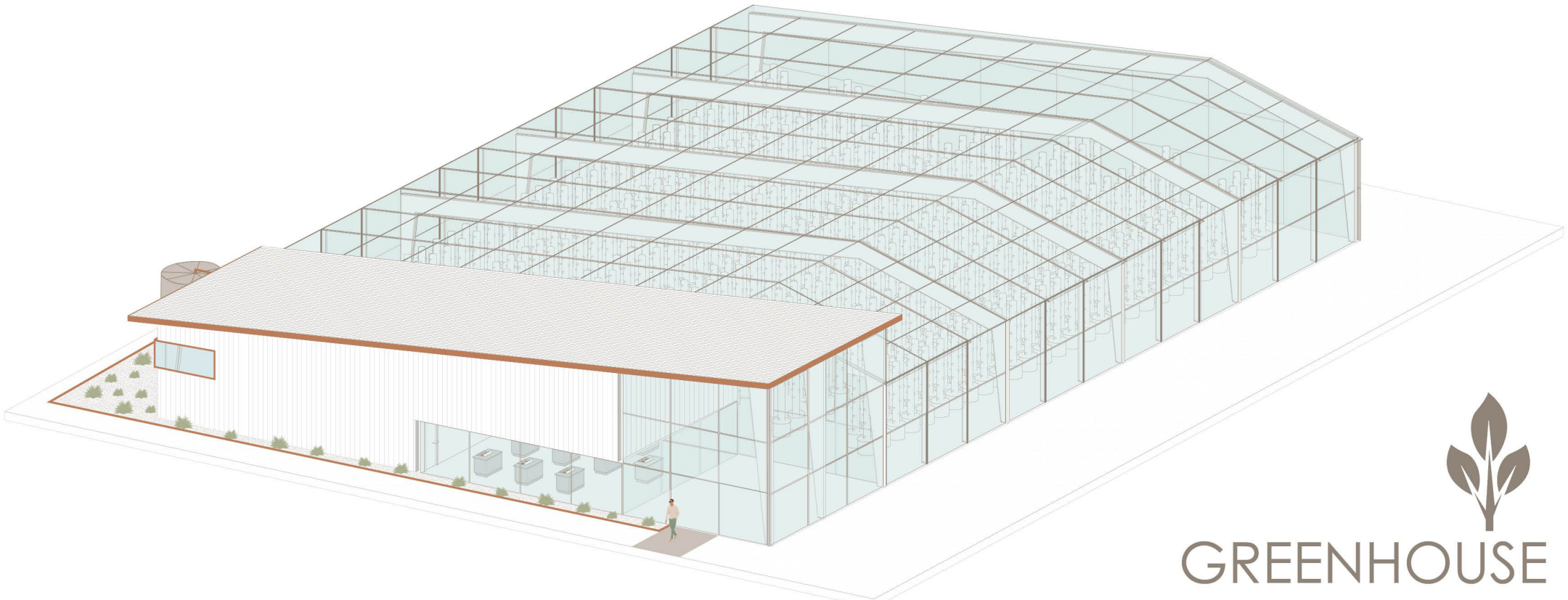
POLYCARBONATE



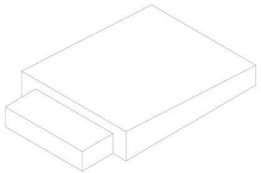


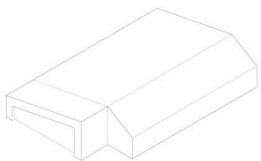


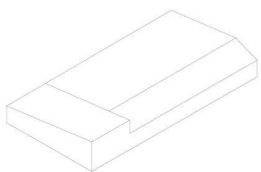




GREENHOUSE







Intended to be the first building experienced on site, the greenhouse is located on the south side closest to the main parking lot. To meet the needs of low income families in the area, the greenhouse functions as a large scale hydroponic garden. The hydroponic garden provides families with affordable, nutritious food to help offset the currently rising health issues many East End residents face. Hydroponic gardens, compared to conventional methods, have the ability to produce food 30% faster using 1/10th the land and up to 98% less water. The simplicity and automated process of hydroponic garden allows the average person to take part in growing food. Therefore, in addition to producing nutritious food for the masses, the greenhouse can also help to improve the economy by provide jobs for individuals in the area.

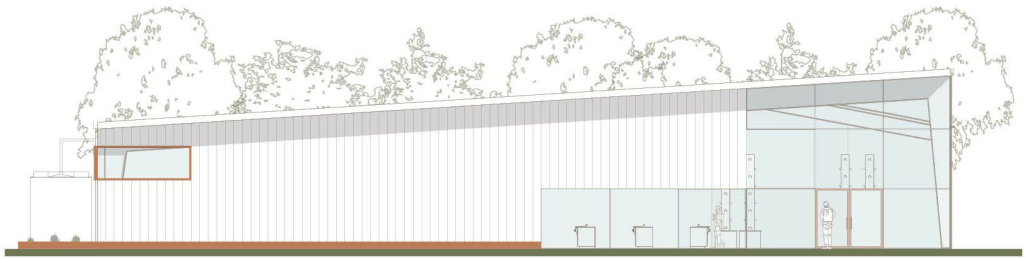
GREEN HOUSE

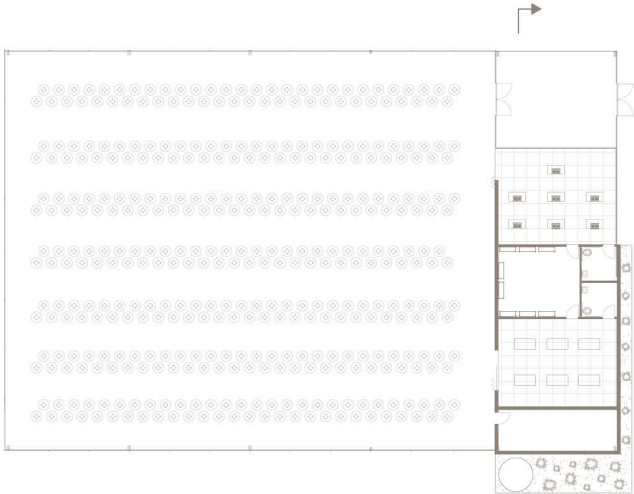
98%
Less Water

3X
FASTER

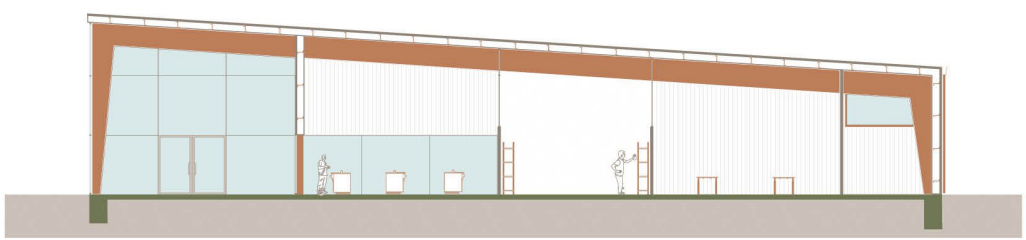
90%
LESS LAND

The greenhouse's location on the south side of the site takes advantage of the unobstructed southern sun, while glazing gives the hydroponic towers in the greenhouse ample lighting in order to produce efficiently. Three elevations of the greenhouse are unornamented and rely on the alignment and spacing of joints and other elements within the set structural grid. On the facade, the interaction of the glazing and metal panel denote the functions taking place inside. The private places, such as the storage, restrooms and production are cladded with metal panel and open into the greenhouse through sliding doors. Glazing breaks up the metal panel to allow people walking along the main axis to obtain a glimpse into the teaching kitchen.

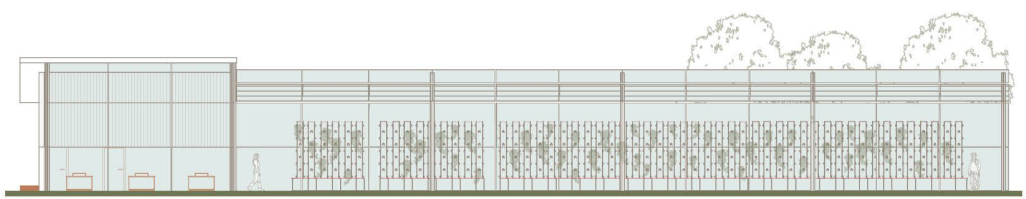


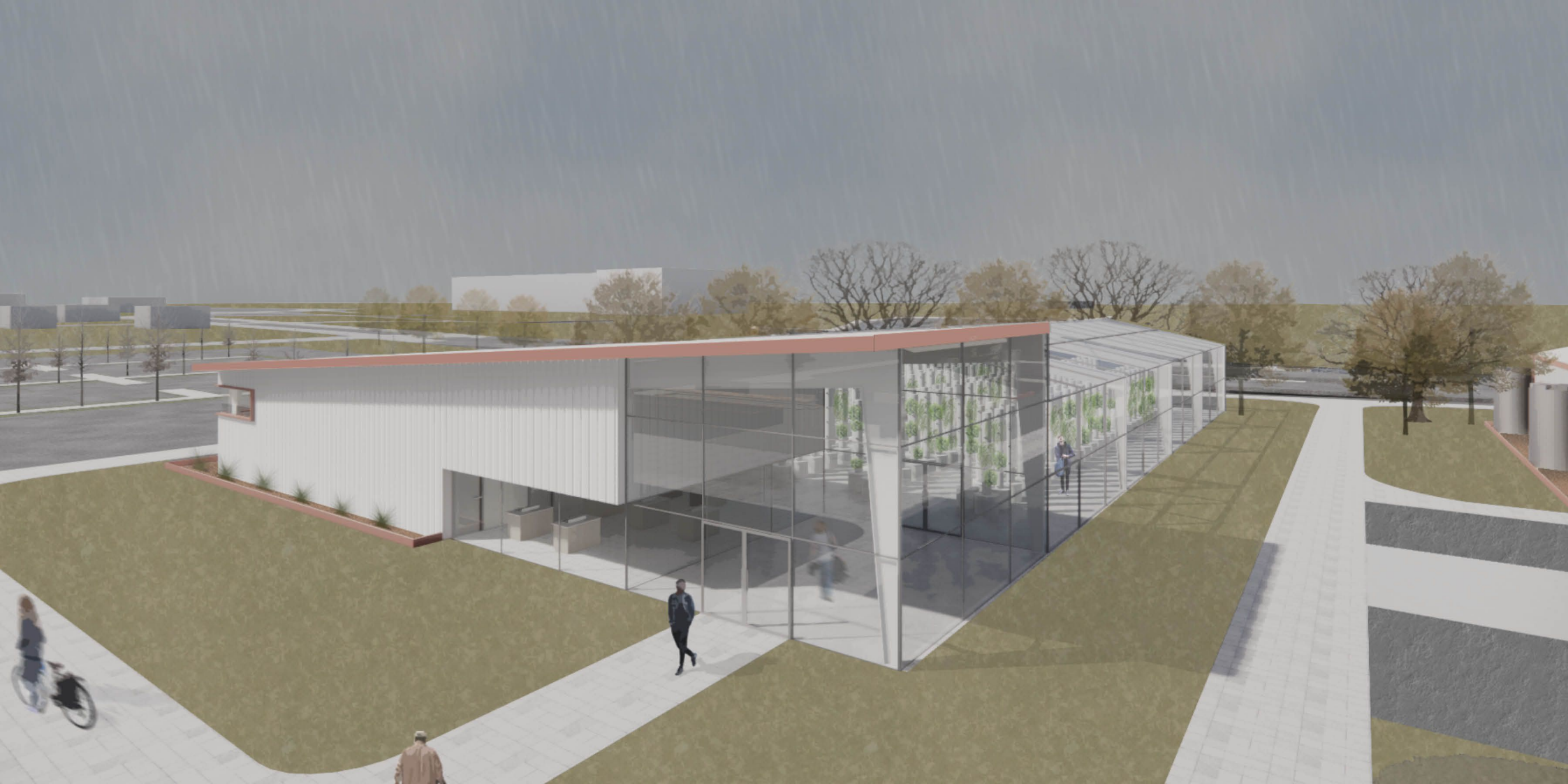


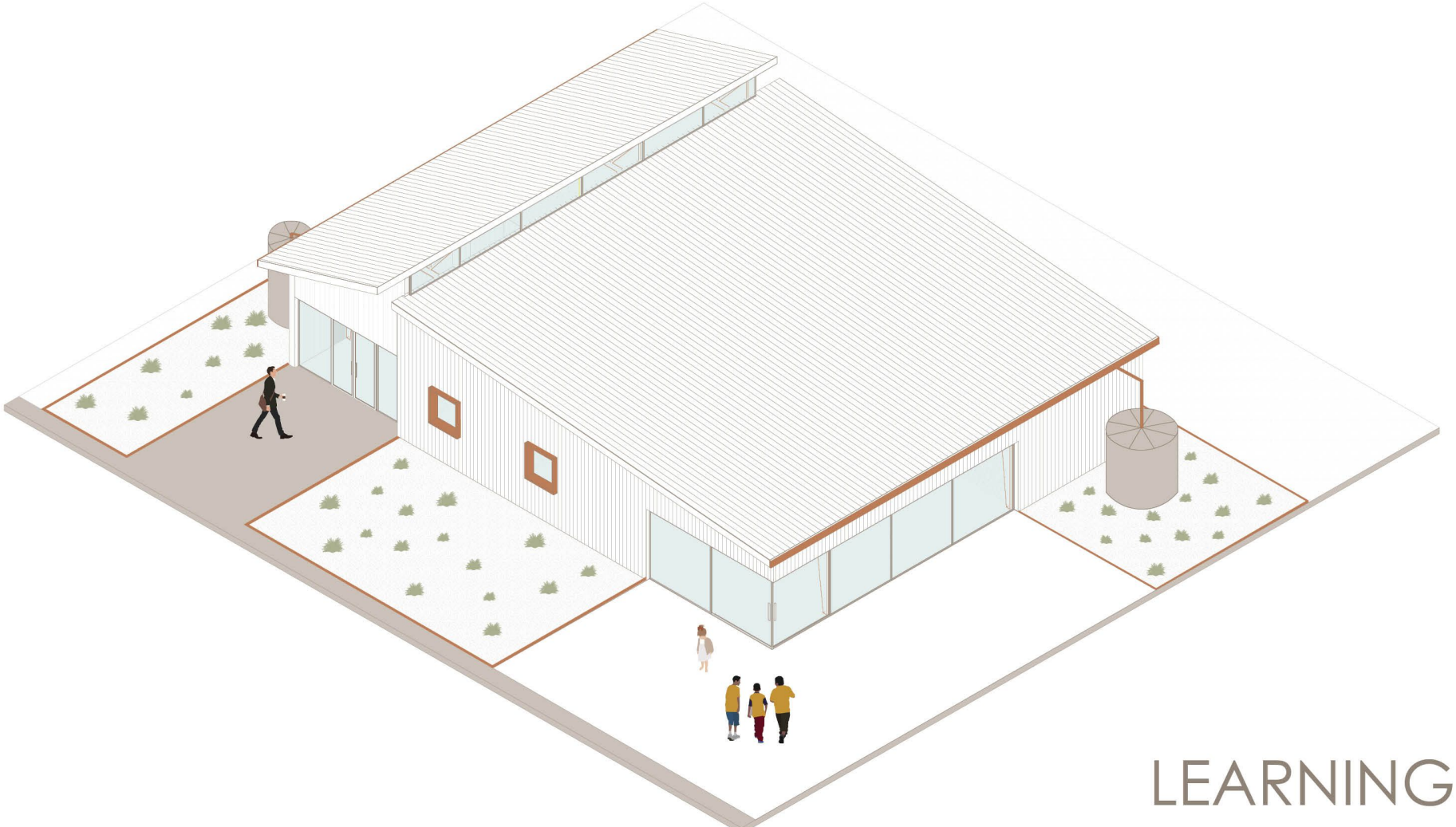
In addition to the hydroponic garden, the greenhouse hosts a teaching kitchen, prep space and ample storage, allowing the glazed in greenhouse to obtain the maximum space and flexibility for the hydroponic towers. The teaching kitchen is intended to be used for cooking classes where residents and visitors can learn how to utilize the fresh ingredients obtained from the hydroponic garden.



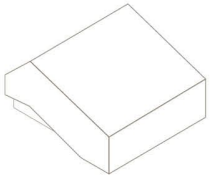
The hydroponic garden becomes a place that embodies the goals of the site. It is a place in which the community can obtain ingredients to live a healthier life through consuming fresh grown produce, learning how to nourish their body, or even gaining meaningful social interaction. This becomes a place for everyone to connect with nature in a new, unique way at anytime of the day, through out any season.

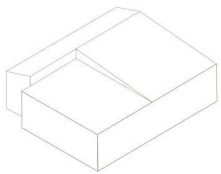


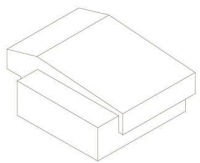


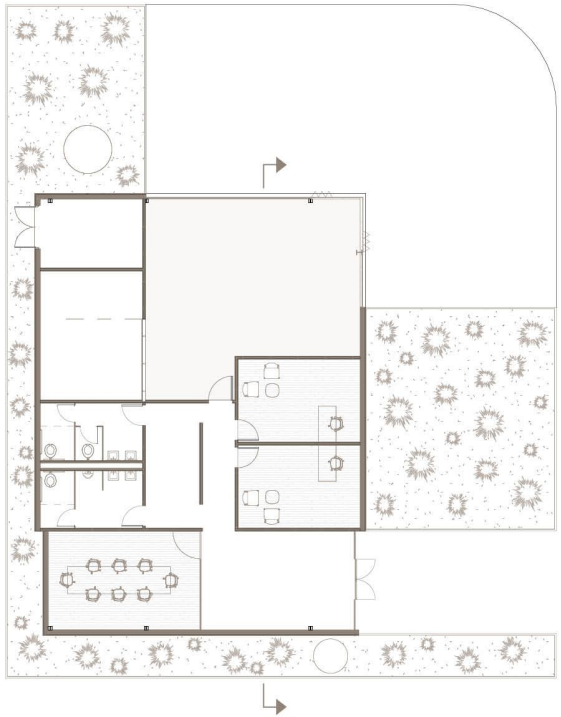


LEARNING CENTER



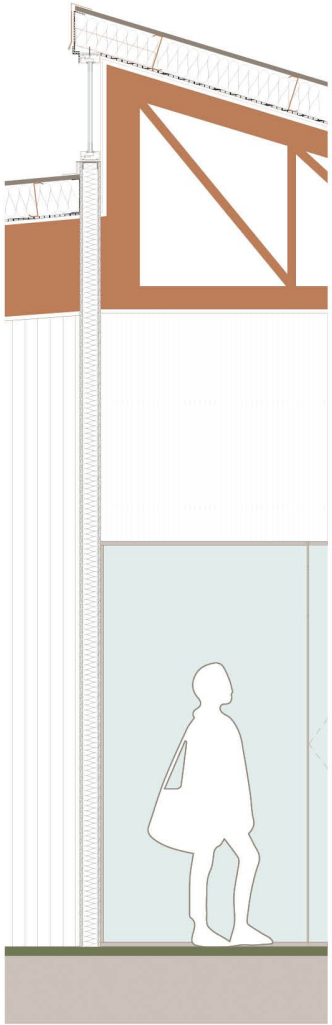




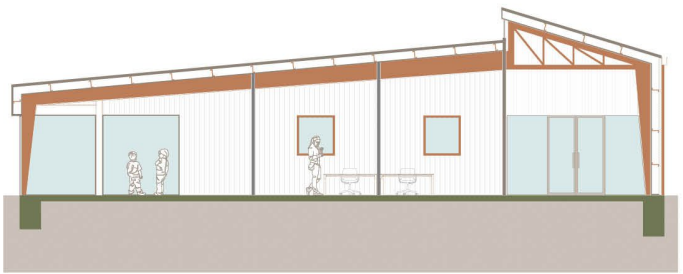


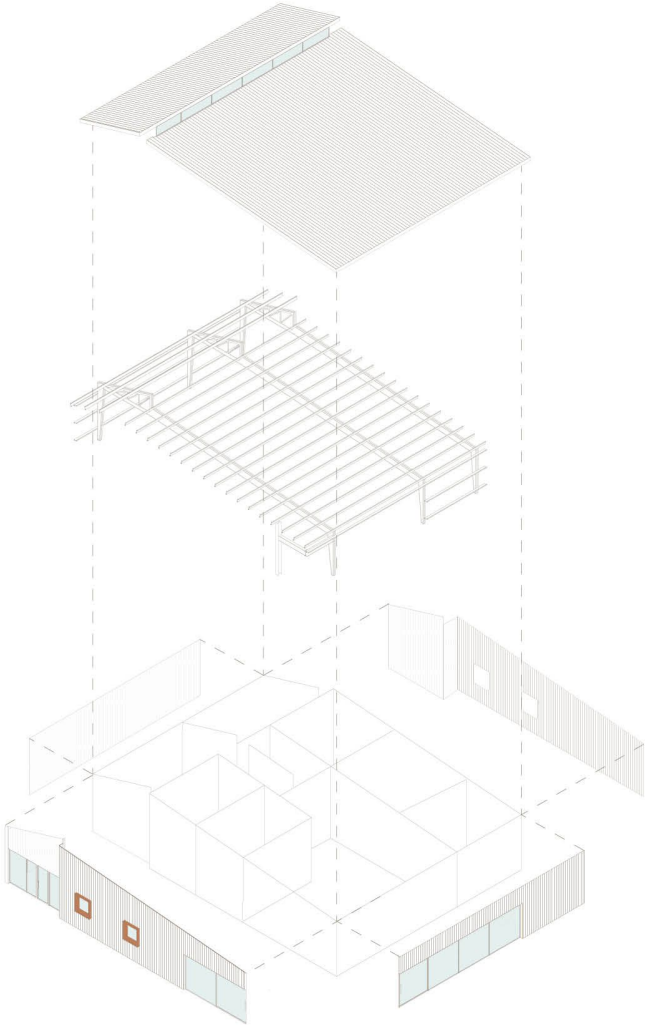
LEARNING CENTER

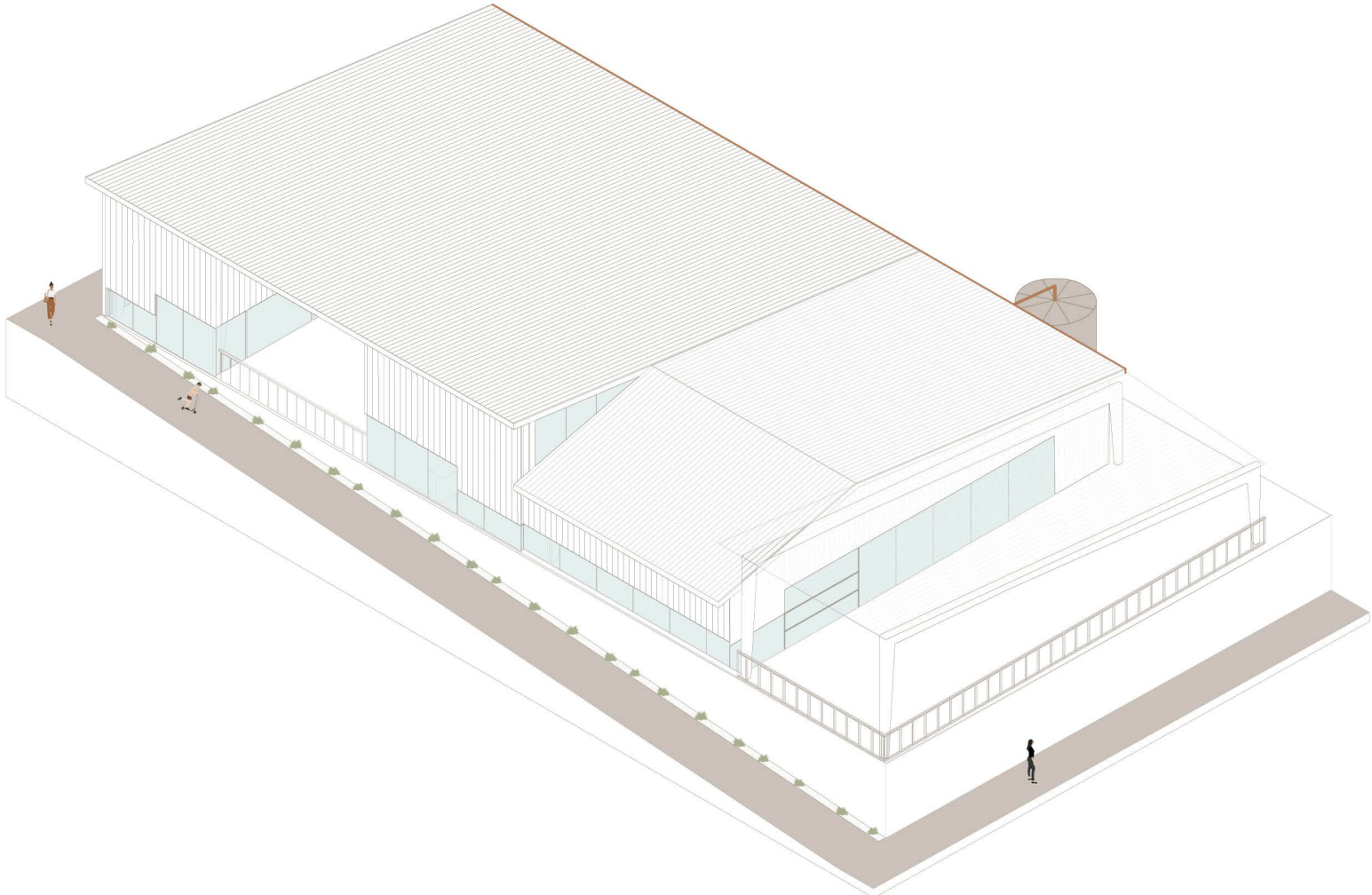
Located along a pathway broken off from the main axis, the Learning Center provides meeting space for the community to engage in meaningful discussions and activities to promote the health and prosperity of the area. According to the OECD journal one of the leading causes of systemic obesity is the lack of education on nutrition. Just as it is important to provide nutritious food, it is important to educate children on the importance of a healthy, well rounded diet and the benefits that may follow. Engagement is achieved through conference rooms while offices provide quiet breakout space for employees on site. The community can gather in the flex space to observe events that showcase the local culture or take part in learning activities that encourage transformation of the neighborhood. The building itself consists of two main masses with opposing single-sloped roof lines to mimic the off centered a-frame seen throughout the site.



The south-facing mass rises above with an extended roof line to denote the entry into the building. A clerestory ribbon window fills the space between the two heights of the masses and allows light to filter into the entryway. The larger mass is cladded in metal panel to create privacy in the offices and service areas. Glazing wraps the corner of the flex space creating a parallel to the clerestory window and a connection to the outdoor space in front of the building. The structure of the learning center is set back as to allow the sliding glazed door to open at the corner and expand the room outside. The frames supporting the clerestory window that runs along the taller mass shows the capabilities of how a pre-engineered system can be customized to address a variety of needs. The frames of this building are designed to contain a truss which allows the building to be column free, giving the it the flexibility to adapt interior spaces for future changes.

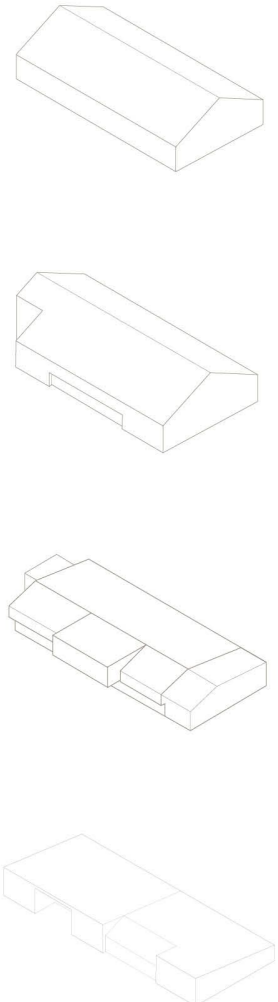


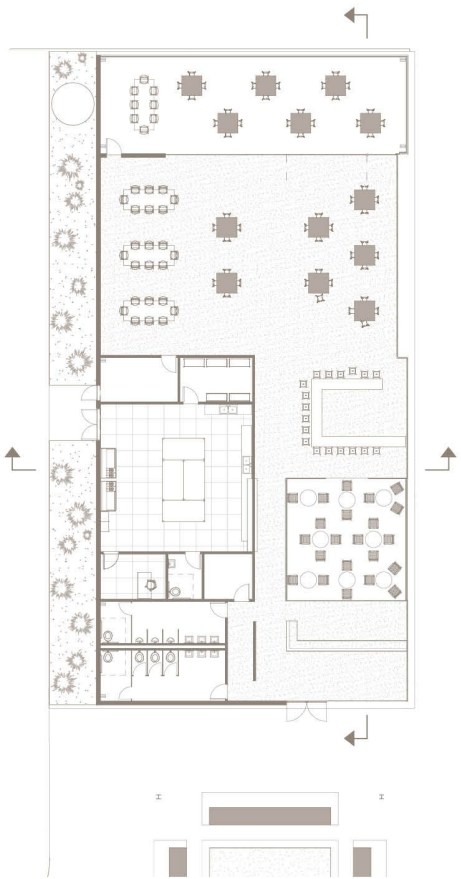




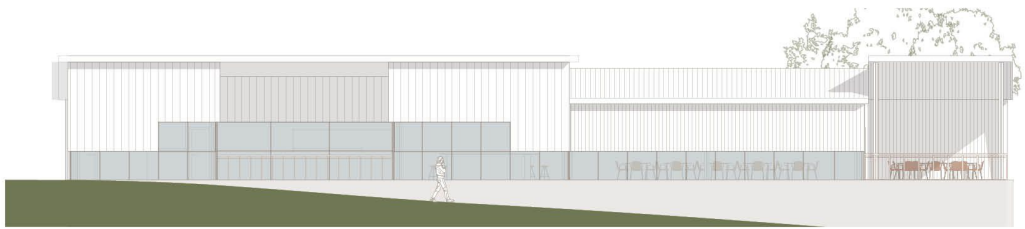
RESTAURANT

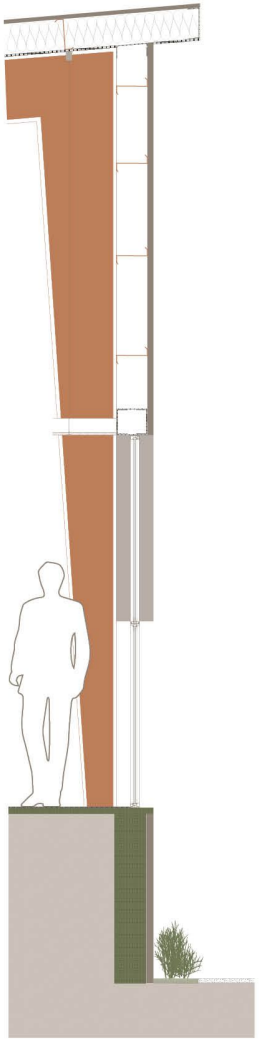
RESTAURANT





The restaurant sits on the north end of the site at the intersection of the two main axis. The restaurant is divided into three main masses differentiated by the roof planes and the material. The first mass with a straight roof frame hosts the entrance, bar area, restrooms and kitchen. A void within the center of this mass separates the reception and bar while creating a covered lounge area looking over the site activities. The second mass is distinguished with polycarbonate cladding and a double slope roof. Within this mass is an open area for seating with a softer boundary to create more connection to the outside. This primary seating area opens onto a flanking outdoor dining area hosted within the third mass. The roofline that mirrors the first creates open space for flexible outdoor seating with views of the Bayou. Rolling overhead doors can remain open to blur the distinction between interior and exterior dining areas, while allowing ample light and natural airflow.





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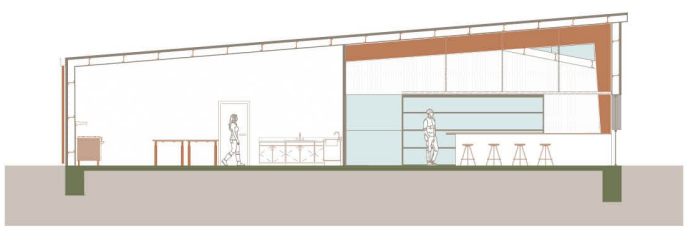
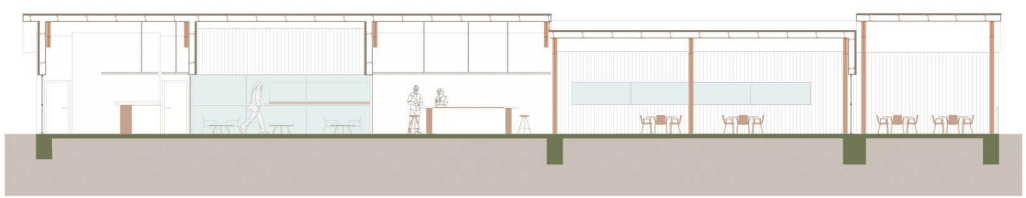
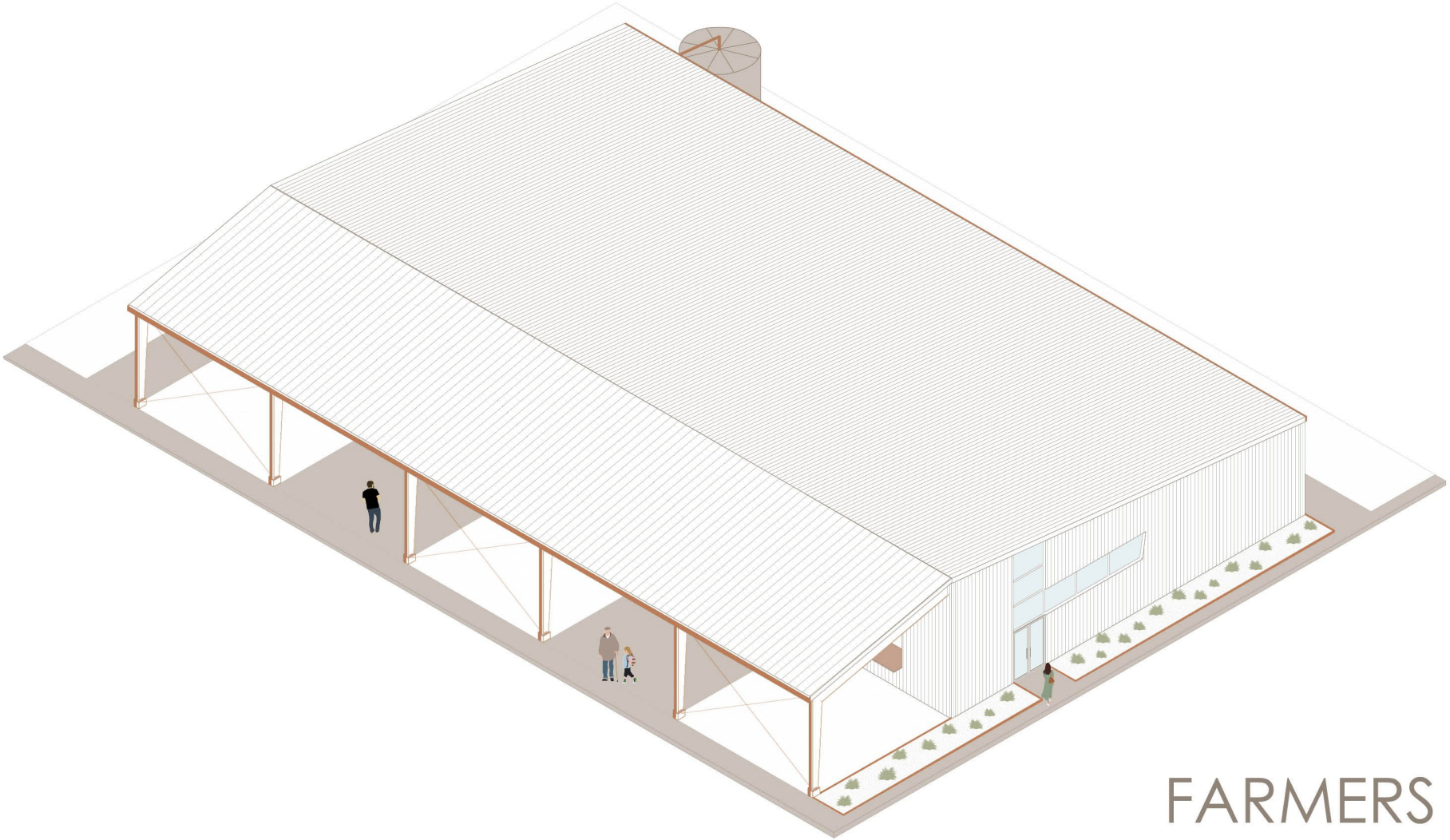
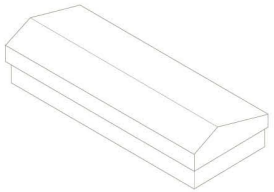
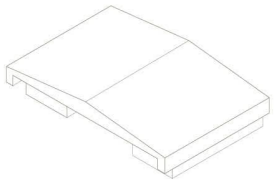


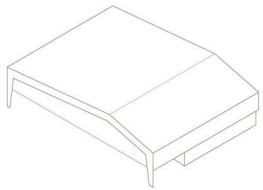


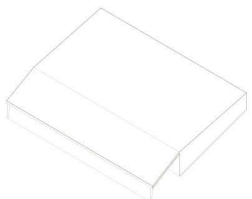


FARMERS MARKET





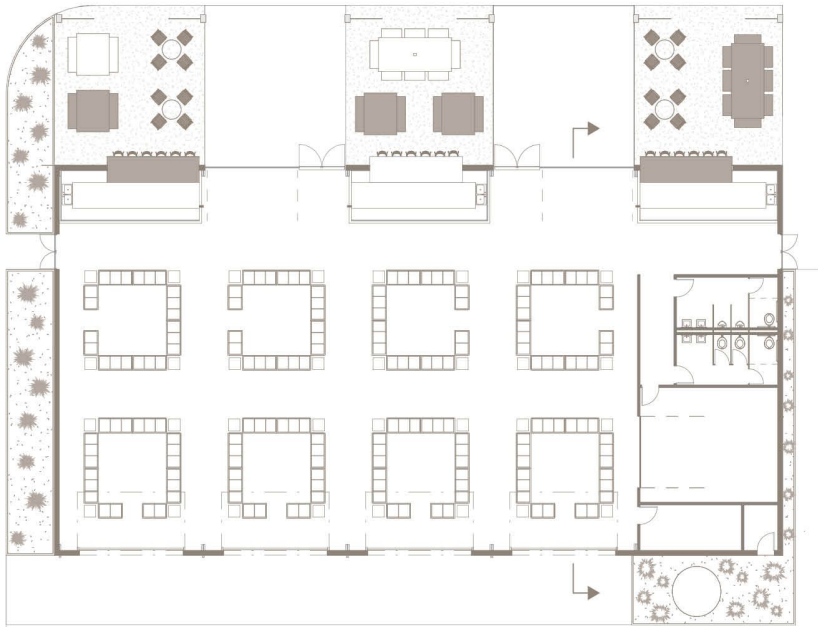


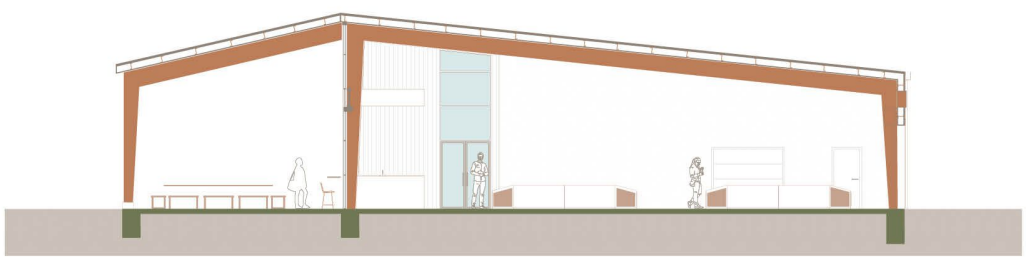


FARMERS MARKET

Located at the intersection of the two main pathways, the farmers market becomes the heart of the site. A large, open area created by the unobstructed pre-engineered structure provides abundant space that is flexible for vendors to set up individual shops how they wish. The building consists of five structural bays, three of which utilize cross bracing to block traffic along the north facade Two open bays create allow for traffic to flow underneath the covering into the market. The large, glazed overhead sectional doors allow for the expansion of the interior space outdoors. Inside, three built-in bar areas have a static presence which connect outdoors through rolling overhead doors. These bars help to define the path of circulation into and through the market. The three closed bays contain comfortable covered seating space to eat, relax or watch over the adjacent playground.

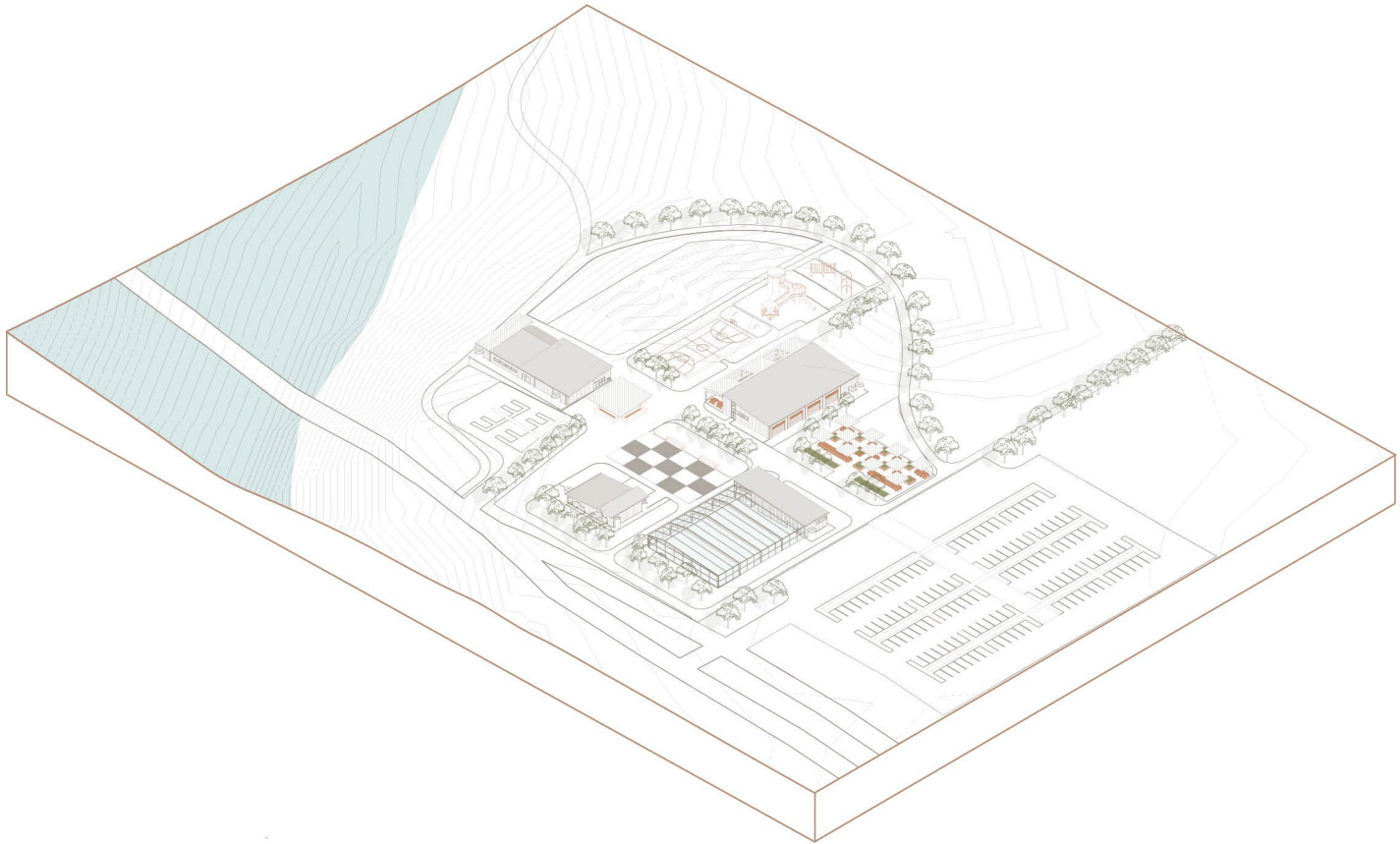
The farmers market provides the vehicle for the greenhouse produce to be sold along with other local goods such as dairy, meats and art. Here small scale businesses are given the opportunity to sell their products directly to consumers without having to pay for transportation and overhead costs. In addition, the community is given access to critical sources of nourishing food that they may not find locally in their neighborhood. According to the USDA, "when food is produced, processed, distributed and sold all within the same region, more money stays in the local economy." This interaction leads to job creation and economic development all while fostering interactions among people of different age, race and social backgrounds. Markets are not only a place to obtain local foods and goods, but they are a social event for people to come together and share new ideas and interests.





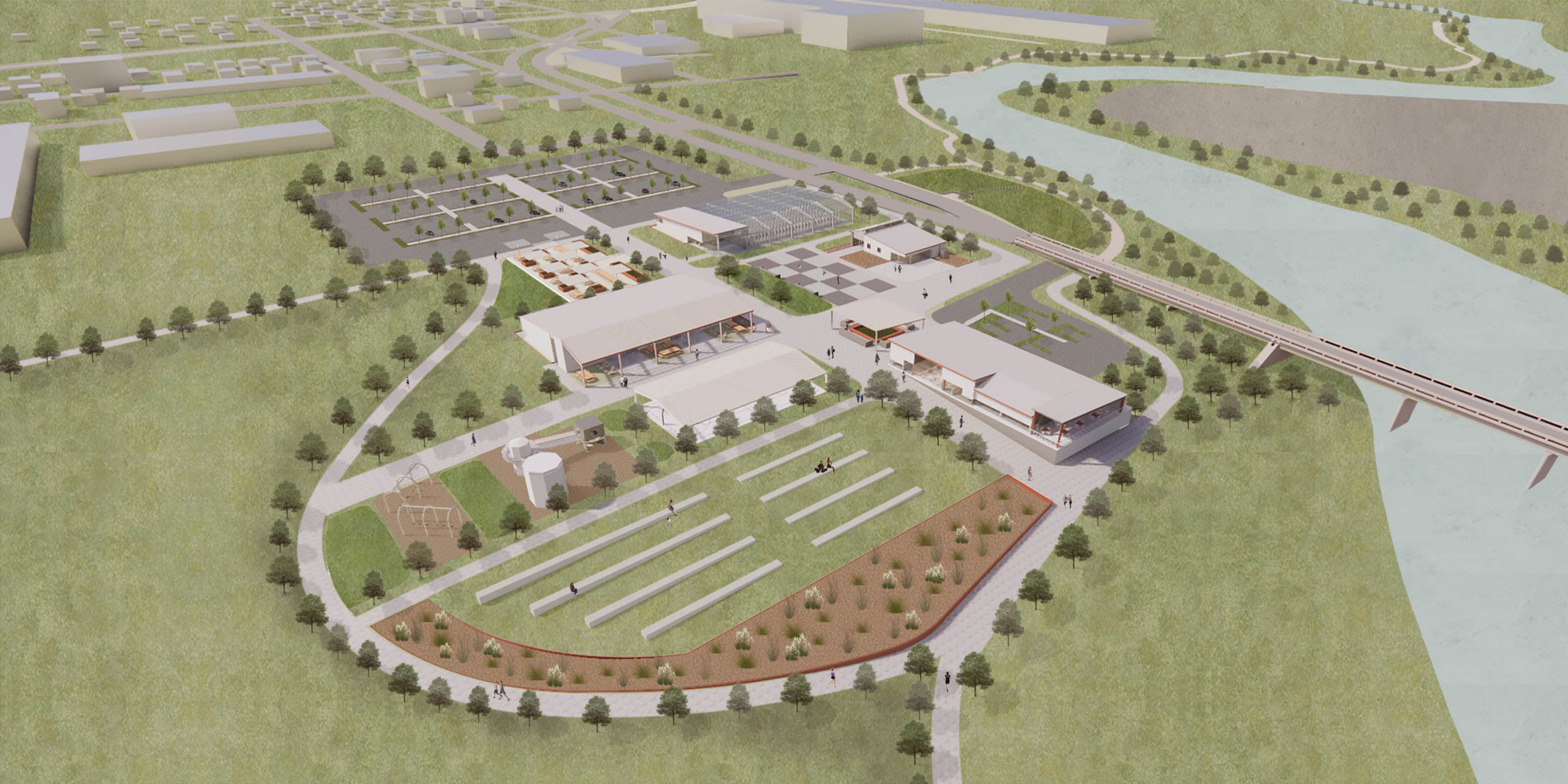
SITE ACTIVITY

REGENHUB



Architectural and landscaping elements pair together to create engaging space for outdoor activity to take place. Adjacent to the parking lot, polycarbonate shading elements create comfortable spaces for visitors to enjoy food from food trucks or the farmers market. Planters containing native plants help to create circulation pathways and reinforce the idea of nature and growing on the site. The splash pad gives kids a fun place to play and cool off during the hot Houston summers. The polycarbonate and steel playground is designed to resemble the cement silos and oil rigs that once covered the area. This creates a fun, interactive safe spot for kids to enjoy the historic spirit of the location. Lastly, seating carved into the natural topography of the site creates a serene area to relax and look over the bayou.

Overall, Regenhub revives the East End by creating a safe and vibrant center for residents and visitors to enjoy. Through renewed landscaping and modest architecture that embodies the history and culture of the area, residents can enjoy a green urban center that creates a strong sense of place and identity in the community. Urban gardening and access to outdoor activity emphasize the importance of nutrition and a healthy lifestyle in a malnourished group of people. Extending the urban fabric to the waterfront edge becomes a symbol for the city's regeneration and commitment to improving the life of city dwellers.



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