



# OPUNTIA WELLNESS CENTER | DESERT RESILIENCE DISTRICT

BuildingsNEXT Competition 2025  
Open Commercial Division

Joy Chou, Darvell Fatt, Sierra Minotti, Maritza Noriega, Tiffany Sanchez, Francisco Zazueta



College of Architecture,  
Planning & Landscape  
Architecture

# TEAM OPUNTIA | The University of Arizona

College of Architecture, Planning and Landscape Architecture B. Arch 4th Year



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## Core Tenets of Integrative Medicine Center:

*Embraces the healing power of nature powered by science*



Body-Mind-Spirit



Patient-Centered



Innate Healing Capacity



Lifestyle Approaches



Healing Traditions & Natural Modalities



Community & Environmental Influences



Evidence-Based



Conventional Medicine



Team Opuntia with Dr. Esther Sternberg from the Andrew Weil Center for Integrative Medicine and our mentor David Brubaker

# INDIGENOUS CENTER | Wassaja Carlos Montezuma Center

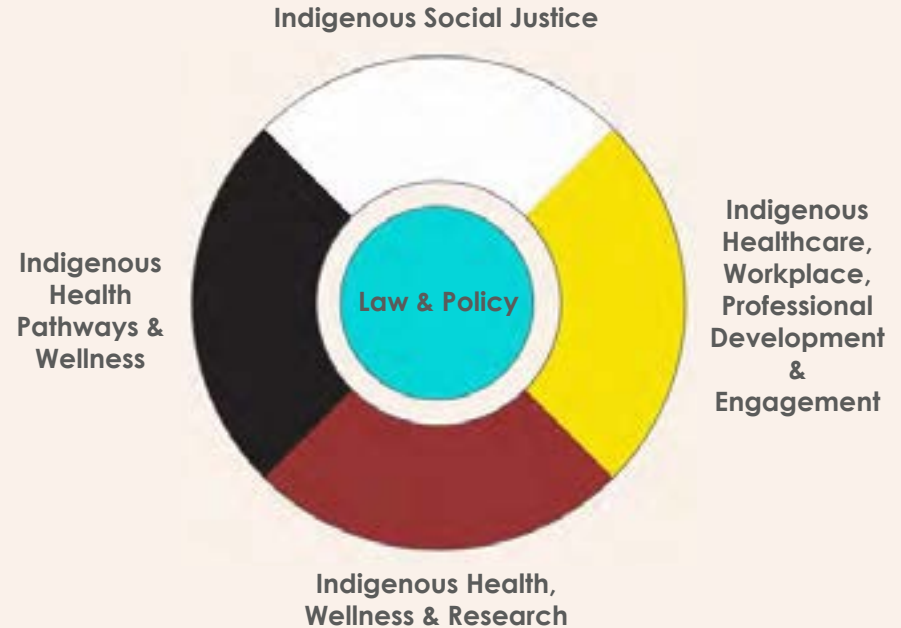


*“empowers and heals Indigenous families using a culturally appropriate holistic approach”*

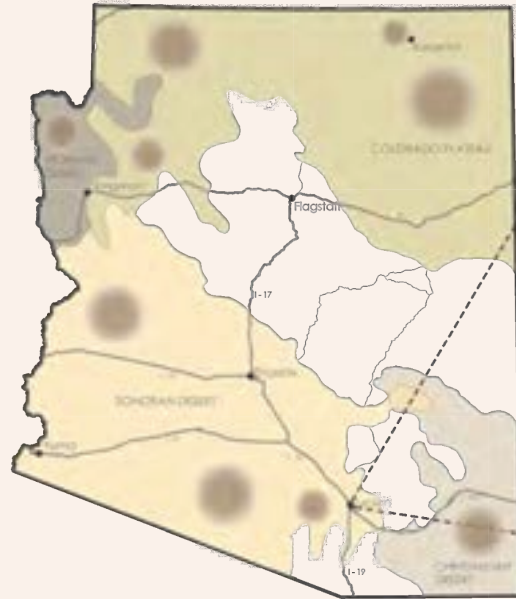


Team Opuntia with Christina Bell from Wassaja Carlos Montezuma Center for Native American Health and our mentor David Brubaker

## Framework of Wassaja Carlos Montezuma Center:

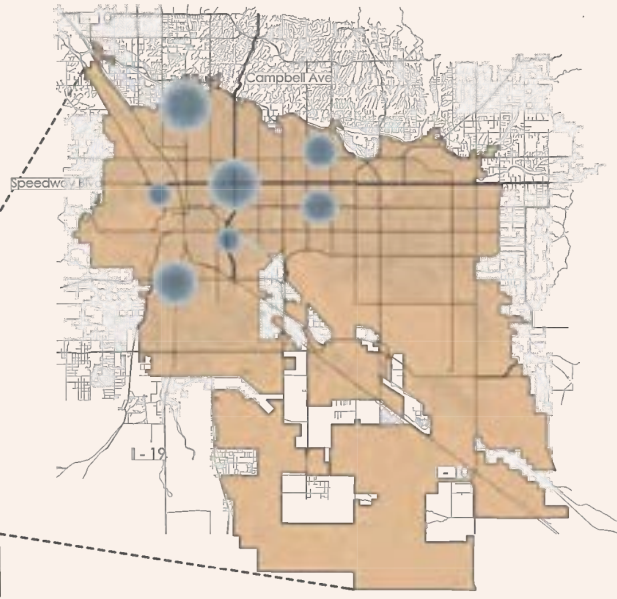


# PROJECT | Location



## ARIZONA

- Medicinal Herbs
- Sonoran
- Chihuahua
- Mohave
- Colorado



## TUCSON, AZ

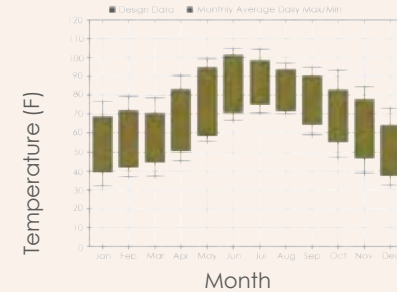
- Clinics
- City Limits



## Location: Tucson, Arizona

- Ecosystems range from the Sonoran Desert to the Colorado Plateau
- native plants used for Native American traditional healing practices
- Center for herbal medicinal education and clinical research

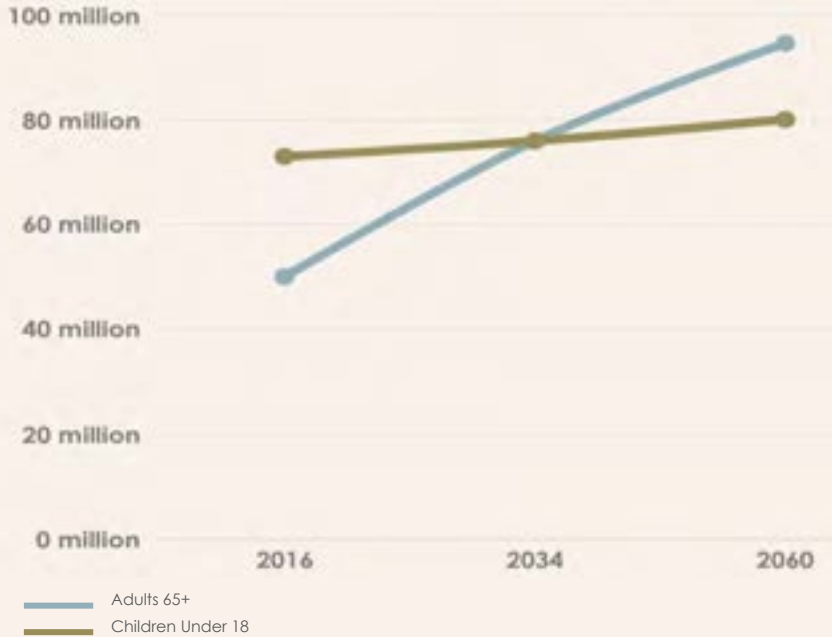
## Monthly Design Data



## ASHRAE CLIMATE ZONE 2B

- Dry Hot Climate and Cool nights
- 112 Day Above 100° F in 2024

# TARGET MARKET | Senior



Projection Population Tucson, AZ (2016-2060)



## Community Goal

- Encourage community participation in food and health
- Facilitate support in new life stage
- Create easy access to resources



## Market Goal

- Accessible healthcare for 65+ citizens
- The University of Arizona students
- Meet the upcoming demand of aging adult

Growth Rate of Senior Population

**1.5% per year**

Native American Population in Tucson

**3.18%**

# DESERT RESILIENCE DISTRICT | Master Plan



## Key

- 01** | Site: Desert Resilience District
  - a** | Opuntia Wellness
  - b** | Marigold Education Center
  - c** | Rosemary Senior Housing
- 02** | Andrew Weil Center
- 03** | The University of Arizona
- 04** | Banner Health

# DESIGN GOALS | Narrative



## Promote Health

Healing its patients holistically

- Tenets of integrative medicine
- Traditional healing services
- Healing garden



## Connection to Nature

Exterior spaces to interact with patients

- Framed views
- Integrated water harvesting
- Natural materials
- Exterior gathering



## Cultivate Community

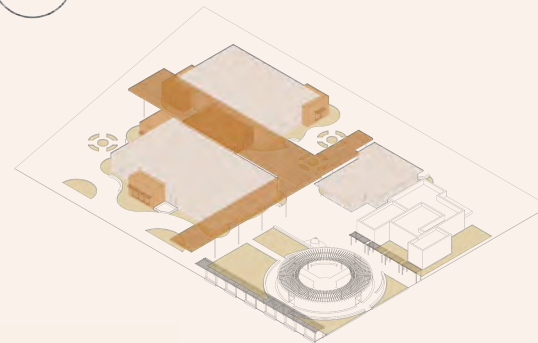
Promote social relations

- Seating areas and a tea shop
- Community garden
- Ceremonial events





## Architecture Strategy



### Site Key

- 01 | Active Rehabilitation Clinic
- 02 | Primary Care Clinic
- 03 | Nutrition Building
- 04 | Tea House
- 05 | Oidag Pavilion
- 06 | Succulent Garden
- 07 | Annual Garden
- 08 | Shrub Garden

# ARCHITECTURE | After



--- | **New Ramada System**  
Encouraging movement, connecting three buildings

--- | **Succulent Garden**  
Native plants

--- | **Window Shade**  
Optimized Natural daylight

# ARCHITECTURE | Renderings- Welcoming Entry

OPUNTIA WELLNESS

--- | **Permeable Pavers**  
water harvesting; universal design

# ARCHITECTURE | Active Rehabilitation Plan



## Plan Key

- 01** | Private Physical Therapy Room
- 02** | Storage / Clean Holdings Room
- 03** | Assistants' Office
- 04** | Breakroom
- 05** | Multi - Purpose Room
- 06** | Mechanical / Electrical Room
- 07** | Recharge Room®
- 08** | Soiled Holdings Room
- 09** | Restroom
- 10** | Office
- 11** | Physical Training Room
- 12** | Health Coaches' Office
- 13** | Shared Waiting Room



# ARCHITECTURE | Renderings-Shared Waiting Room

| **Acoustic Panel**

Acoustic comfort

| **Biophilic Design**

Dynamic and diffuse light

# ARCHITECTURE | Renderings-Recharge Room®



--- | **Special Visual and Acoustic Design**

Foster immersive experience

# ARCHITECTURE | Primary Care



## Plan Key

- 01 | Shared Waiting Room
- 02 | Assistants' Office
- 03 | Regenerative Lab
- 04 | Blood Draw Room
- 05 | Exam Room
- 06 | Collaborative Medicine Room
- 07 | Restroom
- 08 | Vitals Room
- 09 | Storage
- 10 | Electrical Room
- 11 | Breakroom
- 12 | Procedure Room
- 13 | Clean Holdings Room
- 14 | Soiled Holdings Room
- 15 | Mechanical Room
- 16 | Physician Office
- 17 | Meeting Room



# ARCHITECTURE | Renderings - Exam Room



--- | **Clerestory Window**  
Access to natural daylight

# ARCHITECTURE | Renderings - Procedure Room



--- | **Clerestory Window**  
Access to natural daylight

# ARCHITECTURE | Nutrition Plan

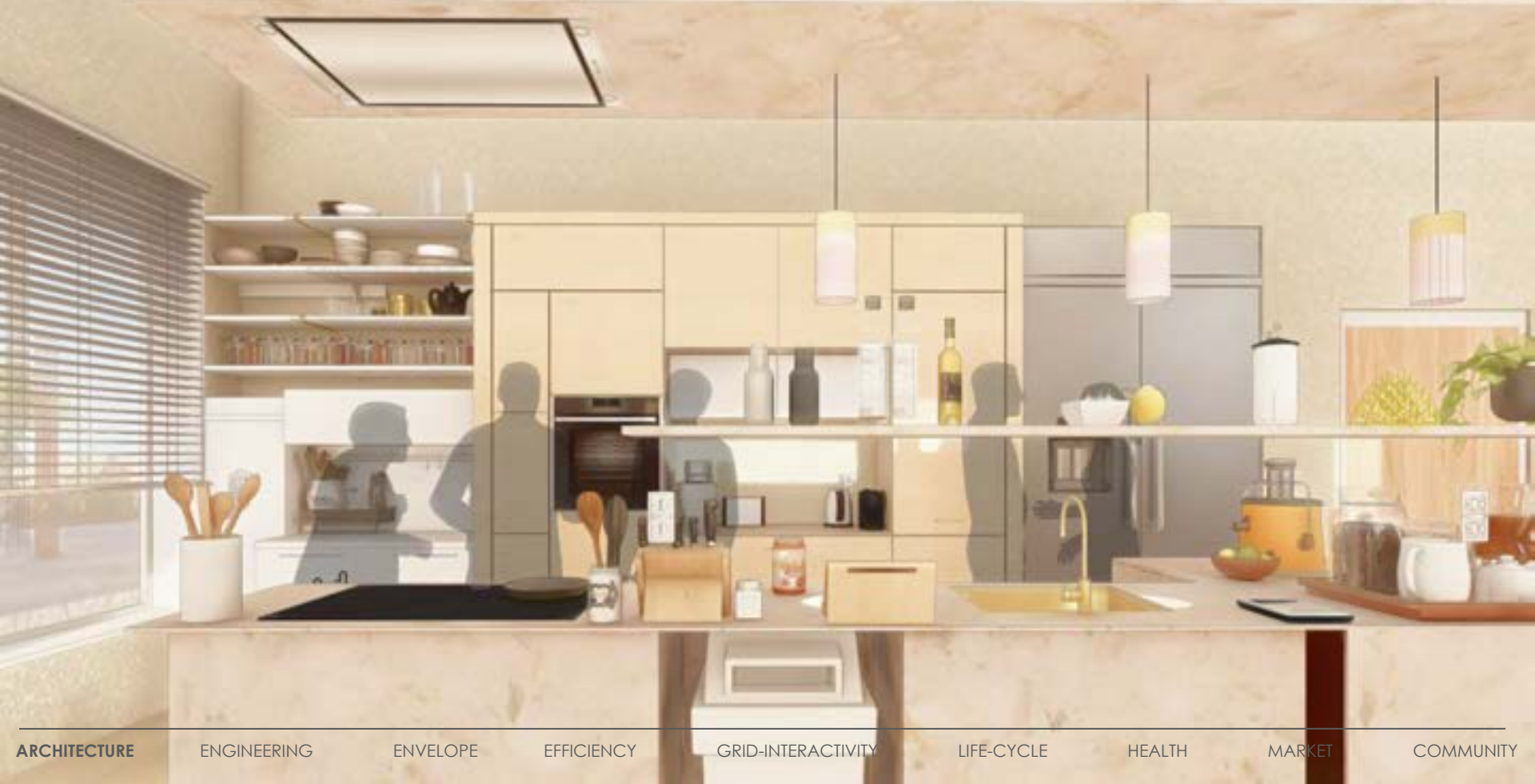


## Plan Key

- 01 | Waiting Room
- 02 | Healing Store
- 03 | Restroom
- 04 | Electrical / Mechanical Room
- 05 | Prep Kitchen
- 06 | Storage
- 07 | Counseling Office
- 08 | Learning Kitchen
- 09 | Tea House



# ARCHITECTURE | Renderings-Learning Kitchen



ARCHITECTURE

ENGINEERING

ENVELOPE

EFFICIENCY

GRID-INTERACTIVITY

LIFE-CYCLE

HEALTH

MARKET

COMMUNITY

# ARCHITECTURE | Renderings-Healing Store

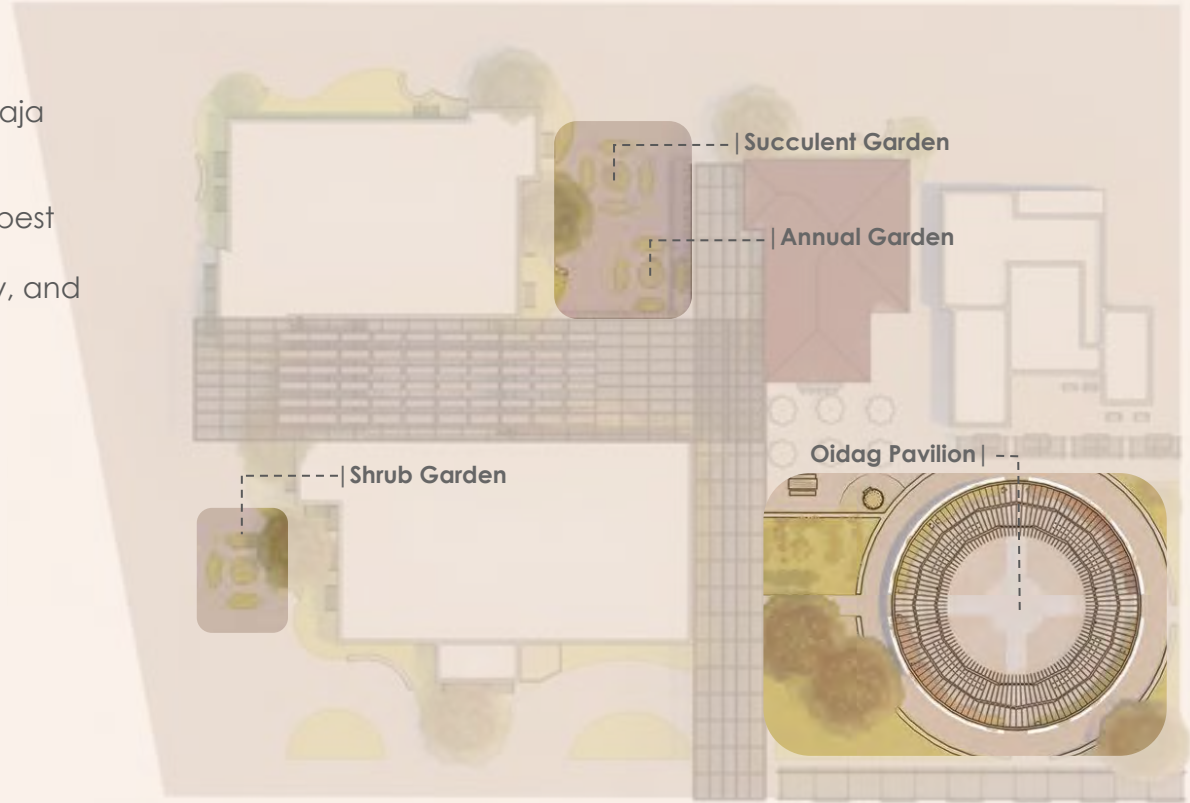


# SITE | Garden

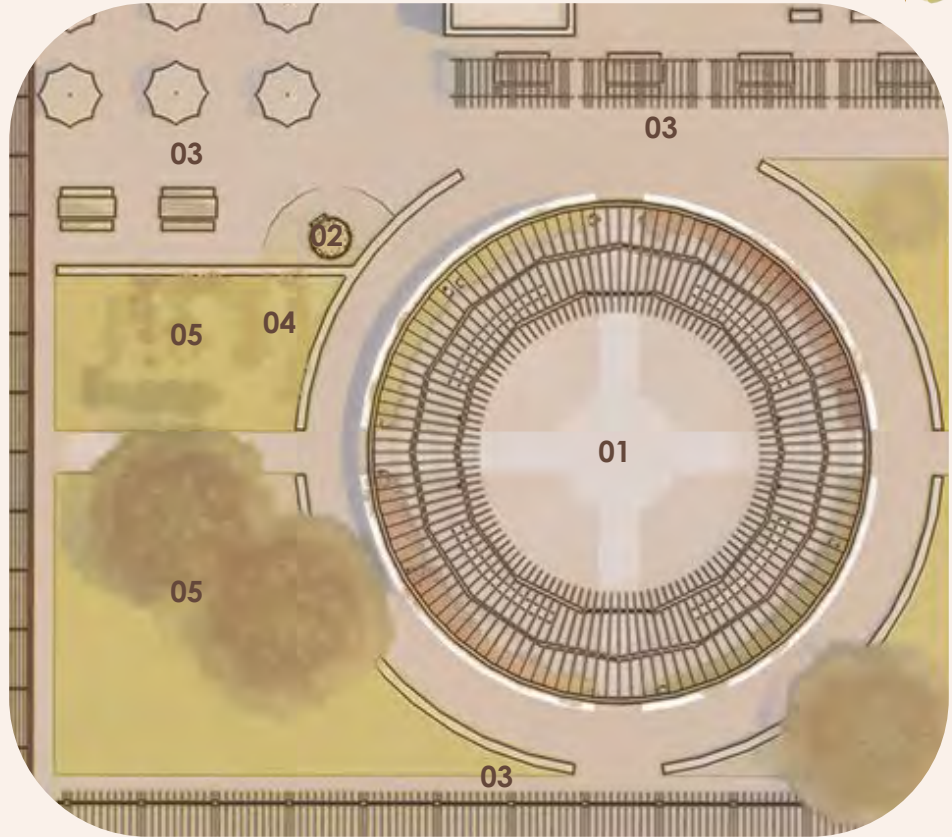
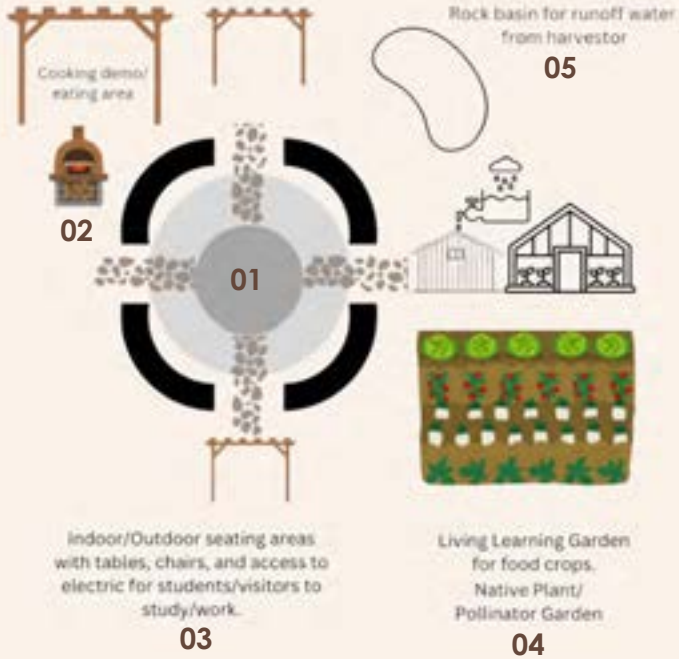


## Landscape Design

- Native American culture
- Oidag Gardens inspired by the Wassaja Carlos Montezuma Center logo
- Participation of a variety of tribes to best represent them as a collective
- Symbolizes interconnectedness, unity, and the cyclical nature of life



# SITE | Garden



## Key

- 01 | Oidag Pavilion
- 02 | Existing Oven
- 03 | Outdoor Seating
- 04 | Native Garden
- 05 | Water Collection

# SITE | Plant Selection



## Succulent Garden



Agave



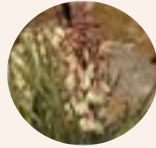
Aloe Vera



Cane Cholla



Prickly-pear



Banana Yucca

## Annual Garden



Desert Lupine



Desert Chia



Canterbury Bells



Purple Aster



Hopi Red Dye Amaranth

## Shrub Garden



Creosote



Desert Hackberry



Desert Lavender



Jojoba



Oreganillo

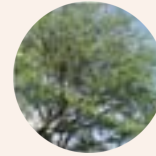
## Trees



Blue Palo Verde



Desert Willow



Velvet Mesquite



White Thorn Acacia

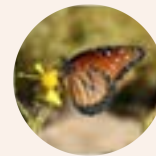
## Wildlife



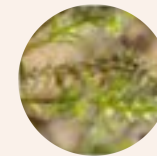
Birds



Pollinators



Butterflies



Larvae



**Native Medicinal Plants**



**Low Water Consumption**

# ARCHITECTURE | Renderings-Oidag Garden



----- | **Student Made Adobe Oven**  
Preserving existing site element

--- | Blue Palo Verde

--- | Jojoba

--- | Creosote

--- | Purple Aster

--- | Desert Lupine

--- | Canterbury Bells

# ARCHITECTURE | Renderings-Oidag Garden

---| **Tribal Symbol**

Honoring 22 Arizona tribes

---| **Material**

Fieldstone

---| **Moveable Fire Pit**

Adaptable for ceremonies



## Physical Health

- **Optimized HVAC system**
- **Shade Structure**
- **Material Selection**
  - Paint (Originat)
  - Furniture (Naugahyde®)
  - Tile
  - Flooring (Forbo)



## Mental Health

- **Gentle Daylight**
- **Natural View**
- **Acoustic Comfort**



## Emotional Connection

- **Spaces are designed to promote peace**
- **Oidag Garden**





ANNUAL RAINFALL HARVESTED **84,804 GALLONS**

Approximately  $\frac{1}{3}$  of the annual rainfall per acre in Tucson or enough water to sustain **68** trees a year

## Misting System

- Lowers temperature up to **30°** in 100°F
- Comfortable environments indoors and outdoors
- **8580** gallons annual usage approximately

## Drip Irrigation System

- Allows water to drip on plant
- Less water usage
- Less maintenance
- **24,544** gallons annual usage approximately

## Water Storage

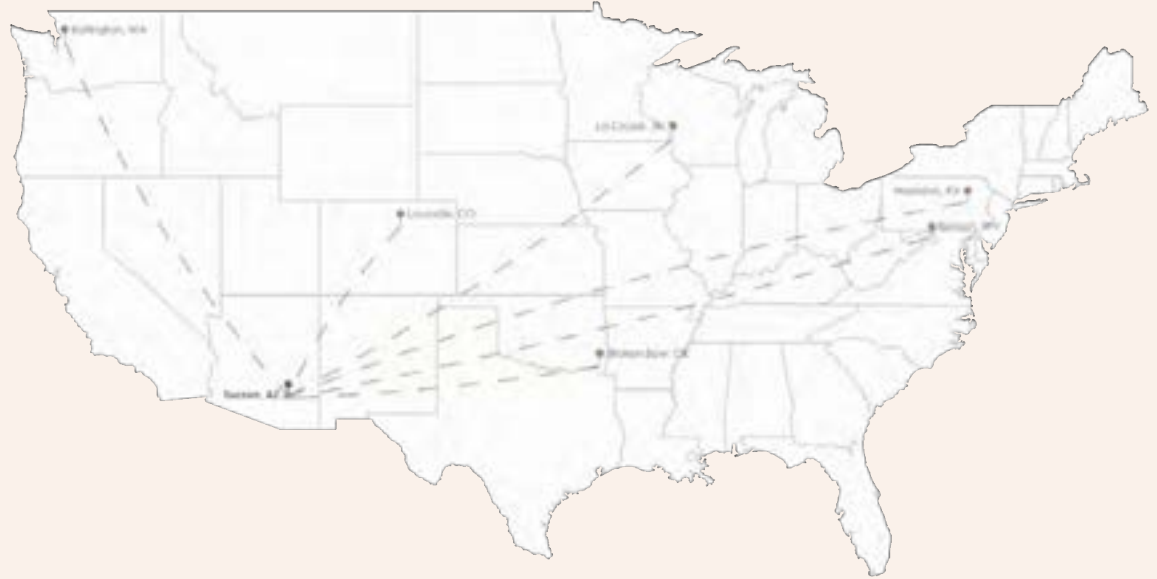
- Water is stored in underground tanks for future use
- Excess water is distributed around the site





## Life-cycle Goal

- Repurposing spaces for well-being
- Extends building life span through repurposing foundations and structural elements
- Integrates efficient walls to meet PHIUS suggestions
- Promotes connection with nature, natural light, and water



Metal Framing Lifespan

**50-100 YEARS**

Concrete Foundation Lifespan

**80-100 YEARS**



**Alpen Windows**  
Louisville, CO



**Zip Board**  
Broken Bow, OK



**Silfab Solar Panels**  
Burlington, WA



**Cascadia Clips**  
La Crosse, WI



**Mineral Wool Insulation**  
Ranson, WV



**Forbo Flooring**  
Hazleton, PA

# BUILDING SCIENCE | Building Life-Cycle



## Tally Life Cycle Assessment - Carbon Dioxide Equivalent

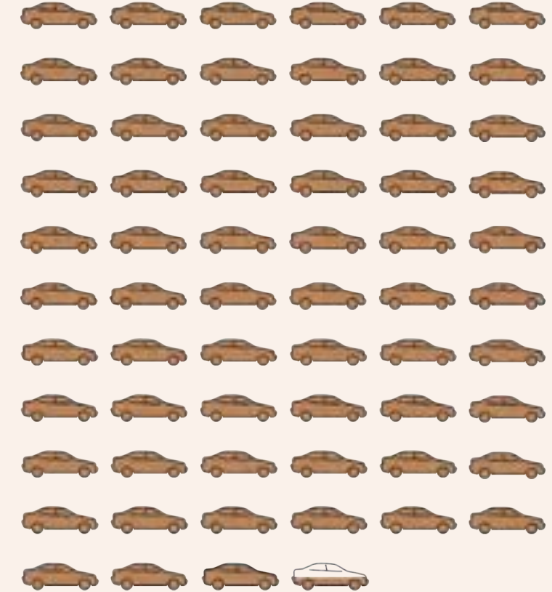
Retrofit

238,079 kg CO<sup>2</sup>eq

New Build

2,582,145 kg CO<sup>2</sup>eq

Reduction of Emissions  
↓ 985%



2,344,066 kg CO<sup>2</sup>eq  
≈ 63.4 Cars

\*Removed From Assembly Line

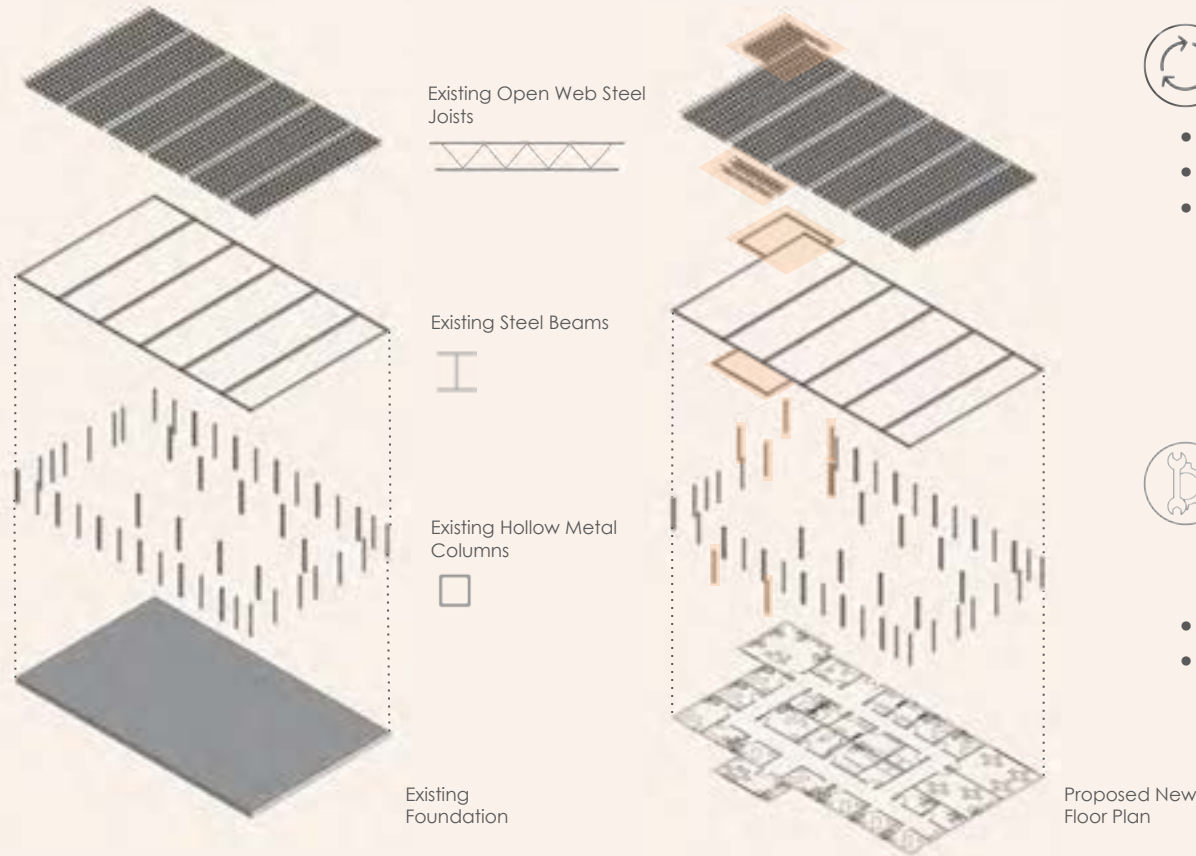
Retrofit Carbon Dioxide Equivalent (kg CO<sup>2</sup>eq) per Building Element



New Construction Carbon Dioxide Equivalent (kg CO<sup>2</sup>eq) per Building Element



● Superstructure ● Enclosure ● Interiors



## Retrofit Strategy

- **Preserve** existing steel structure
- **Reuse** open web steel joists
- **Enhance** spatial flexibility and long-term usability

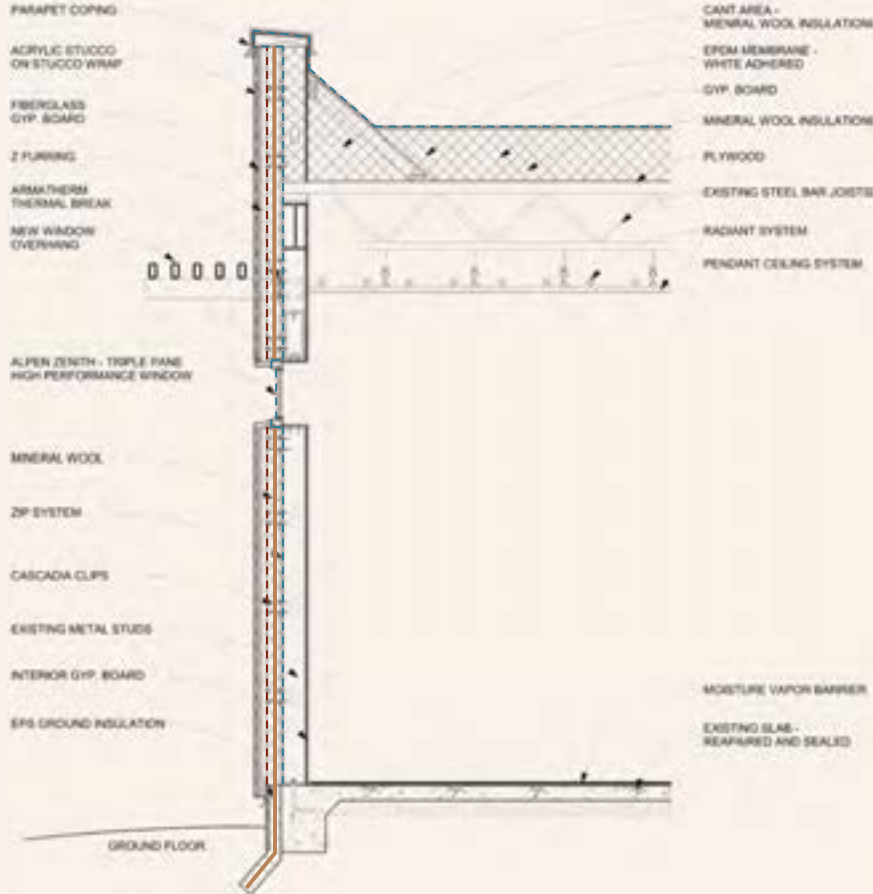


## Engineering Strategy

**Implement steel strengthening techniques:**

- Bolted plate reinforcements
- Welded plate reinforcements

# BUILDING SCIENCE | Building Envelope



## Notable improvements:

- Continuous Insulation
- Thermal Bridge Prevention
- Vapor Barriers
- Airtight Membranes
- High Performance Windows

## Control Layers

- Air barrier + vapor control
- Thermal envelope
- - - Air/drainage plane

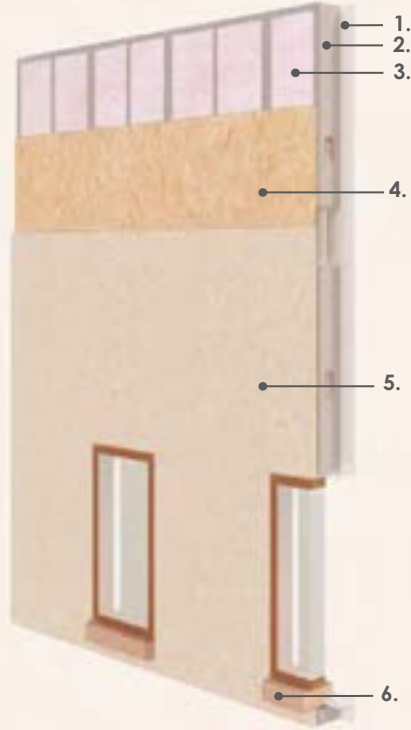


# BUILDING SCIENCE | Wall Assembly



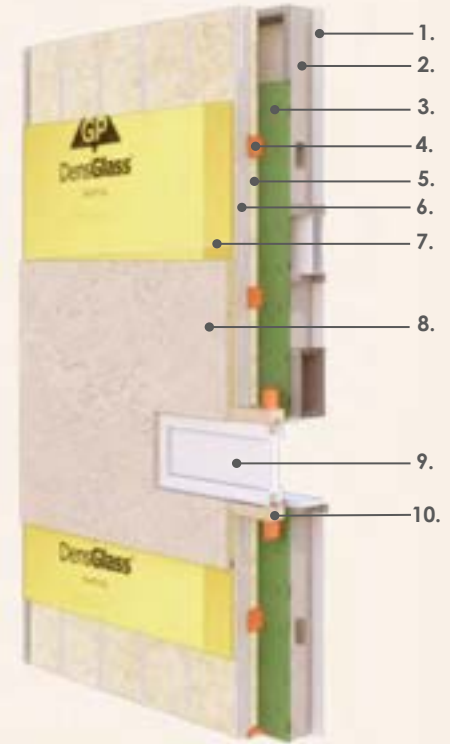
## Existing Wall Assembly

1. 5/8" Interior Gypsum Board
2. Steel Studs
3. 6" Batt Insulation
4. 1/2" O.S.B Sheathing
5. Exterior Cladding
6. Red Brick External Sill



## Upgraded Wall Assembly

1. 1/2" Interior Gypsum Board
2. Steel Studs
3. 5/8" Zip System
4. Cascadia Clips
5. Mineral Wool
6. Z Furring
7. 5/8" Dens® Fiberglass Gypsum Board
8. Acrylic Stucco-Stucco Wrap
9. ALPEN Window Zenith Triple-Pane
10. Wood Block

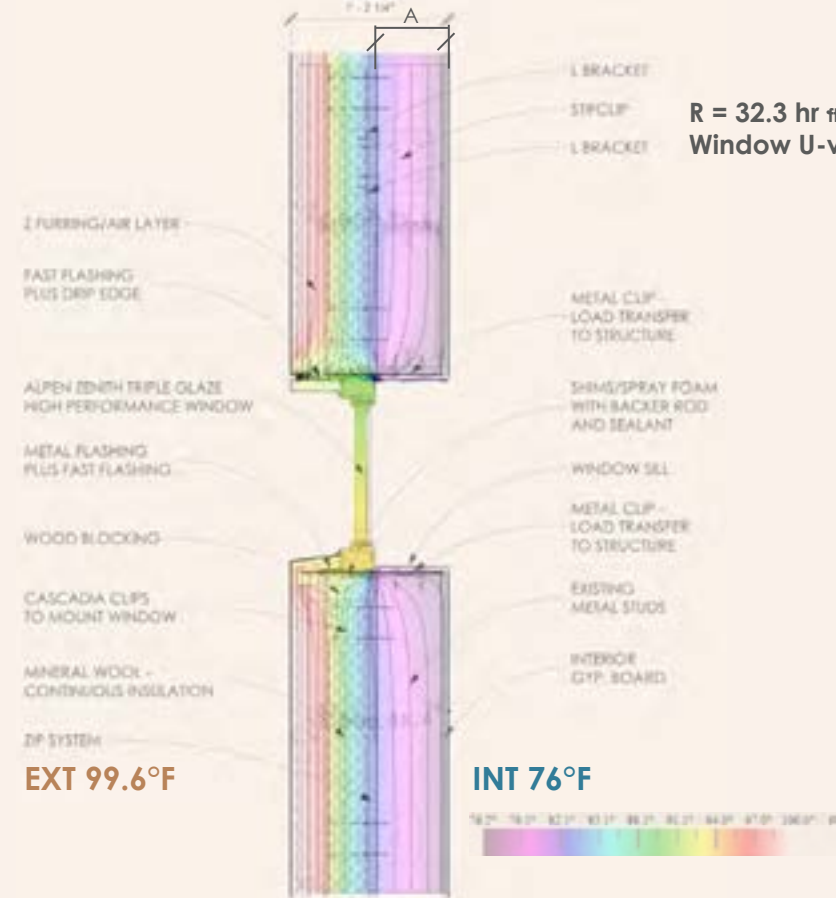
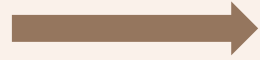


# BUILDING SCIENCE | Therm Model Before (Left) VS After (Right)



**R-value = 12** hr ft<sup>2</sup> °F/BTU  
**Window U-value = 1.1** W/m<sup>2</sup> K

Stucco  
 Fixed Window  
 6" Batt Insulation



**R = 32.3** hr ft<sup>2</sup> °F/BTU  
**Window U-value = 0.68** W/m<sup>2</sup> K

**EXT 99.8°F**

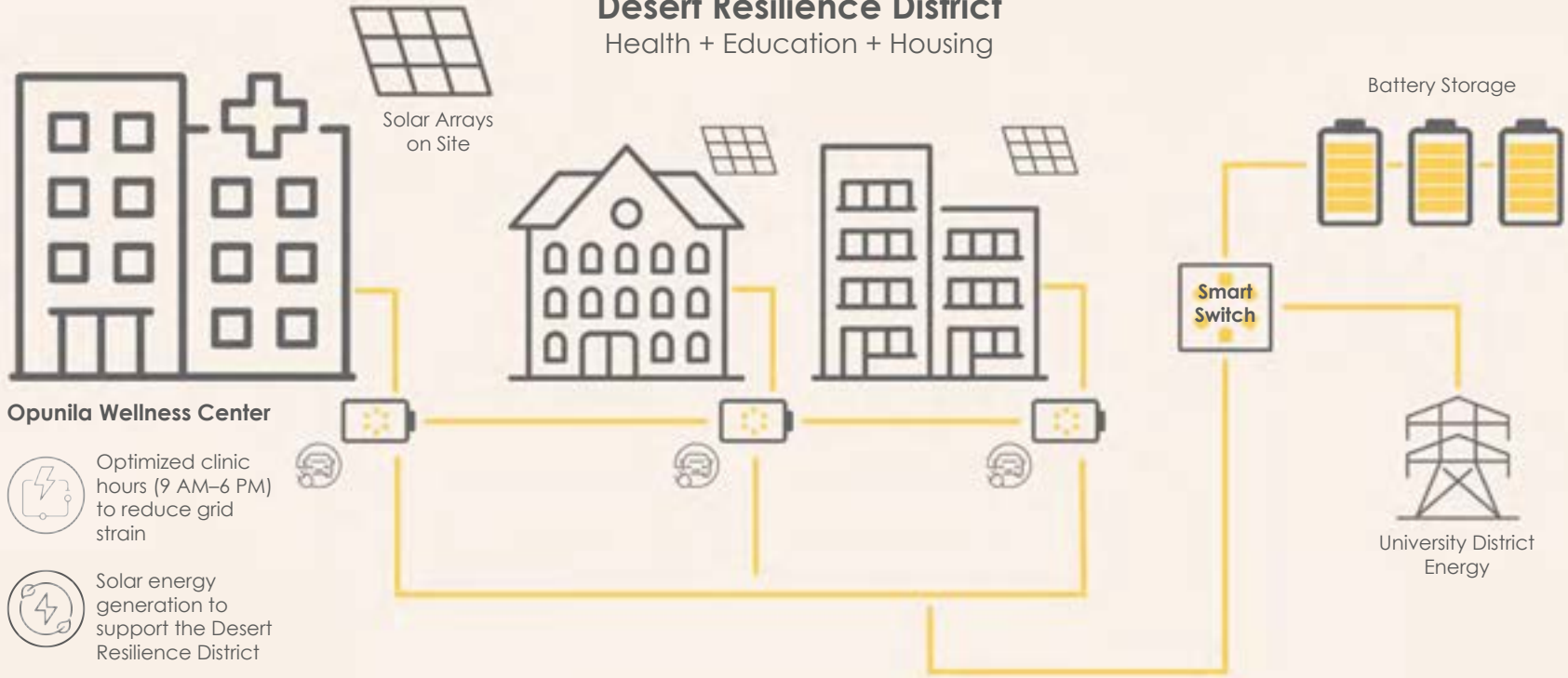
**INT 77.7°F**

**EXT 99.6°F**

**INT 76°F**



## Desert Resilience District Health + Education + Housing





## Mechanical Systems

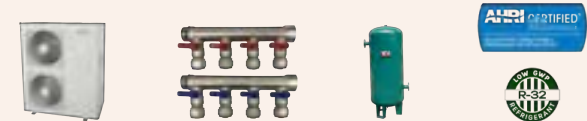
- Dedicated Outdoor Air System by Oxygen8
- Radiant Cooling and Heating
- Optimized ventilation, dehumidification, HVAC integration



EM Fans    VRV & Chilled/Hot Water Coil    Counterflow Core    Hydronic Heat    Fan and Filter

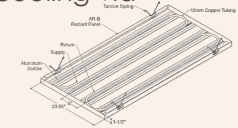
### CX50 Air To Water Heat Pump:

- Air-to-water heat pump
- Radiant heating & hot water systems
- Ideal for Tucson's climate

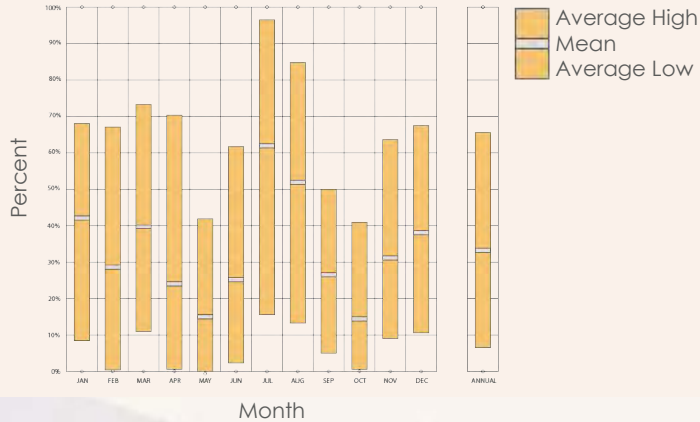


### The Armstrong MetalWorks Airite Radiant Ceiling:

- Energy-efficient heating & cooling via ceiling panels
- Enhances acoustics
- Ideal for healthcare



# BUILDING SCIENCE | Photovoltaics



## Solar Power

By using a renewable source such as solar power that can be generated on-site, one can reach Net-Zero energy.

## Solar Panels / Photovoltaics

SIL-590 XM+ BIFACIAL  
 ~ 22.8% module efficiency  
 30-degree angle towards South



## Sky Cover Graph



Approximate Energy Used  
**81,750 kWh/Year**

Approximate Energy Generated Onsite  
**101,494 kWh/Year**

Approximate Energy Surplus  
**19,744 kWh/Year**

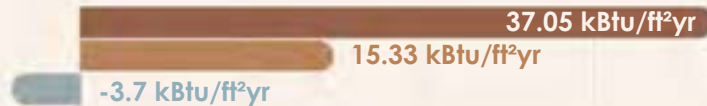


## Full Building Energy Model

### Site Energy Comparison

(Includes DOAS, lighting, plug loads, ventilation, & water)

Existing Building  
Retrofitted Building  
With Photovoltaics



Reduction of Energy  
↓ 58.62%

### Annual Demands & Loads



# CONCLUSION



## Modern Medicine and Tradition

Healing its patients holistically



## Clinical Care and Nature

Spaces to interact with patients



## Innovation and Inclusion

Promote social relations



# ACKNOWLEDGEMENT



## Special Thanks to...



Christina Bell  
Wassaja Carlos Montezuma Center

David Brubaker  
U of A Adjunct Lecturer  
Team Lead + Professor  
Phius Certified Consultant

Dr. Esther Sternberg  
Andrew Weil Center for Integrative Medicine

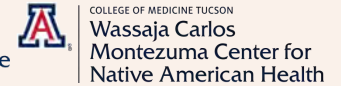
Jonathan Bean  
UofA Associate Professor  
Phius Certified Consultant

Randy Horwitz  
Andrew Weil Center for Integrative Medicine

Stephen Dahmer  
Andrew Weil Center for Integrative Medicine



**BuildingsNEXT Student Design Competition**



Check out our instagram: [Opuntia\\_Wellness](#)

