

THE URBAN ECOLOGY CENTER



Vol 1

Project Framework • Sydney Tucker



Figure 01

Conceptualization of Nature and Retreat

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Prologue

re • treat n. 1 (a) : an act or process of withdrawing especially from what is difficult, dangerous, or disagreeable (2) a : a place of privacy or safety

— Merriam Webster's Collegiate Dictionary

Retreat in architecture transcends simply withdrawal, becoming a deliberate act of cultivation, shaping spaces that not only safeguard land and its inhabitants, but also enrich them. By intertwining natural restoration with human refuge, architects have the power to design sanctuaries of vitality and meaning.

... architects best serve their local culture by employing practices that leave the place in which they work more cultivated—capable of sustaining richer experiences of inhabitation—than when they first came to it. (1)

— Brian MacKay-Lyons and Robert McCarter
Ghost: Building an Architectural Vision

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C H A

P T E

R O 1

—— An Introduction



Figure 02
Conceptualization of Retreat

PROJECT FRAMEWORK

Main Project Ideas • Outline and Implementations

This book serves as the foundational framework for my final thesis project, to be completed in the Spring of 2025. The proposed project is located in the urban core of downtown Tempe, Arizona, and is centered on creating a retreat tailored to a specific community of my choice. For my design, I have chosen to focus on designing an Urban Ecology Center for Tempe visitors, as well as the local community. This project will provide an educational environment for the Tempe community while offering sanctuary for the preservation and revitalization of Arizona's native ecosystems. This book initiates and explains the research that will continue into next semester and will remain a vital resource throughout my design process.

Organized into seven chapters, this book represents a comprehensive overview of my research process and design approach, concluding with a summary of findings that will shape next semester's project. Each chapter builds upon a core aspect of my thesis, offering insights into my evolving design strategy.



Figure 03
Conceptualization of Retreat

The second chapter, following the introduction, compiles position statements developed throughout the semester. These statements, initially prompted by weekly readings and class discussions, are accompanied by my reflective responses. These reflections capture how my ideas have evolved over the semester, forming a cohesive narrative of my intellectual growth and the primary principles guiding my project.

The Typology chapter introduces the primary challenge my design seeks to address and explores the urban ecology center as a building type. This includes analysis of relevant precedents, focusing on similar programs and typologies.

In the Site chapter, I document the process of selecting the most suitable location for the project. This section outlines the critical criteria that guided my decision-making, explains the significance of these characteristics, and evaluates alternative site options, detailing their strengths and limitations. Ultimately, I articulate why the chosen site best aligns with the project's objectives.

The Program chapter delineates the spaces that comprise the urban ecology center, supported by relationship diagrams that illustrate the spatial and functional connections between these elements. Building on this, the Spaces chapter provides a detailed examination of each program area, offering comprehensive information on the individual components that form the proposed design.

The Regulations chapter serves as a repository for the governing rules, codes, and zoning requirements that inform the design of the ecology center. Beginning with broader regulations, this chapter narrows its focus to the specific guidelines pertinent to the chosen site in Tempe.

This book represents an in-depth exploration of my research and design methodology, laying the groundwork for the creation of the Tempe Urban Ecology Center. It encapsulates my commitment to designing a space that fosters community engagement, environmental education, and ecological preservation.



Figure 04
Conceptualization of Retreat



Figure 05
Clark Park Pool, June 12, 1978

HISTORICAL ANALYSIS

General History • Historical Importance within Tempe

An analysis of the history of the Tempe waterways and how the Rio Salado was first re-imagined.

The history of the Rio Salado in the Tempe area is a testament to the enduring importance of water management throughout Arizona and its clear impact on cultural and urban development. The Hohokam people, who inhabited the region between 500 and 1450 A.D., created an extensive canal system capable of irrigating over 10,000 acres of land.¹ This sophisticated network, spanning hundreds of miles, laid the foundation for modern irrigation in the Salt River Valley.

The Hohokam's legacy of water control continued through even later eras. Spanish missionaries named the river "Rio Salado" in the 1700s, and later settlers like Charles Trumbell Hayden further harnessed its potential for commerce and agriculture.^{1 2} Construction of infrastructure such as the Roosevelt Dam in the early 20th century addressed flooding issues, but also led to the river becoming dry.

In response to this environmental degradation, the Rio Salado Project was initiated in the 1960s by Arizona State University students and faculty.² Today, this area attracts 2.4 million visitors annually and has become a hub for recreation, culture, and ecological restoration.



Figure 06
The Rio Salado Project Rendering, Tempe History Museum

The urban ecology center proposed for the edge of Tempe Town Lake could honor this rich history while promoting sustainable urban living. By incorporating innovative water management systems alluding to the Hohokam's ingenuity and modern sustainability practices, the center can serve as a bridge between the area's past and future, emphasizing the continues importance of sustainability in desert environments.^{1 2}

Colonial and Early Settlement

The Hayden Flour Mill, founded in 1874 by Charles Trumbell Hayden, marked a pivotal shift in the Salt River Valley, building on centuries of indigenous water management while introducing industrialization that significantly altered the region. Initially known as "Hayden's Ferry" taking users across the Salt River, Hayden's mill became essential for local farmers, producing high-quality flour that fueled economic growth. However, this development came at a cultural cost, as the influx of European settlers displaced indigenous communities and disrupted their traditional ways of life and agricultural practices. Today, while the

Hayden Flour Mill serves as a historic landmark celebrating Tempe's agricultural roots, it also serves as a reminder of the cultural losses experienced during this transformative period.³ Modern urban planning efforts can draw from this history by honoring the land and implementing a more inclusive future.

River Transformation

The Rio Salado Project, initiated in 1966 by Dean James Elmore and architecture students at Arizona State University, began a project to transform the empty Salt River bed into a dynamic urban space. Over the next thirty years, the project evolved, gaining support from local organizations. By 1974, the idea had been scaled down to a 38-mile-long green belt featuring a network of lakes and streams. The vision ultimately led to the creation of Tempe Town Lake in 1999 and has fueled economic growth and continues to inspire revitalization efforts along the Salt River.⁴ However, small portions of the river continue to stay dry before seasonal flow of water, for the proposed urban ecology center will look to revitalize a portion of the dry riverbed.



Figure 07
Dry Bank of the Salt River, March 26, 1999



Figure 08
The Sonoran Desert

ENVIRONMENTAL ANALYSIS

Project Environmental Advocacy • Specific Environmental Aspects

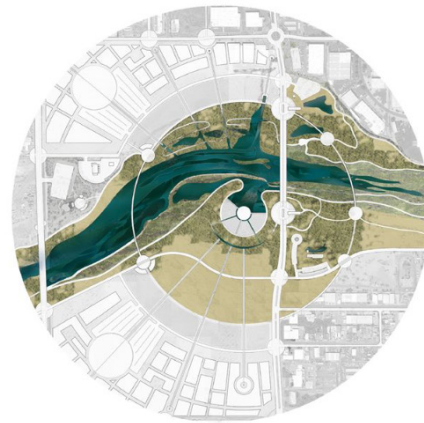
An understanding of the importance of the dry river bed, and the unique challenges the area imposes.

Environmental awareness for the Tempe area can be approached from multiple directions with a primary focus on natural revitalization and water conservation. Given the region's arid climate and increasing population, it is crucial to promote efficient water use and educate the public about challenges and strategies for adapting to the desert environment. Educating visitors about the Salt River's history and its transformation from once a crucial water source to a managed system can highlight the necessity of these water conservation practices. The rapid urban sprawl in the Phoenix metro area has played a significant role in water consumption, pollution, and inefficient land use, making these efforts even more critical to mitigate the impact of continued growth. ⁵

An urban ecology center near Tempe Town Lake, drawing inspiration from the LHC Environmental Learning Center designed by Jones Studio, would serve as an ideal platform for fostering environmental stewardship and sustainability. ⁶ By educating visitors on sustainable urban design, water-efficient landscaping, and environmental preservation through exhibits and hands-on experiences, the center



NORMAL RIO



MONSOON RIO

Figure 09
Diagram from Jones Studio of Rio Salado Seasonal Comparison

could encourage responsible practices. Additionally, by building on the underutilized dry riverbed of the Salt River, this offers the opportunity to revitalize this historically significant area. The ecology center would look to transform the surrounding landscape and reconnect the community with its natural and cultural heritage.

Monsoon Season

Monsoon season in Tempe, which officially runs from June 15 to September 30, is a critical period for the region, bringing much needed rainfall to the dry, arid landscape. This seasonal shift is characterized by increased humidity and the arrival of thunderstorms, which can contribute up to 50% of the area's annual precipitation. Monsoon storms can lead to flash flooding and other severe weather events, yet they play a vital role in replenishing local water supplies and supporting the Tempe ecosystem.⁷ As seen in Figure 10, the Rio Reimagined aerial footage shows the proposed dry riverbed site during March of 2023, the driest monsoon season on record. Additionally, an ecology center located in this area could leverage this seasonal phenomenon to teach visitors the importance

of rainwater harvesting, and sustainable landscaping strategies with native species. The center can look to foster a deeper appreciation for these natural cycles while promoting responsible water usage in a rapidly urbanizing environment.

Building Considerations

Building within the dry riverbed would accommodate a Hot-Dry Climate Zone (2B) in Tempe. Thermal considerations for this region demand efficient insulation to combat the dry temperatures in this area. The International Energy Conservation Code (IECC) 2021 sets minimum insulation requirements, including R-13 for walls and R-25 for roofs.⁸ The design could additionally incorporate construction methods that minimize excavation, such as elevated structures, which reduce impact on the riverbed while facilitating passive cooling.⁹ These structures could be oriented based on daylight analysis to optimize natural lighting and ventilation, reducing dependency on artificial systems in such a hot climate. Water harvesting strategies, such as rooftop or bioswale rainwater collection during monsoon seasons, and solar panels for



Figure 10
Aerial View of the Salt River in Tempe from the Rio Reimagined

renewable energy integration, would enhance the center's sustainability extensively.

Native Desert Plants

Native plants play a critical role in this effort to restore the dry riverbed and ecosystems of Tempe. These plants listed are uniquely adapted to the harsh conditions of the desert, including high temperatures, minimal rainfall, and nutrient-poor soils. Their deep root systems help stabilize soil, reduce erosion, and improve water infiltration, making them instrumental in riverbed restoration.¹⁰ These plants' ability to stay resilient to the extremes of the desert include their qualities of conserving water, tolerating drought, and withstanding intense sunlight. Incorporating native flora into a restored riverbed not only aligns with environmental preservation goals, but also represents an agricultural ecosystem that was once crucial to original civilizations. These plants were critical for sustaining life and contributed to the stabilization of the desert ecosystem.¹¹

List of native plants:¹²

Trees

Palo Verde
Mesquite
Ironwood

Shrubs

Creosote Bush
Desert Willow
Brittlebush

Grasses

Sideoats Grama
Buffalograss
Big Bluestem

Edible Plants

Prickly Pear Cactus
Agave
Mesquite



Figure 11
Image of Tempe, Arizona

POLITICAL ANALYSIS

Tempe 2050 General Plan • Primary Zoning Elements

An analysis of the future zoning implementations of Tempe, and how they will affect the project moving forward. Also an observation of Kevin Lynch's "Elements of a City."

The proposed Urban Ecology Center aligns directly with Tempe's 2050 General Plan by addressing critical priorities such as sustainability, climate resilience, and community engagement. By incorporating sustainable design elements like passive cooling, solar energy, and innovative water management techniques, the center demonstrates a commitment to "Sustainability, Climate Friendliness, and Environmental Stewardship," ensuring resilience against climate change and the region's highly arid climate. Its integration into a mixed-use design reflects Tempe's dedication to creating neighborhood-scaled developments that combine educational, and recreational, enriching the community. Transit-oriented design can also be implemented as well as walkability, which will in turn support "Sustained Mobility/Greater Accessibility", encouraging eco-friendly transportation methods and fostering connections between the center, nearby public transit, and pedestrian pathways.

Additionally, the center reflects the city's vision for adaptive reuse by revitalizing underutilized urban spaces like the dry riverbed, directly addressing Tempe's goals for sustainable urban development.



Figure 12
Pedestrian-Friendly Cities: A Major Push in the Tempe 2050 Plan

Its focus on water conservation aligns with Tempe’s recognition of water as a vital regional resource. Public spaces within the center will enhance community involvement, celebrating the cultural and historical significance of the Salt River and Hohokam legacy. This combination of walkability, bikeability, urban infill, sustainability, tourism encouragement, and arts and culture appreciation, supports Tempe’s long-term goals for improved quality of life, a connected city, and historical preservation, encapsulating the primary principles of the 2050 General Plan.¹³

City Elements

This area near Tempe Town Lake is defined by interconnected edges, paths, nodes, landmarks, and districts that create a dynamic urban landscape. The Tempe Town Lake and the Salt River form natural and recreational edges that clearly separate urban spaces from the desert landscape. Key paths include Rio Salado Parkway, the Mill Avenue Pedestrian Bridge, and the river walk, facilitating connectivity for vehicles, cyclists, and pedestrians, enhancing the areas walkability and accessibility. Major nodes

include Tempe Beach Park, a central gathering point for community events, and the adjacent Mill Avenue District, a vibrant area of mixed-use activity. Landmarks like the historic Hayden Flour Mill, the modern Tempe Center for the Arts, and the scenic pedestrian bridge reinforce the area’s cultural and architectural identity. Together, these features create a cohesive network, tying together the vibrant downtown, the ASU campus, and surrounding districts.¹⁴

Edges

Tempe Town Lake
Salt River

Paths

Rio Salado Pkwy.
Mill Ave. Bridge
Riverwalk

Nodes

Tempe Beach Park
Mill Avenue Dist.

Landmarks

Hayden Flour Mill
Tempe Arts Cent.
Mill Ave. Bridge

Districts

ASU Campus
Downtown Tempe
Mill Avenue Dist.



Figure 13
Diagram Displaying Lynch's Nodes, Edges, Paths, and Landmarks



Figure 14
Sunset Neighborhood in Tempe, Arizona

SOCIOCULTURAL ANALYSIS

Rio Salado and Beach Park Masterplan • Resident Visions

Finally, a sociocultural analysis primarily on the future plans for the Rio Salado River throughout Tempe, and what they mean for the potential implementations into the project.

The future Rio Salado and Beach Park Masterplan represents a collaborative effort to transform Tempe's underutilized dry riverbed and surrounding areas into a vibrant community asset. Key organizations are involved in the project including, but not limited to, Rio Reimagined, the Urban Waters Federal Partnership, Arizona State University (ASU), the Swalt River Project (SRP), Maricopa County, and the Lower Gila River Collaborative. Together, they bring valuable expertise in environmental restoration, urban design, and sustainable development, ensuring the project aligns with Tempe's long-term vision for resilience and community well-being.¹⁵

A major component of this masterplan involves acknowledging the steep slopes along the dry riverbed near the city and river edge and the dam to enhance pedestrian and bicycle accessibility. Proposed features include eco-bridges with scenic lookouts, bike-share stations, and public art installations that celebrate the area's cultural and ecological significance. Additionally, the current riparian habitat within this area will be preserved and expanded to support native species and

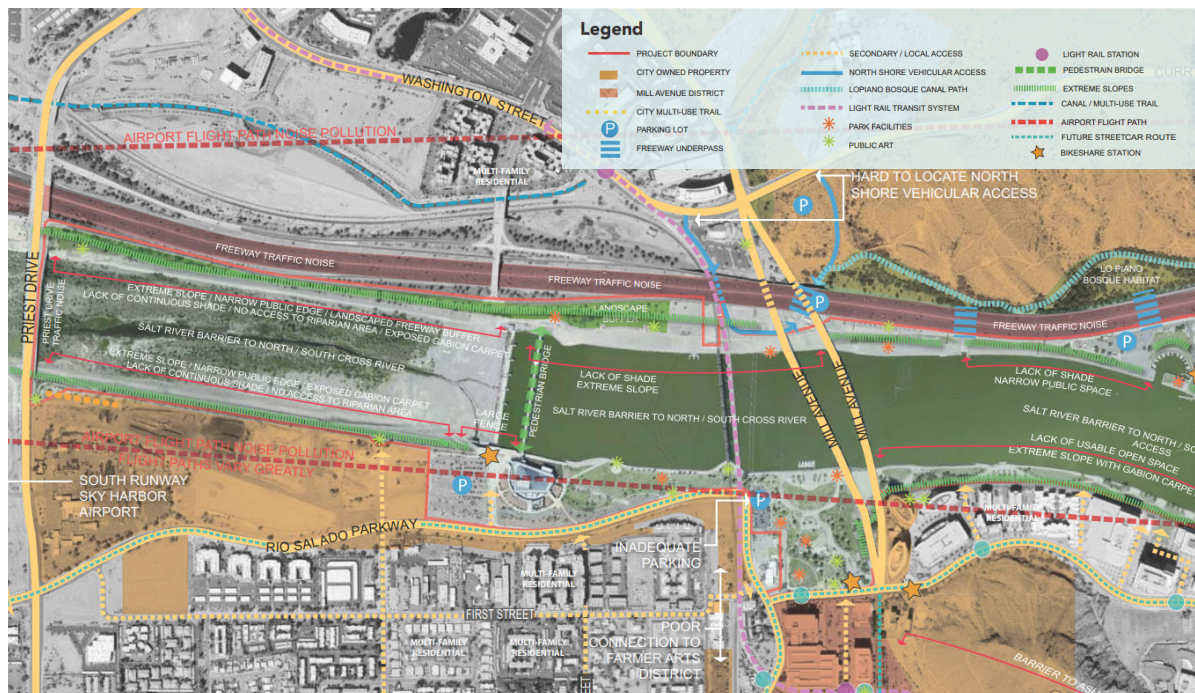


Figure 15
Rio Salado Future Master Plan

promote environmental education. These initiatives directly support the Rio Reimagined project's goal of revitalizing the Salt River and the Urban Waters Federal Partnership's mission to improve water quality and ecosystem health in urban waterways.¹⁶ With support from ASU and other key stakeholders, the project also emphasizes transit-oriented design, including extending the Tempe Streetcar along Rio Salado Parkway to ensure accessibility for residents and visitors.¹⁶ As downtown Tempe, Papago, and North Tempe continue to evolve as pedestrian-friendly neighborhoods, this revitalized riverbed will serve as a critical link, connecting these areas with sustainable infrastructure. The collaboration of these organizations reflects a shared commitment to preserving the environment while fostering cultural acknowledgment and sustainable urban growth.

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Figure 16
Rio Salado Future Master Plan

C H A

P T E

R O 2

———— Project Statements



Figure 17
The Sonoran Desert

The Sonoran Desert, rich with diverse life forms, vegetation, and landscapes, offers a unique environment for all living things, but particularly a difficult climate for humans. Throughout history, Arizona's landscapes have been shaped by various organisms, with humans having the most significant impact to this landscape. Understanding and respecting the desert's characteristics is essential for designing within the Sonoran region. This approach not only ensures successful architecture, but also honors Arizona's abundant history and if applied appropriately, can help the landscape thrive. The architecture of Arizona should be "...in deep conversation with the land..."¹ Embracing this philosophy, architects can better adapt to the desert's natural characteristics rather than trying to alter them for a softer, greener landscape. As a result, the architecture of Arizona has become more successful and better suited to its environment. Frank Lloyd Wright, a pioneer of this ideology, states to ..." [c]over up your walls, plant trees and vines and water them well. But plant trees and vines native to the condition here."² By studying and observing these innate characteristics of the desert, specifically the unique species and vegetation, architects can create work that both enhance and respect these thriving ecosystems.

The greatest impacts that designing within the Sonoran Desert proposes include the importance of place and unobtrusive design to the surrounding environment. Lawrence W. Cheek mentions in "The Making of the Arizona School," "...few have stood still long enough to let the land explain what it wanted."³ This particularly refers to the necessary steps it takes to understand the land and how

architects can better design with it. Experiencing multiple architectural styles and typologies in its history, Arizona offers a perfect example of how a landscape can thrive, or could be utterly devastated, purely from the results of architectural development. This sustainable ideology is critical for architects to observe and learn from, for all architecture can be more successful by understanding the importance of place and resilient design in every environment. As Wright expresses, "...[a] desert building should be notably simple in outline as the region itself is sculptured."⁴ This philosophy for becoming inspired by, and designing within, the desert is universal. By reflecting and enhancing the inherent beauty of the landscape, architecture can both support and be supported by the natural environment, maintaining a harmonious relationship with nature.

Reflection

Reflecting on this statement I made earlier this semester, it's clear that this topic became passionate to me as my typology came to life. Designing within the desert is a deeply rewarding challenge that shows respect for its ecosystems, resilience, and history. My project looks to heavily draw from these principles of designing for the desert, inspired by its natural forms and innate adaptability of its flora and fauna. By creating spaces that celebrate the land and its inherent beauty, this project can contribute to a deeper understanding and appreciation of the natural landscape and our relationship with it.

Figure 18
Sainte-Chapelle, Built in 1248



Retreat, traditionally, originates from the motivations and hermetic traditions of early Christianity. While these early retreats were mainly for religious and spiritual seclusion, they share a common theme with the retreats we see in contemporary society today. The idea of retreat in our modern society continues to be for purposes of growth, healing, and resistance to societal norms. Additionally, it is a response to the constant overstimulation and complexity of modern life. The traditional and contemporary retreats today share similarities, both rooted in the idea of withdrawing from pressures of everyday life.

In “Taking Refuge from Modernity: 21st Century Hermits”, Iona Boyd continues to highlight how retreat has evolved from historical practices of physical isolation to more nuanced forms of escape, especially in response to a dissatisfaction with contemporary life. As Boyd calls them “contemporary hermits”, he suggests many of them are suffering from modern phenomena, even one known as electromagnetic hypersensitivity syndrome (EHS).⁵ This condition, where people believe their health is affected by exposure to electromagnetic fields, reflects a modern need for seclusion in response to what Boyd describes as symptoms of the “illness of modernity”.⁶ Boyd’s concept of contemporary hermits reflects how retreat today has evolved into a response to modern anxieties, particularly the discomfort with technological environments. Today’s retreats often stem from a need of self-preservation, as individuals feel overwhelmed or harmed by the pressures of modern life. The act of retreat is often driven by factors

such as overstimulation, dissatisfaction, and a desire for restoration. The environments where people seek refuge can take many forms. Architecturally, retreat manifests in the design of spaces that offer seclusion, refuge, or healing. Historically, monasteries have long been environments for physical and spiritual recovery. Nadya Eriksson and Lena Wiklund-Gustin suggest that monastic settings allow individuals a space where they can feel “autonomous” and “alone with themselves”.⁷ Ultimately, acts of retreat reflect a complex response to modern pressures, encompassing a desire for healing, self-reconnection, and the creation of restorative spaces.

Reflection

The concept of retreat within my project extends beyond this foundational analysis of creating sanctuary for humans as it also seeks to provide refuge for the native flora of Tempe and the surrounding desert. By addressing the pressures of urbanization and modernity, I aim to design a space where natural environments can thrive alongside human recreation and reflection. While urban environments often lack connection to nature, this project offers a retreat for healing and collective rejuvenation of plant life and human life. It emphasizes an interplay between people and their environment and addresses illness in modernity just as Boyd discusses in his writings. I truly believe with these philosophies, I can begin to foster a community well-being through an intentional engagement with the natural world and its surrounding users.

Figure 19
Site in Arizona



Chapter 02

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In considering what constitutes “site” in architecture, I personally view it as more than just where a project is situated, but as a combination of its environmental, cultural, and societal factors. The site serves as a foundation for understanding community needs, and solving the unique challenges that a location or place may offer. Reflecting on *Designing Architecture* by Andrew Pressman, there is an emphasis on integrating both qualitative and quantitative methods in site analysis, paralleling my own personal approach when understanding a site. As Pressman notes, “...site analysis is not simply an exercise in data collection but involves interpretation and meaning-making.”⁸

For me, site analysis begins with a philosophical approach – understanding the history, essence, and community values tied to a place. This qualitative lens allows me to observe the unique features, and subtleties that a quantitative tool may overlook. “[G]round”, as Pressman puts it, is where we can look to observe patterns, textures, and natural rhythms.⁹ Each site brings its own layers of history, environmental characteristics, and cultural significance, which are all essential to consider when analyzing a site. Observing how natural elements interact with the land, how people navigate the space, and understanding the stories embedded into the place are integral to a design looking to revitalize its context and emphasize existing features.

However, as Pressman argues, as well as James LaGro in his book *Site Analysis*, quantitative methods to site analysis are equally essential. Tools like adjacency matrices and bubble diagrams provide

clarity especially for my own design process regarding spatial relationships, efficiency, and functionality.¹⁰ By using a quantitative method, you can begin to observe diagrammable site data such as zoning, massing, material considerations, and more functional considerations such as parking.¹¹ By studying these aspects in this detailed approach, I can gain insights into how people functionally move and interact with the site, as well as how the built environment can be designed to harmonize with existing features and restrictions within my future projects. By using these site analysis methods, I can start to determine how various components of a project work together to create a cohesive and responsive design.

Reflection

The site analysis for the project has been essential in understanding the unique environmental challenges posed by the underutilized dry riverbed. This analysis has guided my choice to research construction methods that align with the area’s natural features and minimize disturbance to the land. By considering flooding patterns and the surrounding landscaping plans for the Rio Salado area, I can create a design that not only respects but enhances the community. The integration of these factors ensures that the project will contribute positively to the long-term sustainability of the site. This approach aligns with the ongoing master planning efforts by organizations focusing on water conservation and habitat restoration.

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—— Typology



Figure 20
Rio Unido, Jones Studio • A Resilient Community Along the Rio Salado

PROJECT TYPOLOGY

The Problem • Community Needs • Retreat

An overall explanation of the project typology and the overall problem, community, and retreat it will be looking to solve.

Problem Statement

In the initial research process, an email exchange with a successful Arizona architect was conducted. Brian Farling, a principal at Jones Studio, has long been designing for the unique challenges of the Sonoran Desert. With multiple accolades and successful design projects, including many that express the preciousness of water and light in this area, Brian was asked where the important spaces may be within Tempe to pay special attention to when selecting a site for this project. After sharing resources, including the Rio Reimagined initiative, it became clear that the dry riverbed site was the area to research further. With many organizations working on the Rio Reimagined project, including Brian, it was determined that the riverbed site near the Tempe Town Lake Lake Dam provided multiple opportunities for resilient and contextual design.¹

Tempe currently faces a challenge of balancing urban growth



Figure 21
Rio Unido, Jones Studio • A Resilient Community Along the Rio Salado

with ecological and cultural preservation, as much of its natural and historical landscape has been compromised due to urban sprawl and misaligned architectural practices, as outlined in the regional analysis and position statements at the beginning of this book. Not only has this been a historical issue, but Tempe's population is projected to increase by 42% from 2020 to 2050.² The Rio Salado dry riverbed represents a critical opportunity to reverse these trends by creating a dual-purpose space that supports both the community and the environment. This center aims to reintroduce native flora and fauna to an area that has been ecologically degraded, while also paying homage to the cultural significance of the region. Tempe's monsoon and flooding seasons present unique challenges to designing within the riverbed, but these conditions also provide opportunities for adaptive solutions that restore the river's ecological functions. With a proposed partnership with many of the projected organizations within the Rio Reimagined Plan outlined in the regional analysis, the project aims to address these pressing issues by fostering environmental awareness and cultural appreciation, reconnecting the urban community with the

beautiful, local natural environment.³

Project

The proposed project is an Urban Ecology Center located within the Rio Salado dry riverbed, dedicated to the restoration and celebration of the river's natural and cultural heritage. This center will provide educational opportunities, abundant gardens showcasing and providing native vegetation, and recreational spaces that encourage the community to engage with the environment. Its program will include learning exhibits and classrooms for plant and earth conservation, observation areas for learning and reflection, auditorium-style spaces for educational and professional use, and gardens showcasing and providing plants for the community. These gardens would potentially look to provide to local food banks as well, such as the Tempe Community Food Bank, and Pitchfork Pantry at ASU. By integrating ecological restoration with public engagement, the project seeks to make the riverbed a vibrant and meaningful space for the people of Tempe.

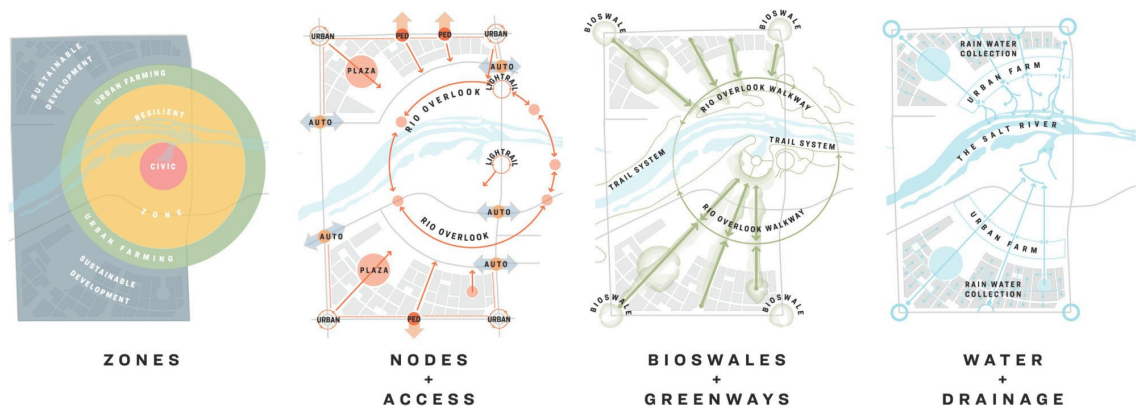


Figure 22
Rio Unido, Jones Studio • Site Studies

Community

This program addresses a unique cohesion of community, where a thriving environment for both human and natural ecosystems can coexist. By transforming an underutilized area into a multi-functional project, the typology aligns with the Tempe 2050 General Plan's goals for sustainability, walkability, and cultural enrichment. Based on the regional analysis research, the proposed program would be highly valuable not only for the nearby Tempe community, but the habitats that remain essential for the region's biodiversity. Through features like bikeable pathways, public art installations, and ecological gardens, the center helps restore the Rio Salado area, integrating it with the city's broader urban fabric. With the implementation of gardens with potential outreach to local food pantries, this would also benefit a large part of the community. According to research, 32% of students in the ASU dorms reported inconsistent access to food. In total, 13.7% of Maricopa County reported food insecurity, and the Pitchfork Pantry currently serves 2,200 weekly visits.⁴ This design approach encourages community members to embrace sustainable practices,

encourages community members to embrace sustainable practices, share these findings with one another, and give back to the community as a whole. This overall fosters a shared responsibility for the health of Tempe's environment.

Retreat

The Urban Ecology Center embodies the concept of retreat by providing sanctuary for both people and nature. Inspired by Iona Boyd's notion that modernity creates an "illness" requiring escape, the project offers a space where individuals can reconnect with the land and find respite from the pressures of urban life. At the same time, it creates a haven for native plants and wildlife, offering a retreat from the environmental disruptions historically caused by urban sprawl.⁵ This harmonious existence of humans and nature exemplifies how urban spaces can heal both ecological systems and communities, showcasing a future where cities can support thriving ecosystems while enhancing the human experience. By revitalizing the Rio Salado dry riverbed, the project sets a precedent for urban design that integrates retreat as a central priority.

WATER EDUCATION CENTER

JONES STUDIO

Central Arizona Water Conservation District • Phoenix, Arizona • 15,000 Square Feet







Figure 23
Jones Studio Water Education Center Section

In addition to speaking with Brian Farling at Jones Studio, I also researched some of the work at the firm looking into similar environmental typologies. The Water Education Center by Jones Studio offers a compelling precedent for my proposed project. This project serves as a vital educational and environmental hub that emphasizes the significance of water conservation in a desert climate. Located along the Salt River in Scottsdale, the center is a collaborative project with the Salt River Project, a prominent water and energy provider in the region. Its design integrates sustainable practices and reflects the cultural and ecological importance of water in the area.

This project highlights the potential of architecture to educate and engage communities on critical environmental issues, particularly water conservation, which is a primary goal of sustainability in a climate like Arizona's. By integrating water as both thematic and functional element in its design, through rainwater and interpretive displays, the center embodies a combination of the built and natural

environment. The use of local materials and site-responsive landscaping at the Water Education Center underscores the importance of harmonizing architectural interventions with the natural landscape, aligning closely with my design goals of creating a retreat that is both educational and restorative for the environment and community.

The architecture of the center incorporates water as a thematic and physical element, displays that teach visitors about Arizona's water systems and conservation techniques. The use of natural materials and landscaping further aligns the building with the surrounding environment, creating a space that is both functional and harmonious with the desert ecosystem. This project exemplifies how thoughtful design can merge education, sustainability, and cultural heritage.⁶

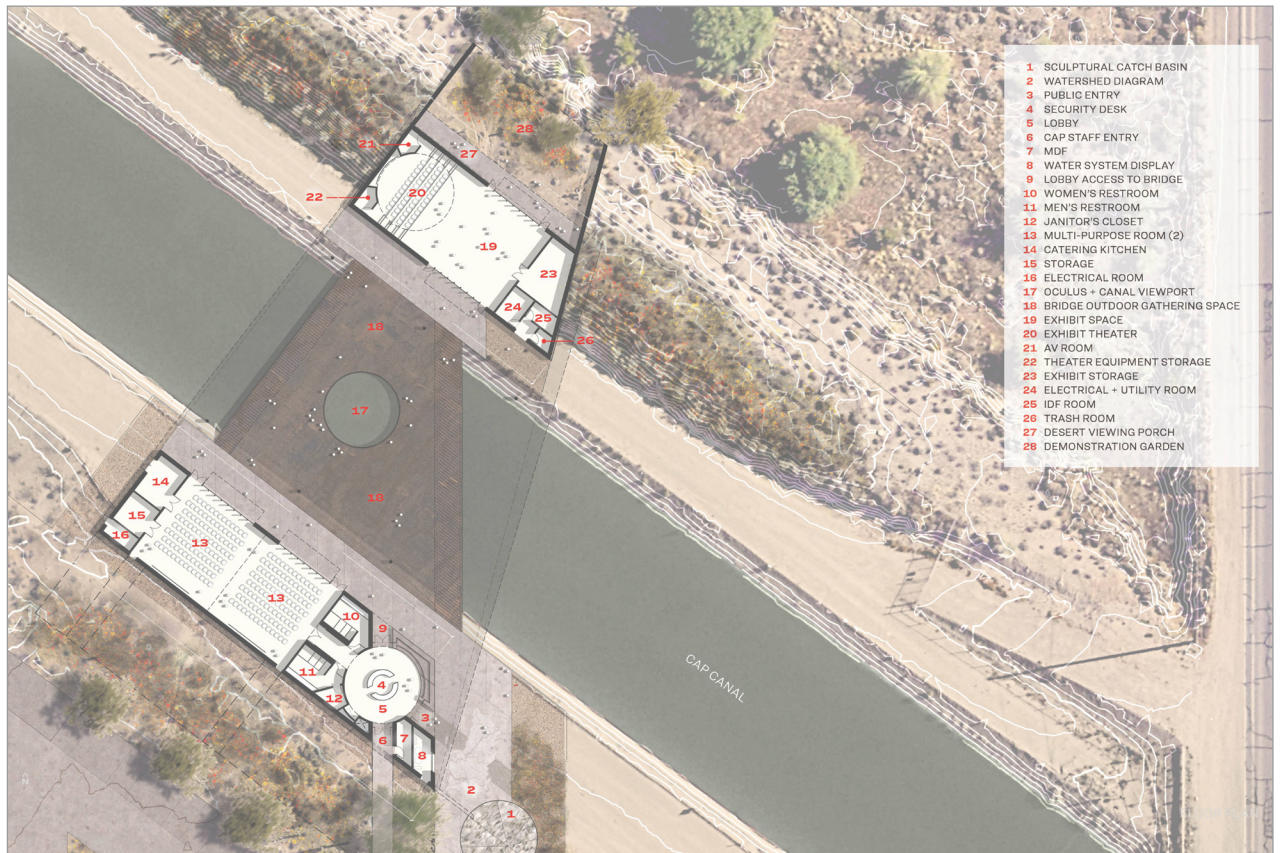


Figure 24
 Jones Studio Water Education Center Plan

URBAN ECOLOGY CENTER

LAKE FLATO

Phil Hardberger Park Conservancy • San Antonio, Texas • 18,000 Square Feet





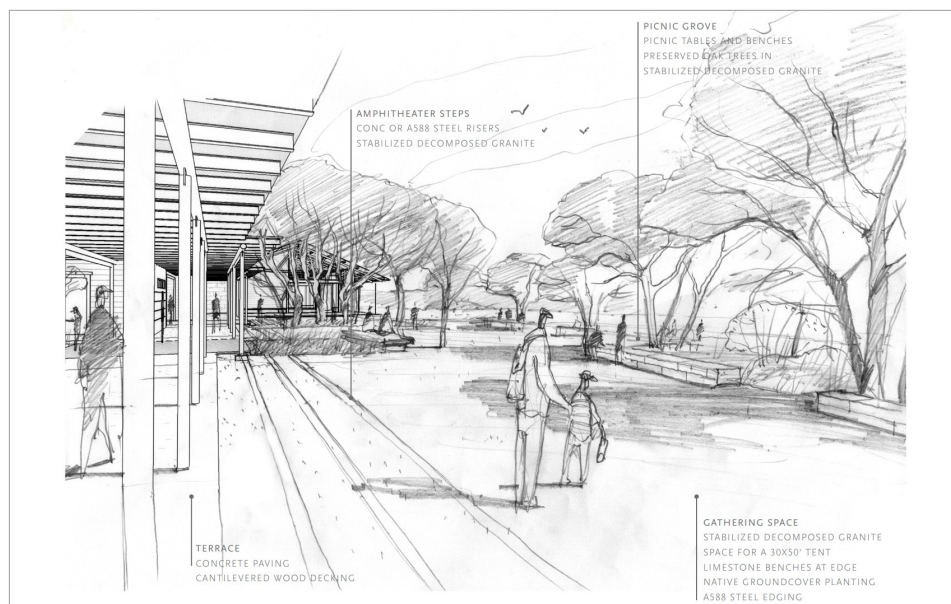


Figure 25
Lake Flato Urban Ecology Center Site Design Sketches

The Urban Ecology Center at Phil Hardberger Park, designed by Lake Flato Architects, showcases yet another blend of sustainable design and ecological education. Located in San Antonio, Texas, this facility heavily integrates rainwater harvesting, bioswales, and air-conditioning condensate reuse to manage water sustainably and promote conservation. Its design restores native oak savannas and uses region-specific landscaping, creating a seamless connection between architecture and environment. The center serves as a hub for community engagement, offering classrooms, an event hall, offices, and outdoor learning spaces that support the park's mission to educate the public about urban ecology and sustainability.

This project is particularly relevant to my proposed urban ecology center, as both aim to blend similar educational programming with ecological preservation. Combining this precedent with the previous Jones Studio precedent, it's clear how the two precedents could begin to blend into a harmonious piece of architecture. Similar to the Hardberger Park

facility, my design will incorporate programmatic elements like classrooms, gardens, offices, and a gathering hall to foster environmental awareness and community participation.

The center's success in creating a "cultivated wild" environment through thoughtful integration of architecture and native landscapes provides a valuable model for how my project can begin to celebrate Arizona's unique atmosphere, while offering multi-functional spaces for learning and interaction. By drawing from the strategies employed at the Urban Ecology Center, I aim to create a retreat that not only educates but also immerses visitors in the natural beauty and ecological significance of the local environment.⁷

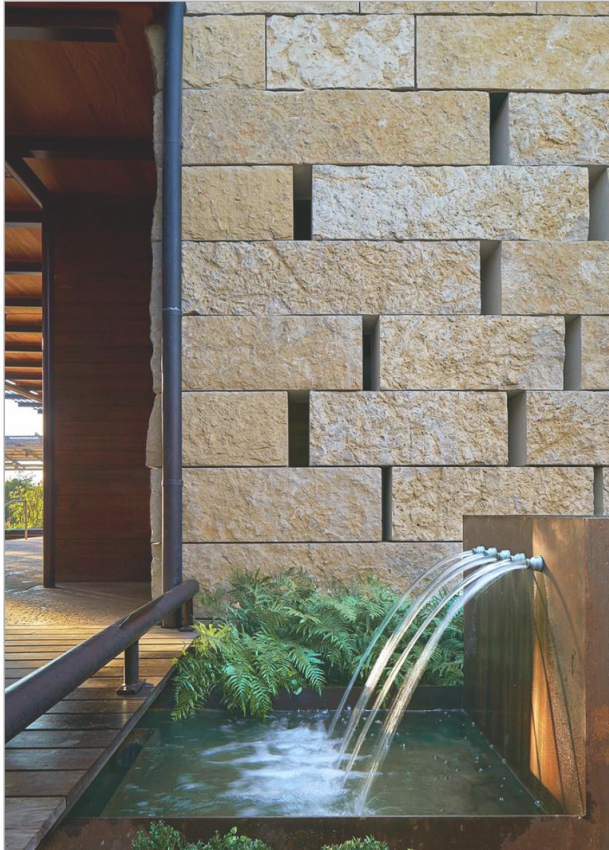


Figure 26
Urban Ecology Center Water Treatment



Figure 27
Urban Ecology Center Entry

LAKE HAVASU LEARNING CENTER

JONES STUDIO

City of Lake Havasu • Lake Havasu City, Arizona • 20,000 Square Feet







Figure 28
Lake Havasu ELC Section Cut Through Living Machine Garden

The Lake Havasu City Environmental Learning Center (ELC), designed by Jones Studio, serves as a critical educational hub to address water sustainability in Arizona. Situated on an 80-acre campus near Lake Havasu, the ELC combines experiential learning, water research, and environmental stewardship. The facility includes features such as water quality laboratories, classrooms, immersive galleries, and spaces for community gatherings. Outside, its design integrates the desert landscape with a Living Machine Garden, which demonstrates natural water recycling processes, and native botanical gardens that support research and education. The site also includes trails and habitat towers, fostering hands-on interaction with the environment while addressing critical water issues through innovative architectural and landscape strategies.

For my proposed typology, this project is applicable due to its elements of integrating educational, ecological, and communal programs into a cohesive design. the inclusion of labs,

gardens, and multipurpose spaces at the Environmental Learning Center mirrors my envisioned experience and program of my proposal of the Urban Ecology Center in Tempe.

The Environmental Learning Center's emphasis on contextual design, which harmonizes with its desert surroundings and educates visitors through interactive experiences, offers a compelling model for addressing environmental challenges in urban Arizona. ⁸ I plan to draw ongoing inspiration from these precedents as I refine and develop my project next semester, using them as a guiding framework throughout the design process.

Figure 29

Lake Havasu ELC Exterior Rendering



Chapter 03

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C H A

P T E

R O 4



Figure 30
Arizona Landscape - River View

THE SITE

Site Alternatives • Final Site

An overview of the site selection process, and how the final site was determined. Observing multiple site options and locations, and why the final site was ultimately chosen.

The site selection process was initiated throughout the semester to determine a location best fit for the urban ecology center. The first sites were suggested to be outside of the Tempe city limits, where recreational amenities were already provided. This allowed for an escape from the busy city life within Tempe, but research later showed that this was something that could be potentially needed directly within the city limits. Two alternative sites are located outside the city limits which showed potential positive benefits, but the final site was selected to be in the dry riverbed after speaking with professionals.

The overall site selection was centered on finding a location close enough to the metro area for easy accessibility, along the historic riverfront. After speaking with Brian Farling at Jones Studio, sharing his expertise on the water issues within Arizona brought up the dry riverbed site. We agreed that working within the city limits of Tempe would provide more options and amenities for the community and natural environment of Tempe. Furthermore, research was conducted on the flood patterns in the area, making this an important aspect of the site selection process. Monsoon season heavily affects the dry riverbed in the yearly flooding seasons, particularly in the spring.¹

Size

The size of the site was important when selecting a site to allow for adequate parking if needed, exterior garden spaces, and potential trails or other outdoor amenities. The space needed to be

able to accommodate ample circulation and access throughout the site, as well as spaces for equipment or other necessary sustainable elements that would be required to be stored on the site.

Relationship with Context

From the beginning, the relationship between the site and the river has been crucial. When the initial site selection process was conducted, the relationship between the city of Tempe and the site was important but not critical. However, as further research was done on the project, it became clear that the site would be most appropriate within the city limits. Therefore, access to public transportation, parking lots, and other recreational amenities became a significant factor in the final site selection process. While Tempe provides great public transportation amenities, the reality is that many people primarily rely on cars for their main mode of transportation. The site must be able to accommodate this, as well as heavy pedestrian foot traffic – which would be most ideal for the project.

Relationship to Nature

Finally, as the site selection process was conducted, it was important to choose a site with a connection to the natural environment, most importantly the river. Additionally, the site was open to having challenges due to mother nature, so that the architecture could provide solutions and resilience to these unique challenges of the desert. By



Figure 31
Site Option 01 | 33°22'44"N 112°22'20"W

first observing sites on recreational land, this provided its own unique challenges, while the dry riverbed will provide very different challenges of its own.

Site Option 01

The first potential site considered was on Estrella Mountain Regional Park, just south of the Phoenix metro area. Estrella offered several appealing features, including its rich history near the Gila River. The park's location on land owned by Maricopa County made it promising in terms of feasibility, as it would be similar to developing a public-focused project like the Desert Botanical Gardens in Papago Park. However, the distance ultimately became a limiting factor, for the remoteness from the core metro area would make frequent visits less practical for city residents.

Size

The size of this site was big enough for the required program but presented some interesting challenges with the existing topography. However, the existing park would have provided some amenities,

potentially minimizing the amount of parking or trails directly on the site.

Relationship with Context

The contextual relationship of the site to necessary elements such as road access, public transportation, and parking would have provided a challenge. The distance from the road is a good distance, and GIS maps do not indicate any relationship to public transportation in the area. These distances ultimately caused this site to be mostly impractical for city residents, and those looking to visit the ecology center.

Relationship to Nature

Finally, the relationship to nature for this site was highly ideal. The connection to the Gila River was very close by, and the connection to the mountains was a great addition to the site. The rich history this site held would have been highly inspirational if the accessibility was not an issue.



Figure 32
Estrella Mountain Regional Park



Figure 33
Estrella Mountain Regional Park

Pros

- Beautiful scenery
- Rich history of the land
- Close connection to the Gila River

Cons

- Distance to urban area is too far
- Topography offers challenges
- Access to nearby roads is a challenge
- Zoning challenges - mostly county land



Figure 34
Site Option 02 | 33°30'49"N 111°41'03"W

Site Option 02

The second potential site considered was within the Granite Reef Recreational Area located about 25 minutes east of Tempe. As an existing recreational area with established trails and parking, the site provides a solid foundation for enhancing community access and engagement with a historic natural environment. However, there were many important considerations for this site such as the site's status with the Bureau of Land Management (BLM), which is federally owned yet managed by the Salt River Pima- Maricopa Indian Community (SRPMIC) and the U.S. Forest Service. This small site is currently controlled by the Bureau of Reclamation, adding layers of complexity in terms of approval. However, the site looks to provide public access to the communities, which would ultimately be approved by these entities, but still would have proposed a complex zoning challenge.

Size

The size of the site was large enough to accommodate the project, however, the shape of the site would have been awkward in some areas, primarily in terms of parking and lot sizes. The zone of the

site follows the river again proposing somewhat of an awkward shape for construction.

Relationship with Context

The contextual relationship of the site to necessary elements such as road access, public transportation, and parking would have been mostly accommodated for, other than the public transportation aspect. Located just north of Mesa, vehicular accessibility would be very doable, as well as nearby existing parking lots could have accommodated for off-site parking.

Relationship with Nature

Finally, the relationship to nature for this site was highly accessible. The recreational area is already widely used by many people in the Phoenix metro, as well as the high traffic of tourists. Wedged between the Tonto National Forest and the Granite Reef Recreational Area, also primarily BLM land, the site would have been a beautiful outdoor area, just along the historic Salt River.



Figure 35
Granite Reef Recreational Area



Figure 36
Granite Reef Recreational Area

Pros

- Beautiful scenery
- Rich history of the land
- Direct connection to the Salt River

Cons

- Reliance on vehicular transportation
- Many zoning challenges
- Awkward site shape



Figure 37
Selected Site | 33°26'02"N 111°57'10"W

Selected Site Rationale

The final site selection was primarily focused on the implementation of the dry riverbed in Tempe and its close connections with Tempe's primary amenities such as public transportation, similar arts and educational typologies, pedestrian walkways, and main road access. Additionally, the selected site is in direct connection with many natural amenities such as Tempe Town Lake, Tempe Beach Park, and the proposed master planning development for the Rio Salado.²

Size

The site size is more than enough to fit the desired project and has plenty of room for expansion. Nearby parking lots could potentially minimize need for immediate vehicular access and site shape is adequate for meeting needs.

Relationship with Context

Visible in the provided diagrams, the proposed master plan for the Rio Salado development offers multiple new pieces of

infrastructure that can easily be tied in to the proposed ecology center. This includes overlooks, bird viewing areas, bike share stations, event spaces, and even a light rail expansion along Rio Salado Parkway.³ In addition to this, the community this ecology center will look to provide educational resources to is the Arizona State University Campus (ASU), high tourist attractions, and the downtown context. This site perfectly meets those requirements for a contextual site analysis.

Relationship with Nature

Finally, the relationship to the Rio Salado was again a critical feature of the site selection process. While the site was susceptible to natural flooding during the monsoon season, this was ideal in the typology having the potential to be resilient and raise awareness for these natural occurrences. The site offers extensive opportunities for water collection, gardens, and other sustainable strategies.

After speaking with Brian Farling at Jones Studio, and researching the Tempe master planning documents, this site was perfect for potential restoration of what the Rio Salado was and can be again in the future.⁴



Figure 38 | 39

Site in Relation to River Master Plan Project | Aerial View of Site Via Google Earth

Pros

- Within Tempe limits and near the lake
- Rich history of the land
- Direct connection to the river
- Connects to the Rio Salado master plan
- No re-zoning necessary

Cons

- Highly susceptible to flooding

Chapter 03

References

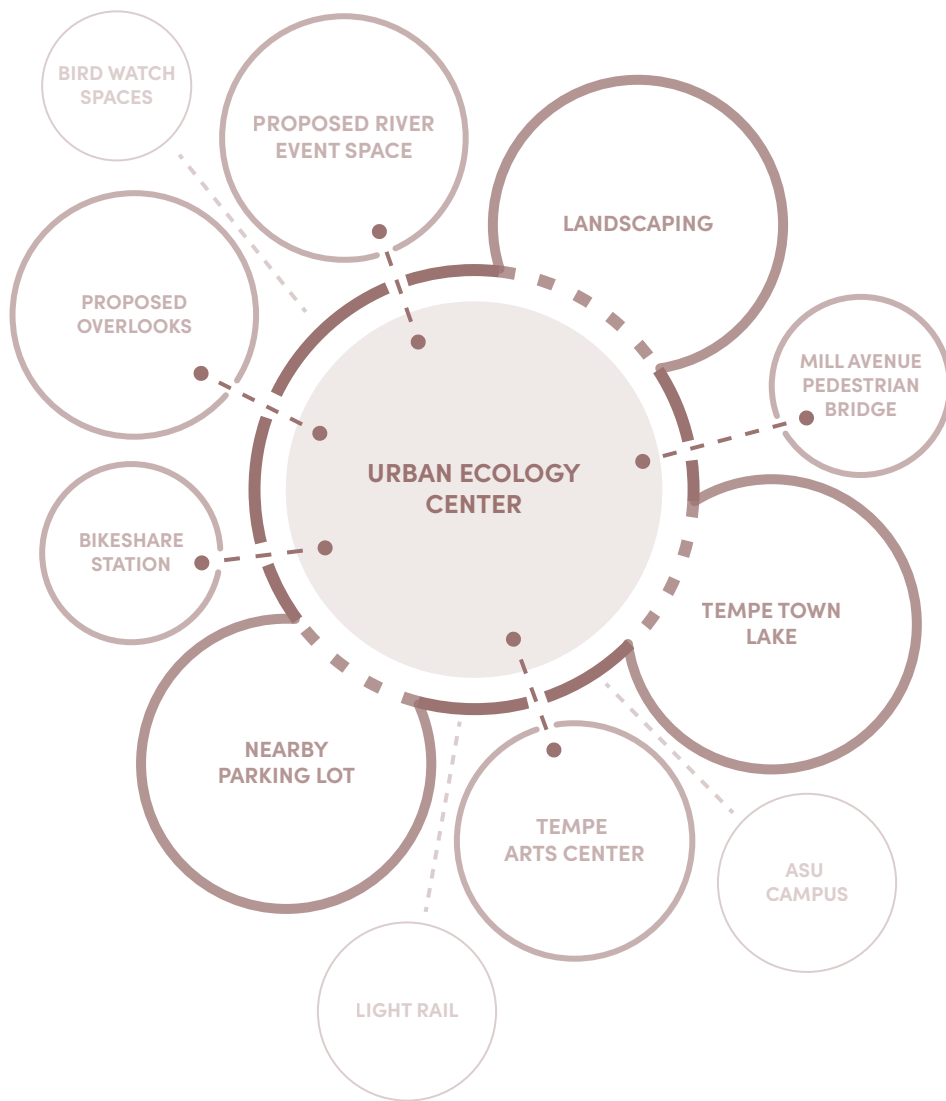
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C H A

P T E

R O 5

———— Program



- ■ ■ ■ DIRECT CONNECTION
- - - - - ● NEARBY CONNECTION
- - - - - BUFFERED CONNECTION

Figure 40
Site Adjacencies

PROGRAM

Program Outline • Critical Adjacencies

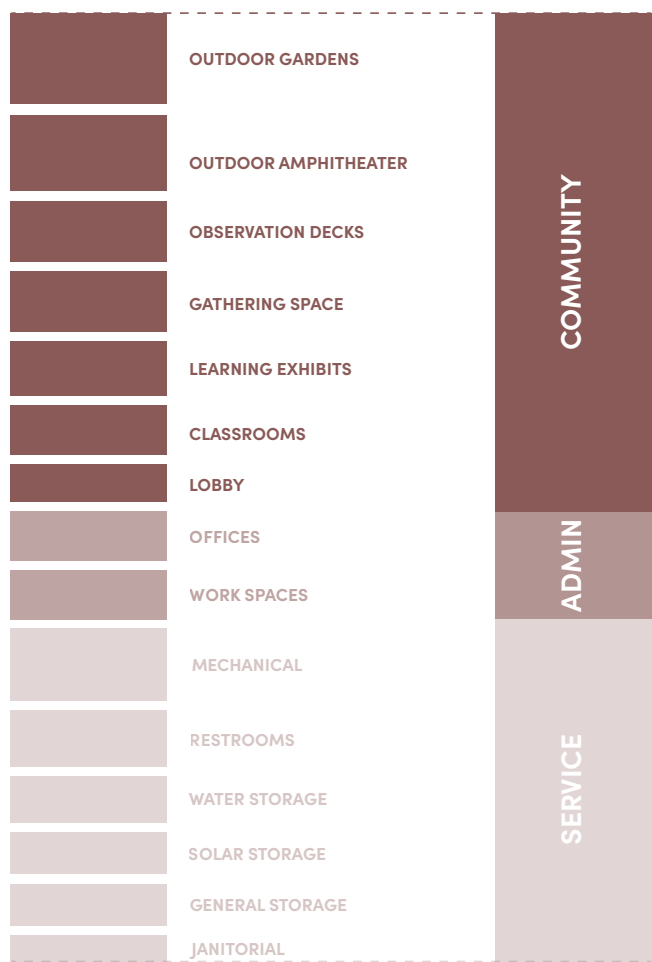


Figure 41
Program Size and Categories

This analysis begins with the observation of critical adjacencies to the nearby site context, including site amenities that will be implemented in the future Rio River project in Tempe. It was important to select a site that could accommodate a seamless integration in terms of program, and recreational opportunities that could provide this area of Tempe a creative and unique learning space.

It was important to incorporate spaces that would offer community collaboration, as well as administrative services to benefit the public and educational systems of Tempe, and service amenities for general building upkeep. This is how the program of the Urban Ecology Center has been arranged in terms of program, and adjacencies.

The program of the Urban Ecology Center implements large outdoor spaces including gardens for growing and distributing plants and produce, an outdoor amphitheater space to accommodate large lectures and gatherings, and observation decks to observe the dam and garden areas within the complex. Additionally, spaces will accommodate large groups within the community for learning and classroom zones, as well as learning exhibits where they can display their work, as well as the faculty researchers. Groups using the space for research work are expected to either be full-time staff, or even students from ASU's campus. Therefore, work spaces will be accessible to these users for their research and studies. Finally, storage zones are critical for sustainable elements distributed throughout the building, and may also be on display for visitors throughout the circulation or observation areas provided.

Community Spaces

Outdoor Gardens	10,000 NSF	These garden spaces will be dispersed throughout the site, with at least two separate garden spaces proposed. Comprised of native and edible plants.
Outdoor Amphitheater	5,000 NSF	A space for admin and community use, for events, lectures, and other gatherings. Flexible for multiple uses.
Observation Decks	3,000 NSF	These decks will be dispersed throughout the site for observation of plant life, the building, and the surrounding Tempe context.
Gathering Space	2,000 NSF	Located centrally in the plan, this area will serve as open gathering space for the community, or other educational or arts and culture-related events.
Learning Exhibits	1,500 NSF	(2) Primarily showcasing research, the arts, or historical information, these will present findings and other art created by the faculty and community.
Classrooms	1,500 NSF	(3) At 500 NSF each, these will serve the community for hands-on learning at the Urban Ecology Center.
Lobby	1,500 NSF	Will include reception area, information area, and seating for visitors.

Total	24,500 NSF	41,650 GSF
	x 1.7 Grossing Factor	

Admin Spaces

Offices	600 NSF	(4) At 150 NSF each, these will serve the employees and any researcher working full-time.
Work Spaces	600 NSF	(2) At 300 NSF each, work spaces will be provided for professional research conducted by faculty or ASU students.

Total	1,200 NSF	2,040 GSF
	x 1.7 Grossing Factor	

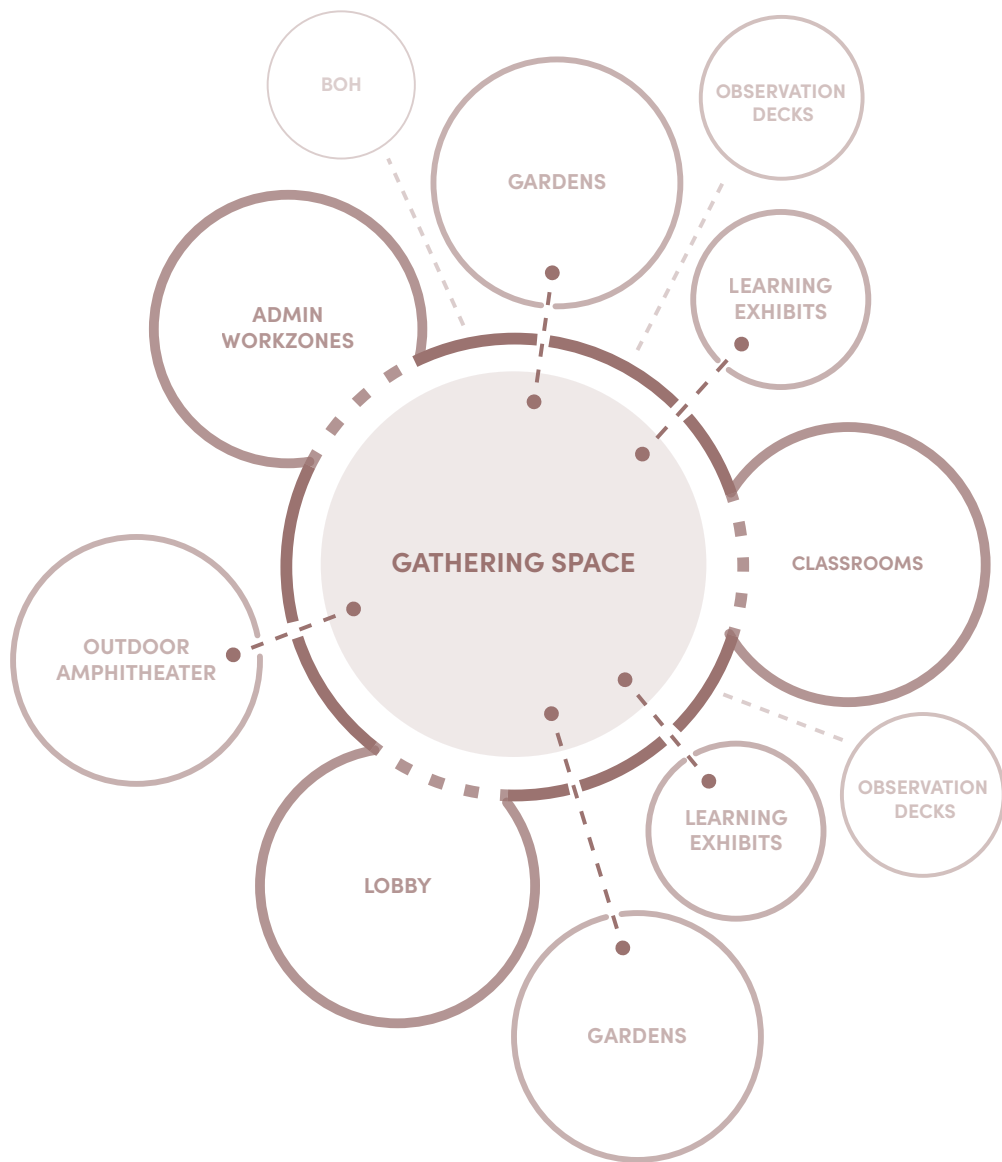


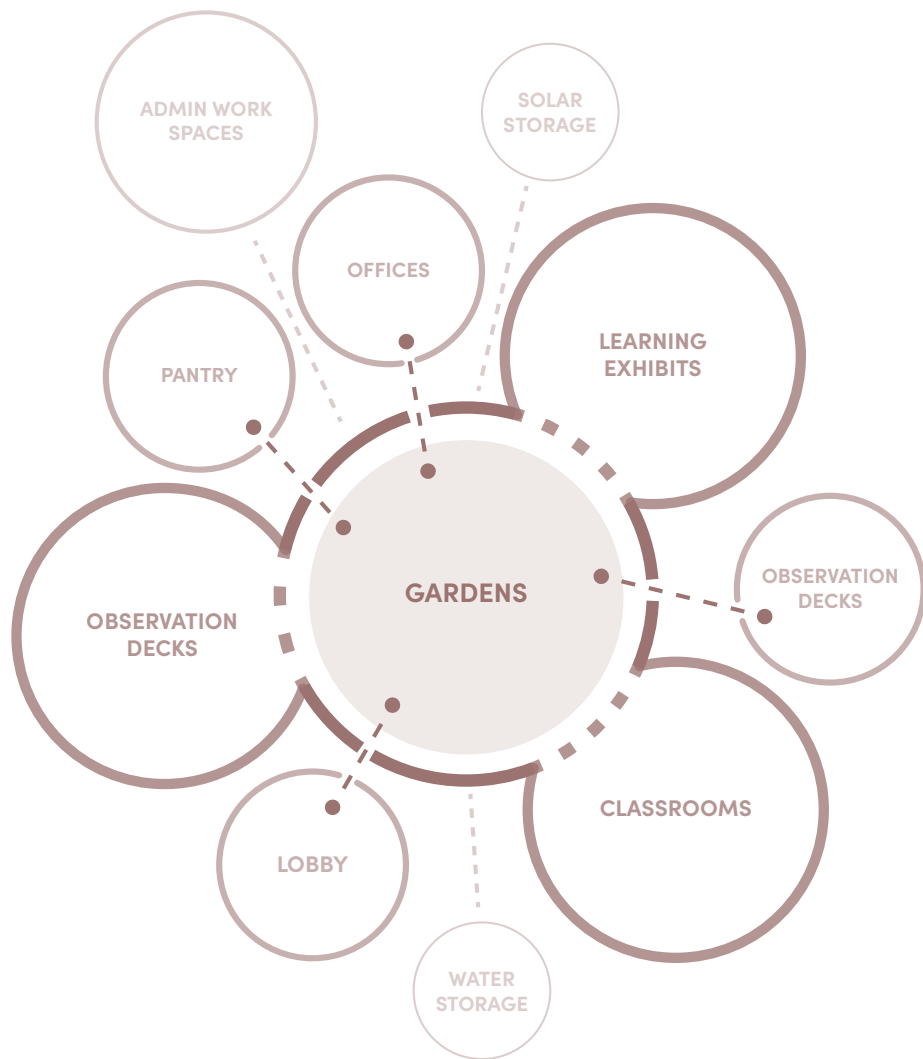
Figure 42
Gathering Space Spatial Adjacencies



Figure 43
Jones Studio, Water Education Center, Gathering Space Inspiration

Service Spaces

Mechanical	1,000 NSF	Storage for HVAC equipment, maintenance equipment and tools, and other upkeep tools.
Restrooms	800 NSF	(2) At about 400 NSF each, including ADA stalls, both restrooms should, in total, include 12 male and 22 women water closets, and 8 lavatories each.
Water Storage	750 NSF	This area will store tanks for water collection and other tools or equipment necessary.
Solar Storage	750 NSF	This space will house necessary solar batteries and maintenance and equipment tools required.
General Storage	750 NSF	Will store all other items such as exhibit equipment, furniture, and more.
Pantry	500 NSF	Will store items for local food banks and other perishables.
Janitorial	200 NSF	(2) At 100 NSF each; each equipped with 1 mop sink.
Total	4,750 NSF x 1.7 Grossing Factor	8,075 GSF
	Building Only	20,815 GSF
	Overall Total	51,765 GSF



- ■ ■ ■ DIRECT CONNECTION
- - - - ● NEARBY CONNECTION
- - - - - BUFFERED CONNECTION

Figure 44
Gardens Spatial Adjacencies

C H A

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LOBBY

1,500 SF

01

Uses

The lobby space will hold general information about the space, exhibits, and assist visitors in finding other spaces. There will also be a reception desk and receptionist for additional aid.

02

Users

The users of this space will be primarily the community, and receptionist. This is where visitors can get information and easily find their way through the building.

03

Adjacencies

Important adjacencies to this space include exhibit spaces, classrooms, and any necessary vertical circulation as the design moves forward. These spaces are important to be close to the entrance.

04

Furnishings and Fixtures

Furniture and fixtures in this space will primarily be a reception desk for the receptionist, tables for pamphlets or other exhibit information, and seating arrangements for visitors.

05

Qualities

This space should be large and open, and allow visual access to direct, nearby spaces to minimize any circulation confusion. Also views to the gardens and equipment would be ideal.

06

Codes and Standards

This space must be ADA accessible, with direct views to elevators or elevator signage. The reception desk must also accommodate ADA heights.

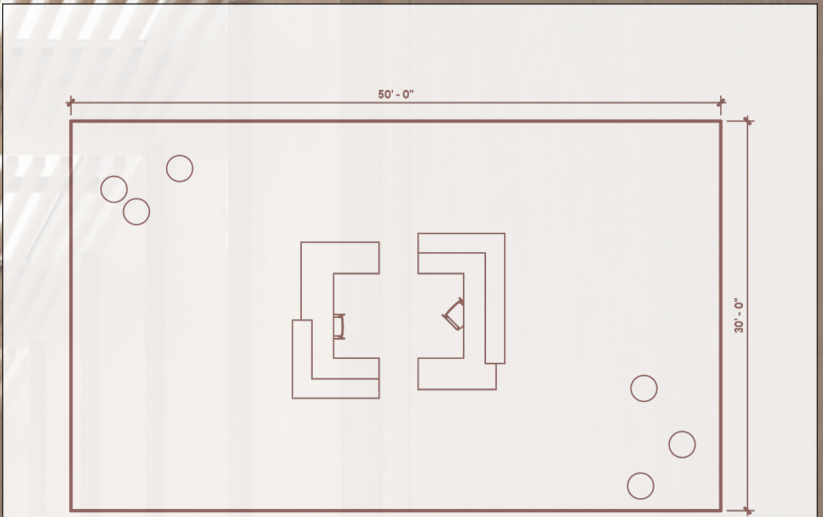


Figure 45 | 46

Lobby Plan Drawing | Lobby Design by MPA Architects

MoHF

GATHERING HALL

2,000 SF

01

Uses

The gathering hall will hold events or potential lectures held for the community or educational purposes. When not in use for events, it could be used for a social area with simple furniture arrangements.

02

Users

The primary users of this space will be the any member of the community or visitor, or private party using the space for educational or private events.

03

Adjacencies

Ideally, this space would be near the main entry for easy access from the entrance. Additionally, this space would be near one of the large garden areas for ideal views.

04

Furnishings and Fixtures

Furniture held in this space will come with a variety of furniture arrangements for the specific event being held. This could be tables and chairs, lounge chair configurations, or no seating at all.

05

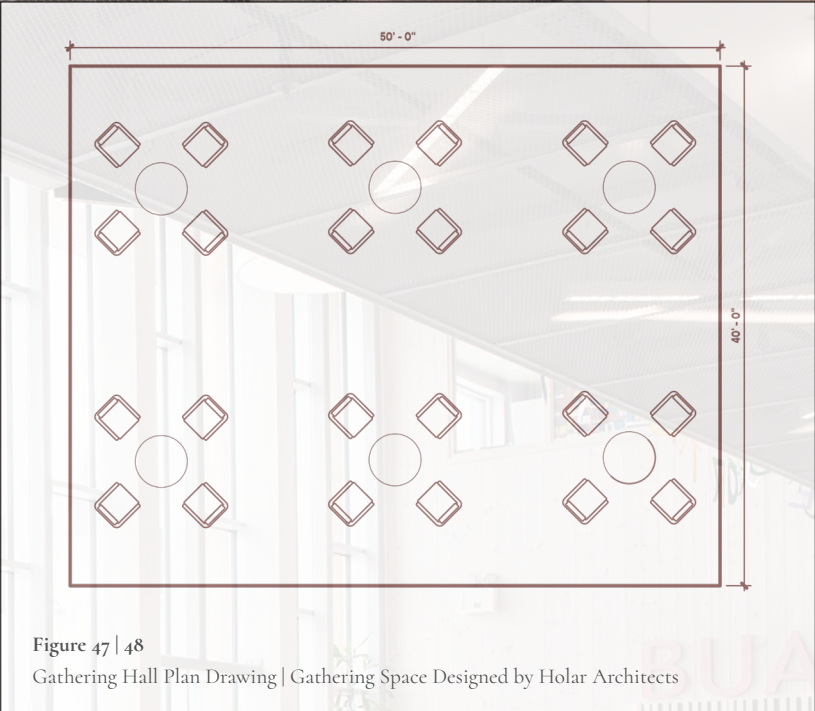
Qualities

This area should have ample natural lighting, and views to nearby garden spaces. Natural ventilation would be greatly encouraged, as well as artificial lighting for nighttime use.

06

Codes and Standards

This space should accommodate all ADA standards and occupancy loads in terms of door widths and stair widths.



CLASSROOMS

500 SF (3)

01

Uses

The classrooms will serve primarily the community for research classes on the plantlife and Rio Salado history. These courses will be for small class sizes, and likely short lengths of time.

02

Users

The users of the space will be any member of the community who would like to learn more about the research being conducted at the ecology center, and for any age.

03

Adjacencies

Adjacencies to the entry are critical since these will be used primarily by the public. However, they can be dispersed throughout the building, but wayfinding should be clear.

04

Furnishings and Fixtures

Stackable tables and chairs would be most ideal for these spaces so that they can be as flexible as possible. There will also be screens available for researchers and teachers can properly present.

05

Qualities

Every classroom should have access to natural lighting and ventilation, and some classrooms should have direct access to outdoor garden spaces, or at least very close by.

06

Codes and Standards

All classrooms should have proper spacing between tables to accommodate for wheelchairs and other accessibility equipment as well as proper egress door and circulation widths.

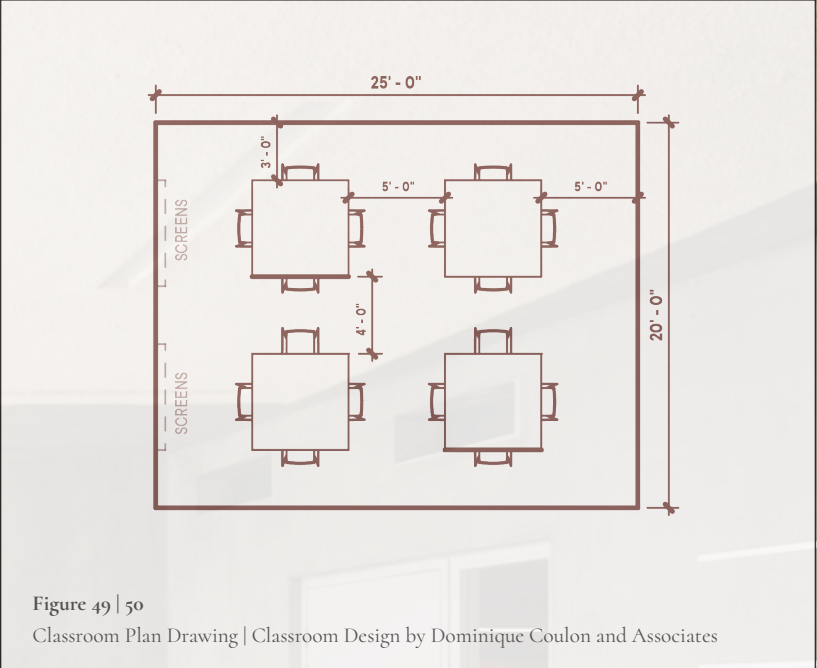
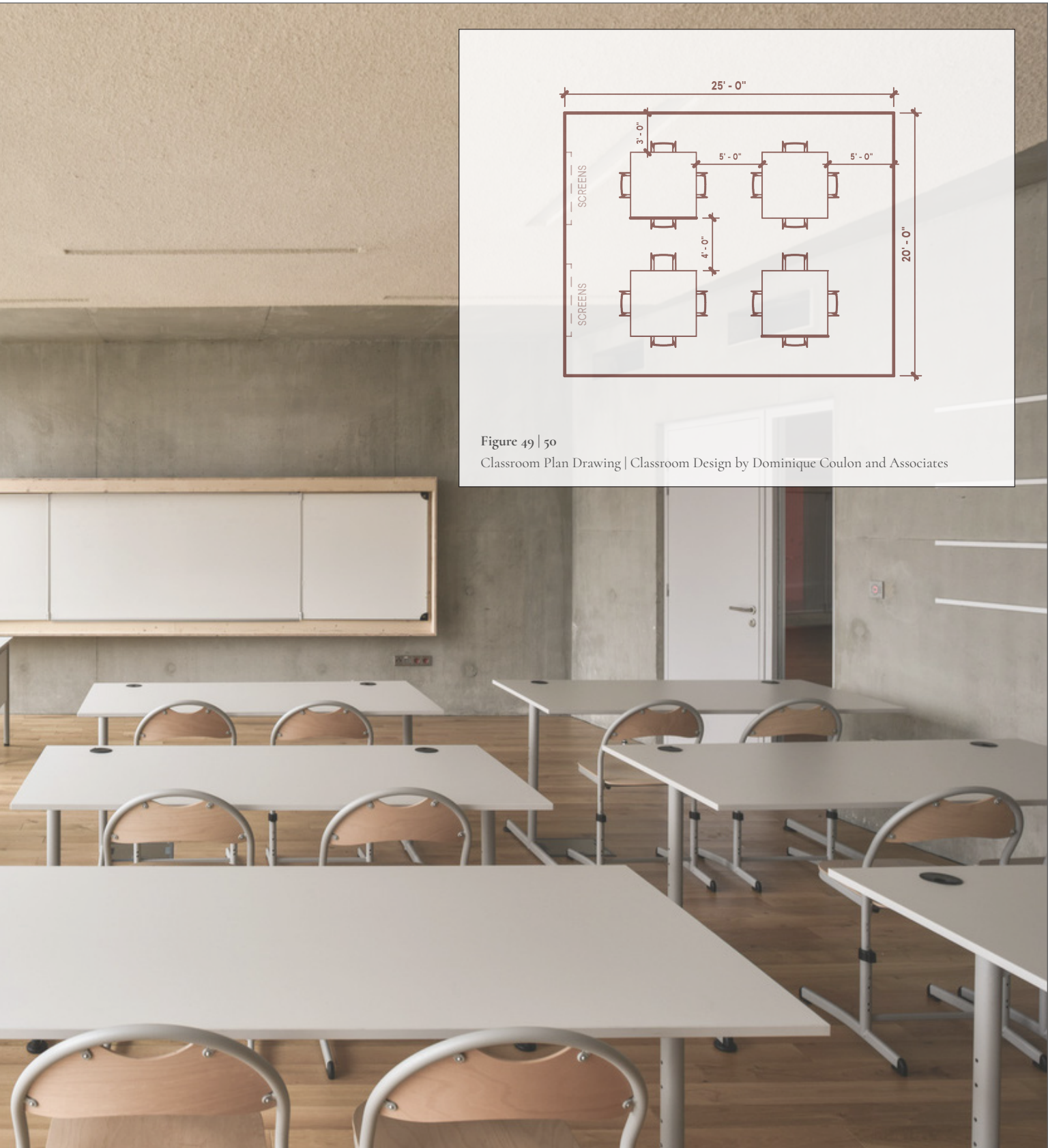


Figure 49 | 50
Classroom Plan Drawing | Classroom Design by Dominique Coulon and Associates

OFFICES

150 SF (4)

01

Uses

The office spaces will be permanent spaces for workers within the ecology center to have an complete their research or other work in a private environment.

02

Users

The primary users of these spaces will be faculty or students from ASU conducting research from the plantlife areas or historical research that can be displayed to the community.

03

Adjacencies

These spaces should be directly adjacent to the work spaces that area also provided to the faculty, and near the garden spaces where their research will be conducted.

04

Furnishings and Fixtures

Each office will be equipped with an L-shaped desk and two guest chairs at a minimum. Some offices could also accommodate a lounge chair and additional storage shelving if needed.

05

Qualities

Each office space would ideally have natural lighting and be near the garden spaces for easily accessibility. At the very least they may have glass facades for lighting and ventilation from nearby spaces.

06

Codes and Standards

Each desk should be equipped with legroom and circulation space to accommodate wheelchair accessibility.

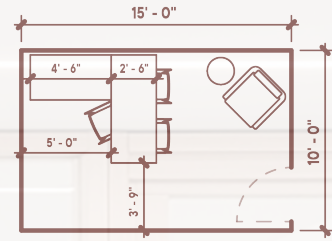


Figure 51 | 52

Office Plan Drawing | Office Design published by Yatzer

WORK SPACES

300 SF (2)

01

Uses

These work spaces are provided for the faculty and admin of the building to collaborate on research, and have a healthy work-life balance through multiple work environment options.

02

Users

The users of this space will be the full-time faculty working in the ecology center, as well as visiting students from ASU conducting research.

03

Adjacencies

Critical adjacencies include restrooms, and faculty offices. These spaces should also be near the gardens to be able to conduct research, and efficiently bring findings back to work zones.

04

Furnishings and Fixtures

Furnishings provided should accommodate multiple arrangements including large collaborative desk areas, small bench seating, and countertop space for storage, printing, etc.

05

Qualities

These spaces should have adequate natural lighting from nearby outdoor garden spaces being adjacent, and offer a warm and comfortable appearance for working individuals.

06

Codes and Standards

All work spaces should have proper spacing between tables to accommodate for wheelchairs and other accessibility equipment as well as proper egress door and circulation widths.



Figure 53 | 54

Work Space Plan Drawing | Work Space Designed by Balbek Bureau

EXHIBITS

750 SF (2)

01

Uses

The primary use of these exhibits are to present findings and other research conducted within the ecology center. Additionally, permanent spaces could be held for historical and educational river information.

02

Users

The main users of these spaces would be the community and other visitors, while on occasion the faculty may set up for important events or necessary cleaning.

03

Adjacencies

The exhibits should be near the lobby and entrance, and would ideally be near the gathering space as well so that visitors can view, and have a space to meet and relax.

04

Furnishings and Fixtures

Furnishings and fixtures may be very minimal in this space such as direct lighting for art and other pieces, and small benches for occasional sitting and viewing.

05

Qualities

This spaces likely will not have direct natural light due to damage of artwork or other artifacts. However, they should have natural ventilation and clear wayfinding in and out of exhibits.

06

Codes and Standards

All exhibits should have proper spacing between furniture and displays to accommodate for wheelchairs and other accessibility equipment as well as proper egress door and circulation widths.



Figure 55 | 56

Exhibit Plan Drawing | Gallery Space Designed by DA Integrated Limited

AMPHITHEATER

5,000 SF

01

Uses

The outdoor amphitheater should accommodate for up to 200 visitors for outdoor events, lectures, and other gatherings. The space could be used for shows, or other lectures conducted by faculty.

02

Users

The primary users of this space will be the community, or private parties that will be visiting the facility. This also may be used by anyone using the outdoor areas for recreational use.

03

Adjacencies

This space has no real critical adjacencies other than the garden spaces. This area is flexible to move as further site analysis is done and should be placed appropriately in terms of community site context.

04

Furnishings and Fixtures

The primary furniture arrangement of the amphitheater spaces is fixed seating in the style of long benches with possible plantings throughout the multiple levels to soften the edges.

05

Qualities

These outdoor spaces should have ideal views to site context that provides an interesting and engaging space to the community. Shading and planting would be most practical.

06

Codes and Standards

Proper egress walkway widths should be primarily addressed, as well as ADA spaces at the top of the amphitheater for accessible accommodations.



Figure 57 | 58

Amphitheater Plan Drawing | Amphitheater Design by Gray Matter(s)

OBSERVATION DECKS

3,000 SF

01

Uses

These spaces provide respite and retreat throughout the building. These decks will offer views to the architecture, and garden spaces with sustainable equipment for awe and observation.

02

Users

The users of this space are mainly the community, and anyone using the area for recreational use in the dry riverbed design. These spaces will be open to the public and integrated into the site design.

03

Adjacencies

Critical adjacencies are primarily the garden spaces and restrooms. It may be appropriate to also locate these observation decks near the amphitheater for additional seating and viewing of the stage and site.

04

Furnishings and Fixtures

Seating arrangements are provided to the right, showcasing multiple furniture types. These areas can be mostly standing room, but may offer fire pits, telescopes, and other amenities as the design progresses.

05

Qualities

These spaces should be welcoming and inviting, and potentially match the styles of other observation and trail designs throughout the Rio Salado future master plan that will also be near this site.

06

Codes and Standards

All slopes and ramps should be ADA accessible, as well as ample widths for walkways shall be provided.



Figure 59 | 60

Furniture Arrangement for Decks | Design by Didzis Jaunzems

GARDENS

10,000 SF

01

Uses

These garden spaces will be designed to accommodate many native and edible species of plants throughout the site design. These should be accessible to all users and encourage engagement.

02

Users

Everyone throughout the community is encouraged to engage with the garden spaces, as well as researchers may have specific gardens for their own research near their respective administrative areas.

03

Adjacencies

These garden spaces should be mostly dispersed throughout the plan, wedged throughout series of program. They should be viewed by the public whenever possible, and be near necessary maintenance spaces.

04

Furnishings and Fixtures

The garden spaces will hold multiple species of plant types, and may also have seating areas such as benches or simple water features integrated throughout the design.

05

Qualities

The garden spaces should have clear pathways and wayfinding for users to understand the different space types, the plants they withhold, as well as lighting to accommodate lit pathways at night.

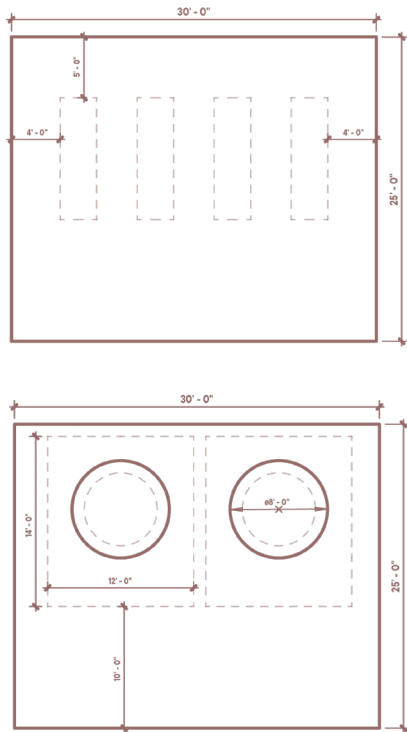
06

Codes and Standards

All pathway widths and ramp slopes should meet ADA Standards and Guidelines.

Figure 61
Garden Space Designed by EFPEKT

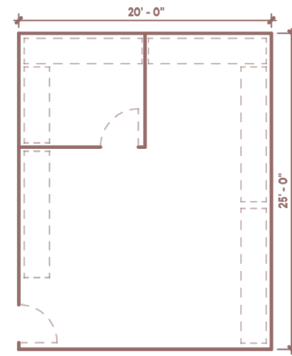




SOLAR & WATER STORAGE

750 SF (EACH)

Figure 62



PANTRY

500 SF

Figure 63

01

Uses

These areas will house all necessary mechanical and maintenance equipment for solar and water collection.

02

Users

Primary users of these areas will be trained personnel who understand the process and maintenance of this equipment.

03

Adjacencies

Adjacencies would ideally be near the garden spaces for minimal distance between plantings, bioswales, and other water collection areas.

04

Furnishings and Fixtures

Fixtures in these areas include water tanks, solar batteries, and any other necessary maintenance equipment.

05

Qualities

These spaces should be well-lit through artificial lighting and have cleanable surfaces throughout.

06

Codes and Standards

The solar and water storage areas will meet ADA accessibility standards lined out in the 2010 ADA Guidelines.

01

Uses

This pantry will store all edible plants or products grown in the gardens for distribution to local food pantries and banks.

02

Users

Faculty only will be allowed in these spaces, or volunteers from the community or from the ASU campus such as Pitchfork volunteers.

03

Adjacencies

Critical adjacencies would be the garden spaces to minimize distances between growing and storage areas.

04

Furnishings and Fixtures

Required furnishings include shelving for storage, as well as a walk-in refrigerated area with storage for perishables.

05

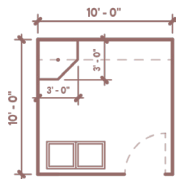
Qualities

These spaces should be well-lit through artificial lighting and have cleanable surfaces throughout.

06

Codes and Standards

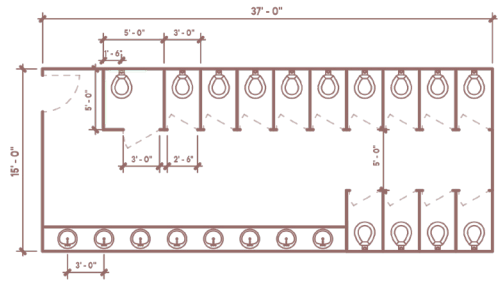
The pantry storage area will meet ADA accessibility standards lined out in the 2010 ADA Guidelines.



JANITORIAL

100 SF (2)

Figure 64



RESTROOMS

~500 SF (2)

Figure 65

01

Uses

Janitorial spaces will store all necessary cleaning supplies and equipment for building janitor use.

02

Users

Access to these spaces will only be by janitorial staff or other necessary faculty members.

03

Adjacencies

Adjacencies for the janitorial spaces include nearby bathrooms, and possibly near the classrooms for consistent cleanup.

04

Furnishings and Fixtures

Cabinetry and open shelving are crucial, as well as one mop sink area in the corner.

05

Qualities

Proper artificial lighting should be implemented, as well as no windows throughout.

06

Codes and Standards

One mop sink is required per the IPC, as well as these areas will meet ADA accessibility standards lined out in the 2010 ADA Guidelines.

01

Uses

Larger restrooms will be provided due to primarily assembly occupancy, as well as large gatherings and events will be common.

02

Users

All building users will have access to men and womens restrooms at all times of the day.

03

Adjacencies

Critical adjacencies are the janitorial spaces, gathering hall, and major circulation paths for easy access.

04

Furnishings and Fixtures

Per the IPC, the restrooms should accommodate 12 mens and 20 womens water closets, and 8 lavatories each.

05

Qualities

The restrooms should provide adequate lighting and all surfaces should be easily cleanable.

06

Codes and Standards

One accessible stall per restroom that follows all necessary ADA requirements.

C H A

P T E

R O 7

———— Regulations



Figure 66
Arizona Architecture

REGULATIONS

Code Analysis • Zoning Analysis

Understanding the regulations of the building and occupancy types are critical. This chapter outlines all necessary code and zoning restrictions necessary to highlight moving forward.

Occupancy Classification

This project falls in multiple occupancy classifications. Those classifications, as specified in Chapter 3 of the 2018 IBC in section 302.1, are as follows:

- Assembly (A-3) and (A-5)
- Business (B)
- Educational (E)
- High Hazard (H-2)
- Storage (S-1)

Construction Type

Type III-B Construction (IBC Chapter 6 Section 602)

This construction type was chosen due to its ability to be a combustible and non-combustible hybrid construction, and have the ability to incorporate cross-laminated timber (CLT) or other sustainable elements. This construction must be compliant with 2-hour fire resistant exterior walls, and 1 hour fire-resistant non-bearing walls within thirty feet of nearby structures. This construction additionally will be sprinklered allowing for exit distances to be one-third the diagonal distance of the area being served.

Occupancy Calculations

Occupancy Loads Specified in IBC Chapter 10 Table 1004.5

Gathering Space (A3) - 2,000 NSF / 7 net	286 occupants
Lobby (A3) - 1,500 NSF / 20 net	75 occupants
Outdoor Amphitheater (A3) - 1,500 NSF / 5 net	300 occupants
Outdoor Gardens (A3) - 10,000 NSF / 15 net	667 occupants
Observation Decks (A3) - 3,000 NSF / 7 net	429 occupants
Exhibits (A3) - 1,500 NSF / 7 net	215 occupants
Offices (B) - 600 NSF / 150 gross	7 occupants
Work Spaces (B) - 600 NSF / 150 gross	7 occupants
Classrooms (E) - 1,500 NSF / 20 net	75 occupants
Outdoor Amphitheater (A5) - 250 seats	250 occupants
Solar Storage (H-2) - 750 NSF / 300 gross	5 occupants
Water Storage (H-2) - 750 NSF / 300 gross	5 occupants
Janitorial (H-2) - 200 NSF / 300 gross	2 occupants
Mechanical (S-1) - 1,000 NSF / 300 gross	6 occupants
General Storage (S-1) - 750 NSF / 300 gross	5 occupants
Pantry (S-1) - 500 NSF / 300 gross	3 occupants

Total Occupancy Throughout Site 2,217 occupants

Total Building Occupancy 691 occupants



Figure 67
Parking Lot Design with Landscape

Allowable Height and Area

Heights and Area Specified in IBC Chapter 5 Section 504

Allowable Building Height *Table 504.3* - 75 feet

Allowable Stories *Table 504.4* - 3

Allowable Area *Table 506.2* - 45,000 Square Feet

Tempe Codes

2018 International Building Code (IBC)

2018 International Fire Code (IFC)

2018 International Mechanical Code (IMC)

2018 International Residential Code (IRC)

2018 International Existing Building Code (IEBC)

2018 International Fuel and Gas Code (IFGC)

2018 International Plumbing Code (IPC)

2018 International Energy Conservation Code (IECC)

2018 City of Tempe Administrative Provisions (ADMIN)

Plumbing Requirements

Assembly 3 Occupancy

1,912 Occupants

Water Closets: 7.6 Mens, 14.7 Womens

Lavatories: 4.78 Mens, 4.78 Womens

Assembly 5 Occupancy

250 Occupants

Water Closets: 1.6 Mens, 3.1 Womens

Lavatories: .6 Mens, .8 Womens

Business Occupancy

14 Occupants

Water Closets: .2 Mens, .1 Womens

Lavatories: .1 Mens, .1 Womens

Education Occupancy

75 Occupants

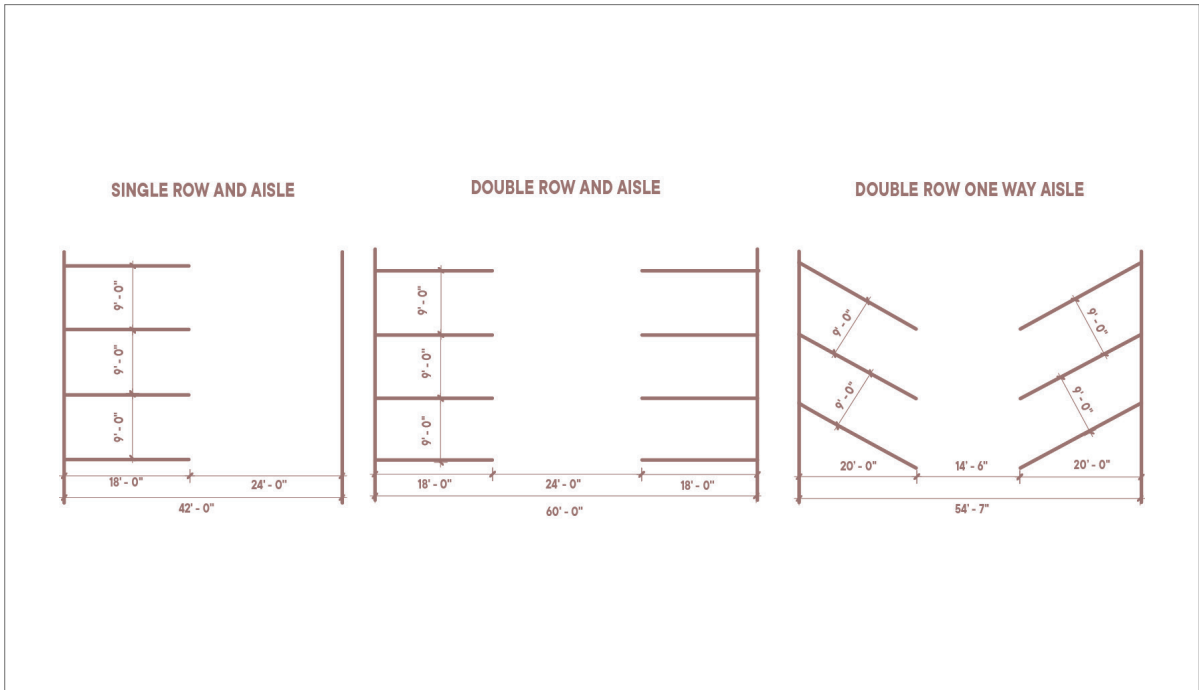


Figure 68
 Parking Guidelines

Water Closets: .75 Mens, .75 Womens
 Lavatories: .75 Mens, .75 Womens

Storage Occupancy

8 Occupants
 Water Closets: .04 Mens, .04 Womens
 Lavatories: .04 Mens, .04 Womens

Hazard Occupancy

1 WC and Lavatory per 100 Occupants
 Water Closets: 1 Mens, 1 Womens
 Lavatories: 1 Mens, 1 Womens

Drinking Fountains - 1 per 100 occupants

Total Mens WC	12
Total Womens WC	20
Total Lavatories	8 each
Total Drinking Fountains	7

Parking Requirements

The chosen site has been located near an existing parking lot. However, this lot does not comply with ADA parking requirements and standards for the lot (*Table 4-603E*) . If the Urban Ecology Center were to provide a parking lot the preliminary counts would be as follows based on the Tempe zoning and development codes: ¹

- 1 parking space per 250 square feet floor area
- 4 ADA parking spaces per 76-100 parking spaces
- 1 bike parking space per 4,000 square feet floor area

80 parking spaces, and 4 ADA parking spaces required
 6 bike spaces required

Bicycle spaces should meet the following: ²

- Should be clearly marked and near building entrances
- Should not impede main walkways
- Should as well lit as vehicle parking



Figure 69
Arizona Landscape

ZONING

Code Analysis • Zoning Analysis

Site Zoning

- **Parcel Number:** 314-14-043
- **Lot Number:** 124
- **Jurisdiction:** Queen Creek
- **Address:** W Rio Salado Pkwy, Tempe, AZ
- **Zoning:** Mixed-Use 4 (MU-4)
- **Adjacent Zoning:** Nearby zoning includes Light Industrial District (LID) just to the north, Planned Commercial Center (PCC-2) to the south, and a surrounding mixture of General Industrial District (GID) and Residential (R1-6).

Permitted Uses

This project aligns with the typology and occupancy types of a Mixed-Use 4 zoning district.

Lighting Requirements

The building must meet all lighting standards outlined in Section 4-803 in the Tempe municipal code. That includes the following:

- Maximum on-site lighting is 40 foot candles
- Lighting of exterior must illuminate all walkways and paths to entry
- All parking, breezeways, entrances and exits, loading docks, stairwells, and gates must be lit from dusk to dawn
- Light fixtures for public use must be out of reach of public and only accessible to employees of the business

Site Requirements

The building must meet all site requirements outlined in Chapter 7 in the Tempe municipal code. The following are critical for this project:

- Parking lots must have landscape treatments - 10% of the surface area minimum
- Parking structures shall have a perimeter landscape
- Land use buffers must accommodate trees and planting spaces
- All on-site parking areas adjacent to streets shall be screened from street view
- All service areas (loading docks, delivery, etc.) shall be screened from street view

Additional Design Considerations

Additional design considerations as outlined in the Appendix A of Tempe municipal code are as follows:

- Building should be accessible to every person and consistent with the Americans with Disabilities Act (ADA) Standards
- Crime prevention design is strongly encouraged
- Buildings must be contextually appropriate in terms of massing, scale, rhythm, scale, height, and form
- To mitigate heat island impact, new and existing buildings are encouraged to use highly reflective and permeable materials
- On-site and underground rainwater storage is permitted



Figure 70
Tempe Site Elevation and Flood Areas

Flooding Acknowledgments

The Urban Ecology Center, due to its site positioning, will be highly prone to flooding in the dry river bed area. Tempe's planning guidelines highlight the importance of floodplain management. Development near Tempe Town Lake would likely be subject to floodplain regulations that require flood hazard analysis and potential mitigation strategies. The city's floodplain management program emphasizes ensuring structures are elevated above the base flood elevation and may also require floodproofing for non-residential structures. Given the proximity to the dam, the project site would need to meet these standards to ensure safety and compliance with the city's policies.³

As shown in the image above, the site sits at approximately 1,119 feet above sea level. The average elevation of Tempe is 1,190 feet above sea level, while the Tempe Town Lake Dam sits at about 1,166 feet above sea level. These numbers will be critical in understanding when determining access points to the site, and how they relate to the future planning of the river from the city of Tempe. Additionally, Tempe and the Phoenix-metro have outlined a series of guidelines and requirements for flood hazard areas, which this site would follow.

Floodplain Management

As specified in the Chapter 12 Article II of the Tempe Municipal Code⁴

- Building must be elevated above the base flood elevation determined by the floodplain maps
- Required protection of floodplains must be understood and preserved due to water absorption and habitat provision
- All water collection equipment must be located to avoid impairment or contamination during flooding
- Wastewater disposal systems shall not be installed wholly or partially on a floodway
- All construction subject to flooding must have a minimum of two openings, and shall be no higher than one foot above grade
- All new construction and substantial improvements shall be constructed with materials resistant to flooding and flood damages

Figure 71
Jones Studio, Water Education Center



Chapter 07

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E N D

M A T

T E R

———— Conclusion

CONCLUSION

Final Thoughts

The Urban Ecology Center is an exciting project that aims to serve as not only an educational hub, but a space offering retreat and learning opportunities for Arizona's native ecosystems. The project will continue to focus on creating a meaningful connection with the urban environment, and the natural world. With an emphasis on sustainability and community engagement, the design will prioritize accessibility, flexibility, and functionality - creating spaces for education, hands-on experiences, and quiet reflection. The integration of local plant species, water and solar conservation systems, and climate-responsive design will ensure that the center aligns with its environmental goals. Furthermore, the project seeks to foster a sense of place and encourage the community through resilient and impactful design, to engage with nature in an immersive and responsive way.

To move forward with the design next semester, I will focus on refining the spatial organization, considering the relationships between the various program elements, such as classrooms, outdoor learning areas, and reflective spaces. This will involve exploring site-specific conditions, including climate, topography, and urban context, to inform the design decisions. I plan to integrate innovative ecological features like solar, rainwater harvesting systems, and native landscaping. By combining these strategies, I aim to create a cohesive and engaging environment that supports the goals of education, and conservation, ensuring that the design is both a functional and inspiring retreat for all ecosystems.

Thank you.

FIGURES

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