

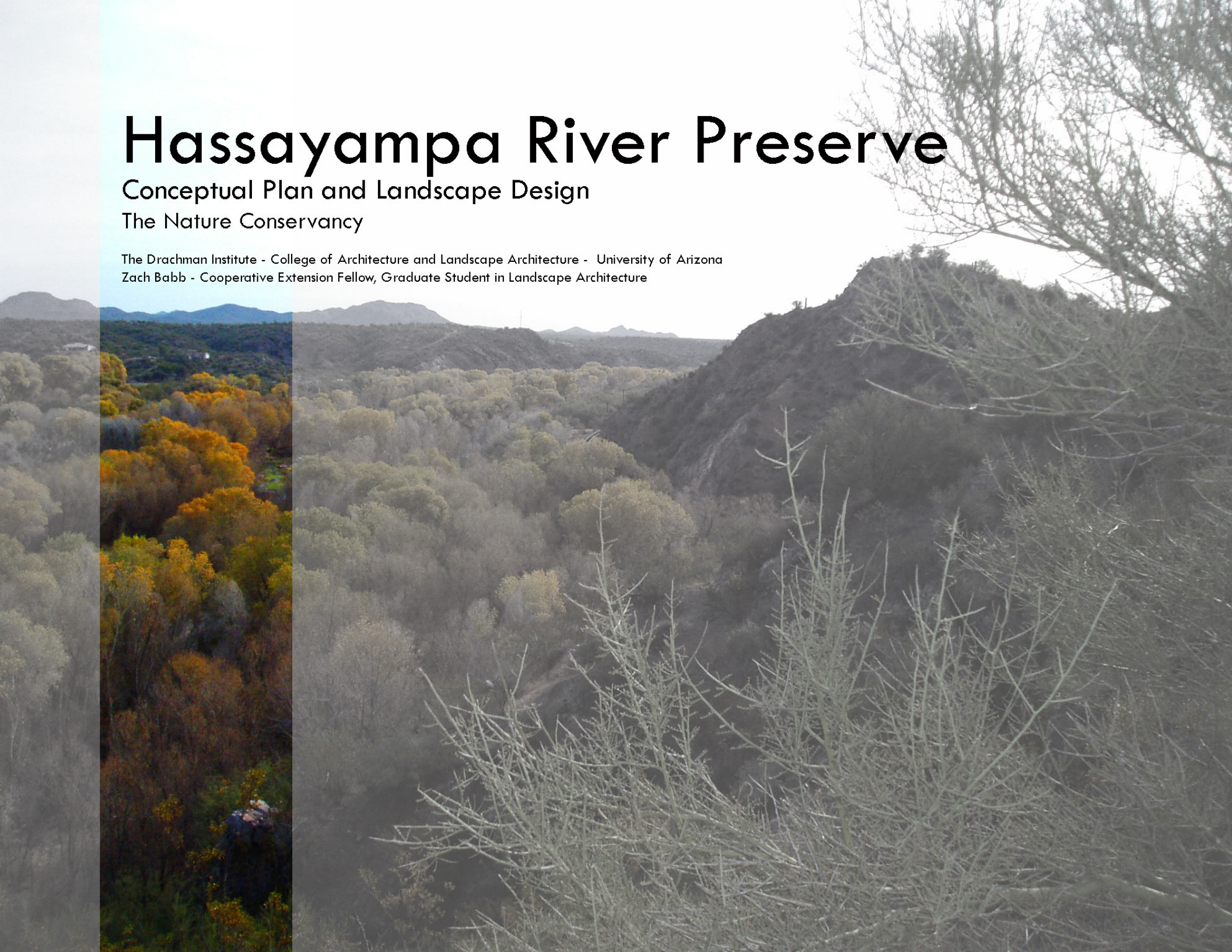
# Hassayampa River Preserve

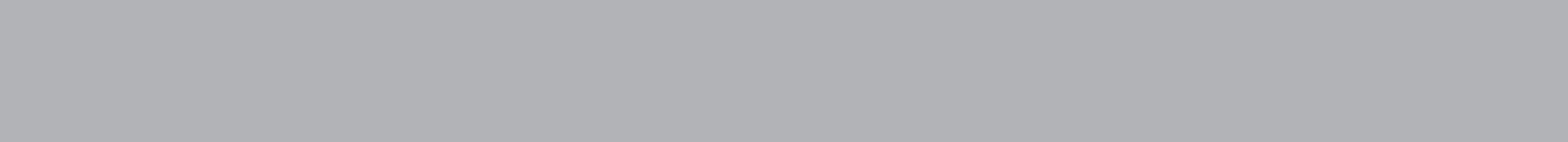
Conceptual Plan and Landscape Design

The Nature Conservancy

The Drachman Institute - College of Architecture and Landscape Architecture - University of Arizona

Zach Babb - Cooperative Extension Fellow, Graduate Student in Landscape Architecture







Prepared by The Drachman Institute:  
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Prepared for:  
Hassayampa River Preserve  
The Nature Conservancy  
Funded in part by:  
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June 2008

The Drachman Institute is the research and public service unit of the College of Architecture and Landscape Architecture at the University of Arizona, dedicated to the environmentally sensitive and resource-conscious development of neighborhoods and communities. The Drachman Institute dedicates its research and outreach activities to the proposition that housing is the building-block of neighborhoods, and neighborhoods are the building-blocks of communities.



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<http://www.nature.org/?src=logo>

Founded in 1951, The Nature Conservancy is a leading conservation organization working around the world to protect ecologically important lands and waters for nature and people.

Their mission statement reads "The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive."

Operating through donations and augmented by volunteer efforts, the Nature Conservancy prides itself on its public service and wide ranging public support. The Nature Conservancy has over one million members in its organization and they are fighting to protect the natural world in all fifty states and in over 30 countries. A model of success, the Nature Conservancy has saved over 110 million acres of land and over 5000 miles of river worldwide.

### The Hassayampa River Preserve



The Hassayampa River Preserve is a 660-acre nature preserve located off US highway 60, just south of the town of Wickenburg, Arizona. The preserve occupies the former Brill Ranch headquarters, dating back to the 1860's. The site was also one of the first dude ranches in Arizona in the 1930's, offering a glance back on much of Arizona's economic and cultural history.

The preserve is the primary tourist attraction for the community of Wickenburg, and receives approximately 10,000 visitors per year. While popular with school children, hikers, walkers, and photographers, the preserve is also a world renowned birding destination that is home to over 280 bird species.

# Introduction

## Chapter 1

Along most of its one hundred mile course, the Hassayampa River flows beneath the surface, leaving a green trail as the only alert to its presence. However, at a critical point in its course the river emerges to the surface and creates a natural wonder, teeming with life, in the middle of the sonoran desert.

Over 90% of the riparian habitat in the southwest is considered threatened, degraded, or completely lost. This is catastrophic change for native plant and animal species with up to 80% dependent on this rare habitat type.

*The Hassayampa River Preserve protects one of the rarest, most threatened, and most biologically diverse environments in the Southwest United States.*



**Hassayampa River Preserve**

<http://www.nature.org/wherewework/northamerica/states/arizona/preserves/art1970.html>



## Recognizing a Critical Resource

Water is in critical supply throughout the arid southwest, but when it is present it creates a cacophony of life. We see this along the banks of reservoirs and during the monsoon season. The Hassayampa River Preserve experiences this incredible bounty of life year round, and is a natural, educational, and cultural treasure for the state of Arizona and the community of Wickenburg.

## Preservation and Conservation

The Nature Conservancy approached the Drachman Institute in 2005 to receive assistance in rehabilitating some of the guest facilities at the Hassayampa River Preserve.



# Introduction

## Chapter 1

### PRESERVE LOCATION

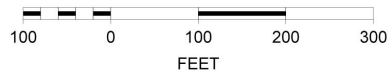
The Hassayampa Preserve is located southwest of Route 60, near mile marker 114. It is north of Phoenix.

The address:

Hassayampa River Preserve, 49614 Highway 60, Wickenburg, AZ 85390



SCALE 1 : 2,097








# Introduction

## Chapter 1



### PROGRAM ELEMENTS

-  Gateway and Entry Sequence
-  Interpretive Signs
-  Trail Loop

This project is comprised of three separate sections:

- Signage
- Visitor center courtyard planting design
- Trail design criteria



### SIGNAGE



#### Signage:

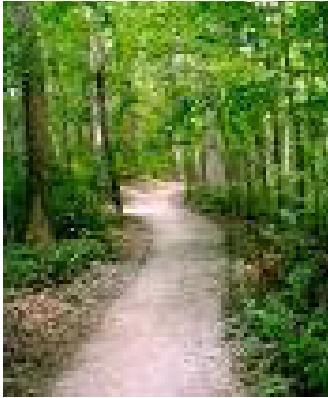
The Nature Conservancy needs conceptual ideas to improve the visitor experience at the preserve. Areas needing attention are the entry/arrival sequence, way-finding within the preserve, and educational/informational signs describing the natural and historic wonders of the preserve.



# Introduction

## Chapter 1

### TRAILS



<http://www.playworldsystems.com/pd/images/ada3.jpg>

Trails that serve Americans with disabilities:

Currently, there are no ADA (Americans with Disabilities Act) accessible trails at the Hassayampa River Preserve. However, one of the primary walking routes, the loop that circles the spring fed pond, can accommodate a fully accessible trail. Ultimately, these facilities will open the preserve to a wider range of user groups and offer a deeper, more meaningful educational experience. This document contains solutions related to the planning, design, construction, and maintenance of ADA accessible trail facilities.

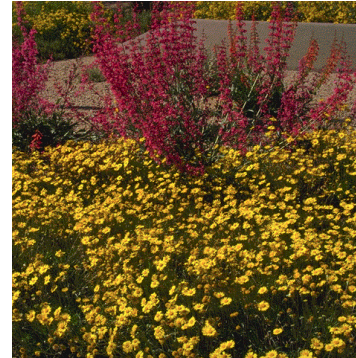




### THE VISITOR CENTER GARDEN



The Arthur L. Johnson Visitor Center is the heart of the preserve and includes nearly one thousand square feet of open space that is used as a garden for visitors and staff alike. Currently, the garden is under-utilized and needs to be replanted. The Drachman Institute will provide a planting design so that the garden will be as pleasant and enjoyable as the rest of the preserve. This garden design uses native species and is interactive and educational for visitors, bridging the human and natural worlds.





# *Signs and Wayfinding*



NO PARKING



### Types of signs

There are four types of signs for trails: regulatory, warning, informational, and educational.

Regulatory signs are used to inform users about the rules of the trail. Such signs are stop, yield, right-of-way, speed limit, and exclusion signs.

Warning signs are used to alert trail users to potential hazards, usually near intersections, bridges, and severe grade changes. These signs include any hazard that may be found along streets and roadways or specific to a trail.

Informational signs are usually used to orient trail users to their location or tell them about facilities and points of interest. These signs may include mile markers, kiosks with trail maps, and information about trail difficulty levels. In addition, public bulletin boards could be placed on trails near towns or trail heads to inform people about civic and cultural events. Such use would encourage people to use trails to come into town.

Educational signs can teach trail users about historic relics left in place along the trail: old bridges, canals, work camp refuse heaps, and building foundations. Local history can also be included in the signage to bring life to an unfamiliar area. Signs are opportunities for interpreting unique features of geology, ecology, and even reminding users of trail etiquette.

### Use of standard signage

Because trails are transportation corridors, signage familiar to street users should be used for ease of recognition. Signage standards can be found in the U.S. Department of Transportation's Federal Highway Administration's *Manual on Uniform Traffic Control Devices (MUTCD)*.





Signage has different functions. The sign design should marry appropriate material with the intended use of the sign.

### Signage materials

Several kinds of materials for signage are available, each with advantages and disadvantages. Cost, maintenance, and aesthetics should all be considered when planning a trail signage system.

Plastics are widely available in a number of forms. Some plastics can fade in sunlight. Many plastics expand and contract with temperature changes.

Fiberglass is durable, impact resistant and can be formed into customized shapes. Graphics can be applied then sealed for color fastness.

Wood can be relatively inexpensive, and has a natural appeal but must be treated for weather resistance. It can also be easily damage by vandals.

Aluminum is widely available and does not rust. However, some types of aluminum require special surface treatments to protect against pitting.

Steel is also widely available and easy to weld and form. However, it too may need special finishes to avoid rust.

Stone is a natural material and extremely durable but difficult to work with. It is also heavy to move to remote trail sites.

Recycled materials can also be used, especially where it is desirable to instruct trail users about ecological behavior.



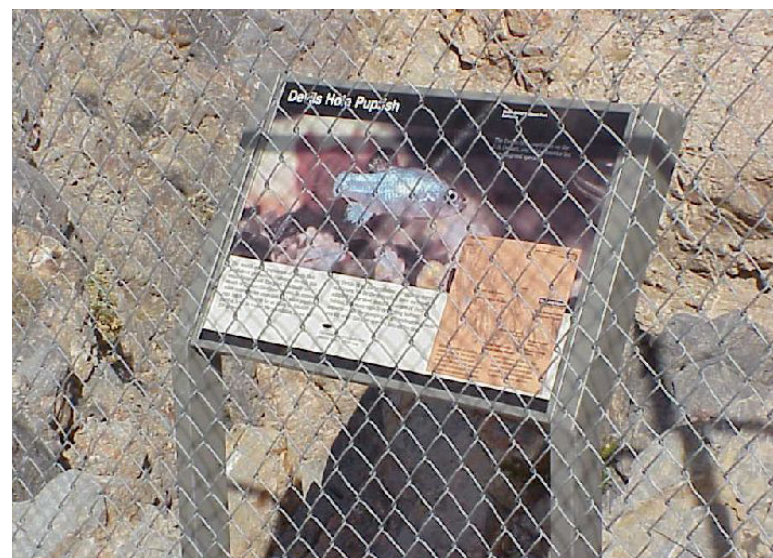




### Making trails unique

The use of a recognizable logo adds uniqueness to a trail and helps create unity and continuity. Create a logo, simple and recognizable, which represents the community or organization supporting the trail. Place the logo on all signage if possible, especially at orientation and public informational kiosks and trail heads. By repeating the logo at regular intervals, such as at quarter-mile trail markers, a sense of continuity is reinforced in trail users' minds.

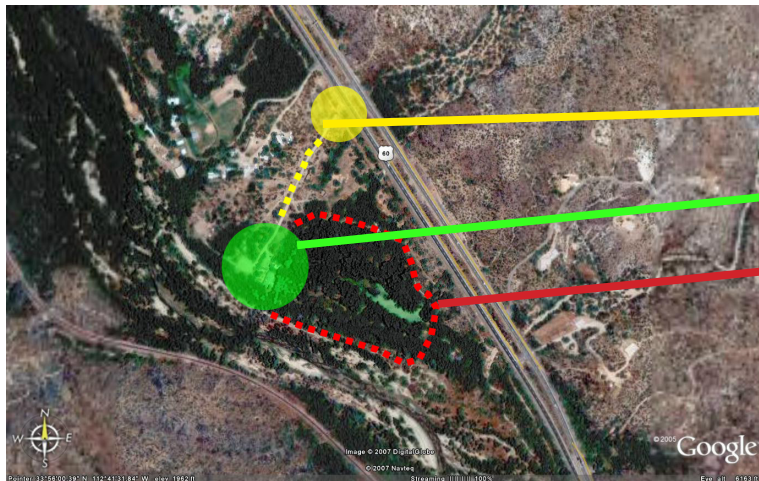
Also, different logos may be used with different connecting trails. This "branding" of each trail helps users orient themselves and emphasizes the singular experience that each trail offers - for example "Pond Loop Trail". Logos can also be used on for fund raising and public relations materials such as T-shirts, letterhead, and window decals. Repeated emphasis of a trail organization's logo and its association with a trail builds strong and lasting impressions of professionalism, public support and interest, leading to greater trail use and contributions in the form of volunteer, political, and financial support.



### Signs and Way Finding

Movement to and through a site is an orchestrated experience, not unlike a dance. Proper use of signage and way finding devices helps direct and form this experience for the users.

Carefully designed and applied signage will increase the emotive response from the visitors. A more powerful sense of arrival, a redefined sense of place, and a better understanding of the message and purpose of the site enhances the experience and improves the profile and the value of the Preserve.



### Signage Goals:

Conceptual schemes for sign designs and placement are presented herein. This includes possible materials, design styles, information recommendations, and location criteria.

The "Hassayampa River Preserve Interpretive Outline" document was referenced in building these concepts.

Other factors considered are cost analysis, durability, accessibility, context, and importance to the overall visitor experience. Three areas require appropriate signage:

-The Entry Sequence

-Interpretation Signs

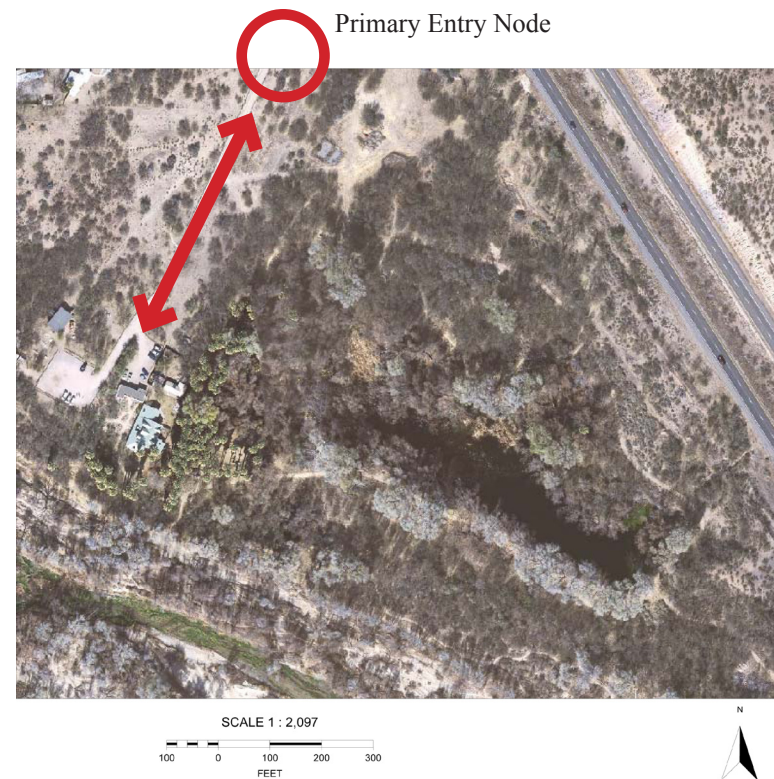
-Way Finding Markers



## The Entry Sequence:

Currently, there is no strong sense of arrival at the Hassayampa River Preserve. There are several opportunities to improve the safety and aesthetics of the entry experience. Our recommendations are:

- Improve visibility of the entry point for visitors arriving from the highway. Make this point an announcement for an impending experience.
- Create a sense of place and an historical context through the use of materials, plantings, and iconography.
- The concept must be robust and durable, yet aesthetically pleasing. It will use local materials to ensure cost effectiveness.



The primary entry to the site is along a dirt access road. The road is lined with a wooden fence, adding a western feel to the former ranch. We suggest adding an allee of native tree species to both sides of the road to create a rhythmic sense of movement, while accentuating the existing sequence.

### The Entry Sequence: A Visual Analysis

Starting from US 60 and proceeding into the Hassayampa River Preserve.



1.



2.



3.



4.



5.



6.





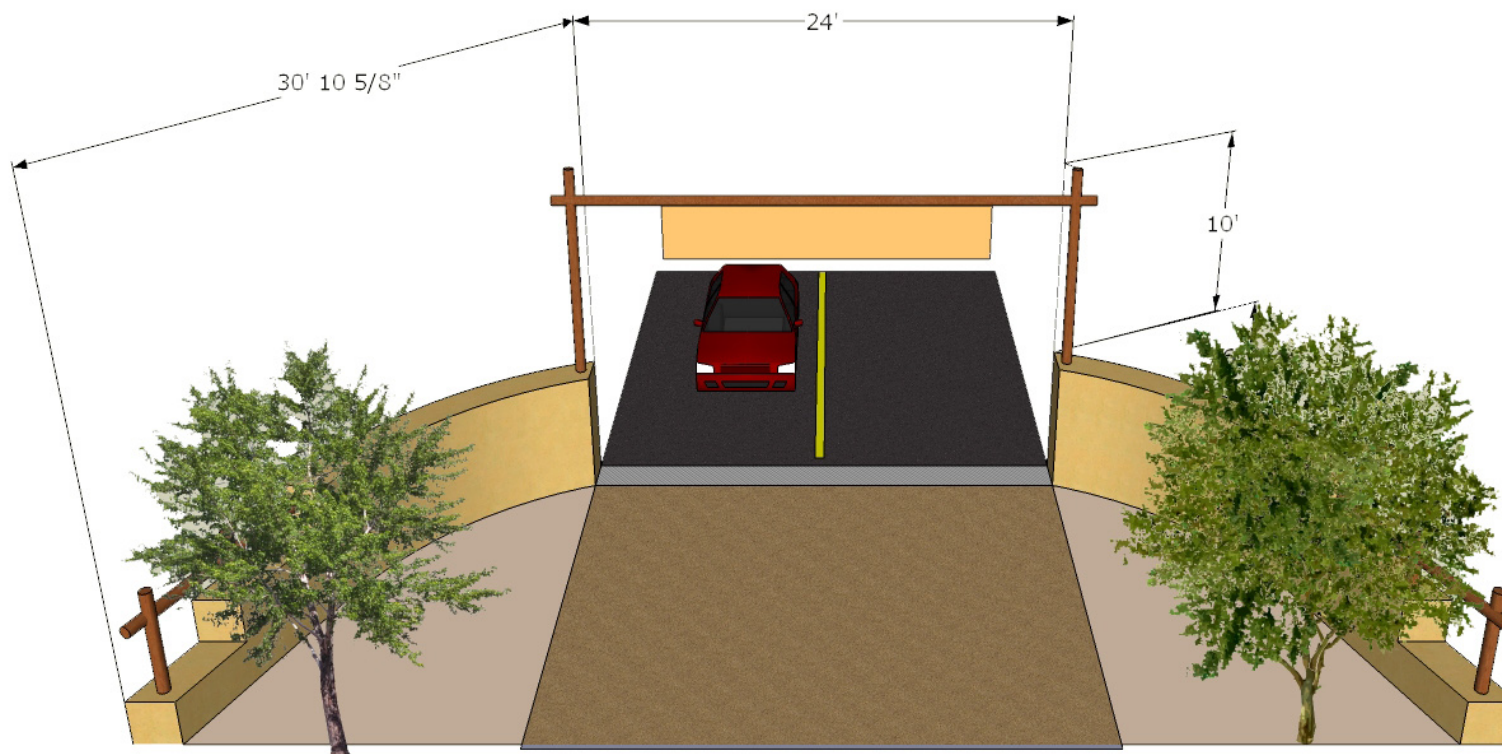
View 1

### The Entry Sequence: Create a Landmark

Construct a visually significant entry point to the Preserve. Use regionally appropriate material such as adobe or stucco masonry to build the side walls. Wooden timbers for the side fencing will support a sign. These materials are currently used in other elements at the preserve and they evoke an historical and cultural motif that is consistent with the goals and objectives of the development of this site. The walls will be highly visible from the road and it will help frame approaching vistas and enhance the arrival and entry sequence.



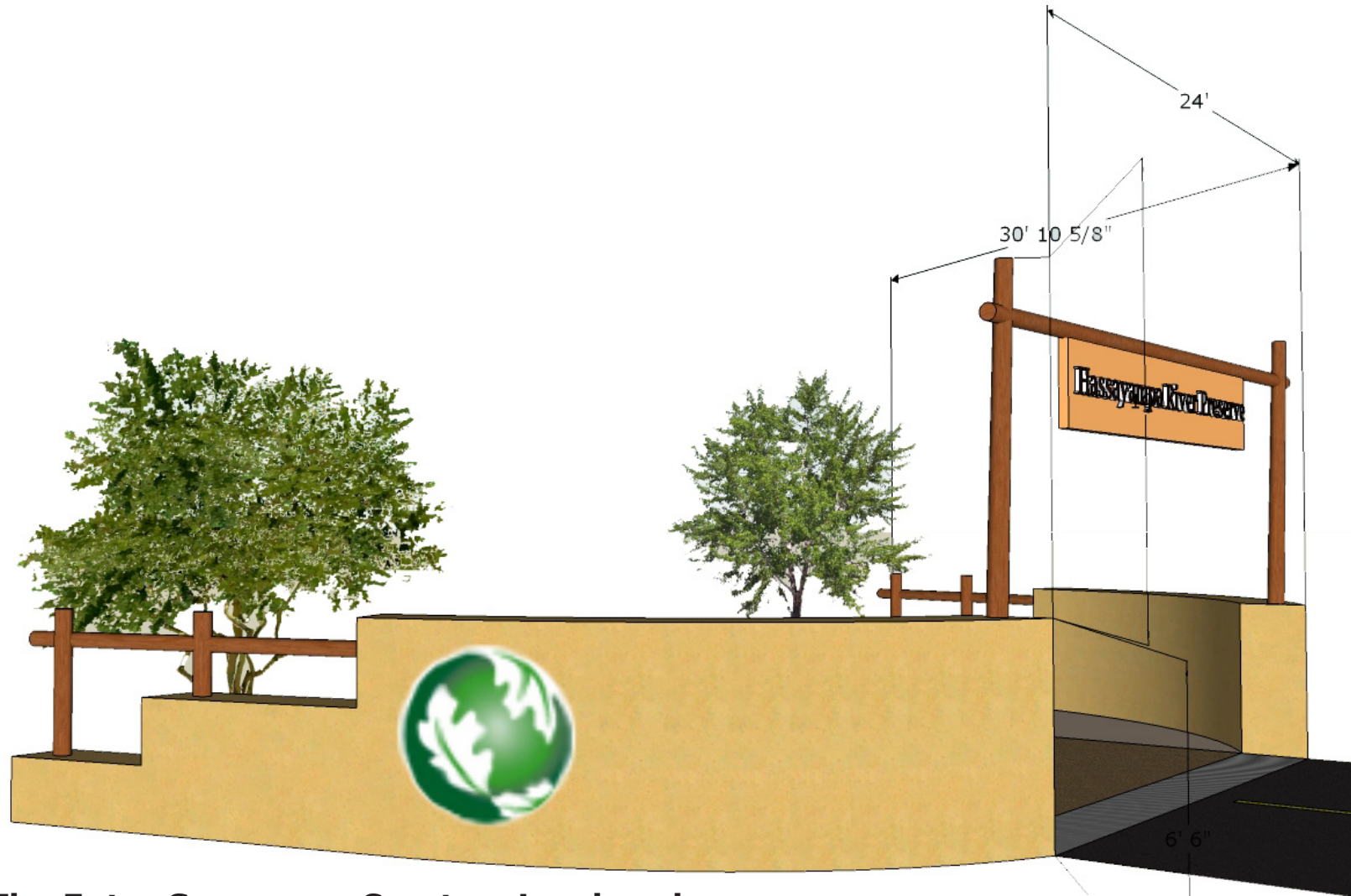




View 3

### The Entry Sequence: Create a Landmark

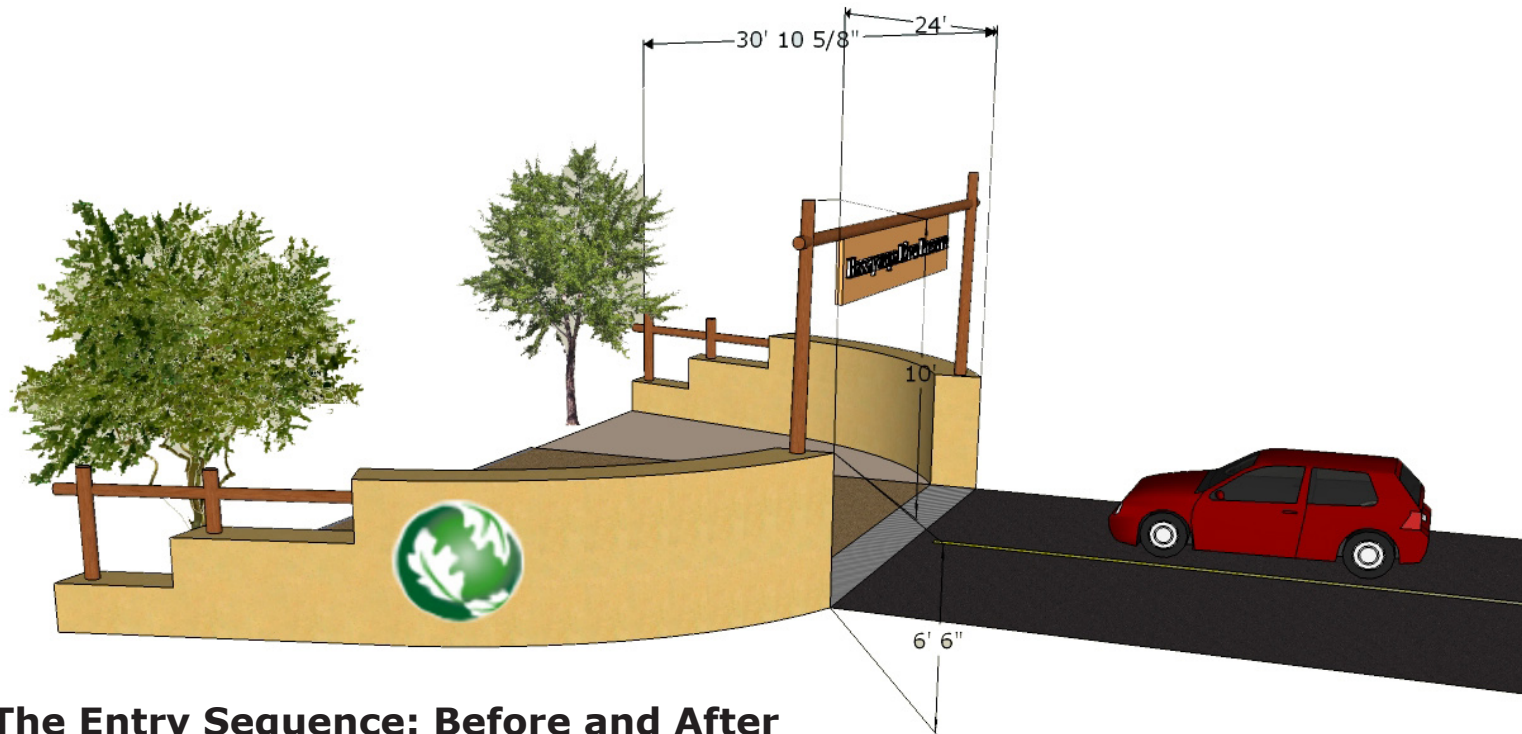
The exit sequence will be improved as well. Visitors departing will gain a better sense of departure from the site as the walls will create a 'choke' point that opens onto open space vistas and the highway. This is also an opportunity for the Nature Conservancy to place informational signs reminding departing guests as to what special events are scheduled at future dates, thereby increasing the annual attendance levels.



### The Entry Sequence: Create a Landmark

The Nature Conservancy logo or an art piece or mural can be added to the wall to enhance the aesthetic appeal and to further create a well-defined landmark. This concept seeks to be understated, yet highly visible.





**The Entry Sequence: Before and After**



Before



After

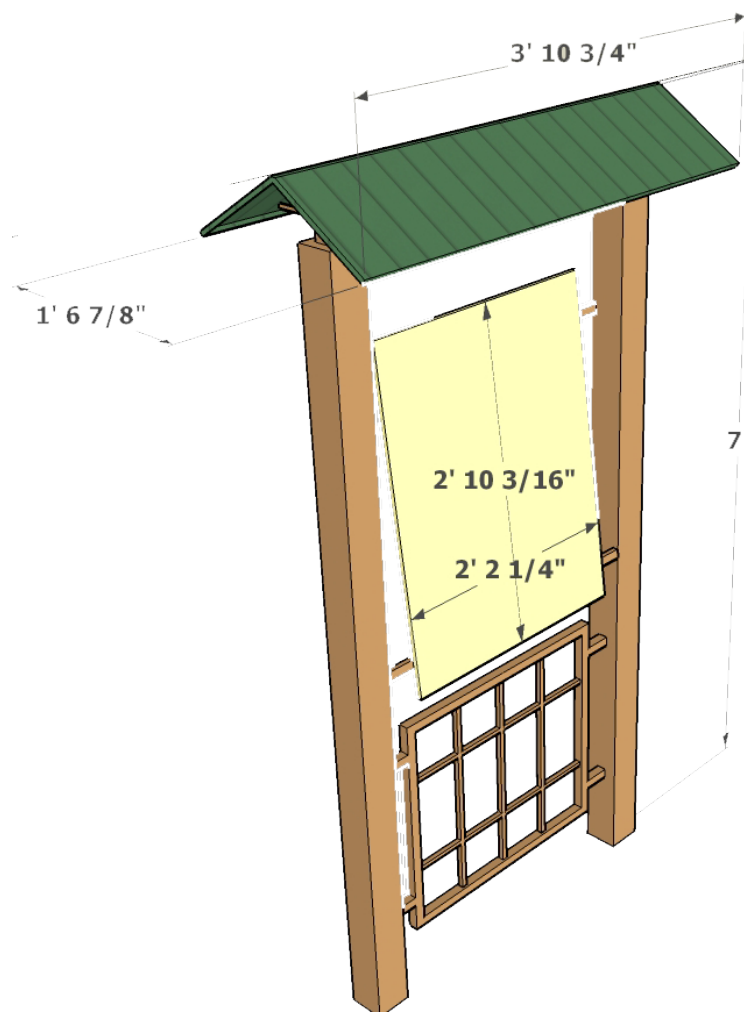
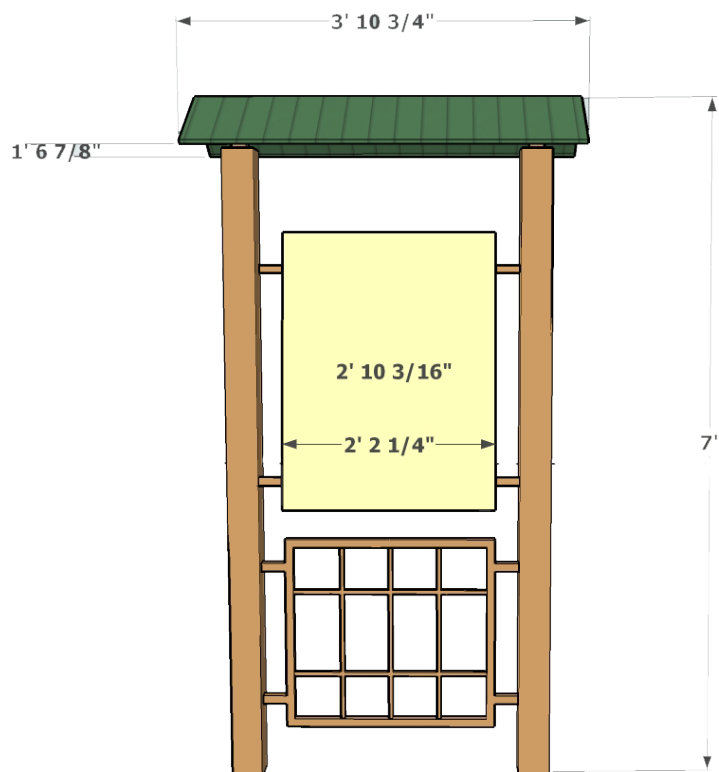
### The Entry Sequence: Scale and Sense of Place



Using traditional materials and a simple yet beautiful design, improves the profile of the entrance for visitors arriving on US 60 without creating an eyesore. Safety and accessibility is enhanced. It also add helps deepen the visitor experience by connecting to the site's southwestern ranching history. This concept does not overwhelm the surrounding view-sheds and fits the overall context of the site.

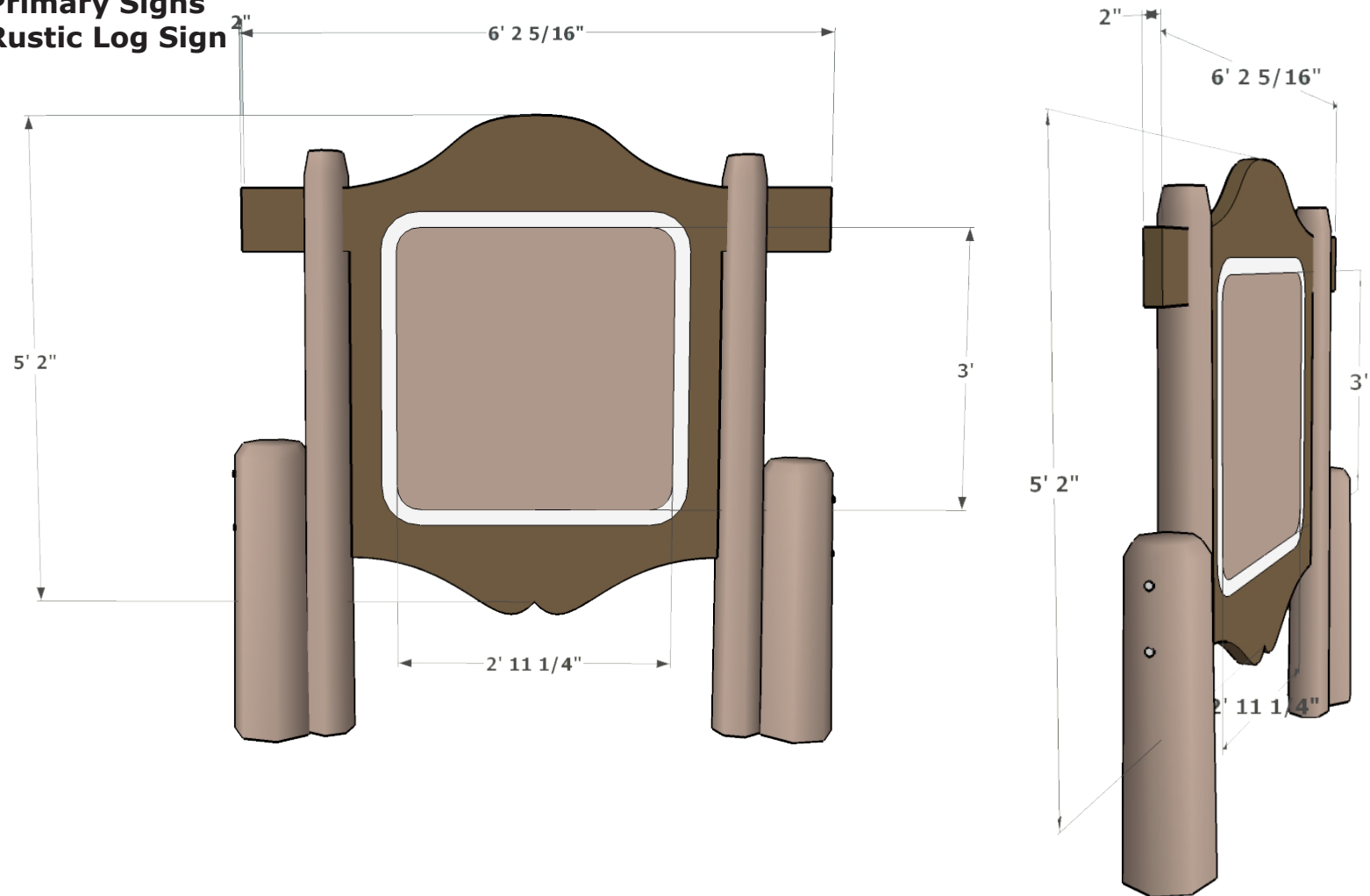


### Informational & Interpretive Signage: Primary Signs Hutch Sign



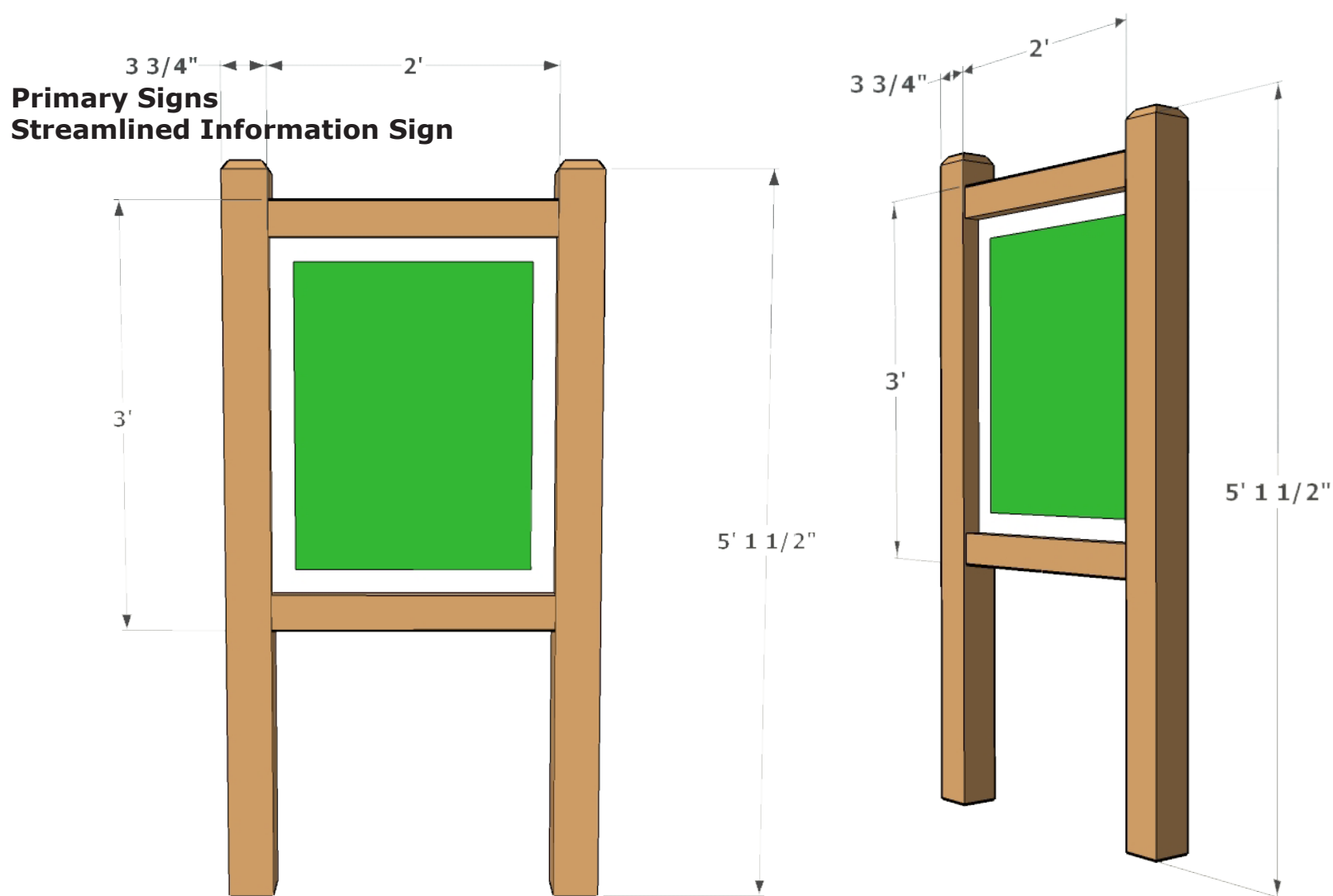
This concept uses a wooden frame set on two posts. There is an aluminum roof over the display board to protect it from rain and direct sunlight. Over seven feet tall, this concept is meant to be a primary information source at a trailhead or at a significant node such as a picnic area. It can also be clustered, creating a series of informational boards.

### Primary Signs Rustic Log Sign



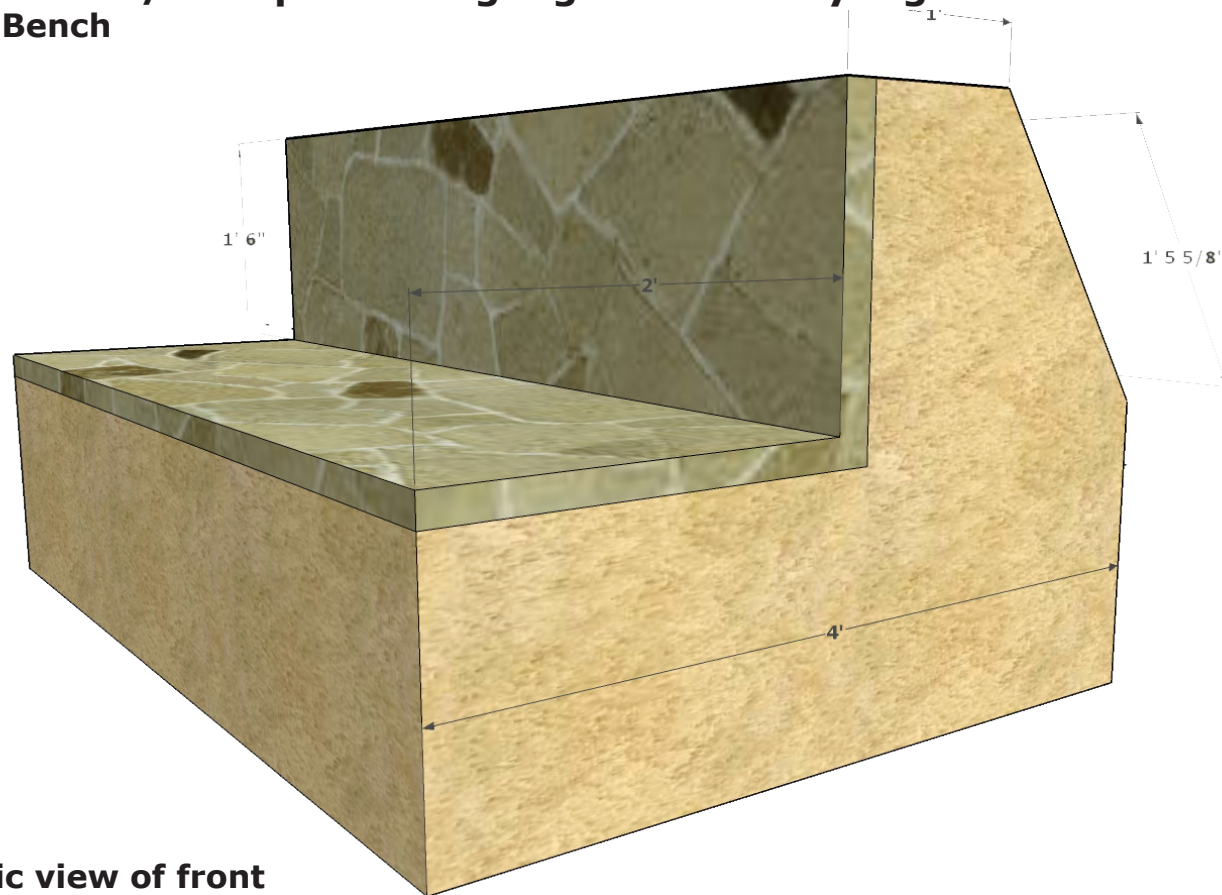
The support for this sign comes from two groups of wooden timbers (i.e. logs). The sign itself can use a wooden frame and either an aluminium or plastic plate for the display board. Although quite pleasing to the eye, this concept is best suited for an entry or exit area, as a greeting of sorts, rather than to provide detailed information.





A very simple concept, this sign can be used in groups, with information on the front and the back, to educate Preserve users. Although the concept shown here is made from wood, it could very easily be made from metal or a composite material .

### Informational/Interpretive Signage: Secondary Signs Earthen Bench



**Isometric view of front**

This is an adobe or straw bale bench with a stone cap. This bench also serves as a sign. It is meant to sit at one of the viewing areas along the trail near the pond. Durable and pleasing to look at, it would also be expensive and nearly permanent once it is placed. The local materials and craftsmanship tie it to the setting, making it an iconic addition to the Preserve.

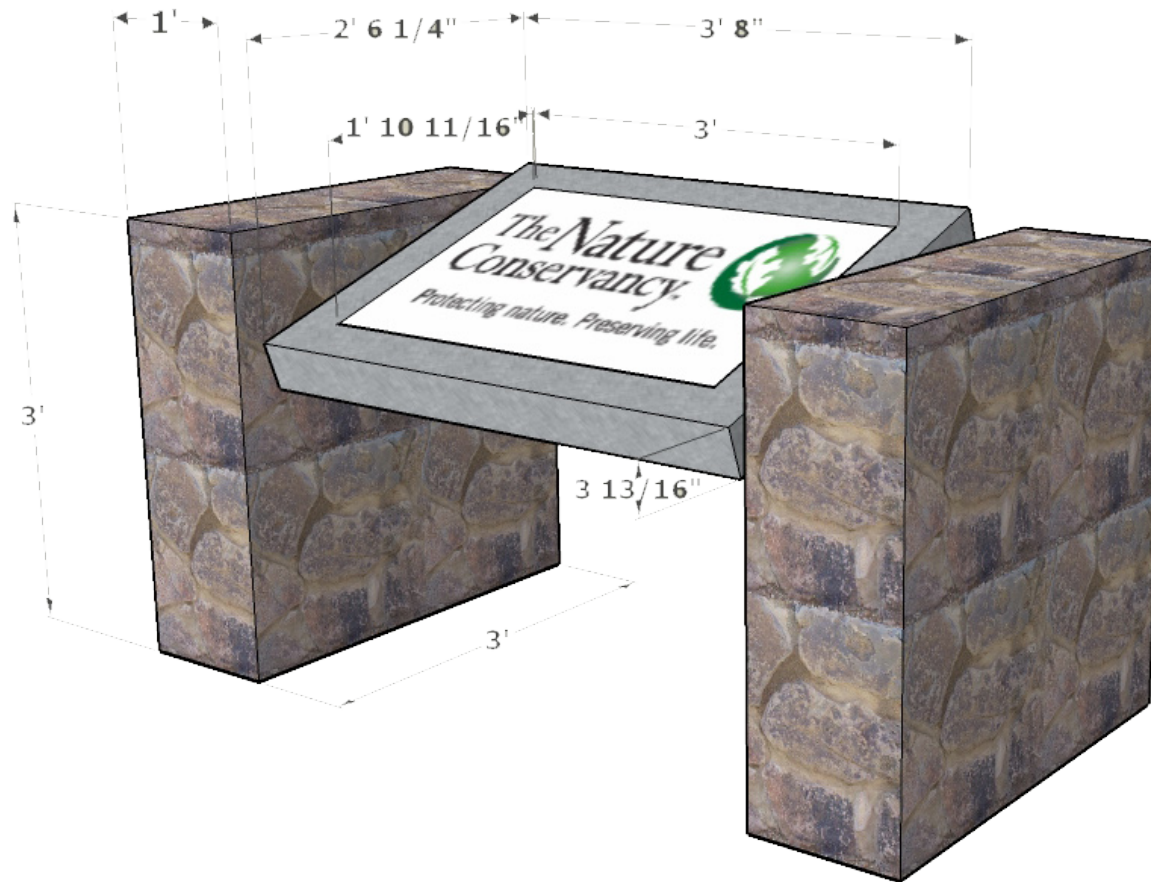




### View of the back

The back of the bench functions as sign with significant space for interpretive information. The bench is a gathering place. This technique of using a bench as signage capitalizes on the time visitors spend lingering, observing, reading and discussing. The low profile of the bench does not interfere with views or create an unnatural focal point on the landscape for those looking outward or towards the bench.

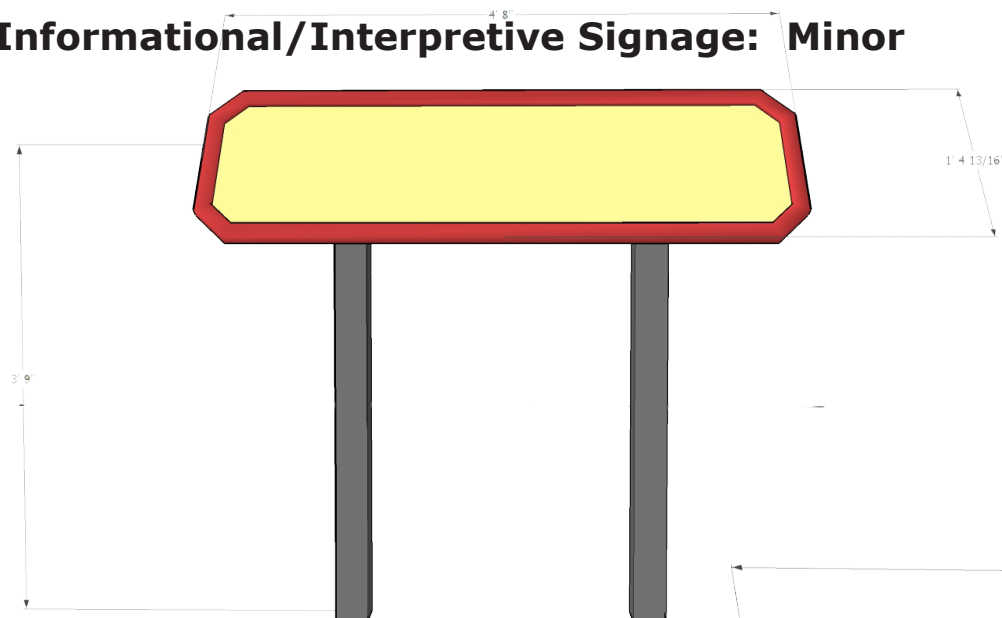
### Stone Interpretive Sign



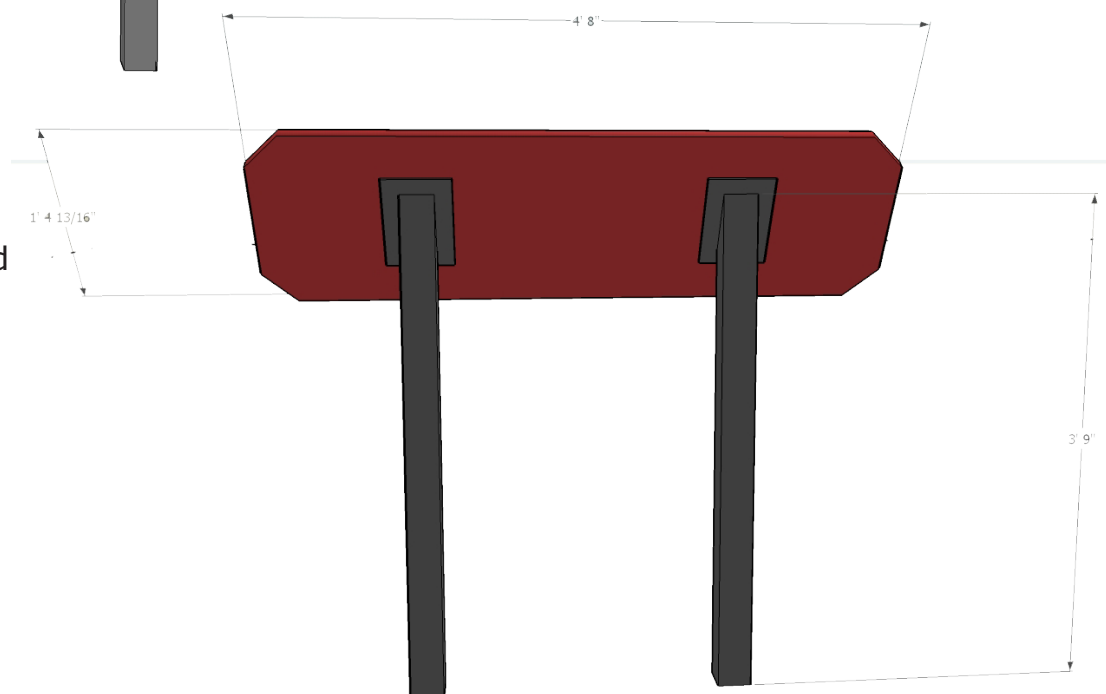
This low profile sign station uses stone supports and a metal frame to contain the 24" x 36" sign display. This is a highly durable concept mixes modern and traditional styles. The material palette uses elements that are both natural and artificial. The size of the display area could easily be expanded to accommodate the space needed for information. It is also a low-cost option.



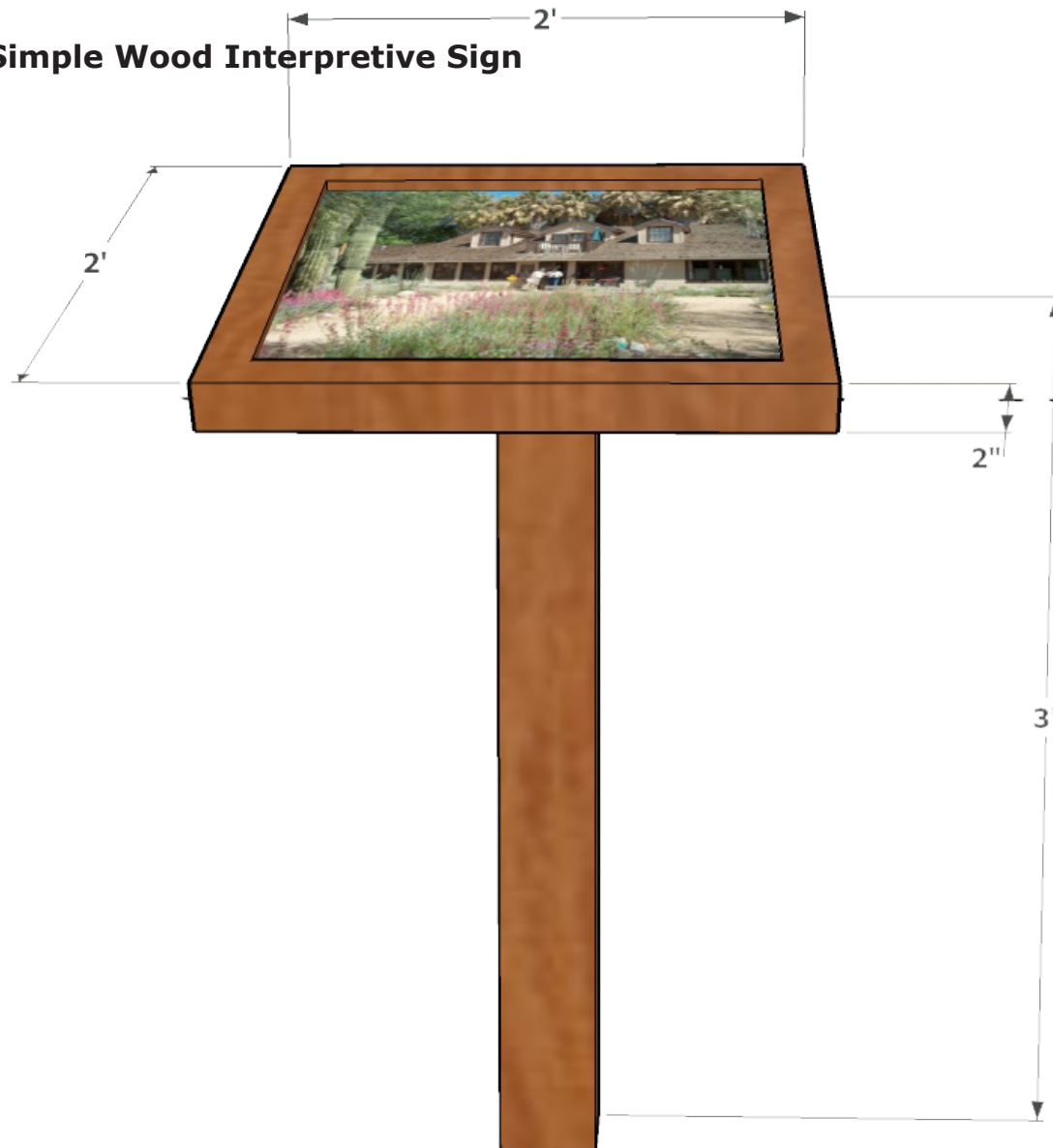
### Informational/Interpretive Signage: Minor



Standing under four feet high, this concept is cost effective and maintains a low profile. The materials shown here includes metal stands, a metal frame, and space for a plastic or metal sign. This concept could be built out of wood, if desired.



**Simple Wood Interpretive Sign**



This is the simplest option of the various concepts. This small wooden stand holds a single display board. A sign of this size and nature is best suited for some of the viewing areas off the main trail.







# *Accessibility*





Accessibility is important for making the Hassayampa Preserve noticeable for those who both intentionally come to visit and those who are passing by. It is also important to consider multi-modal access links. Connecting the Preserve to existing bicycle routes and trail systems aides in creating a series of interconnected nature nodes and encourages and educates people about non-vehicular transport.

The following material was taken from  
Trail Guidelines: *Pedestrian and Bicycle Design Guide*  
City of Flagstaff Coconino County  
Arizona Department of Transportation, Flagstaff Metropolitan

### Bicycle Paths

Dedicated bicycle paths will not only encourage more bicycle use, but will improve safety conditions by restricting use to specific routes. These routes with increased volume will be more noticeable to drivers. Clearly marked bike routes will also aid in linking trails on one end of town with trails on the other. For bicycle paths there are three primary types:

- on-street bike lanes
- off-street multi-use paths
- bike routes in mixed traffic

### Connecting Wickenburg to Hassayampa Preserve:

The Wickenburg connection section should be considered a "rural collector" type of situation. A rural collector has no curb or gutter. The bike lane is a portion of a street reserved for the exclusive use of bikes.

#### Design implications

- Bike lanes should be designated by signage and lanes and symbols marked on the pavement.
- The lane should be paved with a cross-slope of 1.5%
- Recommended bike speed is 20 mph
- Bike lane width is 4' minimum
- Striping should be 6"-wide city, 4"-wide county

### Connection to Wickenburg Options:

1. "Minor collector bike lane" (no on-street parking, curb and gutter)

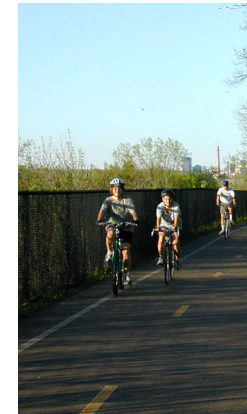
#### Design Considerations

- Paved with a cross-slope of 1.5%
- Recommended bike speed: 20 mph
- Bike lane: 4.5' min., gutter pan width: 18"
- Striping width 6" city, 4" county

2. "Bicycle Route" (a public road or street identified, signed and designated or mapped for use by cyclists. Cyclists share the public street with, and are not separated from, motorized vehicles. Several criteria also should exist before such a route is signed. A traffic engineer should be consulted.

#### Design Considerations

- Paved
- Usable lane width: 14', gutter pan width: 18"
- Recommended bike speed: 15 mph



# Accessibility

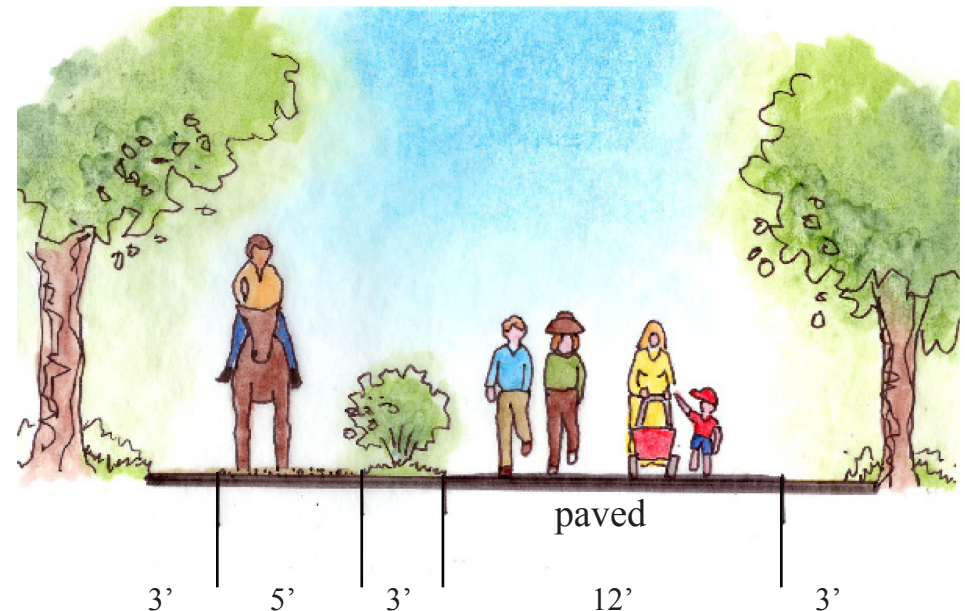
## Chapter 3

**Off-street multi-use paths** are the primary type that will be used along the ADA accessible trails that the Nature Conservancy wishes to build around the Pond Loop.

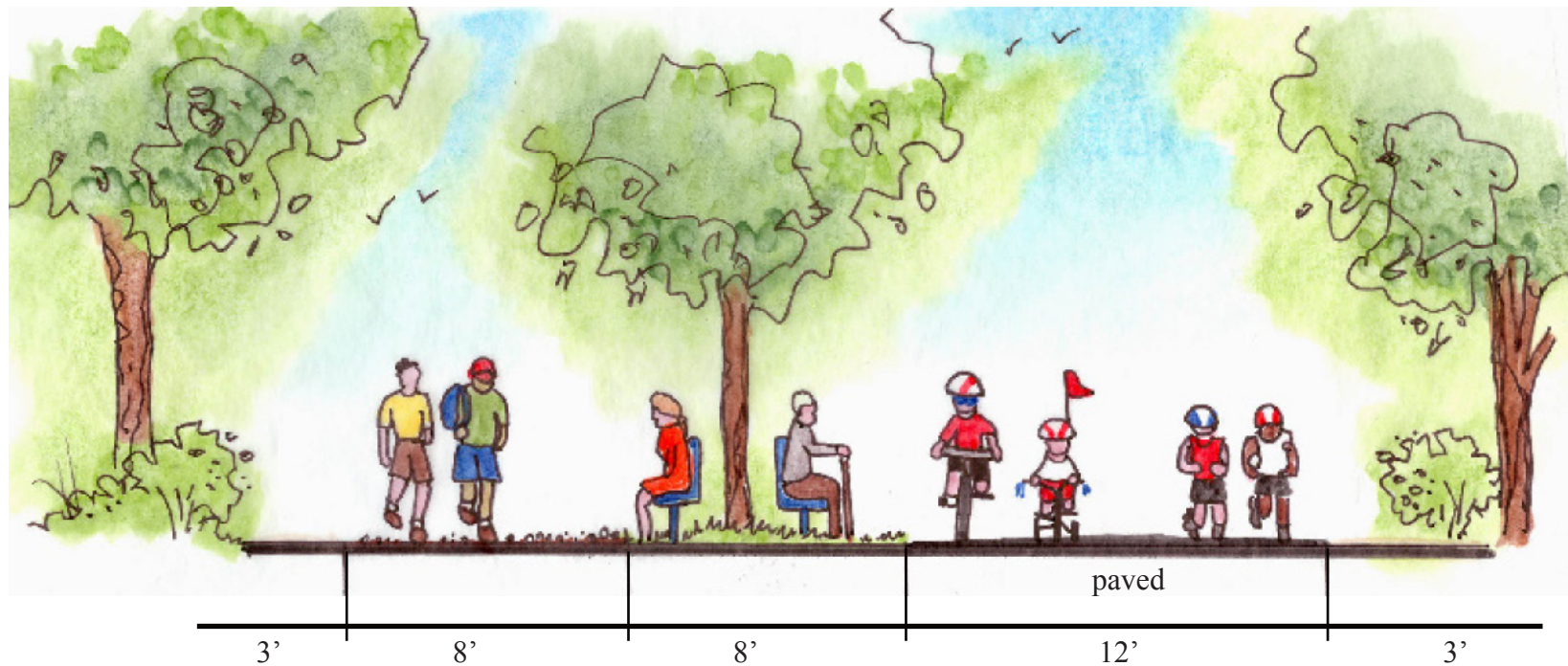
### Design Implications

- Path is unpaved with a cross-slope of 1% min., 2% max.
- Recommended bike speed: 15 mph
- Vertical clearance of 10' (more for horses), width: 6-10' (4' ped. use only, 6' ped/equestrian use, 8' multiple users, 10' primary bike path [must have long sight lines, wide curve radii, drainage features must be unobtrusive and few in number]), shoulders 2'
- Surfaces: dirt, stabilized dirt
- Width: include 5' wide dirt track on multi-use trails with harder surfaces
- Vertical distance 10' min., horizontal clearance 5' min. (limbs cut flush)
- Sight lines at 100' min.
- Water crossing preferred to high bridge crossings

Trails for the twenty-First Century, 2nd edition  
Charles A. Flink, Kristine Olka, Robert M. Searns  
Island Press, Washington, 2001







The disabled have the same wants, needs and rights to recreational experiences as any other user group. In the case of the Hassayampa River Preserve, the primary hindrance for disabled visitors is the lack of fully accessible walking paths and trails.

In some cases having a guide can help, but the Preserve has opportunities to open up some of the best experiences to users of all abilities without having to add services. This can be achieved by designing infrastructure and connections that are accessible by all people and multiple modes of movement.

By improving the primary walking route along the edge of the pond, the Nature Conservancy can create a series of experiences all users can enjoy.

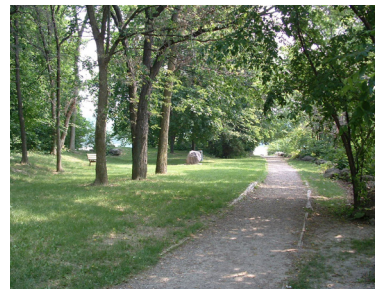
### Trail User Slope Requirements

Each user group of the trail has slightly different restrictions and requirements. Longitudinal slope especially should be taken into consideration.

User	Average speed mph Cross slope	Longitudinal
Pedestrian	3-7 4% max.	No restriction
Wheelchair	3-7 2% max.	3% pref./5%
Bike	8-10 2-4%	3% pref./8%

#### Design Implications

- Trails for all users except equestrians should be kept fairly flat
- Minimal cross slopes will let water drain surfaces. Some soft, unstable materials can be used if soil stabilizers are added.



### Surface Types

The type of surface used will depend upon factors such as budget, preferred user groups and aesthetic considerations. Many types of materials are available:

- granular stone
- asphalt
- concrete
- soil cement
- resin-based stabilized material
- wood chips
- left natural

Materials can be considered hard or soft depending on ability to repel moisture.

#### Hard surfaces are:

- soil cement
- crushed stone
- asphalt
- resin-based stabilized material
- concrete

#### Soft surfaces are:

- earth
- wood chips

#### Design Implications

- Multi-use trails may use hard surfaces; they require less maintenance but initially are more expensive to install.
- Surface types can be used to encourage or discourage use (thereby controlling user groups). Softer surfaces tend to discourage some user groups and harder surfaces tend to be more universally accessible.
- Wheelchair use requires firm and stable surfaces, not necessarily concrete or asphalt. Some soft, unstable materials can be used if soil stabilizers are added.
- Phasing: trail surfaces can always be upgraded. It is better to open a trail with only the ballast material in place (as long as it is stable for intended users), rather than delay use while waiting for funds to pave it with asphalt.



Surface Material (cost per mile) (longevity)	Advantages	Disadvantages
Soil cement, \$60,000-\$100,000), medium (5-6 years)	Uses natural materials, more durable than native soils, smoother surface, low cost, multiple-use, natural look	Surface wears unevenly, not a stable all-weather surface, may erode, difficult to achieve correct mix
Granular stone, \$80,000-\$120,000, medium-long (7-10 years)	Soft but firm surface, natural material, modest cost, multiple-use	Surface can rut or erode with heavy rainfall, regular maintenance needed to keep consistent surface, replenishing stones may be long-term expense
Asphalt, \$200,000-\$300,000, medium-long (7-15 years)	Hard surface supports most types of use, all-weather, accommodates most users simultaneously, smooth surface to comply with ADA guidelines, low maintenance	High installation cost, costly to repair, not a natural surface, freeze/thaw can crack surface, heavy construction vehicles need access, hot surface in summer months
Concrete, \$300,000-\$500,000, long-term (20 years plus)	Hardest surface, easy to form to site conditions, multiple-use, lowest maintenance, resists freeze/thaw, best cold weather surface, most resistant to flooding	High installation cost, costly to repair, can be slippery when wet, highly reflective, holds heat during hot months
Boardwalk, \$1.5-\$2 million, medium-long	Necessary in wet or ecologically sensitive areas, natural-looking surface, low maintenance, multiple-use	High installation cost, costly to repair, can be slippery when wet
Resin-stabilized, cost varies depending on type of application, medium-long depending on type of application	Aesthetic, and has less environmental impact, possible cost savings if soil used, can be applied by volunteers, natural appearance	Need to determine site suitability and durability, may be more costly in some cases
Native soil, \$50,000-\$70,000, short to long depending on local use and conditions	Natural material, lowest cost, low maintenance, can be altered for future improvements, easiest for volunteers to build and maintain	Dusty, ruts when wet, not an all weather surface, can be uneven and bumpy, limited use, possibly not accessible

### Bridges

**If bridges currently exist**, they should be examined by a structural engineer to determine integrity and by an architect or historian if historical significance is suspected.

Bridge decking: The surface of the bridge (decking) acts as a continuation of the trail surface: that is, it should be comfortable to walk or ride on, stable and not slippery when wet. Appropriate decking may need to be installed. Note: Horses prefer a water crossing to a high, hard-surfaced bridge crossing wherever possible.

#### Design implications

- Gaps no wider than 1/4 inch will allow drainage without tripping up users.
- Concrete decking (poured over corrugated metal decking) may also be used as it is less slippery, more durable and cost competitive.

Bridge approaches: Approaches to bridges should not be overlooked in the design. Approach railings facilitate safe passage onto the bridge and an appropriate trail width mitigates congestion.

#### Design implications

- Approach railings should be constructed in a similar manner to bridge railings (except that posts are inserted into the ground) and extend to at least 15 feet from the bridge end. Clear sight lines and extra-wide trails at bridge approaches will help to prevent congestion at bridges.

Bridge railings: Railings provide a safety factor and can be either post and rails or posts and mesh. Posts are vertically attached to the bridge decking or superstructure and placed no more than 6 feet apart. Horizontal components (rails or mesh) are attached to the posts. (AASHTO standards should be consulted for weight distribution requirements.)

Railing height depends upon the anticipated user groups.

#### Design Implications

- For pedestrians: top of railing height should be 42 inches above bridge decking.
- Railings can be made of wood, metal, wire, concrete steel cable, metal alloys, plastic or rope.
- Minimum standards require three rails: top, middle and bottom, with the middle rail being 33-36 inches above the deck for pedestrians and bike users, and the underside of the bottom rail no higher than 15 inches.
- The maximum vertical opening between railings should not exceed 15 inches.





### Trail Support Facilities

A trail system intended to serve many people and last into the future will need trail support facilities: parking areas, rest rooms, drinking fountains, seating, trash receptacles, and picnic areas. These facilities, to be successful, should be planned for, if not immediately built, right from the start. Grouping facilities at access points will help give the trail a level of high visibility. Some general design guidelines follow:

#### Design Implications

- Clustering different types of facilities together can help distinguish major trail heads from minor trail heads
- Clustering also makes trail heads recognizable
- Access points should link the trail to as many different forms of transportation as possible
- Locate major access points close to developed areas



### Picnic areas

Picnic tables and benches located at major trail heads or access points are major incentives to trail use, especially for family and group outings.

#### Design Implications

- Locate picnic areas well back from trails, sidewalks and parking lots
- Tables and benches should be located on flat, hard surface areas with good drainage
- A single table with benches requires about 168 square feet, an area of 12 by 14 feet
- The table and bench should be about 6 by 8 feet with 48 inches on all sides for wheel chair circulation
- Tabletops should be between 30 and 34 inches high with a 29 inch wheelchair clearance on each end
- Many materials are available and prefabricated units can be purchased from manufacturers in many styles and colors



# Accessibility

## Chapter 3

### Parking areas

Parking areas should be kept as simple and easy to use as possible. They should also be harmonized with the surroundings as much as possible. At least one space for disabled accessibility should be designed into every parking lot. If equestrian use is a goal of your trail, special design considerations need to be taken. Room for horse trailers and installation of hitching posts may be desirable. As safety and efficiency are vital in parking lot design, a traffic engineer should be consulted for construction details.

#### Design Implications

- Entrances and exits should be clearly marked and be no less than 50 feet from an intersection
- Parking lots should drain but not exceed 5% slope
- Plan for at least 300 to 350 square feet per car space
- Disabled parking spaces require between 234 and 270 square feet, or one 13 foot by 18 foot space
- Equestrian trailers with vehicles require about 45 feet long and 15 feet wide
- Hitching posts, where trees are not available, might be installed to allow horses to be tied

### Rest rooms

Along with parking lots, rest rooms can be the most expensive trail side facility. Expense, however, will depend upon number of stalls, whether sewage connections will be used or alternately organic composting toilets. Local ordinances and construction guidelines should be consulted very early in the facilities design stage.

#### Design Implications

- Toilet facilities should be visually buffered from neighboring uses
- Stalls for the disabled must be properly scaled for wheel chair accessibility: minimum of 5 feet by 10 feet with a sink (consult building guidelines for details)
- Standard single stalls require at least 3 feet by 9 feet 6 inches with a sink (consult building guidelines for details)



### Drinking Fountains

Drinking water, whether in fountains, or bottled, or in vending machines must be accessible to all. Locating fountains near rest rooms can make double use of existing water lines and drainage utilities. If no water is available, signs should be posted alerting trail users to bring their own.

#### Design Implications

- Adult height spigots should be 42 inches above the ground
- Heights for the disabled should be no more than 36 inches, with 27 inches of space below the basin for wheel chair pull up
- Children should either have steps up to the adult spigot or their own at 30 inches above the ground
- Fountains should be both hand and foot operated where possible
- Fountains should be located at least 4 feet off the trail, with drainage away from pathways
- Consider the inclusion of special spigots for dogs to use available at manufacturers



### Seating

Seating is available in a number of forms: benches, stools (fixed in place), seat walls, concrete blocks, whimsical sculptural forms, and natural boulders. Choice of style and materials will determine if a rest area is formal or informal, urban or rustic and will determine maintenance issues as well. Seating can be grouped at access points where family picnics might be desirable or it can involve a solitary on-trail rest spot for contemplating a view. Many kinds of prefabricated seating can be purchased from dealers.

#### Design Implications

- Typical benches measure 72 to 90 inches wide with a 15 inch high back and a seat that drains gently to the rear
- Consider aesthetics and maintenance when choosing materials
- Benches should be securely anchored to the ground for safety reasons
- Seating should be set at least 3 feet off any paths
- Seating area should drain away from trail
- A distance of 4 feet between benches and other facilities will allow for disabled circulation





# Accessibility

## Chapter 3

### Shelters

Shelters can be an especially welcome facility as a place to rest out of the elements. Shelters can be located at major access points and closely grouped with other facilities, or they can be in more remote areas. In either case they should be placed no closer than 3 feet to the trail edge.

#### Design Implications

- Visibility into and out of shelters should not be obstructed by natural or built features or utilities
- Shelters should be positioned to block prevailing winds; wind screens can be built if needed
- Exterior walls of shelters can be between 10 and 16 feet in length and between 5 and 8 feet wide
- Interior height should be between 7 feet and 8 feet 6 inches







# ***Planting Design***





The location of the Visitor Center off of the main access road into the Preserve.



### VISITOR CENTER GARDEN

The planting design for the entrance garden is meant to introduce visitors to the environment and botany of the Hassayampa Preserve. Existing mature plants are preserved. A variety of native plant species are used, displaying the great diversity of plant life that the Sonoran Desert supports. Vegetation and shade create micro-climates with discernibly lower temperatures of from 3 to 8 degrees. Mature trees with benches placed under their protective shade canopy, create a place for resting and lingering and observing wildlife in the garden. Interpretive signs inform visitors about the plants and their function in the environment. Many plants attract wildlife, especially native birds and lizards. This space augments the Visitor Center area, creating a starting point for the visitor's walking experience and a central node for the Preserve.



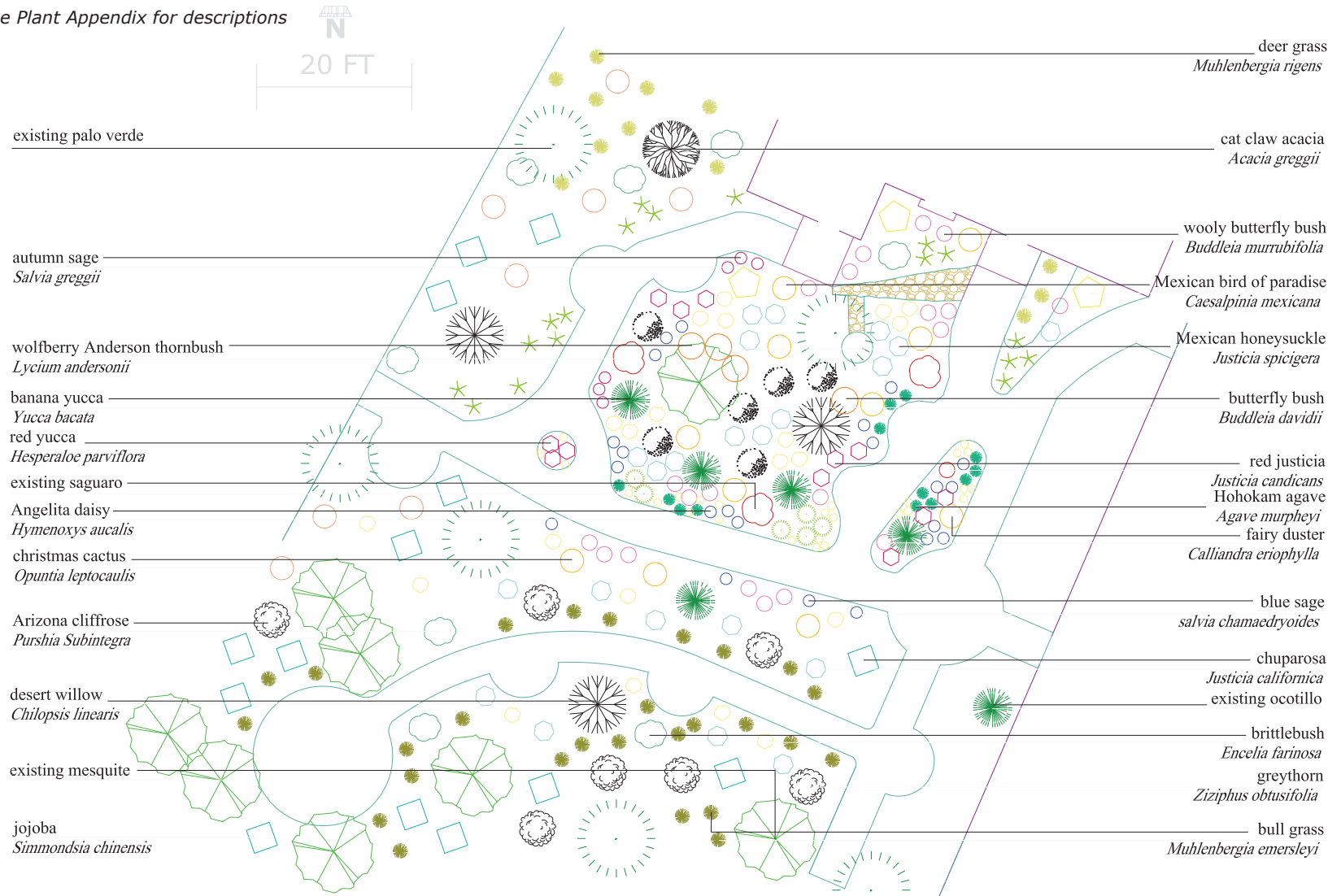
The existing garden

# Planting Design

## Chapter 4

### PLANTING PLAN

see Plant Appendix for descriptions





BEFORE



AFTER



### BEFORE AND AFTER

The layout of the garden remains similar to the current layout to preserve existing mature vegetation. The major design modifications add a variety of native species maintaining a natural but dense planting scheme.

Inexpensive infrastructure such as benches and paths and plant identification markers provide visitors with the opportunity to linger, explore and enjoy. The garden becomes a destination, not simply a conduit to reaching the rest of the Preserve.





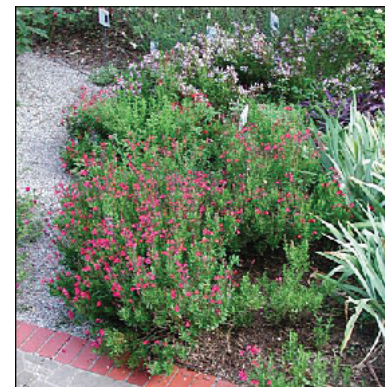
Angelita Daisy, *Angelita Daisy*

Groundcover to small shrub, yellow blooming flowers, partial sun.



Arizona cliffrose, *Purshia subintegra*

Small to medium shrub. Perennial, blooms in spring/summer, prefers rocky outcroppings.



Autumn sage, *Salvia Greggii*

Small shrub with redish flowers, very fragrant, attracts pollinators.



Blue sage, *Salvia chamaedryoides*

Small shrub, blue blooming flowers, partial sun, attracts pollinators.



Brittle bush, *Encilia farinosa*

Small shrub, yellow blooming flowers and whitish leaves, full sun and even reflected heat.



Butterfly bush, *Buddleia davidi*

Small shrub to medium shrub, purple blooming flowers, partial sun, very popular with pollinators.





Chuparosa, *Justicia californica*

Small shrub, red blooming flowers, partial sun to full sun.



Desert cassia, *Cassia nemophila*

Medium to large shrub, yellow blooming flowers, full sun and reflected heat. Tolerates frost.



Fairy duster, *Calliandra eriophylla*

Small shrub to medium shrub, white to red blooming flowers, full sun, attracts pollinators.



Gray thorn, *Ziziphus obtusifolia*

Medium to large shrub, full sun. The fruits are enjoyed by native birds such as Gambel's quail.



Jojoba, *Simmondsia chinensis*

Large shrub, full sun and reflected heat, dense branching and fruits make it a popular species for fauna.



Little leaf cordia, *Cordia parvifolia*

Medium to large shrub, white blooming flowers, full sun, can tolerate reflected heat and frost.



Mexican bird of paradise, *Caesalpinia mexicana*  
Large shrub, yellow blooming flowers, full sun and reflected heat, attracts pollinators.



Mexican honeysuckle, *Justicia spicigera*  
Small shrub, red blooming flowers, partial sun.



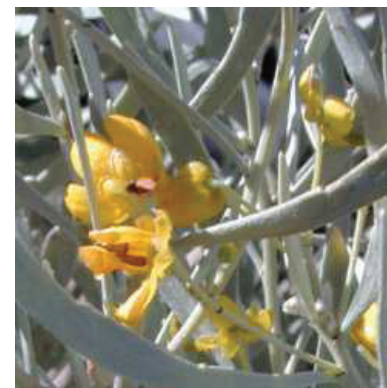
Red justicia, *Justicia candicans*  
Small shrub, red blooming flowers, partial to full sun.



Red bird of paradise, *Caesalpinia pulcherrima*  
Large shrub, yellow to red blooming flowers, full sun, can tolerate reflected heat, and attracts pollinators.



Silvercloud sage, *Leucophyllum candidum* 'Silver Cloud'  
Small to medium shrub, purple flowers with whitish leaves, partial to full sun, can tolerate reflected heat.



Silvercloud cassia, *Cassia artemisioides*  
Medium shrub, orange blooming flowers with light green-silver leaves, partial sun to full sun, drought resistant.





Tombstone rose,  
*Rosa banksiae*

Large shrub, can be trained as a vine. Small white blooming flowers tolerates partial to full sun.



Sandpaper verbena, *Verbena rigida*

Groundcover to small shrub, purple blooming flowers, partial to full sun, tolerates reflected heat.



Wooley butterflybush,  
*Angelita Daisy*

Small shrub, white to yellow to red blooming flowers, light green to whitish leaves, partial sun, attracts pollinators.



Blue agave, *Agave tequilana*  
Small to medium shrub, full sun, can tolerate reflected heat.



Desert spoon, *Dasylirion wheeleri*  
Medium shrub, spiny, full sun, tolerates reflected heat.



Buckhorn cholla, *Opuntia acanthocarpa*  
Medium to large shrub, red flowers, full sun, tolerates reflected heat. Excellent bird habitat.



Gopher plant, *Euphorbia rigida*  
Small perennial shrub blooms in late spring. Grows up to 2 feet tall and 3 to 5 feet wide. Very drought tolerant, will accept full sun.



Desert Christmas cholla, *Opuntia leptocaulis*  
Medium to large shrub, white flowers, full sun, tolerates reflected heat. Excellent bird habitat. The fruit is edible.



Hedgehog cactus, *Echinocereus triglochidiatus*  
Groundcover to small shrub, red to purple flowers, full sun, tolerates reflected heat, edible fruits, and the flowers stay open overnight.





Hohokam agave,  
*Agave murpheyi*

Medium to large shrub, huge flowering stalk, full sun, tolerates reflected heat, many traditional indigenous uses.



Red yucca, *Hesperaloe parviflora*

Small to medium shrub, red to pink flowers on a very dramatic stem, full sun, tolerates reflected heat.



Pencil cholla, *Opuntia ramossissima*

Medium to large shrub, red flowers, full sun, tolerates reflected heat, edible fruits, excellent bird habitat.



Soaptree yucca, *Yucca elata*  
Large shrub, full sun, very sculptural, fronds used for weaving and ropes.



Prickly pear, *Opuntia spp.*

Medium to large shrub, red flowers with numerous red fruits, full sun, reflected heat tolerant.



Tree beargrass,  
*Nolina matapensis*  
Large shrub, full sun, tolerates reflected heat, seeds are eaten by wildlife.



Twin-flowered agave,

*Agave geminiflora*

Medium shrub, enormous,  
spectacular flowering stem,  
full sun, tolerates reflected  
heat.





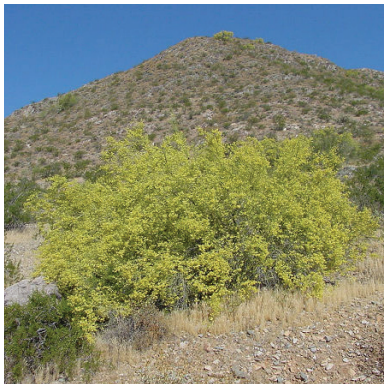
Cat's claw acacia,  
*Acacia greggii*  
Small to medium tree, yellow  
blooming flower puffs, full  
sun, frost tolerant.



Desert hackberry,  
*Celtis pallida*  
Small tree, red blooming  
flowers, full sun, fruit feeds  
wildlife.



Desert Museum palo verde,  
*Parkinsonia aculeata*  
Small to medium tree, yellow  
blooming flowers, full sun.



Foothills palo verde,  
*Cercidium microphyllum*  
Small tree, yellow blooming  
flower puffs, full sun, excel-  
lent wildlife habitat.



Sweet acacia,  
*Acacia farnesiana*  
Small to medium tree, yellow  
to orange blooming flowers,  
full sun, attracts pollinators.



Western hackberry,  
*Celtis reticulata*  
Medium to large tree, full  
sun, fruit feeds wildlife.

# Planting Design

## Chapter 4



Arizona grape, *Vitis arizonica*  
Vine, greenish-white flowers  
and purple fruits, partial sun,  
people and animals eat the  
fruit.



Bull grass,  
*Muhlenbergia emersleyi*  
Groundcover to small shrub,  
yellow blooming flowers,  
partial sun,



Deer grass,  
*Muhlenbergia rigens*  
Tall grass tolerates full sun.  
Birds eat the seeds.



Devil's Claw, *Proboscidea parviflora*  
Groundcover to small shrub, yellow to  
pinkish-purple flowers that can be quite  
large, the flowers are heliotropic (they  
follow the sun throughout the day),  
partial to full sun.

## Accents



