MOJAVE BLOOM

Team Las Vegas
Architecture Jury Narrative

Contents

Summary 2
Architectural Goals. 3
Introduction 4
Architectural Responses to PTSD 6
Desert Bloom Ceiling 7
Architectural Resilience 8

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Summary

Mojave Bloom is team Las Vegas's home for a military veteran. Like a desert flower, the house beautifies its surroundings while remaining entirely energy self-sufficient. Featuring local plants and reflecting the array of colors in desert sunsets and rises enables the home to enhance its surroundings. Integrating proven efficiency strategies and passive design principles reduce energy loads, while a photovoltaic array generates electricity, achieving energy self-sufficiency. Research-based design provides a framework for influencing design decisions that facilitate proven therapies, allowing the occupant to heal and bloom. Mojave Bloom connects residents to their environment through carefully orchestrated processions of sen-sory experiences. The soothing sound of trickling water draws attention to our most precious resource and humidifies the dry air. The home celebrates the beauty of the Mojave Desert while bringing awareness to occupant-specific sustainable design.

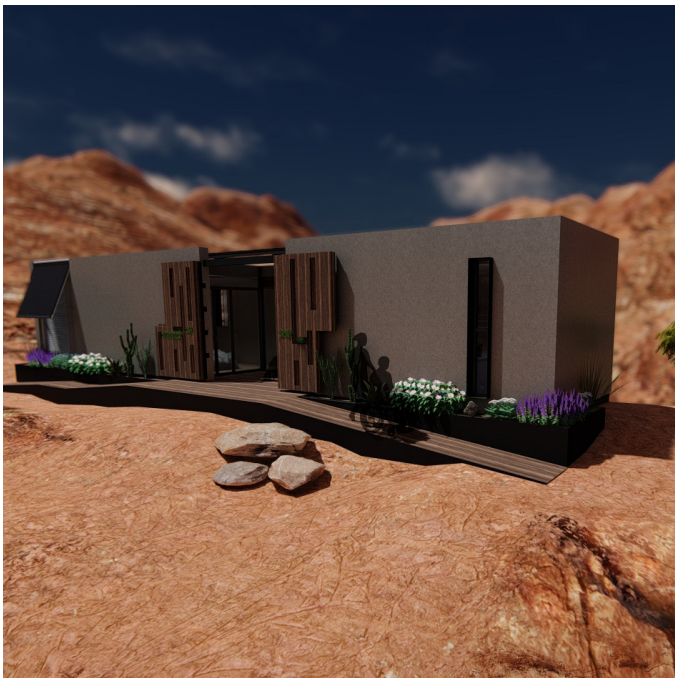
Architectural Goals

Team Las Vegas will design its prototype house to achieve the following goals:

• Create a strong indoor-outdoor relationship by opening up the rooms to the central courtyard, a contemporary reinterpretation with a long history in desert environments

• Interior spaces will have bilateral day lighting with windows that have good solar orientation and are properly shaded. Electric lighting will supplement day lighting and will be used to create ambience for dinners and other events.

• Utilizing movable shading screens to mitigate heat gain from the desert sun and manage glare. Light passing through the bifacial solar panels will create controlled day lighting in the courtyard and adjacent spaces, while reducing heat gain.



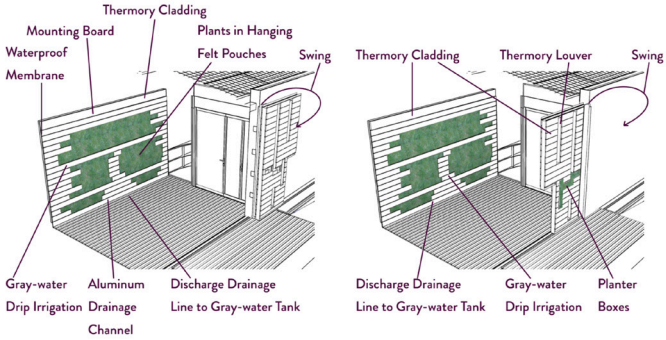
• Exterior building skin will reflect and reject heat during daytime hours and will cool quickly, reducing the urban heat island effect, a severe and increasing problem in desert communities.

• Integrate technology and controls into the architectural and interior design to act as supporting systems for the architectural experience.

Introduction

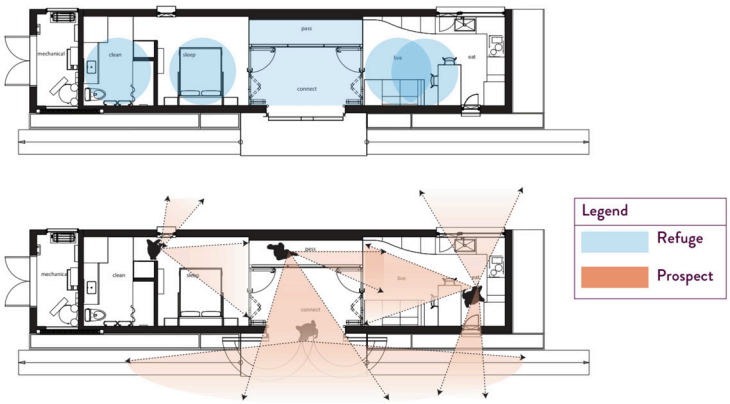
Desert Bloom's main focus was aiding in the improvement of life for returning veterans suffering from PTSD and Traumatic Brain Injury through efficient systems and comforting design. A large part of that healing is taking advantage of the human tendency to interact or be close to other forms of nature. Sufficient daylighting through the courtyard, windows, and skylights help to rebalance circadian rhythm to help with sleep difficulty. The interior living green wall provides visual, auditory, and olfactory stimulation and distraction to help with irritability. With the use of the inner courtyard, exterior planters surrounding the home, and interior green wall, our resident may find relief from symptoms such as depression, fatigue, and anxiety.

Introduction Continued



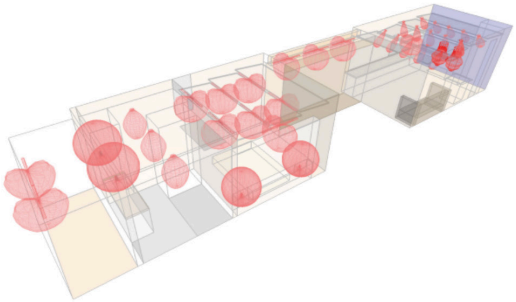
Mojave Bloom is inspired by traditional Islamic sahn, with a courtyard featuring a hydroponic living green wall within the home. The green wall and operable green gate add a layer of protection from the prevailing winds of Nevada. The house was designed as a healing environment for war veterans who may suffer from PTSD and TBI. The courtyard and green systems empower the resident to control their environment through cultivation and reconfiguring their environment as needed to facilitate healing. The glass door system and thermally treated wood louvered gates allow the user to alter their space according to their needs. Beyond the visual stimulation the green space offers, the user is immersed with a slight aroma of fresh herbs and the calming sound of trickling water.

Architectural Responses to PTSD

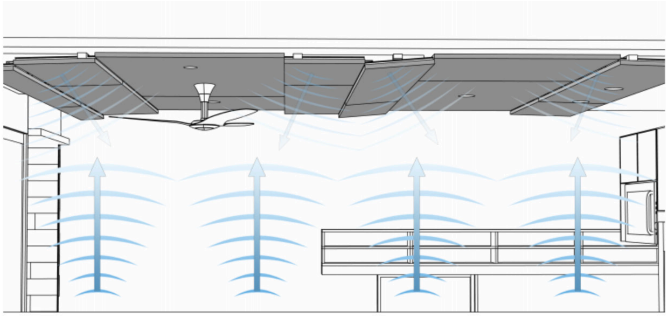


Post-traumatic stress disorder and traumatic brain injury are two of the biggest challenges for veterans. Mojave Bloom accommodates veterans' needs by utilizing prospect and refuge principles to provide simultaneous access to outside views, without exposing the occupants to onlookers. Mojave Bloom empowers residents by giving them control over their environment to be as open and private as they require. With the gates and adjustable shades over the courtyard windows, residents are free to enjoy the outdoors without sacrificing their privacy. The house's windows and skylight keep our residents connected to the outside world with visual access as well as providing connection to the experience of light and shadows as the day progresses. This connection has been shown to improve sleep cycles, reducing stress.

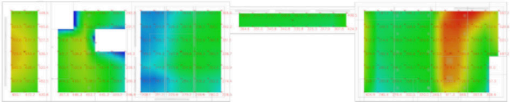
Desert Bloom Ceiling



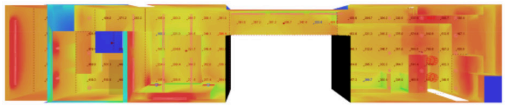
Shaded Luminaire Axonometric - This illustrates where the light fixtures will be located utilizing Grasshopper.



Acoustic Ceiling Illustration



Luminance Mapping - This heat map illustrates the intensity of lights relative to each other



Artificial Light Analysis - This heat map illustrates the intensity of lights relative to a scale limited to 1000 lux in order to show the light dispersion pattern

The ceiling is a metaphorical "desert bloom" in section that is driven by research in artificial lighting. The panels at the Live and Eat spaces facilitate dynamic lighting through omni-directional fixtures, while the acoustic panels reflect and spread the lighting pattern. This evens out light dispersion patterns. In the Sleep and Live spaces, the are acoustic panels act as sound absorbers, reducing unwanted stimulation and sleep disruptors. These acoustic Tectum Panels having an NRC rating of up 1.00, which means no sound is being reflected back into the room,
providing critically needed peace and quiet to the occupant. There are LED light strips recessed behind ceiling panels to diffuse lighting & reduce shadows & glare, which are triggers for PTSD.

Architectural Resilience and Climate Responses

In recent years, drought conditions are affecting our crops as well as our city's livability. Our design emerges in thinking about how we can survive during more severe drought seasons or if communications with the rest of the country are shut down. Las Vegas' climate is not conducive to strictly relying on rainwater as an alternative supply of water. Mojave Bloom strategically reallocates and partitions the system to take advantage of greywater reuse from the shower, laundry, and irrigation lines to be recycled for toilet flushing and irrigation. The irrigation and recirculation of water will require little energy as the selected plant materials can sustain themselves on a low emitter drip system that, once pumped to an appropriate height, can be gravity fed into high absorption growing media to prolong water residency. The selected plant materials will require little irrigation with a staggered water schedule so that the pump system's energy can be minimal.

Jury Narrative

How well did the team utilize an overall clear concept, idea, or ideas to guide the development of the house?
How well does the house demonstrate overall coherence among disciplines and systems?
How well does the house address unique issues and challenges to respond to its target site?
Drawing inspiration from the traditional Islamic sahn, or courtyard, this house turns inward, sheltering the resident from heat and noise, and achieving a model of alfresco living otherwise unattainable in the southern Nevada climate.

What is the design's overall ability to effectively enhance the life of intended occupants?
The overall architectural design is aimed at veterans who suffer from PTSD . The design will enhance the life of the user by creating a calm atmosphere and healing environment.

How effectively does the overall architectural design offer a sense of inspiration and delight to occupants?
Mojave Bloom is inspired by traditional Islamic sahn, with a courtyard featuring a hydroponic living green wall within the home. The green wall and operable green gate add a layer of protection from the prevailing winds of Nevada. The house was designed as a healing environment for war veterans who may suffer from PTSD and TBI.

How effectively does the design use natural methods to meet heating, cooling, and lighting needs (also known as passive solar design)?
The design executes natural methods of heating and cooling by the bi-facial solar panel roof. The centralized courtyard allows a lot of natural daylight into the house as well as the windows logically placed on the walls.

How well does the team integrate both natural and electric lighting into the house?
The team integrates both natural and electric lighting by only incorporating artificial lighting where task lighting is needed.

How well did the team integrate energy efficiency and energy production technologies into the architectural design?
The use of bifacial solar photovoltaic panels on the roof shade the centralized courtyard, while allowing day light to filter through the courtyard.

How optimal is the use and consideration of the specified site, including views, drainage, regionally appropriate materials, and community connection?
The exterior cladding works as a rain screen with glavanized steel. The exterior materials will age over time, creating a unique color. The views from the interior of the house create an open feel and outdoor connection. The connection will be to the outdoors and the surrounding community.

To what extent does the design consider climatology, including plant palette and water conservation, in the landscaping and site design?
How effectively does the design address unique issues and challenges given its target site?
The planted gate, living green wall, and operable window walls that separate the bedroom and living spaces from the courtyard are designed as a way of expanding the living spaces into the outdoor volume, as well as an act of empowerment for the user, a catalyst for the healing act of controlling one's environment. This ability to manipulate space allows the resident to shift their home to meet their needs, adapting to the weather conditions of the Las Vegas Valley.

Appendix A - Architectural Photographs

MOJAVE BLOOM

Architecture Narrative

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MOJAVE BLOOM

Architecture Narrative

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