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1 | HISTORY AND CONTEXT
HISTORY

El Paso and University of Texas-El Paso (UTEP) have a rich history, defined by their geographic position on the US-Mexico Border and characterized by the convergence of distinct cultures. El Paso, which means ‘The Passage,’ has been a crossroads for travelers since its founding in 1659. As a city along the El Camino Real de Tierra Adentro—a major trade route running south to Mexico City and north along the Rio Grande to San Juan Pueblo, New Mexico—it marked the transition from Rio Grande floodplain into the magnificent Franklin Mountains, which rise out of the vast Chihuahuan Desert. Today, the El Paso/Juarez binational metropolitan area (also known as Paso Del Norte) is the largest city in the Chihuahuan Desert ecoregion.

UTEP was in 1914, situated in the foothills and watershed of the Franklin Mountains with dramatic vistas that sweep from the surrounding mountains across the border to Juarez. In 1917, Dean S.H. Worrell’s wife, Kathleen Worrell, promoted the idea of modeling the burgeoning campus after a Bhutanesian mountain village. Mrs. Worrell, inspired by a National Geographic cover story that featured the south Asian Kingdom of Bhutan, recognized the similarities between the El Paso landscape and the mountains of Bhutan and thought the architectural style fitting. Her vision initiated a campus architectural tradition that continues to enrich the flavor of campus architecture today, one that demands a close relationship with the regional landscape.
ECOLOGICAL CONTEXT

Chihuahuan Desert Landscape
While associations with distant mountain cultures have inspired the architecture of UTEP campus, the forces of the Chihuahuan Desert have shaped its landscape, as seen in the 1920 campus photograph below. Before extensive development, the campus was enveloped by pristine mountain foothills and arroyos, which conveyed rainwater through rocky terrain to the Rio Grande below and nourished the desert’s diverse flora and fauna along their course.

Water captured by campus arroyos once helped support a variety of Chihuahuan plant life, including creosote, chamisa, lechuguilla, ocotillo, and prickly pear cactus, as well as animals like desert bighorn sheep, coyote, javelina, jackrabbit, and an assortment of birds, reptiles, and amphibians, such as the Rio Grande frog. Over time, however, most of these waterways were filled to form roads and parking lots, while rocky knolls were leveled, covered in turf, paved, or became sites for monumental buildings. All that remains of the once rugged mountain terrain is a single arroyo and episodic outcroppings scattered throughout campus. These Landscape Architectural Design Standards suggest how arroyos may be restored to provide habitat and honor the Chihuahuan Desert landscape so tied to regional identity.
Regional Watershed

El Paso is a part of the Paso Del Norte watershed within the Rio Grande River Basin. The watershed boundary touches two countries and three states -- Texas, New Mexico and Chihuahua in Mexico. The watershed receives an average annual rainfall of 8 inches a year (in El Paso, the average annual rainfall is 9 inches). According to the Paso Del Norte Watershed Commission, in addition to this very limited annual rainfall, the watershed receives water from the Rio Grande and the Hueco-Mesilla Bolsons and Jornada aquifers. The river irrigates over 200,000 acres of farmland and serves the needs of over 2 million people. Throughout its history it has powered the local economy and industry throughout the region, including mining and smelting operations.

Historic images of the ASARCO smelter on the Rio Grande (www.ourminesourstories.org)
Campus Watershed

Given limited annual rainfall, most streams and arroyos on or near the campus are ephemeral with water flows that appear briefly during storm events. At UTEP, rainwater from Franklin Mountains and nearby Arroyo Park plummets over acres of paving to the Hart-Mill arroyo, the only remaining arroyo on campus. The rapid conveyance of water to the arroyo causes increased erosion and disturbance to plant life, which then limits stormwater infiltration and creates dangerous flood conditions. Water quality is also negatively impacted, as there is limited recharge to the aquifer and reduced biofiltration, which leaves particulates and pollutants to flow into the Rio Grande. These Landscape Architectural Design Standards outline a number of improvements to stormwater management practices on campus, which include restoring function to the Hart-Mill arroyo and sub-arroyos for improved water quality and security at both campus and regional scales.
THE CAMPUS TODAY

This diagram shows the campus as it currently exists. The campus is dominated by vehicular traffic and surface parking, making it inhospitable to pedestrians and to outdoor gatherings.
THE CAMPUS TOMORROW

This diagram features both existing buildings and those proposed by the 2011 Campus Master Plan. Buildings are grouped to create a dense campus core, which offers students, staff, and faculty easier access to campus classrooms, services and facilities.

These Landscape Architectural Design Standards support the goals identified in the campus master plan by de-emphasizing vehicular circulation and proposing comfortable pedestrian environments that promote walking, cycling, and gathering. The design standards use the building layout proposed in the 2011 UTEP Master Plan as a base for all design diagrams.
2 | GOALS AND APPROACH
THE UTEP CAMPUS TRANSFORMATION PROJECT

The University of Texas at El Paso celebrates its 100th Anniversary in 2014. To help mark the centennial, the University is working with a consulting team to generate designs for the Campus Transformation Project that will result in a new pedestrian-focused campus core that prioritizes people and the environment. The completion of Phase I of the project will coincide with the University’s centennial celebration and begin its transformation into a safer, more ecologically-rich environment that exemplifies the beauty of the Chihuahuan Desert.

LANDSCAPE ARCHITECTURAL DESIGN STANDARDS

CREATING THE DESIGN STANDARDS

Comprehensive site analysis, meetings with University officials, and elements of the 2011 UTEP Campus Master Plan informed the designs for the Campus Transformation Project, which serves as the foundation for the framework for development established by these Landscape Architectural Design Standards. The goals outlined in this section will guide current and future development toward socially and ecologically responsible design to better meet the needs of the UTEP community and celebrate the richness of the Chihuahuan Desert in which it resides.

DESIGN STANDARD GOALS

The Landscape Architectural Design Guidelines seek to achieve four goals:

1. Establish a strong campus identity
2. Foster human comfort on campus
3. Exemplify ecological urbanism
4. Develop culture of sustainability

These goals aim to stimulate learning and help realize the vision of UTEP sustainable, place-inspired world class campus.

These Landscape Architectural Design Standards have been developed to work in concert with the principles of the Sustainable Sites Initiative (see appendix).

Goal 1: Establish a Strong Campus Identity

Development at UTEP should strengthen the character of the campus, building upon the existing Bhutanese architectural style while dramatizing mountains and arroyos with the texture of native vegetation. The built environment should be crafted to support the social traditions of students, as well as their educational endeavors and aspirations. In this way, the campus will become a living laboratory for a range of disciplines: engineering students, for example, will have the opportunity to study fluvial geomorphology while botany students observe plants’ reactions to gray water system; art students will be invited to display their work.
along the campus sculpture trail, a venue that encourages engagement with the landscape. The campus will be a place where students bring their families to share in rich campus traditions and festivities, like Texas College of Mines Day, Minerfest, and Bhutan Days. The new cohesive landscape will inspire pride for the unique beauty of the West Texas region. The UTEP campus will also become an example for the City of El Paso and other desert communities around the world for transforming over-paved, car-oriented sites into living, breathing urban ecologies that support a high quality of life and connection with nature.

The vital path of water will be emphasized throughout campus and become a defining element in all exterior spaces. Rainwater gardens and arroyos brimming with native plants and trees will weave through campus as a design feature that unifies the campus while slowing, cleansing, and absorbing stormwater before it reaches the Hart-Mill arroyo.

The following recommendations will provide other campus features with equally successful form, function, and coherency:

- Follow Wayfinding Standards
- Plan gateways at vehicular and pedestrian entry points.
- Use materials and colors inspired by the place: e.g., the mountains, soil, native Andesite stone
- Create clear hierarchy of paths and malls.
- Foster a sense of order along malls and streetscapes with formally spaced trees.
- Create consistency in hardscape materials throughout the campus.
- Incorporate selected site furnishings that are consistent.
- Use Chihuahuan Desert and Desert adapted plant species.
- Emphasize the sacred path of ephemeral water through the site with vegetated arroyos, acequias and bridges.

The path of water and consistent plant palette, signage, paving, and architectural style of outdoor spaces and gateways combine to create a strong campus identity that improves wayfinding for students and visitors and establishes the campus as a landmark within the City of El Paso and beyond.
Goal 2: Foster Comfort of Mind, Body, and Spirit

Outdoor spaces provide novel opportunities for learning, recreation, gathering and solitude, which reinforce collegiate values for exploration, cooperation, and self-improvement. Naturally, local climate is an important consideration in the design of this outdoor environment. Shelter from intense spring winds, shade from the year-round searing sun, and materials that mitigate the desert’s diurnal flux in temperature are key to cultivating an active outdoor life. Shade from the sun, the most persistent climatic element, is perhaps the most important consideration. Every opportunity to integrate shade into exterior spaces should be taken: linear tunnels of shade should be developed along every pathway and groves of trees or shade structures should be located at all gathering places—courtyards, plazas, and amphitheaters—and special attention should be given to provide shade and shelter at building entry points.

For movement through outdoor spaces to be enjoyable, spaces must also be safe. It is mandatory that there be universal access. TAS and ADA must be followed and all designers shall work closely with an ADA specialist on their team. It is a challenge on this mountainous site but the changes in grade also make the outdoor experience more interesting. Consistent lighting at night is also a major factor in the comfort level and the 24/7 safe use of the campus.

The following recommendations foster physical comfort in the outdoor environment, which will inspire related mental and spiritual pursuits:

- Use a variety of methods to create shade: trees, vegetation, shade structures, awnings.
- Use evergreen species such as Arizona Cypress to create windbreaks from the northwest wind.
- Include generous areas for vegetation along all pedestrian malls, walkways and courtyards.
- Create outdoor spaces in microclimates created by buildings to achieve shelter. Use plants to amplify the feeling of shelter in a desert canyon.
- Specify furniture both moveable and fixed. Make sure it is heavy enough to stand up to the wind.
- Plant trees to provide linear tunnels of shade along walkways. Plant trees in groves to create bosques for gathering.
- Provide ADA accessibility for outdoor spaces.
- Adhere to the campus lighting standards.
- Provide wifi access at new spaces.
- All developments on campus to adhere to the standards set forth in Crime Prevention Through Environmental Design (CPTED) standards such as natural surveillance, territorial reinforcement and natural access control.
- All developments including campus buildings and spaces must be accessible for fire and safety.
Goal 3: Exemplify Ecological Urbanism in the Chihuahuan Desert

The development of a dense campus core will be balanced with the integration of diverse native vegetation and restoration of campus arroyos, transforming UTEP into a Chihuahuan desert oasis and model of ecological urbanism for El Paso and other desert cities around the world. UTEP will demonstrate the strategies and benefits of transforming over-paved, impervious sites into living, breathing urban ecologies that connect urban dwellers with nature and provide a higher quality of life.

The following recommendations will allow an urban ecology to emerge:

- Use a variety of low impact development strategies for storm water management:
  - Use permeable paving
  - Implement active and passive water harvesting
  - Celebrate, articulate and slow the path of all storm water through the site
  - Re-use of materials
  - Maximize planting to filter & store stormwater
- Create urban wildlife habitat through biodiversity and increased biomass.
- Minimize hardscape to reduce urban heat island.
- Mitigate the climate with trees & shade structures.
- Create people places integrated with nature.
- Use low water use native plants where possible and do not use invasive plants.
- Lighting shall comply with dark sky ordinances.
- Future buildings and spaces shall reorient to the arroyo rather than turn their backs to it.
- Use structural soil as appropriate to aid street tree growth in hardscaped urban locations.
- Use alternative energy: sculptural wind turbines as focal points, solar panels as shade structures.

Goal 4: Develop a Culture of Sustainability

Toward becoming a Tier 1 national research facility, UTEP will develop educational programs and policies that encourage sustainability research and practices. UTEP will assign performance benchmarks from the Sustainable Sites Initiative to each project designed and implemented as part of the Campus Transformation project. This goal requires collaboration between forward-thinking design and engineering consultants, UTEP leaders, and members of the UTEP community. The Sustainable Sites benchmarks can be challenging to attain, but will help produce an environmentally-responsible campus where technological and ecological research opportunities abound.

The following recommendations will aid UTEP in attaining the sustainable sites rating:

- Set performance benchmarks for each Campus Transformation Project and future development that meet the criteria outlined in “2013 SITES Reference Guide” (or later).
- Set benchmarks high in each area of focus: hydrology, soils, vegetation, materials and human health and well being.
- Create a team environment to ensure support for benchmarks across disciplines.
- Assign a leader to each benchmark.
- Reference other documented Sustainable Sites-certified projects for successful design strategies and maintenance practices.
3 | LANDSCAPE ARCHITECTURAL DESIGN STANDARDS
The four stated goals of The Landscape Architectural Design Standards are realized through changes to circulation and a well-defined palette of design elements and space typologies, which combine to create a cohesive design language and sustainable campus structure.

Design standards for campus circulation, design elements, and space typologies are discussed in three respective sections:

In the Circulation section, proposed vehicular, bus, bicycle and pedestrian networks are discussed. These standards provide a framework for reducing and restricting vehicular traffic at the campus core, promoting the use of buses and bicycles, and improving the pedestrian environment throughout campus.

In the Design Elements section, standards for paving, planting, water elements, walls, metal work, site amenities and color are defined. These are details enrich spaces and circulation routes and begin to define the texture of the campus as a whole.

In the Spaces section, specific forms and design elements that define space typologies of campus—such as plazas, park spaces and courtyards—are identified. These design standards maintain distinctive spaces while developing a strong, cohesive campus identity.
Aerial perspective of Centennial Plaza (Conceptual Design)
A| CIRCULATION

These Design Standards establish the parameters for developing the campus as it shifts from a vehicular focus to a pedestrian focus. This shift is at the core of the Campus Transformation Project improvements and will have a profoundly positive impact on the daily lives of the students, staff, faculty and larger community of UTEP.

This section establishes standards for vehicular circulation, pedestrian circulation, campus gateways, bus circulation and bicycle circulation.

Circulation standards build on the work outlined in the 2011 UTEP Campus Master Plan and synthesize the master plan with the core campus development of the Campus Transformation Project.
**VEHICULAR CIRCULATION**

Changes to vehicular circulation are central to Campus Transformation Project and these Landscape Architectural Design Standards. By re-routing vehicles and designing the core campus for the pedestrian, UTEP promotes sustainable modes of transportation and creates a welcoming, vibrant campus core with safe spaces that support learning. The diagram on the following page outlines these proposed changes.

**Vehicular Circulation Type I**
Type I roads are open to all public vehicular traffic without restriction. These roads may have multiple lanes to handle a large volume of traffic. Roads are paved in concrete with concrete sidewalks that are separated by a curb for safety.

**Vehicular Circulation Type II**
Type II roads accommodates UTEP personnel with limited public access. Access to these roads will be limited to those with electronic card keys and to service vehicles and buses. These circulation routes will maintain sufficient width to accommodate emergency vehicles, but will have the appearance of a pedestrian mall.

**Vehicular Circulation Type III**
Type III routes are not accessible by the public. Only emergency vehicles and approved service vehicles may use these routes. Type III routes have many pedestrian amenities, including ample shade, planting, non-reflective paving, and places to gather/rest. As with Type II routes, the paving profile and street width will comply with emergency vehicular regulations, but these routes will be designed primarily for pedestrian comfort.

**Restricted Access Points**
Electronic card key gates and guards will be stationed at these points to restrict vehicular access to the core campus.

**Passenger Drop-off Zone**
Passenger Drop-off Zones will be positioned just before restricted access points, allowing public vehicles to easily drop-off passenger and turnaround. Enhanced paving such as stone paving or permeable unit pavers along with special planting will be used to highlight these junctures.

**Campus Gateways**
Vehicular and pedestrian gateways will be marked by structures that are easily identifiable. These gateways will mark important entry points into the campus, improve wayfinding, and help define the identity of the campus.
UTEPE VEHICULAR CIRCULATION

- Type I: Public Access
- Type II: Limited Public Access / Bus
- Type III: Pedestrian / Service Vehicles (No Public Access)

- Restricted Access Point
- Passenger Drop-Off Zone
- Campus Gateway
- UTEP Property Line
PEDESTRIAN CIRCULATION

Primary Malls
Vehicular streets will be transformed into formal pedestrian malls that generously accommodate large pedestrian crowds as well as bicycles and emergency vehicles. A combination of paving materials will be used. Approximately 30% of the walking area will be composed of sandblasted concrete or concrete with exposed 3/8” crushed aggregate to reduce glare and staining. The remaining 70% will either be composed of stabilized decomposed granite or permeable pavers. Each mall will be lined and shaded with formal, linear desert gardens known as ‘acequias,’ concave planting areas that harvest and slow water to nourish trees, shrubs and groundcover. Consistent light standards will be spaced to respond to tree spacing.

Secondary Paths
Secondary paths between 6’ and 10’ wide will be pedestrian-only. They will be paved with exposed ¼” crushed aggregate concrete to reduce glare. These walks may be straight or curved and shall be shaded with formal tree planting or arbors.

Tertiary Paths
Tertiary paths of 6’ or less will take form as medium sandblasted concrete walkways or stabilized granite trails. These paths will be less formal, weaving between campus buildings and through planted areas.

Pedestrian Circulation Design Standards
- Use consistent tree species at uniform spacing. Trees shall be selected from approved plant list (see Appendix).
- Use low-growing plants along edges of malls and paths to reduce overlap.
- Arrange seating and other site amenities so as not to restrict pedestrian flow or fire truck movement.
- Provide continuous shade.
- Use consistent matte finish paving to reduce glare.
- Refer to “Design Elements: Paving” section for paving options.
- When possible, walkways shall not exceed 5% slopes and handrails shall be avoided.
GATEWAYS

Vehicular Gateways
Entrance thresholds into campus create important first impressions for the public, including those arriving by car. These thresholds shall be marked with structural gateways; elegant, monumental signage; and changes in paving paired with formal planting schemes, banners, and lighting to welcome the vehicle into passenger drop-off plazas or parking areas. Traffic will be slowed and trees will be integrated into plazas to provide shade, creating a safe, comfortable, and inviting arrival for pedestrians and vehicles alike.

Vehicular Gateway Design Standards
• Place gateways at major entry points such as University and Oregon Drive. Reference the proposed vehicular circulation diagram in the circulation portion of this document for proposed locations.
• Use monumental signage to announce passage into the campus. Reference Wayfinding Standards for these monuments.
• Use quality materials that require little maintenance, such as stone, cast-in-place concrete, precast concrete, or steel for construction of these monuments.
• Use distinctive paving at entry thresholds.
• Incorporate formal tree and shrub/accent planting schemes to reinforce the entry points and drives.
• Use non reflective matte finish paving for drop-off plazas.
• Gateways shall be lit at night and comply with dark sky ordinances.
Pedestrian Gateways
There are several key portals into campus that will be entered only by pedestrians. These thresholds shall be marked with special paving, smaller scale entry monumentation, and formal planting and feature wayfinding signage as well. An example of a pedestrian portal location was found at Oregon Street and Miner’s Village near the arroyo, part of Phase 2 of the Campus Transformation Project.

Pedestrian Gateway Design Standards
• Create human scale thresholds for pedestrian entries into campus designed to accommodate maximum potential pedestrian traffic.
• See Wayfinding Standards for appropriate sign monumentation and directional at gateways.
• Shade with trees.
• Light appropriately within Dark Sky Ordinance.
• Use enriched paving.

Focal Points & Sculpture
To improve wayfinding, focal points such as sculpture, framing elements and specimen planting shall mark important circulation transitions. Consider sculpture that is interactive, educational and site specific. Designing sculptural elements specific to program, solar orientation and wind direction will help reveal how the site functions and strengthen sense of place.

A sculptural wind turbine could mark pedestrian gateways

A sculpture using local materials or subject matter can help to create a sense of place

Trellis frames and marks a pedestrian gateway

A sculptural shade structure marks this pedestrian gateway & threshold
These diagrams analyze existing bus routes and propose changes that support the goals of the Landscape Architectural Design Standards. Efficient bus routes are a critical component of the campus improvements. UTEP students and staff need to be able to easily traverse the campus without compromising the pedestrian campus core.

The proposed bus routes utilize passenger drop-off locations give students and staff convenient access to the campus core. Critical loop routes are maintained along Sun Bowl Drive and Oregon and Mesa Streets.
**BUS CIRCULATION | PROPOSED**

**Sun Metro**
The City of El Paso Sun Metro bus routes do not change in the proposed bus circulation route. City bus service would continue to service the east side of campus along Oregon Street and Mesa Street and to the south from Prospect Street.

**UTEP’s Miner Metro**
Using the 2011 UTEP Master Plan proposed circulation as a guide, the proposed bus circulation routes for Miner Metro bring bus service along the perimeter of campus and as close to the core campus as possible. The proposed West Route provides service along Sun Bowl Drive. The East Route connects from University along Oregon Street up to the northern boundary of campus. The proposed Nursing Route continues to provide a critical connection between the hospital and campus, while offering an extension along Rim Road to the proposed turnaround at Wiggins Avenue.

“Existing Routes to Remain” refers to routes that were previously eliminated in the 2011 UTEP Master Plan, but restored here as to ensure optimum service. “Proposed Route Extensions” indicate where Miner Metro routes may be integrated with circulation changes made by the Campus Transformation Project.
The bicycle circulation plan helps shift the focus of the campus away from the vehicle, building upon bicycle circulation proposals developed in the 2011 UTEP Campus Master Plan and during schematic design phase of the Campus Transformation Project. This plan outlines possible routes that would maximize opportunities for bicycle circulation and bicycle storage, while maintaining the core campus as a pedestrian-focused environment.

**BICYCLE CIRCULATION**

Bicycle racks should simple in design, blend into the environment, and meet city standards for functionality and layout. Bright colors should be avoided in favor of stainless steel or steel painted to look natural.

**Signage**

Bicycle signage should be coordinated with signage consultants Cloud Gehshan Associates, charged with designing the wayfinding program for the campus. Sign graphics and materials should coordinate with the larger wayfinding system while clearly indicating each bicycle circulation type. Images shown below are precedents only and have not been coordinated with the program.

**Type I: Designated On-Street Bike Lanes**

The plan proposes a designated bike lane along Schuster Avenue. This bicycle lane type provides a dedicated bike lane delineated by/separated from vehicular traffic by a painted stripe, protective bollards, or a vegetated buffer for added cyclist safety.

**Type II: Shared Use On-Street Lane (Vehicular + Bicycle)**

Most of the bicycle lanes on campus are Type II, in which cyclists share the road with vehicles. Routes are marked with a “sharrow” painted on the pavement within the traffic lane.

**Type III: Shared Use On-Street Lane (Bus + Bicycle)**

Along Oregon Street, bicycles must to share the road with vehicles and buses. As with the Type II system, Type III bicycle routes use a painted “sharrow” marking on the pavement to indicate the route and to call attention to cyclists on the road.

**Type IV: Shared Path Off Street (Pedestrian + Bicycle)**

A proposed route for shared bicycle-pedestrian use traverses the southern edge of the Miner Village Student Housing to connect bicyclists from Oregon Street to the core campus at University Ave.

**Dismounted Bicycles Only**

In the proposed plan, cyclists would be required to dismount and park bicycles at the edge of the core campus in order to maintain a pedestrian-focused environment.

**Bicycle Parking**

Bicycle parking will be located at transition points between bicycle lanes and dismount zones at the edge of the core campus. When possible, bike parking shall be located in special bike parking zones delineated by with stabilized decomposed granite paving.
UTEP CONCEPTUAL BICYCLE CIRCULATION PLAN

- **Type I**: Designated On-Street Bike Lanes (Conventional Bike Lane, Cycle Track)
- **Type II**: Sharrow -- Shared Use On-Street Lane (Vehicular + Bicycle)
- **Type III**: Sharrow -- Shared Use On-Street Lane (Bus + Bicycle)
- **Type IV**: Shared Path Off Street (Bicycle + Pedestrians)
- **Dismounted Bicycles Only**

- **Campus Core**
- **Proposed Bicycle Parking**
- **UTEP Property Line**
B | DESIGN ELEMENTS

This section establishes standards for the building blocks of the landscape: paving, planting, water features, walls, metal work, site amenities and the use of color throughout the campus. These standards are intended to provide a framework for future development without dictating the use of specific product manufacturers, thereby allowing for maximum flexibility within a cohesive system.
SUPPORTING THE GOALS OF LANDSCAPE ARCHITECTURAL STANDARDS

Future development and the selection of design elements should support the four goals of the Landscape Architectural Design Standards.

1. Establish a strong campus identity
2. Foster comfort of mind, body, and spirit
3. Exemplify ecological urbanism in the Chihuahuan Desert
4. Develop a culture of sustainability
PAVING

The UTEP community should minimize impervious paving when possible in favor of pervious paving choices and increased planting areas. These choices will reduce stormwater runoff and mitigate the urban heat island effect, moving the campus closer toward its goal of sustainability. With this in mind, paving should be durable, non-reflective and meet Federal ADA, Texas Accessibility Standards, and campus requirements to maximize accessibility throughout campus.

The material, color, finish, and texture of paving should be thoughtfully selected as it helps define the character of the campus experience. Texture in paving is encouraged as it provides visual interest and contrast. Dark colors in paving should be avoided in favor of light, natural colors in order to reduce urban heat island effect. It is important the paving materials be selected to meet design standards, however, more flexibility is allowed at building entrances and courtyards in cases where paving should respond to existing architecture.

Concrete

Cast-in-place concrete paving should match the colors of the surrounding mountains and soil. Paving should be matte finish and light in color. Create texture by varying the finish. Stamped, stained, or patched concrete is not permitted.

Concrete Paving Profiles Standards

- Vehicular & Pedestrian -- 6” concrete paving
- Confirm dimensions and subgrade preparation with civil engineer and geotechnical engineer prior to construction.

Concrete Approved Colors

- Use “Sandstone” color no. 242, as supplied by Solomon Colors. Use an integral color admixture conforming to the requirements of ACI 303.1, ASTM C979 / C979M - 10 and AASHTO M194.
- Use natural gray concrete without colored admixture to create contrast.

Concrete Finish

Create subtle textural interest using a variety finishes including:
- light sandblast or waterblast
- exposed aggregate with 3/8” exposed crushed aggregate (natural gray).

Concrete Jointing

- Expansion joints: 1/2” joint with joint sealant color to match adjacent paving; dust with (to be approved by landscape architect).
- Control joints: 1/8” sawcut control joints to a depth 1/4 the depth of the slab.
- Construction joints: keyed construction joint (cold joint) with continuous reinforcement.

Concrete Approved Colors

- Use “Sandstone” color no. 242, as supplied by Solomon Colors. Use an integral color admixture conforming to the requirements of ACI 303.1, ASTM C979 / C979M - 10 and AASHTO M194.
- Use natural gray concrete without colored admixture to create contrast.
**Stabilized Decomposed Granite**

To minimize hard paving, use stabilized decomposed granite at pedestrian malls, campus pathways and trails for a more natural experience. Integrated with harder paving treatments, stabilized decomposed granite can mitigate the scale of large pedestrian malls, while still offering universal access and textural contrast in large plazas and malls.

**Stabilized Decomposed Granite Design Standards**

- **Aggregate Size**: 1/4”-minus granite fines. Meet AASHTO T11-82 and T27-82 sieve analysis requirements for percentage of weight passing a square mesh sieve.
- **Colors**: Franklin Red, Padre Canyon, or Desert Tan
- **Stabilizer**: A non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite together to produce a firm surface, as supplied by Stabilizer Solutions, Inc.
- **Paving Profile**: For vehicular conditions, use 5” of stabilized dg over 12 inches of compacted base rock. For pedestrian conditions, use 3” of stabilized dg over 4 inches of compacted base rock. Civil engineer and geotechnical engineer must approve profile prior to construction.
- **Pavement Edging (Vehicular)**: A 12-inch wide x 18-inch thick cast-in-place concrete header almost flush to the adjacent stabilized dg (hold dg 1/4” below header).
- **Pavement Edging (Pedestrian)**: A 4” x 3/8” continuous steel plate edge restraint staked with #4 rebar welded to plate.
PERMEABLE PAVING UNITS

To promote the stormwater infiltration, consider using the Eco-Prioria permeable paving unit supplied by Pavestone. This paving unit has interlocking joints 7mm wide that allow surface water to infiltrate into the sublayers, recharging the aquifer and reducing storm water runoff.

- Dimensions: 4-3/4” W x 9-7/16” L x 3-1/8” H
- Color: Tan
- Finish: Standard and shotblast. Use the two finishes to create subtle patterning, as in the precedent image.
- Joint Aggregate and Sublayers: Use materials and profile dimensions recommended by the manufacturer.
- Metal Paver Restraint: Use a 3/8” continuous steel plate edging.
RECYCLED CONCRETE

Use salvaged concrete from project demolition to create unusual paving patterns accented by varied joint materials. Using stabilized decomposed granite or clean stone in the paving joints adds interest and links the paving materials to the larger palette. Larger joints capture ephemeral movement of leaves and blossoms, creating unexpected contrast and interest. All applications must meet ADA and TAS requirements.
WALLS

As a campus situated among mountains and arroyos, dramatic changes in grade require the use of retaining walls. Locally-quarried Franklin Yellow granite stonework is prevalent on campus and throughout El Paso and should be used for retaining walls as a celebration of native material and local tradition. Walls may be monolithic or stone veneer with a visible or non-visible dry-stacked appearance, which preferable in crisper, architectural zones. Stone sourced from non-regional quarries shall not be used for walls or other landscape features except in cases where they must relate to a building façade of another material. Salvaged Andesite boulders may be utilized in stacked boulder walls and arroyo erosion control.

Neutral cast-in-place sandblasted concrete is also an option for retaining walls, particularly amphitheater walls where smoother seating surfaces are required. Trendy materials such as glass block or fiberglass shall be avoided on campus as they are especially vulnerable to the bleaching qualities of the harsh El Paso sun. Typically, the coloring of wall materials shall mimic the color range found in the natural ground plane of the campus and surrounding mountains.

Wall Design Standards

- Use the native excavated Franklin Yellow stone for retaining walls and excavated Andesite boulders and riprap for more naturalistic areas.
- Gabions (Hilfiker ‘Art-Weld’, 9 gauge) baskets filled with native stone should only be used as check dams, bridge abutments and erosion control devices at the main arroyo—not as seating elements or architectural statements.
- Use cast-in-place sandblasted concrete for seatwalls at amphitheaters or outdoor classrooms
- In interior courtyard spaces wall types that match architecture are acceptable.
- Use green walls with vines where there is limited planting space.
- Where possible do not have horizontal hardscape/paving touch vertical walls – relief between the two will provide a greater sense of comfort.
GUARDRAILS & FENCES

Fences and guardrails promote safety and accessibility, help define space, and become an opportunity to express and strengthen campus character. Although there are many types of metalwork in fencing and railing on campus currently, the goal is to simplify the palette in new projects. Guardrails and fences should be made of natural, galvanized, or stainless steel, which recede into the landscape and reduce the need for painting.

Guardrail & Fence Design Standards

- Use galvanized, stainless, or rust/silver colored painted steel (exact paint color to be determined).
- Use natural steel in areas where rust discoloration will not be a problem, such as in more rustic arroyos or planted areas.
- Use stainless steel cable guardrails in the more urbanized and highly trafficked areas of campus.
- Avoid complicated or brightly colored metal railings.

Avoid bright colors when painting metal elements in the landscape (as above). Allow metalwork to blend with the environment.

Overlook with natural steel guardrail and McNichols Tread Plank decking

Gate with natural steel welded wire mesh and frame

Stainless steel cable guardrails provide a more urban aesthetic where desired
STAIRS & HANDRAILS

Stairs on campus will be constructed of cast-in-place concrete with a light sandblast finish. The color of the concrete shall be natural gray except in areas where the surrounding groundplane concrete contains integral color.

Where conditions permit, grade adjacent landscape to slope without the use of retaining walls. This allows stairs to become more naturally integrate with the site and reduces unnecessary costs.

Steps shall have a comfortable tread riser ratio. To achieve this, use the following formula: 2x Riser + Tread = 26. (For example, a step with a 6” riser would have a 14” tread; a 5” riser would have a 16” tread.) Additionally, stair riser profiles shall be completely vertical with no nosing or relief. This allows for a clean aesthetic and ADA compatibility.

Stainless steel handrails of 1-1/2” outside diameter shall be used throughout campus to create a unified look. The subtlety of stainless steel allows the handrails to visually recede in favor of the surrounding landscape. In more naturalized or focal areas, natural steel handrails of the same diameter may be used in a “zig-zag” configuration for a more rustic appearance.
BRIDGES

Bridges not only allow the free movement of stormwater throughout the campus acequias and arroyos, but also serve to highlight the intersection of people and water.

Pedestrian bridges shall be constructed of natural steel planks, such as McNichols Tread Plank. These provide traction in wet conditions and will weather and rust to more smoothly interface with the surrounding landscape.

Vehicular swale crossings will be constructed of concrete with culverts or arch pipes below to allow water passage. Boulders, grade, and plantings will mask the inlets and outlets of the culverts. Natural steel guardrails will be used to protect pedestrians from 30” or greater drops and to accentuate the water crossing. Where guardrails are not required, use a raised metal bumper, per applicable code.
SITE AMENITIES

In keeping with the goals of fostering identity, comfort and sustainability, site amenities shall be contemporary, complementary, comfortable, and durable. Site furniture shall be a combination of custom-built furniture as well as catalog-ordered furniture. Consider using Landscape Forms’ catalog furniture or equal. Furniture may be bolted down or moveable depending on location and should be heavy duty enough that it will not fly away with intense wind. Paint colors for furniture shall be silver or galvanized. Built-in benches shall be sandblasted cast-in-place concrete. Planting urns shall be used as accents at building entrances or courtyards if desired. Pots shall be high quality concrete in simple shapes. Metal or cast concrete trash and recycling receptacles shall be located at accessible and unobtrusive. Bike parking areas shall be mindfully designed as parking gardens similar to those for cars. Bike racks shall be painted silver or galvanized as to blend in with the landscape.

Site Amenities Design Standards
- Use durable galvanized or silver finishes.
- Use perforated metal seats for cooler seating.
- Use heavy, high quality furniture with simple, contemporary details like board-formed concrete.
- Locate site furniture as not to interfere with emergency vehicle access.
- Locate trash receptacles to be accessible and unobtrusive.
- Use site amenities that have recycled material and can easily be recycled or reused.
- Bike parking areas shall be designed into projects with unobtrusive bike racks.
Bicycle parking integrated into design with unobtrusive racks

Example of Planter Urns: Kornegay 'Dune' (precast concrete)

Example of Planter Urns: Kornegay 'Mex Bold' (precast concrete)

Example of Trash/Recycling Receptacle: Landscape Forms 'Select'

Example of Bike Rack: Madrax 'Genesis' 2-capacity bike rack

Example of galvanized finish

Bicycle parking integrated into design with unobtrusive racks
LIGHTING

Lighting provides safety, security, and encourages evening use of campus spaces, while the appropriate selection of fixtures and poles can help unify the campus aesthetic. A silver finish allows poles to recede visually during daylight hours.

The goal is to have enough light for safety but to use as few fixtures as possible in an effort to reduce visual clutter and minimize maintenance. To achieve a moonlight effect, taller and fewer fixtures should be used.

Lighting Design Standards

- All fixtures shall be equipped with LED lamps for increased energy efficiency.
- Vehicular fixtures shall be Cooper ‘Galleon LED’ 2 light bar luminaires mounted on 24’ poles with a silver finish.
- Pedestrian lighting shall consist of Architectural Area Lighting ‘Largent’ pole top luminaires mounted on 12’ round poles with silver finish.
- Lighting shall meet all dark sky ordinances.
COLOR

Treasured tile mandalas act as enhance campus architecture with bold patterns and color. To accentuate these special architectural details, color elsewhere on campus shall be used in a prudent manner. Overuse of color on buildings and hardscape shall be avoided in favor of solid, subdued colors. Color should be used strategically in special places in the form of quality tiles, sculpture, special shade structures, artwork or rhythmic banners. Banners and colorful umbrellas for shade at seating areas can be used on campus against the desert plant material to add vibrancy. Additionally, native plants shall be selected to add seasonal color and interest to the campus landscape.

Color Design Standards

- Be selective and disciplined with use of color
- Use high quality tiles as inlays and avoid colored plastic, glass block or fiberglass.
- Focal points such as sculpture are a perfect opportunity to add color and vibrancy to the campus.
- Use colorful banners and umbrellas (that can handle wind loads) to add color to streetscapes and plazas.
The Chihuahuan Desert plant palette and desert adapted plants shall be used extensively through the campus as a celebration of regional West Texas character as well as for their drought tolerance and resiliency. Abundant planting will help unify and soften the campus.

Typically planting in constrained areas shall be ordered and simple. Natural areas, such as arroyos, shall be more informal, luxuriant, and complex, but the palette and arrangement shall remain simple for ease of maintenance and an overall serene appearance. Plants should be selected and grouped for year-round interest through color and textural contrast.

Trees are perhaps the most important of plants and the spine of landscape design. Trees shall be spaced to provide continuous shade to walkways and plaza spaces where no shade structure is present. Trees are of course complemented by shrubs and groundcovers, which should be planted in triangulated, organized masses at full growth spacing to ensure robust planting especially in the core campus.

Planting shall be specifically attuned to microclimatic conditions created by building placement and exposures. For instance, use shade tolerant plants in shady courtyards and water tolerant plants in acequias and arroyos. Learn from desert canyons in the selection of which species work the best. Reference the Appendix for more information on recommended species.

**Planting Design Standards**
- Use drought tolerant native, near native plants or desert adapted plants.
- Use organized groupings of plants.
- Use trees uniformly to create large areas of shade.
- Select plants for the unique microclimate conditions – e.g., canyon palette for building courtyards.
- All trees are to be on their own irrigation valves separate from shrubs.
- Group plants that have similar water requirements.
- Use nursery grown material only – none salvaged from desert/native settings.
IRRIGATION

Overview
Efficient irrigation is key to supporting a robust ecology within UTEP’s desert campus and to protecting the region’s aquifers. An automated, highly manageable system shall sustain aesthetically and ecologically essential plant life with a reasonable initial construction cost and minimal annual maintenance costs.

This irrigation system will be designed to provide uniform coverage to the plant material with consideration for providing separate control zones for different types of compatible plant material categories, such as active-use turfgrass, passive-use turfgrass, understory planting, and trees. It is anticipated that overhead sprinkler irrigation systems using pop-up rotary and spray sprinklers will be specified for turfgrass areas, and “point-source” and/or sub-surface inline drip irrigation will be utilized for trees, shrubs, and groundcover planting to minimize water lost to evaporation.

Centralized Irrigation Control System
It is anticipated that the irrigation system will be designed to incorporate a computerized central control system to facilitate responsive and efficient application of water to the plant material. This system will allow for monitoring and management of the irrigation system to optimize water application based on specific planting and maintenance needs and seasonal conditions.

The system will include the ability for the field “satellite” controllers to communicate and interface with a PC-based central computer workstation located in the irrigation water manager’s office. This will allow the irrigation water manager to track water use, provide “global” site system adjustments, identify and respond quickly to recognized system alarm conditions such as high or unscheduled system flows (indicating a potential mainline break or leak) and low or no flow conditions (indicating a potential damaged wire or control valve).

The central control system will be capable of utilizing regional, local, or on-site weather station data to make adjustments to the irrigation schedule based on daily evapotranspiration conditions and weather events.

Field Satellite Controllers
Each field satellite controller will require 120 VAC power (low amperage) and a means of communication with the central control computer. Communication can be accomplished in a variety of ways including hardwire connections, landline telephone service, cellular telephone, local radio, Ethernet, and other options. Each field satellite assembly installation will incorporate the control system manufacturers’ recommended grounding components which typically includes a grounding rod and grounding plate. The field satellite assemblies may be mounted on structural walls in secure locations and within stainless steel pedestal enclosures where appropriate.

The field satellite controllers will be capable of operating multiple programs with variable start times and operating times in order to satisfy the varied needs of the plant material, site soil conditions, and water management practices. Programming of the system will be based on site maintenance, site activity scheduling, and seasonal water window constraints.

Low voltage (24 VAC) wiring will be installed from the field satellite to the remote control valves within each area of control for a specific controller assembly or group of assemblies. The control wiring is anticipated to be 14-1 or 12-1 AWG solid copper wire, suitable for direct burial.

Flow Monitoring
Flow sensing instrumentation and master control valves will be specified to interface with the irrigation control system to include flow monitoring and system shut-down capability in the event of a recognized alarm condition. Examples of alarm conditions would include an unscheduled or high-flow alarm that may indicate a break in the mainline piping system, or a no-flow alarm that may indicate a faulty valve condition.
**Irrigation Mainline & Lateral Lines**

The buried mainline will be Class 200 PVC for sizes 2.5-inch and larger, and Schedule 40 PVC for sizes 2-inch and smaller. Mainline fittings 3-inch and larger will be ductile iron with push-on gasketed connections. Mainline fittings 2.5-inch and smaller will be Schedule 80 PVC with solvent weld connections.

Lateral pipe downstream of the automatic control valves will be Schedule 40 PVC. Lateral pipe fittings will be Schedule 40 PVC. Low voltage control wiring will be UF/UL solid copper conductors suitable for direct burial and will be installed in common trench with mainline pipe at a deeper burial depth than the mainline pipe to avoid damage to low voltage conductors during system repairs or excavations. Where irrigation piping and control wire must cross under hardscape surface, they will be routed through separate PVC Class 200 sleeves.

Isolation gate or ball valves will be installed along the mainline pipe network at locations that are appropriate to provide localized isolation of sections of the system to assist in system shut-down and maintenance. Quick coupling valves will be installed along the mainline pipe network at approximately 200-foot intervals to provide a means for incidental hose-end watering, and the washdown of hardscape and surfaces.

**Irrigation Valves**

Remote control valves will be constructed from durable glass-filled nylon, and rated at 200 PSI minimum. They will have flow control capabilities, and be activated by an electric solenoid via a low-voltage signal from the irrigation control system. Remote control valves will be equipped with integral pressure regulation capabilities where appropriate. Each below grade manual and remote control valve will be contained within individual valve boxes for protection from damage and vandalism, and for maintenance access.

**Irrigation Sprinklers**

Sprinklers will be selected based on appropriate size and topography of the irrigated area, and in consideration for the intended use of the area. Computerized single-leg profile sprinkler modeling techniques will be utilized during the sprinkler selection process to ensure that equipment specifications consider optimum Distribution Uniformity (DU) and Scheduling Coefficient (SC) for the selected Sprinkler/Pressure/Nozzle (SPN) combinations. The sprinkler layout will be developed so that it does not exceed the manufacturer’s recommended maximum spacing, and to avoid over-spray onto hardscapes, structural surfaces, and non-irrigated areas as much as possible. Sprinklers in active-use and sports field playing surfaces will be specified to provide the minimum amount of surface area exposure as possible for the class of sprinkler required, and will include rubber-covers to minimize the potential for tripping hazard or injury to the athlete and site user. Unitized swing-joints will be utilized for riser assemblies for pop-up rotary sprinklers, and flexible swing pipe will be utilized for riser assemblies on pop-up spray sprinklers.

**Drip Irrigation**

Drip emitters will be self-flushing, installed on flexible PVC, UV radiation resistant risers at each tree and shrub location. Drip emitters will have flow rates that range between 0.6 gallons per hour (GPH) to 2.0 GPH within an operating pressure range of 15 PSI to 30 PSI. Single outlet emitters will be specified for shrubs and groundcovers, and multiple outlet emitters will be specified for trees. In flat areas where tightly spaced groundcover occurs, consideration will be given to specifying sub-surface in-line drip tubing in a uniform grid pattern. All drip emitter laterals will include filtration and pressure regulation components as part of the remote control valve assembly, and will be provided with a means of flushing the laterals with lateral flush valve components at principal lateral ends.
WATER

Water is sacred. In a climate that receives an annual average rainfall of 9” or less, desert dwellers yearn to connect with this most precious resource. The UTEP Landscape Architectural Design Standards seek to strengthen this desert-water connection physically and psychologically, while helping to restore the health of the watershed.

Ephemeral Water Features
Ephemeral water features such as water harvesting arroyos, acequias and retention gardens shall be used at every opportunity as a signature feature of this campus, recalling the desert washes that once traversed the campus and El Paso. These features will slow the flow of stormwater, allowing it to percolate and feed the new desert vegetation, while reducing scouring of the arroyo and toxins in the watershed.

The goal is to eliminate drain pipes as much as possible, making the path of water an artful thread woven throughout the UTEP campus.

Footbridges
When pedestrian walkways cross acequias or arroyos, footbridges shall be used as an archetypal symbol throughout the campus of crossing the sacred path of water.

Rainwater & Greywater Capture
Where possible rainwater and condensate shall be harvested from all new buildings in above or below grade cisterns for re-use as landscape irrigation or water features.

More traditional water features, when used, shall be placed in special areas where many will enjoy. Urban desert dwellers need the psychological cooling of water. Water features shall be used judiciously. Brimming subtle features are recommended instead of major splashing cascades and jets to minimize water lost to evaporation. These features shall circulate treated air conditioning condensate or gray water as sculptural vessels that look as good empty as they do full.

Water Design Standards
- The path of stormwater through the UTEP campus is a beautiful thread that ties the mountains, the arroyo and pedestrians together and should thus be protected.
- Water features should be used at major gathering spaces or as subtle features at building entries or soothing shaded courtyards.
- Design judicious brimming water features that use the least water for the most effect.
- Celebrate and articulate the path of storm water through the site as an amenity in naturalistic and architectural ways – always integrated with plants to slow water down and clean stormwater before it makes its way to the arroyo.
- Use recycled water for irrigation and use drip irrigation and other water-saving irrigation methods.
- Water features must be beautiful when dry or wet.
- Quality pump and filter equipment must be specified.
Hart-Mill Arroyo

Existing Arroyos to be protected

Proposed Sub Arroyos

Proposed Acequia

UTEP Property Line
WATER

Ephemeral Water Features

Ephemeral arroyo

Water feature with rainwater...

...and without

Water harvest in sculptural planting areas

Footbridges

Footbridge at arroyo crossing

Irrigation

Spanish irrigation runnel combines character and function

Acequia — traditional agricultural method of conveying water to irrigate
Rainwater & Greywater Capture

**Vegetated Bioswale:** Stormwater in vegetated areas shall be redirected through bioswales before leaving the site. Infiltration rates are increased by utilizing check dams and soils designed to accommodate infiltration.

**Sidewalk Bioswale:** Planted swales capture stormwater. Where necessary, curbs can be cut to allow stormwater to drain to the swale.

**Parking Bioswale:** Use permeable pavers at parallel on-street parking spaces to bioswales to treat stormwater and infiltration.
C | SPACES

Certain space typologies can be found throughout the campus, including pedestrian plazas and nodes, park spaces, courtyards, building entrance plazas and parking gardens. These spaces often have common programmatic needs, but they each have unique spatial opportunities, constraints, and varied microclimates.

The Landscape Architectural Design Standards establish parameters for developing these campus spaces. The goal is to allow for site development that honors the distinctive character of each space while creating a cohesive design language and campus identity.
PEDESTRIAN PLAZAS & NODES

Pedestrian plazas and gathering nodes occur at the intersections of major pedestrian paths, at building entries, and at special landscape features such as the campus ‘green’ or a grove of trees. Plazas and nodes serve the dual purpose of directing traffic flow—by orienting visitors, marking decision points, and providing focal points—and serving as gathering and meeting places. These node intersections and plazas are natural locations for focal points such as sculpture, and may be delineated by special paving patterns and textures. Gathering shall be facilitated by providing amenities such as trash and recycling, drinking fountains and seating.

Plaza & Node Design Standards

- Provide as much shade as possible with canopy to canopy spacing of trees.
- Allow free flowing movement through the space.
- Provide seating, kiosks, receptacles as needed depending on node or kiosk.
- Provide gfi’s and any power suitable for musical entertainment, computers etc.
- Accommodate turning radii of emergency vehicles if applicable.
- Design so as not to obstruct pedestrian traffic flow, but to enhance the movement through campus.
- Use paving with matte finish to reduce glare.
- Provide focal points such as sculpture or water elements when appropriate.
- Take advantage of microclimates created by buildings or trees as potential plaza spaces.
- All spaces shall be universally accessible.

A Grove of Trees with Canopy to Canopy Coverage

A seat wall provides ample seating opportunities

Water features create identifiable spaces
**PARK SPACES**

While native plants impart ecological health and beauty to the campus, lawn areas accommodate recreation activities that promote social health. However, drought-tolerant lawn, such as native turf mixes and hybrid Bermuda varieties, shall be used judiciously. Centennial Plaza, Leech Grove, Psychology Green and Geology Green shall be the primary areas where turf is used. Smaller lawn areas may be appropriate for amphitheaters or where it will serve a functional purpose, which shall be reviewed on a case-by-case basis. Where possible these lawns shall retain storm water drainage from adjacent properties. Lawn areas shall incorporate trees to provide shade. Consider installing audio/electric systems in lawn areas, discreetly built into hardscape elements away from view, for concerts, lectures etc.

**Park Design Standards**

- Use lawn judiciously like water and only if it has use or purpose and size appropriately.
- Use resilient lawn varieties that require less fertilizer.
- Use special detailing under heavily used lawns to encourage water permeability.
- Use drought tolerant species listed in the appendix.
- Use trees that produce dappled shade and avoid huge expanses of lawn except where mandated by the University for special events.

Concept sketch for core campus park spaces – Lawn space is used judiciously to create central gathering spaces and to improve stormwater infiltration. Planting and paving balance to support circulation while improving user comfort and the campus microclimate.
COURTYARDS & BUILDING ENTRANCES

Seamless indoor-outdoor experiences between buildings and outdoor spaces promote psychological wellbeing and strengthen a sense of connection to place. The design team for each project should collaborate on how to best achieve this for each particular case. Typically, paving is enriched at building entries and courtyards adjacent to buildings, as these are areas of high use where learning and socializing often take place. Consider formalizing these gathering spaces by integrating arbors or trees, which will provide necessary shade and help ease the transition between dark interiors and intense sunny exterior space. Select trees that might also soften the height of the building and group them with approved plants that have similar shade and water requirements. Consider designing seat walls with built-in GFI's hidden the back to support use throughout the day and provide trash and recycling receptacles nearby to encourage stewardship. Entries should be designed to encourage gathering while maintaining clearance: consider creating shaded social spaces to the sides of entryways. Courtyards can be designed to function as both informal gathering areas and as outdoor classrooms, becoming venues for learning about the dynamic campus landscape.

Courtyard & Building Design Standards

- Use ordered planting arrangements typically at building entrances that provide shade and partial evergreen appearance in the winter.
- Provide seating and gathering spaces to the sides of the entrances so that the entry is not blocked.
- Provide trash and recycling containers near building entrances.
- Enrich paving at courtyards and building entrances.
PARKING GARDENS

To further shift the focus of the built environment toward increased comfort and sustainability, it is important that parking areas be more than hot, vast, barren lots. Rather, parking lots inside the campus shall be designed as parking gardens, which feature permeable paving, recycled concrete, shade trees, and water harvesting swales to enhance ecological performance and more comfortably accommodate visitors arriving by car. Cars shall be screened by arbors or planting. Directional signage shall be provided to orient visitors as they begin their exploration of this unique, comfortable, engaging, and sustainable world class campus.

Courtyard & Building Design Standards

- Use recycled, permeable hardscape materials, especially in parking spaces.
- Shade parking places with trees every third car in addition to trees planted in water harvesting swales between parking rows.
- Use durable hardscape for driving lanes between parking spaces.
- Screen parked cars.
- Use curb breaks to allow storm water from parking surfaces to reach planting areas.

Diagram: Water harvesting swale collects, cleans and retains stormwater in a parking garden

Parking lot screening

Water harvesting swales at parking
APPENDIX

APPENDIX A: Construction Details*

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- walls & boulders 78-83
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APPENDIX B: Approved Planting List

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APPENDIX C: Sustainable Sites

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* Construction Details provided here are intended to be examples of possible design solutions. The degree to which future designs match these details is dependent on each specific project at the discretion of UTEP. Under no circumstance are these details to be used for the construction of site elements without prior review by licensed/registered/certified professionals on a per project basis.
TYPICAL PAVING NOTES:

1. REINFORCING SHALL NOT EXTEND ACROSS EXPANSION JOINTS
2. ALL CONCRETE WITHIN ACCESSIBLE ROUTES SHALL HAVE A 4.9% MAX SLOPE, UNLESS OTHERWISE INDICATED AS A RAMP. CROSS SLOPE SHALL BE NO GREATER THAN 2% AND NO LESS THAN 0.5%.
3. FINISH GRADES AT ADJACENT PAVING SHALL NOT EXCEED +/- 1/4" ELEVATION.

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**concrete paving, typical**

**12" concrete header**
NOTES:
1. SIZE OF DECOMPOSED GRANITE TO 14" MINUS
2. PRE-EMERGENT SHALL BE APPLIED TO FINISH GRADE BEFORE INSTALLATION OF DECOMPOSED GRANITE.
3. STABILIZER AND GRANITE SHALL BE PRE-MIXED PRIOR TO INSTALLATION.
4. FINAL APPLICATION OF PRE-EMERGENT SHALL BE APPLIED TO FINISH GRADE AFTER INSTALLATION OF DECOMPOSED GRANITE IS RAKED SMOOTH AND UNIFORM.
5. WHERE STABILIZED DG MEETS EXISTING OR NEW PAVING SURFACES, THE VERTICAL DISTANCE BETWEEN THE TWO SHALL BE NO GREATER THAN 14".
6. ALL STABILIZED GRANITE SHALL HAVE A 4.5% MAXIMUM SLOPE & A 0.05% MINIMUM SLOPE. CROSS SLOPE MAXIMUM SHALL NOT EXCEED 1.9%.
7. ALL DECOMPOSED GRANITE SURFACES SHALL BE FIRM, STABLE, FREE OF CRACKS AND SLIP RESISTANT UPON FINAL COMPLETION.
8. PEDESTRIAN GRADE DECOMPOSED GRANITE SURFACES SHALL CONSIST OF 4" COMPACTED DG OVER 6" COMPACTED BASE COURSE.
9. VEHICULAR GRADE DECOMPOSED GRANITE SURFACES SHALL CONSIST OF TWO (2) 2 1/2" COMPACTED LIFTS OF DG OVER (2) 6" LIFTS OF COMPACTED BASE COURSE.

stabilized dg - vehicular

stabilized dg - pedestrian

steel header, typical
NOTES:
1. RANDOMLY INTEGRATE STANDARD FINISHES

HORIZONTAL ROWS OR PAVERS SHALL BE WHOLE UNIT PAVERS. WHERE ROWS END, NO PAVER SHALL BE CUT SMALLER THAN 1/3 THE UNIT DIMENSION

TYPICAL PAVER DISTRIBUTION: STAGGERED RUNNING BOND PATTERN; UNIT PAVER JOINTS SHALL SHIFT BY 1/3 PAVER WIDTH PER COURSE

CONCRETE CURB ADJACENT LANDSCAPE

70% (SB) SHOTBLAST FINISH / 30% STANDARD FINISH

permeable paver patterning

permeable pavers w/ drain

permeable paver edge @ planting

permeable paver edge @ concrete

FINISH GRADE
PERMEABLE PAVERS
#8 OR #9 AGGREGATE SETTING BED
#57 STONE OPEN-GRADED BASE, COMPACTED TO 95% P.D.
COMPACTED BASE COURSE
WOVEN GEOTEXTILE FABRIC TO COVER THE ENTIRE AREA OF PREPARED SUBGRADE

4" CORRUGATED, PERFORATED PVC DRAIN PIPE
PREPARED SUBGRADE

CONCRETE CURB ADJACENT LANDSCAPE

4" x 3/8" CONTINUOUS STEEL PLATE, WELD ALL SEAMS; ANCHORS EVERY 18" O.C. HOLD DOWN 1" FROM FINISH GRADE
PREPARED SUBGRADE
WOVEN GEOTEXTILE FABRIC TO WRAP ENDS ONLY - MIN 12"

FINISH GRADE
CONCRETE SLAB EDGE
NON-WOVEN, NEEDLE PUNCHED POLYPROPYLENE GEOTEXTILE FABRIC
PREPARED SUBGRADE
recycled concrete paving - permeable

NTS

sizes vary

recessed concrete slab

adjacent paving

#8 or #9 aggregate setting bed

#57 stone open-graded base, compacted to 95%

compacted base course

woven geotextile fabric

prepared subgrade

4" corrugated, perforated PVC pipe

recycled concrete paving in decomposed granite

NTS
APPENDIX | typical details (paving - recycled concrete)

NOTES:
1. SIZES OF RECYCLED CONCRETE SLABS VARY; LAYOUT SHOWN FOR DESIGN INTENT ONLY
2. 70% OF RECYCLED CONCRETE PAVING SHALL CONSIST OF ≈6'-0" x ≈6'-0" SLABS
3. 30% OF RECYCLED CONCRETE PAVING SHALL CONSIST OF ≈3'-0" x ≈3'-0" SLABS
4. NO PIECES SHALL BE SMALLER THAN 24" SQUARE

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recycled concrete paving layout parameters - acceptable

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RECYCLED CONCRETE SLABS SHALL NOT HAVE STACKED OR ALIGNED JOINTS

---

recycled concrete paving layout parameters - unacceptable

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CONTRACTOR SHALL NOT USE PIECES SMALLER THAN 24"x24" TO FILL VOIDS BETWEEN LARGER SLABS

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JOINT MATERIAL VARIES; USE STABILIZED DECOMPOSED GRANITE FOR PERMEABLE AREAS USE #8/#9 AGGREGATE
1. Water test all tree pits prior to planting. Allow pits to drain for 48 hours. If water does not drain, refer to hardpan detail and notify owner’s representative.

2. Position plant for “best side” view, unobstructed pedestrian access and orient sun-burn susceptible plants per original rotation.

3. Score all rootballs. Make a vertical cut 1/4 to 1/2-inch deep four times around sides and twice across the bottom.

4. The root crown shall be 2" above finish soil grade. Remove excess surface soil from container, exposing crown & root flare. Trees that settle to below the 1" above finish soil grade level will be deemed too deep (see note 12).

5. Salvaged trees will not require staking. Verify need for staking for all others with owner’s representative or as noted on plans.

6. Provide supplemental staking if required to properly support the plant material per tree staking plan details.

7. Install tree guard on all trees located in turf (see specifications).

8. Tree ties shall be 12-gauge galvanized zinc-coated wire encased in 1-inch dia., 2-ply rubber garden hose (black).

9. Tree stakes shall be steel T-stakes, 0'-0" tall from finish grade, driven outside of rootball into subgrade (24-inch min.) painted silver.

10. Arrange stakes around tree canopy to prevent abrasion wounds to branches.
APPENDIX | typical details (planting)

1. **TREE PLANTING NOTES (CONTINUED)**

11. If tree or plant pits are excavated beyond the optimal placement depth, contractor shall replace soil under the rootball and mechanically tamp soil to 90% compaction until the optimal plant placement depth is achieved.

12. All trees planted too deep or that have sunk 2" or more during the maintenance/warranty period will be replaced by landscape contractor at landscape contractor’s expense.

13. Stake all trees unless noted otherwise on plan.

1. **HARDPAN OR IMPERMEABLE SOILS TEST:**

1. Dig test tree pits at all proposed tree locations after rough grade is established and at least 2 weeks prior to scheduled tree planting.

2. Coordinate test pit locations and water testing with owner’s representative.

3. On grade tree pits: fill pits with water. If water does not percolate in 24 hours, notify owner’s representative & implement tree planting on hardpan detail.
**SHRUB PLANTING NOTES:**

1. **FILL PLANT PIT WITH WATER;** IF WATER DOES NOT PERCOLATE IN 24 HOURS, REFER TO TREE PLANTING ON HARDPAN DETAIL AND NOTIFY OWNER'S REPRESENTATIVE.

2. **POSITION PLANT FOR “BEST SIDE” VIEW PER L.A. FIELD DIRECTIVE AND ORIENT SUNBURN SUSCEPTIBLE PLANTS PER ORIGINAL ROTATION.**

3. **SCORE THE ROOTBALL,** MAKE A VERTICAL CUT 1/4- TO 1/2-INCH DEEP FOUR TIMES AROUND SIDES AND TWICE ACROSS THE BOTTOM.

4. **TOP OF ROOTBALL SHALL BE FLUSH WITH OR UP TO 1” ABOVE SOIL GRADE.**

---

**SHRUB PLANTING ON SLOPE**

- Standard shrub planting:
  - 2” DEPTH DECOMPOSED GRANITE MULCH
  - FINISH GRADE
  - PLANT BACKFILL MIX; WATER AND TAMPER TO REMOVE AIR POCKETS
  - SCARIFY SIDES OF PLANTING HOLE TO PREVENT GLAZING
  - 90% COMPACTED SOIL

- Shrub planting on slope:
  - 2” DEPTH DECOMPOSED GRANITE MULCH
  - SOIL GRADE
  - SCARIFY SIDES OF PLANTING HOLE TO PREVENT GLAZING
  - PLANT BACKFILL MIX; WATER AND TAMPER TO REMOVE AIR POCKETS
  - UNDISTURBED NATIVE SOIL OR 85% COMPACTED SOIL

---

**NOTES:**

1. SEE TREE STAKING AND PLANTING DETAIL FOR ADDITIONAL NOTES.

2. DIG TEST TREE PITS AT ALL PROPOSED TREE LOCATIONS AFTER ROUGH GRADE IS ESTABLISHED AND AT LEAST 2 WEEKS PRIOR TO SCHEDULED TREE PLANTING.

3. COORDINATE TEST PIT LOCATIONS AND WATER TESTING WITH LANDSCAPE ARCHITECT & OWNER’S REPRESENTATIVE.

4. AUGER INTO EXISTING HARDPAN WITH MIN. 12” DIA. HOLES. LOCATE MIN. FOUR PER PLANTING PIT, EVENLY SPACED, OUTSIDE ROOT BALL. DEPTH OF HOLE SHALL BE DETERMINED BY FIELD CONDITIONS AND APPROVED BY LANDSCAPE ARCHITECT & OWNER’S REP. BASED ON SOILS EVALUATION TO ENSURE PERCOLATION. WATER TEST TREE HOLES. IF TREE HOLE DOES NOT DRAIN WITHIN 24 HOURS, NOTIFY LANDSCAPE ARCHITECT & OWNER’S REP.
### Typical Details (Planting)

**Planting Bed Soil Profile**

- **ROUNDED GRADE CUT**
- **UNDISTURBED EXISTING SOIL**
- **TURF**
- **ROCK MULCH**
- **APPROVED PLANTING SOIL MIXTURE TILLED INTO EXISTING SOIL**

**Seeding Soil Profile**

- **SCARIFIED LOOSENED EXISTING SOIL**
- **UNDISTURBED EXISTING SOIL**
- **SCARIFIED LOOSENED EXISTING SOIL**
- **HYDROSEEDED PLANTS**
- **FINISH GRADE**

**Turf Sod**

- **TOP OF MOWED TURF - FLUSH W/ ADJACENT PAVING**
- **TOP OF MOWED TURF - FLUSH W/ ADJACENT PAVING**
- **ADJACENT PAVING**
- **UNDISTURBED EXISTING SOIL**

**Turf Grass Soil Profile**

- **TURF**
- **APPROVED IMPORT TOPSOIL**
- **ROUGH GRADE CUT**
- **UNDISTURBED EXISTING SOIL**

---

**Legend:**

- **a.** 2" SOD
- **b.** NATIVE SUBSOIL W/ AMENDMENTS MIXED INTO TOP 8" - 12" OR IMPORTED TOPSOIL.
- **c.** PREPARED SUBGRADE.

---

**APPENDIX | typical details (planting)**
VINE PLANTING NOTES:

1. Score rootball, making (4) vertical cuts 1/4" to 1/2" deep around sides (2) across bottom.
2. Top of rootball shall be 1" above adjacent soil grade.

WALL

SPREAD BRANCHES AGAINST WALL VINE

2" DEPTH DECOMPOSED GRANITE MULCH

FINISH GRADE

SCARIFY SIDES OF PLANTING HOLE TO PREVENT GLAZING

PLANT BACKFILL MIX

2 TIMES WIDTH OF ROOTBALL

NOTES:

1. Install per manufacturer's recommendations
2. Overlap adjacent roll sections & secure w/ steel pins

PLANTING BED SOIL

UNDISTURBED SUBGRADE OR FILL

SECURE MAT AT TOP & BOTTOM OF SLOPE W/ STEEL PINS

FINISH GRADE VARIES

3D EROSION CONTROL MAT, POLYPROPYLENE. INSTALL AT ALL PLANTING SLOPES EXCEEDING 3:1; FILL MAT W/ ± 1" OF SOIL ENSURING THAT THERE ARE NO GAPS BETWEEN THE SOIL FILLED MAT AND SLOPE SURFACE.

PLANTING @ wall

erosion control mat

N/T
NOTES:
1. TO OCCUR EVERY 1'-6" OF ELEVATION DROP THROUGHOUT ALL ARROYOS
2. 2 COURSINGS OF RECYCLED CONCRETE SALVAGE FROM SITE OR ANOTHER APPROVED LOCATION
3. 1" THICK MORTAR SETTING BED, RAKE JOINTS, GROUT COLOR TO MATCH CONCRETE
4. ARROYO TOP DRESSING
5. BURY BOTTOM HALF OF BOTTOM COURSING OF CONC. IN SURROUNDING GRADE
6. MORTAR SETTING BED
7. PREPARED SUBGRADE

ACEQUIA CHECK DAM

NOTES:
1. RECYCLED CONCRETE LENGTH = 6"-36", THICKNESS = 4"-6"
2. IF REBAR IS PRESENT, ALL EXPOSED REBAR TO BE CUT AND GROUND SMOOTH
3. HOLD BACK JOINTS 1" FROM FACE, 1" MAX. JOINT WIDTH
4. SMOOTH, TOP SIDE OF CONCRETE SHALL REMAIN UP, TYP. ALL COURSES

SALVAGED CONCRETE / BOULDER WEIR

NOTES:
1. RECYCLED CONCRETE LENGTH = 6"-36", THICKNESS = 4"-6"
2. HANDSET BROKEN CONCRETE, TOP OF WEIR TO BE LEVEL
3. MORTAR JOINTS AND BED
4. MIN. 6" DEPTH 1" Ø PEA GRAVEL
5. REBAR REINFORCEMENT
6. PREPARED SUBGRADE

WIDTH VARIES

SWALE VEGETATION

SALVAGED CONCRETE, TOP OF WALL TO BE LEVEL

LANDSCAPE BOULDER

MORTAR JOINTS AND BED

PREPARED SUBGRADE
NOTES:
1. PIPE OUTLETS SHALL BE HIDDEN FROM THE VIEW OF ADJACENT PEDESTRIAN WALKS WITH BOULDERS, PLANTING, AND INERT MATERIALS.
2. COORDINATE FINAL LOCATION OF BOULDERS AND PLANTING WITH LAND ARCH PRIOR TO CONSTRUCTION.
3. PROVIDE MINIMUM COVER OVER PIPES PER CIVIL ENGINEER
APPENDIX | typical details (stormwater features)

aggregate transitions at arroyo

NOTES:
1. ALL SURFACES COVERED WITH 100% BASE LAYER OF 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRAINTE MULCH
2. ZONE A: 30% COVER OF 3/4" - 3" Ø SALVAGED ANDESITE OVER 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRAINTE MULCH
3. ZONE B: 70% COVER OF 2" - 8" Ø SALVAGED ANDESITE OVER 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRAINTE MULCH
4. ZONE C: 95% COVER OF 4" - 12" Ø SALVAGED ANDESITE OVER 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRAINTE MULCH
5. MULCH ONLY ZONE: 100% 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRAINTE MULCH

arroyo/acequia aggregate layout - section

NTS
NOTES:
ZONE A: 30% COVER OF 3/4" - 3" Ø SALVAGED ANESITE OVER 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRANITE MULCH
ZONE B: 70% COVER OF 2" - 6" Ø SALVAGED ANESITE OVER 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRANITE MULCH
ZONE C: 95% COVER OF 4" - 12" Ø SALVAGED ANESITE OVER 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRANITE MULCH
MULCH ZONE: 3/4" MINUS 'FRANKLIN RED' DECOMPOSED GRANITE MULCH

APPENDIX | typical details (stormwater features)

arroyo/acequia aggregate layout - plan

ARROYO WIDTH VARIES
APPENDIX | typical details (walls & boulders)

NOTES:
1. PROVIDE MASONRY LAPS PER LOCAL BUILDING CODE
2. WATERPROOF MEMBRANE SHALL BE ELASTOMERIC LIQUID MEMBRANE W/ POLYSTYRENE PROTECTION BOARD
3. CMU WALLS GREATER THAN 5'-0" TALL TO HAVE DOWELS POSITIONED AT 2'-0" FROM BACKFILLED FACE OF CMU

---

1. PROVIDE MASONRY LAPS PER LOCAL BUILDING CODE
2. WATERPROOF MEMBRANE SHALL BE ELASTOMERIC LIQUID MEMBRANE W/ POLYSTYRENE PROTECTION BOARD
3. CMU WALLS GREATER THAN 5'-0" TALL TO HAVE DOWELS POSITIONED AT 2'-0" FROM BACKFILLED FACE OF CMU

---

1. PROVIDE MASONRY LAPS PER LOCAL BUILDING CODE
2. WATERPROOF MEMBRANE SHALL BE ELASTOMERIC LIQUID MEMBRANE W/ POLYSTYRENE PROTECTION BOARD
3. CMU WALLS GREATER THAN 5'-0" TALL TO HAVE DOWELS POSITIONED AT 2'-0" FROM BACKFILLED FACE OF CMU
APPENDIX | typical details (walls & boulders)

NOTES:
1. PROVIDE MASONRY LAPS PER LOCAL BUILDING CODE
2. WATERPROOF MEMBRANE SHALL BE ELASTOMERIC LIQUID MEMBRANE W/ POLYSTYRENE PROTECTION BOARD
3. CMU WALLS greater than 5'-0" tall to have dowels positioned at 2.5" from backfilled face of CMU

C.I.P. CONCRETE SITEWALL, LIGHT SANDBLAST FINISH on all exposed surfaces except board-formed faces

ADJACENT PAVING Varies

PREPARED SUBGRADE

EXPANSION JOINT, TYP.

REBAR REINFORCEMENT

NOTES:
1. ANGLE BACK all exposed vertical faces
2-1/2" TYP.

1/2% SLOPE

STONE TOP, SLOPE 1/2% MIN.
STONE VENEER
MORTAR BED & JOINTS
WATERPROOF MEMBRANE
WEEP WHERE NECESSARY
12"x16" CMU BLOCK
GROUT SOLID ALL CELLS
WASHED #57 STONE, WRAP IN GEOTEXTILE SEPARATION FABRIC
FINISH GRADE
4" CORRUGATED, PERFORATED PVC DRAIN PIPE, WHERE NECESSARY
STUD HOOK
PREPARED SUBGRADE

EXPANSION JOINT, TYP.
ADJACENT PAVING VARIES
**APPENDIX | typical details (walls & boulders)**

---

**ELAVATION: TYPICAL FOR ALL STONE WALLS**

- Top of wall varies
- Stone
- Mortar joints, see note 4
- Finish grade

**PLAN: TYPICAL FOR ALL STONE WALLS WITHOUT CONCRETE CAPS**

- Top of wall varies
- Stone
- Mortar joints, see note 4
- Finish grade

**RETIRED WALL SCHEDULE**

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<td>1'</td>
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<tr>
<td>4'-0&quot; to 6'-0&quot;</td>
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<tr>
<td>&lt; 4'-0&quot;</td>
<td>1'-6&quot;</td>
<td>8'</td>
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</table>

*Schedule applies to structural concrete at retaining walls only, consult w/ structural & civil engineers for appropriate size & locations

**STONE WALL NOTES:**

1. Stone face & stone cap to have random stacked appearance
2. Stone lengths: 6" min. to 36" max.
3. Stone veneer thickness: 2" min. to 8" max.
4. Hold back joints 1" from face of stone, 1" max. joint width

---

**STANDARD | C.I.P. concrete retaining wall**

- Landscape boulder
- Top of boulder
- Finish grade
- Existing subsoil
- Bury approximately 1/3 of boulder

---

**TYPICAL WALL TOLERANCES**

- NTS

---

80  DESIGN GUIDELINES | APPENDIX
low boulder retaining wall

ANDESITE BOULDERS, FILL VOIDS WITH TOPSOIL

1'-0" MIN 8"

WASHED #57 STONE

ARROYO PLANTING

FINISH GRADE

SECTION

SECTION-ELEVATION

ADJACENT PLANTING BED
ANDESITE BOULDERS, FILL VOIDS WITH #57 STONE

VARY HEIGHT OF TOP COURSE BOULDERS
ANDESITE BOULDERS, FILL VOIDS WITH TOPSOIL
FINISH GRADE
WASHED #57 STONE
ARROYO PLANTING

HEIGHT VARIES

2 1

low boulder retaining wall

APPENDIX | typical details (walls & boulders)
APPENDIX | typical details (walls & boulders)

- High boulder wall with built-in planter pockets
- Adjacent planting bed
- Andesite boulders, fill voids with #57 stone
- Anchor trench
- Planting pocket
- Erosion control mat, typ.
- Prepared subgrade
- Finish grade
- Arroyo planting, ref planting plan
- Vary height of top course boulders
- Andesite boulders, fill voids with topsoil
- Planting pocket
- Erosion control mat, typ
- Arroyo planting

Notations:
- Planting pocket
- Erosion control mat, typ
- Arroyo planting

Typical Details (Walls & Boulders)
APPENDIX | typical details (walls & boulders)

1. Consult Civil for erosion control mat (ECM) specifications.
2. Cut and overlap ECM as necessary; turn down 12” minimum at top of slope as drawn to prevent exposure through mulch.
3. Secure ECM to soil subgrade where needed with pins per manufacturer’s recommendations.
4. Cover fabric with 1-2” of soil prior to setting boulder. Wet soil in order to bind boulder to fabric.
5. Where necessary / desired and practical, ECM may be substituted by a minimum of 4” of No. 57 aggregate layer on flat or gently sloping surfaces wrapped in geotextile filter fabric (Mirafi 140N or equal).
6. ECM to be omitted where boulders rest on exposed bedrock.

steep boulder retaining wall - slopes greater than 3:1

SECTION

ADJACENT PLANTING BED
ANDESITE BOULDERS, FILL VODAS WITH #57 STONE

PLANTING TERRACE

PREPARED SUBGRADE
ARROYO PLANTING
WASHED #57 STONE, TYP
FINISH GRADE

EROSION CONTROL MAT, TYP.
REF TO NOTES

ANCHOR TRENCH
PIN, TYP

SECTION-ELEVATION

FINISH GRADE

ADJACENT PLANTING BED
ANDESITE BOULDERS, FILL VODAS WITH #57 STONE

PLANTING TERRACE

PREPARED SUBGRADE
ARROYO PLANTING
WASHED #57 STONE, TYP
FINISH GRADE

EROSION CONTROL MAT, TYP.
REF TO NOTES

ANCHOR TRENCH
PIN, TYP

terraced boulder retaining wall - slopes less than 3:1

SECTION

ADJACENT PLANTING BED
ANDESITE BOULDERS, FILL VODAS WITH #57 STONE

PLANTING TERRACE

PREPARED SUBGRADE
ARROYO PLANTING
WASHED #57 STONE, TYP
FINISH GRADE

PLANTING TERRACE

WASHED #57 STONE, TYP
ARROYO PLANTING

SECTION-ELEVATION

FINISH GRADE

ADJACENT PLANTING BED
ANDESITE BOULDERS, FILL VODAS WITH #57 STONE

PLANTING TERRACE

PREPARED SUBGRADE
ARROYO PLANTING
WASHED #57 STONE, TYP
FINISH GRADE

EROSION CONTROL MAT, TYP.
REF TO NOTES

ANCHOR TRENCH
PIN, TYP

APPENDIX | Design Guidelines

APPENDIX | Design Guidelines
NOTES:
1. GRIND ALL EXPOSED WELDS SMOOTH
GUARDRAIL W/ WOVEN WIRE MESH PANELS; DESIGN TO VARY W/ LOCATION THROUGHOUT CAMPUS

ADJACENT ARROYO LANDSCAPE

STD. HOOK

6" TH. CONCRETE DECKING, CANTILEVERED SLAB WITH THICKENED EDGE
SLAB REINFORCEMENT
SELECT FILL, COMPACTED TO 95%
REINFORCEMENT BEYOND
CULVERT PIPE, VARIES, CONSULT CIVIL FOR SIZING REQ. TYP.
6" OF TYPE 2 BEDDING, COMPACTED TO 95%
WALL REINFORCEMENT
PREPARED SUBGRADE
FOOTING REINFORCEMENT

section - culvert crossing with bridge @ swale

NTS
Box culvert crossing - low & shallow depth
NOTES:
1. REF. TO STRUCTURAL ENGINEER FOR SIZING AND DETAILING OF PEDESTRIAN BRIDGES

**typical steel bridge - abutment plan**

- Width varies
- 12" wide 11 ga treadplank
- Steel support
- Concrete abutment
- Adjacent landscape

**typical steel bridge - cross section**

- Steel bollard, beyond
- Natural weathering steel tread plank
- Natural weathering steel edge protection
- Concrete abutment, beyond
- Finished grade @ arroyo / acequia
- Concrete footing, beyond
- Prepared subgrade

**NOTES:**
1. REF. TO STRUCTURAL ENGINEER FOR SIZING AND DETAILING OF PEDESTRIAN BRIDGES
typical steel pedestrian bridge - section
NOTES:
1. HOLD FRAME 1/2" OFF EDGE OF SLAB
2. GRIND ALL EXPOSED WELDS SMOOTH
APPENDIX | typical details (guardrails)

**NOTES:**
1. ALL POSTS AND CONNECTIONS TO BE STAINLESS STEEL (S.S.)
2. GRIND ALL EXPOSED WELDS SMOOTH
3. ALL POSTS TO BE VERTICAL

**S.S. THREADED TERMINAL POST, WASHER, NUT AND S.S. END CAP, TYP; INSTALL PER MANUF RECOMMENDATIONS**

**END POST**
TYPICAL END POST: (2)
½" x 3" S.S. PLATES W/ (1) ½" x 2 ½" S.S. PLATE

**2" Ø S.S. TOPRAIL, WELD TO S.S. POST, MITERED CORNERS, TYP.**

**TYPICAL INTERMEDIATE POST: ½" TH. S.S. PLATE**

**½" Ø 1x19 S.S. CABLE, SPACED 3" O.C., TYP.**

**¼"x½"x½" S.S. WELD PLATE W/ (4) ½" Ø x 6" HEADED STUDS, TYP.**

**2" O.C., TYP.**

**6'-0" O.C., TYP.**

**AT GRADE BREAK**
ALIGN EDGE OF END POST TO GRADE BREAK, BEND WELD PLATE TO BE FLUSH WITH LANDING AND RAMP

**TOP OF SLAB BEYOND**

**RECESSED HEADWALL**

**wire cloth guardrail - elevation**

**stainless steel cable guardrail - elevation**
APPENDIX | typical details (stairs, ramps & handrails)

TYPICAL HANDRAIL NOTES:
1. TREAD WIDTHS MAY VARY
2. ALL HORIZONTAL CLEARANCES TO COMPLY WITH TEXAS ACCESSIBILITY STANDARDS (T.A.S.) 505.5.
3. CIRCULAR HANDRAIL CROSS SECTION TO COMPLY WITH T.A.S. 505.7.1.

- 5'-0" MAXIMUM SPAN BEFORE REQUIRING DOWN POST; CENTER ON SPAN IF POSSIBLE
- 1 1/2" OUTSIDE DIAMETER CIRCULAR CROSS-SECTION STAINLESS STEEL HANDRAIL, TYPICAL
- STONE VENIERED CHEEK WALL BEYOND, WHERE OCCURS
- WELD ALL SEAMS, GRIND SMOOTH
- 1/4" TOOLED EDGE, CONCRETE STEPS LIGHT SANDABLASTED FINISH, UNLESS SPECIFIED OTHERWISE
- ADJACENT CONCRETE PAVING
- PREPARED SUBGRADE
- REBAR REINFORCEMENT

concrete stair - typical

NTS
APPENDIX | typical details (stairs, ramps & handrails)

concrete ramp - typical

NTS

5'-0" maximum span before requiring down post; center if possible

1 1/2" outside diameter stainless steel handrail, typical

Bottom rail where necessary per code

3" dia. core drill; fill with non-shrink, non-metallic grout, colored to match surrounding paving; typical

Adjacent pavement

Rebar reinforcement

Prepared subgrade

Typical expansion joint

Slope per grading plan

Concrete ramp - typical

APPENDIX | typical details (stairs, ramps & handrails)

NTS
NOTES:
1. GROUT AND WATERPROOF SEAL ALL PENETRATIONS
2. PROVIDE SHIMS AND THIN GROUT TO LEVEL CONTAINER

12" MIN.
8" MIN.

landscape urn - section

LANDSCAPE URN
AMENDED POTTING SOIL
IRRIGATION SUPPLY
PEA GRAVEL WRAPPED IN FILTER FABRIC
GROUT LEVELING BED
PAVEMENT, BENCH TOP OR GRAVEL
FINISH GRADE
1 CF PEA GRAVEL DRAIN SUMP FROM URN WRAPPED IN FILTER FABRIC

WATERPROOF SEAL
REBAR REINFORCEMENT
2" PVC SWEEP ELL FOR USE AS IRRIGATION SLEEVE AND DRAINAGE; SLOPE TO DRAIN
PREPARED SUBGRADE

steel pipe curb stop/bumper - section

WELD JOINTS
3" Ø STD. PIPE WITH 3/4" PLATE END CAPS, TYP.
GRANITE PARKING
3" Ø STD. PIPE, EMBED 12" WELD TO HORIZONTAL PIPE 1/2" STEEL RODS, AS SHOWN
CONCRETE FOOTER, TYP.
FOOTING REINF.
APPENDIX | typical details (site amenities)

bench in dg paving - section

pre-cast concrete table and bench

gfcī & data drop receptacle
bollard @ pedestrian bridges

CONCRETE FOOTING
REBAR REINFORCEMENT

2"x6" RECTANGULAR STEEL TUBE, CONCRETE FILLED. TROWEL CONCRETE SMOOTH (SHALLOW DOME)
PAVING VARIES
GROUT JOINT, COLOR TO MATCH STONE

CONCRETE BASE, EXPOSED AGGREGATE
EMERGENCY PHONE MOUNT, FASTEN PER MANUF. SPEC.
EXPANSION JOINT
ADJACENT PAVING

bike rack mount

FINISH GRADE
STABILIZED DECOMPOSED GRANITE
95% COMPACTED BASE COURSE
REBAR REINFORCEMENT
MOUNT PER MANUF. SPEC PREPARED SUBGRADE

ADJACENT LANDSCAPE
STEEL HEADER
ADJACENT PAVING
BIKE RACK
STABILIZED DECOMPOSED GRANITE

emergency phone mount - plan

CONCRETE BASE,
EXPOSED AGGREGATE
EMERGENCY PHONE MOUNT; FASTEN PER MANUF. SPEC.

CONCRETE FOOTING
REBAR REINFORCEMENT

expansion joint
adjacent paving

bike rack layout plan

typical bike rack layout plan

bike rack mount

NTS

NTS

NTS
NOTE:

1. Footing to extend 2'-8" above finish grade in parking lots and roadways where posts are not located on raised curb.

SECTION

TAPERED ROUND POLE; REF LIGHTING PLANS FOR SPECIFICATIONS

ANCHOR BASE & COLLAR; FASTEN PER MANUFACTURER’S RECOMMENDATIONS

FINISH GRADE

ANCHOR BOLTS, FASTEN PER MANUFACTURER’S RECOMMENDATIONS

FOOTING REINF.

SUBGRADE

VERIFY DEPTH W/ STRUCTURAL ENGINEER

1'-0 5/8"

APPENDIX | typical details (lighting)
## TREES

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<th>COMMON NAME</th>
<th>NATIVE / ADAPTED</th>
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<td><em>Celtis laevigata</em> var. <em>laevigata</em></td>
<td>Hackberry or Sugarberry</td>
<td></td>
<td>good for drainage / ponding areas</td>
</tr>
<tr>
<td><em>Celtis laevigata</em> var. <em>reticulata</em></td>
<td>Canyon Hackberry</td>
<td>native*</td>
<td>shade, fruit</td>
</tr>
<tr>
<td><em>Cercis canadensis</em> var. <em>mexicana</em></td>
<td>Mexican Redbud</td>
<td>native</td>
<td>Flowers, patio</td>
</tr>
<tr>
<td><em>Cercis canadensis</em> var. <em>texana</em></td>
<td>Texas Redbud</td>
<td></td>
<td>normally single trunked</td>
</tr>
<tr>
<td><em>Chamaerops humilis</em></td>
<td>Mediterranean Fan Palm</td>
<td></td>
<td>clumping accent</td>
</tr>
<tr>
<td><em>Chilopsis linearis</em></td>
<td>Desert Willow</td>
<td>native*</td>
<td>Flowers, xeric</td>
</tr>
<tr>
<td><em>Chilopsis linearis</em> ‘Art’s Seedless’</td>
<td>Art’s Seedless Desert Willow</td>
<td>adapted</td>
<td>sterile flwrs, no pods</td>
</tr>
<tr>
<td><em>Chilopsis linearis</em> ‘Lucretia Hamilton’</td>
<td>Lucretia Hamilton Desert Willow</td>
<td>adapted</td>
<td>purple flwrs</td>
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<tr>
<td><em>Chilopsis linearis</em> ‘Bubba’</td>
<td>Warren Jones Desert Willow</td>
<td>adapted</td>
<td>deep pink-purple flwrs</td>
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<tr>
<td><em>Cupressus arizonica</em> (C. glabra)</td>
<td>Arizona Cypress</td>
<td>native</td>
<td>Evrgn, screen</td>
</tr>
<tr>
<td><em>Cupressus arizonica</em> ‘Blue Ice’</td>
<td>Blue Ice Arizona Cypress</td>
<td>adapted</td>
<td></td>
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<tr>
<td><em>Cupressus ariziona</em> ‘Compacta’</td>
<td>Compact Arizona Cypress</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Cupressus sempervirens</em></td>
<td>Italian Cypress</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Diospyros texana</em></td>
<td>Texas Persimmon</td>
<td>native</td>
<td>Patio, fruit, xeric</td>
</tr>
<tr>
<td><em>Fraxinus cuspidata</em></td>
<td>Flowering Ash</td>
<td>native</td>
<td>Flowers, patio 2</td>
</tr>
<tr>
<td><em>Fraxinus greggii</em></td>
<td>Gregg’s Ash</td>
<td>native</td>
<td>screen, xeric 1</td>
</tr>
<tr>
<td><em>Fraxinus texensis</em></td>
<td>Texas Ash</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Fraxinus velutina</em></td>
<td>Arizona Ash</td>
<td>native*</td>
<td>valley, shade</td>
</tr>
<tr>
<td>Botanical Name</td>
<td>Common Name</td>
<td>Native/Adapted</td>
<td>Notes</td>
</tr>
<tr>
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<tr>
<td>Acacia aneura</td>
<td>Mulga Tree</td>
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<tr>
<td>Acacia berlandieri</td>
<td>Guajillo</td>
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<td>Acacia farnesiana 'Sierra Sweet'</td>
<td>Podless Sweet Acacia (cold hardy var.)</td>
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<tr>
<td>Acacia greggii v. greggii</td>
<td>Catclaw acacia</td>
<td>native*</td>
<td>flowers, screen</td>
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<tr>
<td>Acacia greggii v. wrightii</td>
<td>Catclaw acacia</td>
<td>native*</td>
<td>flowers, screen</td>
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<tr>
<td>Acer grandidentatum</td>
<td>Bigtooth Maple</td>
<td>native*</td>
<td>fall foliage</td>
</tr>
<tr>
<td>Acer negundo</td>
<td>Box Elder</td>
<td>native</td>
<td>Shade</td>
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<tr>
<td>Arbutus xalapensis var. texana</td>
<td>Texas Madrone</td>
<td>native</td>
<td>flowers, fruit, evrgn</td>
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<tr>
<td>Bauhinia lunarioides</td>
<td>Anacacho Orchid Tree</td>
<td>native</td>
<td>flowers, pati</td>
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<tr>
<td>Brahea armata</td>
<td>Mexican Blue Palm</td>
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<td>accent use; slow growth</td>
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<tr>
<td>Bumelia lanuginosa</td>
<td>Chittamwood, Gum Bumelia</td>
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<tr>
<td>Caesalpinia paraguariensis</td>
<td>Guayacan, Tranquility Tree</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Cedrus deodara</td>
<td>Deodar Cedar</td>
<td>fast growing</td>
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<td>Celtis laevigata var. laevigata</td>
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<td>good for drainage / ponding areas</td>
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<td>Canyon Hackberry</td>
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<td>shade, fruit</td>
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<td>Cercis canadensis var. mexicana</td>
<td>Mexican Redbud</td>
<td>native</td>
<td>Flowers, patio</td>
</tr>
<tr>
<td>Cercis canadensis var. texana</td>
<td>Texas Redbud</td>
<td>normally single trunked</td>
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</tr>
<tr>
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<td>clumping accent</td>
<td></td>
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<tr>
<td>Chilopsis linearis</td>
<td>Desert Willow</td>
<td>native*</td>
<td>Flowers, xeric</td>
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<tr>
<td>Chilopsis linearis 'Art's Seedless'</td>
<td>Art's Seedless Desert Willow</td>
<td>adapted</td>
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<td>Lucretia Hamilton Desert Willow</td>
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<td>purple flwrs</td>
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<tr>
<td>Chilopsis linearis 'Warren Jones'</td>
<td>Warren Jones Desert Willow</td>
<td>adapted</td>
<td>deep pink-purple flwrs</td>
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<td>Cupressus arizonica (C. glabra)</td>
<td>Arizona Cypress</td>
<td>native</td>
<td>Evrgn, screen</td>
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<tr>
<td>Cupressus arizonica 'Blue Ice'</td>
<td>Blue Ice Arizona Cypress</td>
<td>adapted</td>
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<td>adapted</td>
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<td>adapted</td>
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<td>Texas Persimmon</td>
<td>native</td>
<td>Patio, fruit, xeric</td>
</tr>
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<td>Flowering Ash</td>
<td>native</td>
<td>Flowers, patio</td>
</tr>
<tr>
<td>Fraxinus greggii</td>
<td>Gregg's Ash</td>
<td>native</td>
<td>screen, xeric</td>
</tr>
<tr>
<td>Fraxinus texensis</td>
<td>Texas Ash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraxinus velutina</td>
<td>Arizona Ash</td>
<td>native*</td>
<td>valley, shade</td>
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<tr>
<td>Juglans arizonica</td>
<td>Arizona Walnut</td>
<td>native</td>
<td>Riparian/Ponding, for river valley use</td>
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<td>Juglans major</td>
<td>Arizona Walnut</td>
<td>native</td>
<td>valley, shade, frt.</td>
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<tr>
<td>Juglans microcarpa</td>
<td>Little Walnut</td>
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<td>Shade, fruit</td>
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<td>Juniperus deppeana</td>
<td>Alligator Juniper</td>
<td>native*</td>
<td>Evrg, Bark</td>
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<tr>
<td>Juniperus monosperma</td>
<td>One-Seed Juniper</td>
<td>native*</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Juniperus scopulorum</td>
<td>Rocky Mountain Juniper</td>
<td>native</td>
<td>Evergreen</td>
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<tr>
<td>Juniperus virginiana</td>
<td>Eastern Red Cedar</td>
<td></td>
<td>tolerates thin soils</td>
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<tr>
<td>Leucaena retusa</td>
<td>Goldenball Leadtree Flowers</td>
<td>native</td>
<td>flowers, patio</td>
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<tr>
<td>Parkinsonia x Cercidium</td>
<td>hybrid “Desert Museum” Palo Verde</td>
<td>native</td>
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<tr>
<td>Phoenix dactylifera</td>
<td>Date Palm</td>
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<tr>
<td>Pinus cembroides (P. discolor)</td>
<td>Mexican Piñon Pine</td>
<td>native</td>
<td>Evrgrn., nuts</td>
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<tr>
<td>Pinus edulis</td>
<td>Pinyon Pine</td>
<td></td>
<td>slow growing; afternoon shade, nursery grown</td>
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<tr>
<td>Pinus edulis N.M.</td>
<td>M. Pinyon Pine</td>
<td>native</td>
<td>Evrgrn., nuts</td>
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<tr>
<td>Pinus eldarica</td>
<td>Afghan Pine</td>
<td></td>
<td>Evrgrn., foliage</td>
</tr>
<tr>
<td>Pinus englemannii</td>
<td>Apache Pine</td>
<td>native</td>
<td>long needles; for shade</td>
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<tr>
<td>Pinus halepensis</td>
<td>Aleppo Pine</td>
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<td></td>
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<tr>
<td>Pinus pinea</td>
<td>Italian Stone Pine</td>
<td>native</td>
<td>Evrgrn., nuts</td>
</tr>
<tr>
<td>Pinus remota</td>
<td>Texas Pinyon Pine</td>
<td>native</td>
<td>low screening</td>
</tr>
<tr>
<td>Pistacia mexicana (P. texana)</td>
<td>Texas Pistache</td>
<td>native</td>
<td>fall color; good shade tree; dioecious</td>
</tr>
<tr>
<td>Pistacia atlantica</td>
<td>Mt. Atlas Pistache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pistacia chinensi ‘Sarah’s Radiance’</td>
<td>Chinese Pistache ‘Sarah’s Radiance’</td>
<td>adapted</td>
<td>intense fall color</td>
</tr>
<tr>
<td>Pistacia chinensis</td>
<td>Chinese Pistache</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Pistacia texana (P. mexicana)</td>
<td>Texas Pistache</td>
<td>native</td>
<td>Fls. fruit, folg.</td>
</tr>
<tr>
<td>Pistacia x ‘Red Push’</td>
<td>Red Push Pistache</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Platanus mexicana</td>
<td>Mexican Sycamore</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Platanus wrightii</td>
<td>Arizona Sycamore</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Populus deltoides</td>
<td>Cottonwood</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Populus deltoides var. wisiizenii</td>
<td>Rio Grande Cottonwood</td>
<td>native*</td>
<td>valley, shade</td>
</tr>
<tr>
<td>Prosopis glandulosa var. torreyana</td>
<td>Torrey Mesquite</td>
<td></td>
<td>multi-trunked; shrubby variety</td>
</tr>
<tr>
<td>Prosopis glandulosa</td>
<td>Honey Mesquite (thornless = Maverick)</td>
<td>native*</td>
<td>Fls., fruit, shade</td>
</tr>
<tr>
<td>Prosopis juliflora</td>
<td>Arizona Native Mesquite</td>
<td>native</td>
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<tr>
<td>Prosopis pubescens</td>
<td>Screwbean Mesquite</td>
<td>native*</td>
<td>Fls., Fruit, shade</td>
</tr>
</tbody>
</table>
### PREPARED BY

The Botanical Center

**Prosopis x Phoenix**
- Thornless Grafted Mesquite
- adapted

**Prunus mexicana**
- Mexican Plum
- adapted

**Prunus serotina var. rafia**
- Southwestern Chokecherry
- native

**Prunus serotina var. virens**
- Southwestern Chokecherry
- native

**Ptelea trifoliata var. angustifolia**
- Hoptree
- native

**Quercus arizonica**
- Arizona White Oak
- native

**Quercus buckleyi**
- Texas Red Oak, Spanish Oak
- native

**Quercus canbyi**
- Mexican Oak
- native

**Quercus emoryi**
- Emory Oak
- native

**Quercus fissaformis (Q. virginiana var.)**
- Escarpment Live Oak
- native

**Quercus gambelii**
- Gambel Oak
- native

**Quercus gravesii**
- Chisos Red Oak
- native

**Quercus macrocarpa**
- Bur Oak
- adapted

**Quercus muhlenbergii**
- Chinquapin Oak
- native

**Quercus obtuaria**
- Mexican Blue Oak
- native

**Quercus polymorpha**
- Monterey Oak
- native

**Quercus rugosa**
- Netleaf Oak
- native

**Rhus lanulata**
- Flameleaf Sumac
- native

**Robinia neomexicana**
- New Mexico Locust
- native

**Robinia × ambiguca ‘Purple Robe’**
- Pink Flowering Locust
- native

**Salix gooddingii**
- Gooding Willow
- native

**Salix taxifolia**
- Yewleaf Willow
- native

**Sambucus mexicana**
- Mexican Elder
- native

**Sapindus saponaria var. drummondii**
- Western Soapberry
- native

**Sophora affinis**
- Texas Sophora, Eve’s Necklace
- adapted

**Ulmus crassifolia**
- Cedar Elm
- native

**Ulmus parvifolia**
- Chinese Lacebark Elm
- adapted

### SHRUBS

#### BOTANICAL NAME | COMMON NAME | NATIVE / ADAPTED | NOTES
---|---|---|---
**Abelia grandiflora** | Glossy Abelia | several forms & leaf color selections available | available
**Acacia angustissima** | Whiteball Acacia | native* | flwrs, suckers
**Acacia berlandieria** | Guajillo | native | flwrs, foliage
**Acacia constricta** | Whitehorn Acacia | native* | fls., thrms., xeric
**Acacia roemeriana** | Roemers Acacia | native | fls.
**Aloysia gratissima (A. lyciodes)** | Beebrush | native | fls, frag., btfly
**Aloysia wrightii** | Oreganillo, Mexican oregano | native* | fls, xeric
**Ambrosia dumosa** | White Bursage | adapted | tolerates poor drainage
<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Native Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amorpha fruticosa</td>
<td>False Indigo Bush</td>
<td>native*</td>
<td>fls.</td>
</tr>
<tr>
<td>Anisacanthus purpureus</td>
<td>Pinkie Acanthus</td>
<td>native</td>
<td>fls. hhmbrd.</td>
</tr>
<tr>
<td>Anisacanthus quadrifidus v. wrightii</td>
<td>Desert Honeysuckle</td>
<td>native*</td>
<td>fls. hhmbrd.</td>
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<tr>
<td>Anisacanthus thurberi</td>
<td>Sand Sage</td>
<td>native*</td>
<td>evergreen, sand, xeric</td>
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<tr>
<td>Artemisia filifolia</td>
<td>Fringed Sage</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Artemisia frigida</td>
<td>Big Sagebrush</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Artemisia tridentata</td>
<td>Four Wing Saltbush</td>
<td>native*</td>
<td>salt, evrg. Xeri</td>
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<tr>
<td>Atriplex canescens</td>
<td>Quailbrush</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Atriplex longiformis</td>
<td>Coyote Bush</td>
<td>native</td>
<td>Grndcover</td>
</tr>
<tr>
<td>Baccharis X hybrid</td>
<td>“Starn--Thompson”</td>
<td>native</td>
<td>Grndcover</td>
</tr>
<tr>
<td>Bauhinia lunarioides (B. congesta)</td>
<td>Anacacho Orchid Tree</td>
<td>native*</td>
<td>miniature tree form</td>
</tr>
<tr>
<td>Bauhinia lunarioides ‘Pink’</td>
<td>Pink Orchid Tree</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td>Bauhinia lunarioides ‘White’</td>
<td>White Orchid Tree</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td>Berberis bameacatarpa</td>
<td>Red Berberis</td>
<td>native*</td>
<td>Fls. Fruit</td>
</tr>
<tr>
<td>Berberis trifoliolata</td>
<td>Algerita/ Agarita</td>
<td>native*</td>
<td>Fls. fruit, xeric</td>
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<td>Bouvardia ternifolia (B. glaberrima)</td>
<td>Scarlet Bouvardia</td>
<td>native</td>
<td>Fls.</td>
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<tr>
<td>Buddleja davidii</td>
<td>Butterfly Bush</td>
<td>native*</td>
<td>many selections available</td>
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<tr>
<td>Buddleja marrubiifolia</td>
<td>Wooly Butterfly Bush</td>
<td>native</td>
<td>Evrgn. fls.,xeri</td>
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<tr>
<td>Caesalpinia gillesi</td>
<td>Yellow Bird of Paradise</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Caesalpinia mexicana</td>
<td>Mexican Bird of Paradise</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Caesalpinia pulcherrima</td>
<td>Red Bird of Paradise</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Calliandra eriophylla</td>
<td>Fairy Duster</td>
<td>native</td>
<td>Fls. Xeric</td>
</tr>
<tr>
<td>Calliandra ‘Sierra Star’</td>
<td>Fairy Duster ‘Sierra Starr’</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Caryopteris x clandonensis ‘Dark Knight’</td>
<td>Blue Mist</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Celtis occidentalis</td>
<td>Common Hackberry</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td>Celtis pallida</td>
<td>Desert Hackberry</td>
<td>native</td>
<td>Fruit, spines</td>
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<td>Cephalanthus occidentalis</td>
<td>Button Bush</td>
<td>native</td>
<td>Bush Fls.</td>
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<td>Cercocarpus montanus</td>
<td>Mountain Mahogany</td>
<td>native*</td>
<td>Fls. Fruit</td>
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<td>Chrysothamnus mexicana</td>
<td>Damianita</td>
<td>native*</td>
<td>Fls. Evrgn</td>
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<td>Southwest Rabbitbush</td>
<td>native*</td>
<td>Ervg. Fls.</td>
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<td>Condalia (Microrhamnus) eriooides</td>
<td>Javelina Bush</td>
<td>native*</td>
<td>Frut, spine,xeri</td>
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<td>Condalia mexicana</td>
<td>Mexican Blue-wood</td>
<td>native</td>
<td>Frut, spine,xeri</td>
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<td>Condalia warnockii var. warnockii</td>
<td>Warnock Condalia</td>
<td>native*</td>
<td>Frut, spine,xeri</td>
</tr>
<tr>
<td>Cordia parvifolia</td>
<td>Little Leaf Cordia</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Dalea bicolor var. bicolor</td>
<td>Blue Dalea “Monterrey Blue”</td>
<td>native</td>
<td>Winter Fls.</td>
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<td>Dalea bicolor var. orcuttiana</td>
<td>Baja Dalea</td>
<td>native</td>
<td>Winter Fls.</td>
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<tr>
<td>Dalea formosa</td>
<td>Feather Dalea</td>
<td>native*</td>
<td>Fls. Xeric</td>
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<td>Dalea frutescens</td>
<td>Black Dalea</td>
<td>native</td>
<td>Fls.</td>
</tr>
<tr>
<td>Dalea greggi</td>
<td>Trailing Dalea</td>
<td>native</td>
<td>Fls. Grndcover</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Type</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------</td>
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<tr>
<td>Dalea lutea</td>
<td>Dalea lutea</td>
<td>native</td>
<td>Fls.</td>
</tr>
<tr>
<td>Dalea lutea ‘Sierra Moonrise’</td>
<td>Dalea lutea ‘Sierra Moonrise’</td>
<td>native</td>
<td>Fls.</td>
</tr>
<tr>
<td>Dalea pulchra</td>
<td>Beautiful Dalea</td>
<td>native</td>
<td>Spring Fls.</td>
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<tr>
<td>Dalea purpurea</td>
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<tr>
<td>Dalea versicolor var. sessilis</td>
<td>Wlslzenus Dalea</td>
<td>native</td>
<td>Fls.grndcover</td>
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<tr>
<td>Duranta erecta ‘Sweet Memory’</td>
<td>Sky Flower</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Ebenopsis ebano</td>
<td>Texas Ebony</td>
<td>native</td>
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</tr>
<tr>
<td>Ephedra trijuga</td>
<td>Joint fir</td>
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<td>Evrg. Accent</td>
</tr>
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<td>Ephedra viridis</td>
<td>Mormon Tea</td>
<td>adapted</td>
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<tr>
<td>Ericameria (Chrysothamnus) nauseosus</td>
<td>Rubber Rabbitbush</td>
<td>native</td>
<td>Evrg. fls. Xeric</td>
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<tr>
<td>Ericameria laricifolia</td>
<td>Turpentine Bush</td>
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<td>Evrg. Fls.</td>
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<td>Ericameria laricifolia ‘Desert Mountain’</td>
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<tr>
<td>Ericameria nauseosa v. speciosus</td>
<td>Whitestem Chamisa</td>
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<td>Ericameria nauseosus v. nauseosus</td>
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<td>Eriogonum fasciculatum</td>
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<td>Wild Buckwheat</td>
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<td>F. frag.</td>
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<td>Fallugia paradoxa</td>
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<td>Fendlera napicola</td>
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<td>New Mexico Privet</td>
<td>native*</td>
<td>Fls. Bark</td>
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<td>Fls. Bark</td>
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<tr>
<td>Fraxinus greggi</td>
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<td>Garrya wrightii</td>
<td>Silktassel</td>
<td>native*</td>
<td>Fls</td>
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<tr>
<td>Gutierrezia sarothrae</td>
<td>Snakeweed</td>
<td>native</td>
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</tr>
<tr>
<td>Hamelia patens</td>
<td>Sierra Red</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Hamelia patens ‘Sierra Orange’</td>
<td>Texas Firecracker Bush</td>
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<tr>
<td>Ilex vomitoria</td>
<td>Yaupon Holly selections</td>
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<td>Plant Name</td>
<td>Common Name</td>
<td>Native/Adapted</td>
<td>Flowers/Habit_tabs</td>
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<td>Dalea pulchra</td>
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<td>Fallugia paradoxa</td>
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<td>Forestiera  pubescens (F. neomexicana)</td>
<td>New Mexico Privet</td>
<td>Prune up to expose multi-trunk form &amp; bark</td>
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<td>Forestiera neomexicana (F. pubescens)</td>
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</tr>
<tr>
<td>Fraxinus greggi</td>
<td>Littleleaf Ash</td>
<td>Can be trained into small naturally multi-trunked tree</td>
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<tr>
<td>Garrya wrightii</td>
<td>Silktassel</td>
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<td>Gutierrezia sarothrae</td>
<td>Snakeweed</td>
<td>Native</td>
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<tr>
<td>Hamelia patens</td>
<td>Sierra Red</td>
<td>Adapted</td>
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<td>Hamelia patens 'Sierra Orange'</td>
<td>Texas Firecracker Bush</td>
<td>Adapted</td>
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<tr>
<td>Ilex vomitoria</td>
<td>Yaupon Holly selections</td>
<td>Prune to expose multi-trunk form &amp; bark; tolerates poor drainage</td>
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<td>Lagerstroemia indica</td>
<td>Crepe Myrtle</td>
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<td>Lantana horrida</td>
<td>Texas Lantana</td>
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<td>Larrea tridentata</td>
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<td>Leucophyllum candidum</td>
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<td>Leucophyllum frutesens</td>
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<td>Leucophyllum langmaniae ‘Lynn’s Legacy’</td>
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<td>Fragrant Rain Sage “Sierra Bouquet”</td>
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<td>Curl-leaf Rain sage “Houdini”</td>
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<td>Leucophyllum × ‘Heavenly Cloud’</td>
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<td>Leucophyllum ×zygophyllum</td>
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<td>Lonicera albiflora</td>
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<td>Lonicera sempervirens</td>
<td>Coral Honeysuckle</td>
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<td>Pam’s Pink Honeysuckle</td>
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<td>Desert Wolfberry</td>
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<td>Lycium excertum</td>
<td>Thornbush</td>
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<td>Lycium fremontii</td>
<td>Wolgberry, Tomatillo</td>
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<td>Poliomintha maderensis</td>
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<td>Psorothamnus scoparius</td>
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<td>Punica granatum</td>
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<tr>
<td>Purschia mexicana</td>
<td>Cliff Rose</td>
<td>Adapted</td>
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<tr>
<td>Quercus turbinella</td>
<td>Shrub Oak</td>
<td>Adapted</td>
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<tr>
<td>Quercus pungens</td>
<td>Sandpaper Scrub or Vasey Shin Oak</td>
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<td></td>
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<tr>
<td>Quercus toumeyi</td>
<td>Scrub Live Oak</td>
<td>Native</td>
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<tr>
<td>Quercus turbinella</td>
<td>Scrub Live Oak</td>
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<tr>
<td>Rhus glabra</td>
<td>Scarlet Sumac</td>
<td>Native</td>
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</tr>
<tr>
<td>Rhus microphylla</td>
<td>Littleleaf Sumac</td>
<td>Native*</td>
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<td>Rhus trilobata</td>
<td>Three Leaf Sumac</td>
<td>Native*</td>
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<td>Rhus tiborea</td>
<td>Evergreen Sumac</td>
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<td>Ribes aureum</td>
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<td>Lady Bank’s Rose</td>
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<tr>
<td>Rosa woodsii</td>
<td>Wood’s Wild Rose</td>
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<td>Rosemary</td>
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<td>Mejorana</td>
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<td>Salvia chamaedryoides</td>
<td>Mexican Blue Sage</td>
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<td>Punica granatum</td>
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<td>Purschia mexicana</td>
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<td>Quercus turbinella</td>
<td>Shrub Oak</td>
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<td>Quercus pungens</td>
<td>Sandpaper Scrub or Vasey Shin Oak</td>
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<td>Quercus toumeyi</td>
<td>Scrub Live Oak</td>
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<td>Quercus turbinella</td>
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<tr>
<td>Rhus glabra</td>
<td>Scarlet Sumac</td>
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<td>Rhus microphylla</td>
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<td>Rhus tiberea</td>
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<td>Rosa banksiae</td>
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<tr>
<td>Rosa woodsii</td>
<td>Wood’s Wild Rose</td>
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<td>Rosmarinus officinalis</td>
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<tr>
<td>Salvia balleriiflora</td>
<td>Mejorana</td>
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<tr>
<td>Salvia chamaedryoides</td>
<td>Mexican Blue Sage</td>
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**PERENNIALS**

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<th>COMMON NAME</th>
<th>NATIVE / ADAPTED</th>
<th>NOTES</th>
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<td>Acalypha monostachya</td>
<td>“Raspberry Fuzzies”</td>
<td>native</td>
<td>Flr &amp; Foliage color</td>
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<tr>
<td>Allium tuberosum</td>
<td>Garlic Chives</td>
<td>native</td>
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<tr>
<td>Ansonia grandiflora</td>
<td>Arizona bluestar</td>
<td>native</td>
<td>xeric, spring flrs</td>
</tr>
<tr>
<td>Anemopsis californica</td>
<td>Yerba Mansa</td>
<td>adapted</td>
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<tr>
<td>Aquilegia chrysantha</td>
<td>Golden columbine</td>
<td>native</td>
<td>moist soils</td>
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<td>Artemisia schmidtiana ‘Silvermound’</td>
<td>Silvermound</td>
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<tr>
<td>Artemisia X “Powis Castle”</td>
<td>Artemisia hybrid</td>
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<td>Botanical Name</td>
<td>Common Name</td>
<td>Native/Adapted</td>
<td>Notes</td>
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<td>Artemisia ludoviciana</td>
<td>White-sage</td>
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<td>grndcvr</td>
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<td>Asclepias subverticillata</td>
<td>Poison Milkweed</td>
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<td>btfly</td>
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<tr>
<td>Asclepias tuberosa</td>
<td>Butterfly weed</td>
<td>native</td>
<td>btfly</td>
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<tr>
<td>Asclepias subverticillata</td>
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<td>native</td>
<td>btfly</td>
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<td>Baileya multiradiata</td>
<td>Desert Marigold</td>
<td>adapted</td>
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<tr>
<td>Berlandiera lyrata</td>
<td>Chocolate Daisy</td>
<td>native*</td>
<td>fragrance</td>
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<td>Bouchea linifolia</td>
<td>Flaxleaf Bouchea</td>
<td>native</td>
<td>purple flwrs</td>
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<tr>
<td>Callirhoe involucrata</td>
<td>Wine Cups</td>
<td>native</td>
<td>in grass</td>
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<td>Calylophus hartwegii var. fendleri</td>
<td>Sun Drops</td>
<td>native</td>
<td>btfly</td>
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<td>Conoclinium (Eupatorium) gregii</td>
<td>Mist Flower, “Boot Hill”</td>
<td>native</td>
<td>grndcvr, btfly</td>
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<td>Coreopsis lanceolata</td>
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<td>Cuphea llavea</td>
<td>Bat-faced Cuphea</td>
<td>native</td>
<td>rocks, freezes</td>
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<td>Dalea capitata</td>
<td>“Sierra Gold”</td>
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<td>Erigeron divergens</td>
<td>Native Fleabane</td>
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<td>Santa Barbara Daisy</td>
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<td>Eriogonum fasciculatum var. polifolium</td>
<td>Flattop Buckwheat</td>
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<tr>
<td>Eriogonum wrightii</td>
<td>Wright Buckwheat</td>
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<tr>
<td>Gaillardia aristata</td>
<td>Firewheel</td>
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<tr>
<td>Gaillardia pinnatifida</td>
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<td>sow seed</td>
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<tr>
<td>Gaura lindheimeri</td>
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<tr>
<td>Gaura lindheimeri ‘Siskiyou Pink’</td>
<td>Pink Gaura</td>
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<tr>
<td>Gaura lindheimeri ‘Whirling Butterflies’</td>
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<td>Glandularia gooddingii</td>
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<td>Glandularia rigida</td>
<td>Sandpaper Verbena</td>
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<td>Gutierrezia sarothrae</td>
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<td>Maximilian Sunflower</td>
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<td>Iris selections</td>
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<td>xeric</td>
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<td>Showey Menodora</td>
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<td>xeric</td>
</tr>
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<td>Menodora scabra</td>
<td>Twinpod</td>
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<td>Cardinal Monkeyflower</td>
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<td>Common Name</td>
<td>Scientific Name</td>
<td>Native Status</td>
<td>Bloom Characteristics</td>
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<tr>
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<td>Rock Penstemon</td>
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<td>Penstemon barbatus</td>
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</tr>
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<td>Firecracker Penstemon</td>
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<td>Giant Penstemon</td>
<td>Penstemon palmeri</td>
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<td>hmmbrd</td>
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<td>Arizona Penstemon</td>
<td>Penstemon parryi</td>
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<td>hmmbrd</td>
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<td>Pineleaf Penstemon</td>
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<td>hmmbrd</td>
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<td>Frogfruit</td>
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<td>Plumbago auriculata</td>
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<td>“Summer Snow”</td>
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<td>Lavender Spice</td>
<td>Polianthes madenensis</td>
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<td>Paper Flower</td>
<td>Psilostrophe tagetina</td>
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<td>Mexican Hat or Coneflower</td>
<td>Ratibida columnaris</td>
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<td>Arp Rosemary</td>
<td>Rosmarinus officinalis ‘Arp’</td>
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<td>Pitcher’s Blue Sage</td>
<td>Salvia azurea var. grandiflora</td>
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<td>Salvia chamaedryoides</td>
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<td>grncvr</td>
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<td>“Quicksilver”</td>
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<td>Mealycup Blue Sage</td>
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<tr>
<td>Henry’s Sage</td>
<td>Salvia henry</td>
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106 DESIGN GUIDELINES | APPENDIX
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<thead>
<tr>
<th>BOTANICAL NAME</th>
<th>COMMON NAME</th>
<th>NATIVE / ADAPTED</th>
<th>NOTES</th>
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<tr>
<td>Alchemilla lanata</td>
<td>Alpine Lady’s Mantle</td>
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<tr>
<td>Campsis radicans</td>
<td>Trumpet Vine</td>
<td>native</td>
<td>hummers</td>
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<tr>
<td>Cissus trifoliata</td>
<td>Arizona Grape Ivy</td>
<td>native</td>
<td>vine frz to grnd</td>
</tr>
<tr>
<td>Clematis drummondii</td>
<td>Desert Clematis</td>
<td>native</td>
<td>suckers</td>
</tr>
<tr>
<td>Clematis ligusticifolia</td>
<td>Western Virgins Bower</td>
<td>native</td>
<td>suckers</td>
</tr>
<tr>
<td>Lonicera sempervirens</td>
<td>Coral Honeysuckle</td>
<td>native</td>
<td>needs support in maturity; color selections available</td>
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**VINES**

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<th>BOTANICAL NAME</th>
<th>COMMON NAME</th>
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<tbody>
<tr>
<td>Antigonon leptopus</td>
<td>Coral Vine</td>
<td>native</td>
<td>vine frz to grnd</td>
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<tr>
<td>Campsis radicans</td>
<td>Trumpet Vine</td>
<td>native</td>
<td>hummers</td>
</tr>
<tr>
<td>Cissus trifoliata</td>
<td>Arizona Grape Ivy</td>
<td>native</td>
<td>fast growing, tendril climber; may need restraint</td>
</tr>
<tr>
<td>Clematis drummondii</td>
<td>Desert Clematis</td>
<td>native</td>
<td>suckers</td>
</tr>
<tr>
<td>Clematis ligusticifolia</td>
<td>Western Virgins Bower</td>
<td>native</td>
<td>suckers</td>
</tr>
<tr>
<td>Lonicera sempervirens</td>
<td>Coral Honeysuckle</td>
<td>native</td>
<td>needs support in maturity; color selections available</td>
</tr>
<tr>
<td>BOTANICAL NAME</td>
<td>COMMON NAME</td>
<td>NATIVE / ADAPTED</td>
<td>NOTES</td>
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<tr>
<td><strong>Mascagnia lilacina</strong></td>
<td>Purple Orchid Vine</td>
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<td><strong>Maurandella antirrhiniflora</strong></td>
<td>Snapdragon Vine</td>
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<tr>
<td><strong>Merremia aurea</strong></td>
<td>Yellow Morning-glory Vine</td>
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<td><strong>Merremia dissecta</strong></td>
<td>Alamo Vine</td>
<td>native</td>
<td>freezes to grnd</td>
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<td><strong>Parthenocissus inserta</strong></td>
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<td>Virginia Creeper</td>
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<td><strong>Parthenocissus species</strong></td>
<td>Hacienda Creeper</td>
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<td>adapted</td>
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<td><strong>Vitis arizonica</strong></td>
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<td>fruit</td>
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<td><strong>Vitis californica 'Roger's Red'</strong></td>
<td>Roger's Red California Grape</td>
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### ANNUALS, BIENNIALS, SHORT-LIVED PERENNIALS and BULBS

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<td><strong>Abronia angustifolia</strong></td>
<td>Sand Verbena</td>
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<td><strong>Agastache cana</strong></td>
<td>Bubblegum or Coyote Mint</td>
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<td><strong>Bahia absinthifolia</strong></td>
<td>Bahia</td>
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<td>Arizona Poppy/Caltrop</td>
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<td>Bladderpod Mustard</td>
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<td>BOTANICAL NAME</td>
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<td>Creeping Mahonia</td>
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<td>Teucrium X lucidrys (T. chamadrys)</td>
<td>Germander</td>
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**TRACHELOSPERMUM JASMINOIDES**  
Star Jasmine  
versatile twining vine for groundcover or as climber

**ZINNIA GRANDIFLORA**  
Plains Zinnia, Rocky Mountain Zinnia  
spreads by stolons; use with rocks

---

### GRASSES

<table>
<thead>
<tr>
<th>BOTANICAL NAME</th>
<th>COMMON NAME</th>
<th>NATIVE / ADAPTED</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Achnatherum (Oryzopsis) hymenoides</em></td>
<td>Indian Rice Grass</td>
<td>native*</td>
<td>seedless hybrid selections only</td>
</tr>
<tr>
<td><em>Aristida purpurea</em></td>
<td>Three Awn</td>
<td>native*</td>
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<tr>
<td><em>Bouteloua curtipendula</em></td>
<td>Side-oats Grama</td>
<td>native*</td>
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</tr>
<tr>
<td><em>Bouteloua eriopoda</em></td>
<td>Black Grama</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Bouteloua gracilis</em></td>
<td>Blue Grama</td>
<td>native*</td>
<td></td>
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<tr>
<td><em>Buchloe dactyloides</em></td>
<td>Buffalo Grass</td>
<td>native</td>
<td></td>
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<tr>
<td><em>Carex perdentata</em></td>
<td>Texas Hill Country Sedge</td>
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<tr>
<td><em>Cynodon dactylon</em></td>
<td>Hybrid Bermudagrass selections</td>
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<tr>
<td><em>Hesperostipa (Stipa) neomexicana</em></td>
<td>Feathergrass</td>
<td>native*</td>
<td></td>
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<tr>
<td><em>Hilaria rigida</em></td>
<td>Big Galleta</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Muhlenbergia capillaris</em></td>
<td>Gulf Muhly “Regal Mist”</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Muhlenbergia dumosa</em></td>
<td>Bamboo Muhly</td>
<td>native</td>
<td></td>
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<tr>
<td><em>Muhlenbergia emersleyi</em></td>
<td>Bull Muhly</td>
<td>native*</td>
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</tr>
<tr>
<td><em>Muhlenbergia lindheimeri</em></td>
<td>Lindheimer Muhly</td>
<td>native</td>
<td></td>
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<tr>
<td><em>Muhlenbergia porteri</em></td>
<td>Bush Muhly</td>
<td>native*</td>
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<tr>
<td><em>Muhlenbergia rigens</em></td>
<td>Deergrass</td>
<td>native</td>
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</tr>
<tr>
<td><em>Muhlenbergia rigida</em></td>
<td>Purple Muhly</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Nassella (Stipa) tenuissima</em></td>
<td>Needlegrass</td>
<td>native</td>
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<tr>
<td><em>Oryzopsis hymenoides</em></td>
<td>Indian Rice Grass</td>
<td>reseeds</td>
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<tr>
<td><em>Panicum virgatum</em></td>
<td>Switch grass selections</td>
<td></td>
<td>foliage color selections available</td>
</tr>
<tr>
<td><em>Panicum virgatum ‘Dallas Blues’</em></td>
<td>Switch Grass</td>
<td>native</td>
<td>sterile selection; species is invasive</td>
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<tr>
<td><em>Panicum virgatum ‘Prairie Sky’</em></td>
<td>Switch Grass</td>
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<tr>
<td><em>Pennisetum setaceum “Rubrum”</em></td>
<td>Red / Purple Fountain Grass</td>
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<tr>
<td><em>Schizachyrium scoparium</em></td>
<td>Little Bluestem</td>
<td>native</td>
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<tr>
<td><em>Sorghastrum nutans</em></td>
<td>Indiangrass</td>
<td>adapted</td>
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<tr>
<td><em>Sporobolus airoides</em></td>
<td>Alkali scaton</td>
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<tr>
<td><em>Sporobolus wrightii</em></td>
<td>Big Sacaton</td>
<td>native*</td>
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</table>
## SUCCULENTS/ SEMI-SUCCULENTS

<table>
<thead>
<tr>
<th>BOTANICAL NAME</th>
<th>COMMON NAME</th>
<th>NATIVE / ADAPTED</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agave americana v. marginata</td>
<td>Variegated Century Plant</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Agave americana v. mediopicta</td>
<td>Variegated Century Plant</td>
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<tr>
<td>Agave bracteosa</td>
<td>Spider Agave</td>
<td>adapted</td>
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<tr>
<td>Agave colorata</td>
<td>Mescal Ceniza</td>
<td>adapted</td>
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<tr>
<td>Agave geminiflora</td>
<td>Twin-flowered Agave</td>
<td>adapted</td>
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<tr>
<td>Agave havardiana</td>
<td>Chisos or Havard Agave</td>
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<tr>
<td>Agave lophantha</td>
<td>Center Stripe Agave</td>
<td>adapted</td>
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<tr>
<td>Agave montana</td>
<td>Mountain Agave</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Agave multiflora</td>
<td>Chahuuiqui</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Agave murpheyi</td>
<td>Murphy's Agave</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Agave ocahui</td>
<td>Ocahui Agave</td>
<td>adapted</td>
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<tr>
<td>Agave ovatifolia</td>
<td>Whale’s Tongue Agave</td>
<td>adapted</td>
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</tr>
<tr>
<td>Agave palmeri</td>
<td>Palmer Agave</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td>Agave parrasana</td>
<td>Parasanna Agave</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Agave parry v. truncata</td>
<td>Artichoke Agave</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Agave parryi v parryi</td>
<td>Mexcal Agave</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Agave parryi v. neomexicana</td>
<td>Parry Agave, New Mexico Agave</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td>Agave palmeri</td>
<td>Parry Agave, New Mexico Agave</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td>Agave salmiana ssp. Ferax</td>
<td>Salmiana Agave</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Agave schidigera</td>
<td>Rough-leaved Agave</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Agave schidigera</td>
<td>Rough-leaved Agave</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Agave victoriae-reginae</td>
<td>Queen Victoria Agave</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Agave victoriae-reginae ‘Compacta’</td>
<td>Compact Queen Victoria Agave</td>
<td>adapted</td>
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<tr>
<td>Agave weberi</td>
<td>Weber Agave</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Bulbine frutescens ‘Yellow’</td>
<td>Shrubby Bulbine</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Dasylirion leiophyllum</td>
<td>Smooth Sotol, Desert Candle</td>
<td>native*</td>
<td>clump among boulders for best effect</td>
</tr>
<tr>
<td>Dasylirion quadrangulatum</td>
<td>Toothless Sotol</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Dasylirion texanum</td>
<td>Green Sotol</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td>Dasylirion wheeleri</td>
<td>Grey Sotol, Desert Spoon</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td>Ephedra species</td>
<td>Joint Fir, Mormon Tea selections</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td>Euphorbia antisyphilitica</td>
<td>Candellia</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Euphorbia myrsinites</td>
<td>Blue Spurge</td>
<td>adapted</td>
<td></td>
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<tr>
<td>Euphorbia rigida (E. biglandulosa)</td>
<td>Gopher Plant</td>
<td>native*</td>
<td></td>
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<tr>
<td>Ferocactus wislizenii</td>
<td>SW Barrel Cactus</td>
<td>native*</td>
<td>nursery grown only</td>
</tr>
<tr>
<td>Fouquieria splendens</td>
<td>Ocotillo</td>
<td>native*</td>
<td></td>
</tr>
</tbody>
</table>

### DESIGN GUIDELINES | APPENDIX

111
<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Native/Adapted</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Hechtia texana</em></td>
<td>False Agave</td>
<td></td>
<td>clump among boulders for best effect</td>
</tr>
<tr>
<td><em>Hesperaloe camporum</em></td>
<td>Bell-flowered Hesperaloe</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Hesperaloe funifera</em></td>
<td>Giant Hesperaloe</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Hesperaloe nocturna</em></td>
<td>Night-blooming Hesperaloe</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Hesperaloe parviflora</em></td>
<td>Red Hesperaloe, False Yucca</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Hesperaloe parviflora 'Yellow'</em></td>
<td>Yellow Hesperaloe</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Jatropha dioica</em></td>
<td>Leatherstem</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Manfreda maculosa</em></td>
<td>Texas Tuberose</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Manfreda x 'Macho Mocha'</em></td>
<td>Macho Mocha Texas Tuberose</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Nolina lindheimeriana</em></td>
<td>Lindheimer's Grass, Devil's Shoestring</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Nolina microcarpa</em></td>
<td>Littleseed Beargrass</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Nolina nelsoni</em></td>
<td>Blue Nolina</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Nolina texana</em></td>
<td>Texas Sacahusita</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Opuntia basilaris</em></td>
<td>Beavertail Prickly Pear</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Opuntia engelmannii</em></td>
<td>Engelmann's Prickly Pear</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Opuntia imbricata</em></td>
<td>Tree Cholla</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Opuntia macrocentra (O. violacea)</em></td>
<td>Purple Prickly Pear</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Opuntia santa-rita</em></td>
<td>Tubac</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Yucca australis</em></td>
<td>Torrey's Yucca</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Yucca baccata</em></td>
<td>Datil or Banana Yucca</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Yucca baileyi</em></td>
<td>Navajo Yucca</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Yucca constricta</em></td>
<td>Buckley Yucca</td>
<td>native</td>
<td></td>
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<tr>
<td><em>Yucca elata</em></td>
<td>Soaptree Yucca</td>
<td>native*</td>
<td></td>
</tr>
<tr>
<td><em>Yucca faxoniana (Y. carnerosana)</em></td>
<td>Giant or Faxon Yucca</td>
<td>native</td>
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<tr>
<td><em>Yucca pallida</em></td>
<td>Pale Leaf Yucca</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Yucca rigida</em></td>
<td>Blue Yucca</td>
<td>native</td>
<td></td>
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<tr>
<td><em>Yucca rostrata</em></td>
<td>Beaked Yucca</td>
<td>native</td>
<td></td>
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<tr>
<td><em>Yucca rupicola</em></td>
<td>Twisted Leaf Yucca</td>
<td>native</td>
<td></td>
</tr>
<tr>
<td><em>Yucca schidigera</em></td>
<td>Mojave Yucca</td>
<td>adapted</td>
<td></td>
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<tr>
<td><em>Yucca thompsoniana (Y. rostrata)</em></td>
<td>Thompson Yucca, Beaked Yucca</td>
<td>native</td>
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<tr>
<td><em>Yucca torreyi (Y. treuliana)</em></td>
<td>Shaggy or Torrey Yucca</td>
<td>native*</td>
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</tbody>
</table>

**BULBS/ANNUALS**

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Common Name</th>
<th>Native/Adapted</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Zephyranthes candida</em></td>
<td>White Rain Lily</td>
<td>adapted</td>
<td></td>
</tr>
<tr>
<td><em>Zephyranthes x 'Prairie Sunset'</em></td>
<td>Prairie Sunset Rain Lily</td>
<td>adapted</td>
<td></td>
</tr>
</tbody>
</table>
Hechtia texana
False Agave
clump among boulders
for best effect

Hesperaloe campanulata
Bell-flowered Hesperaloe
adapted

Hesperaloe funifera
Giant Hesperaloe
native

Hesperaloe nocturna
Night-blooming Hesperaloe
adapted

Hesperaloe parviflora
Red Hesperaloe, False Yucca
native

Hesperaloe parviflora 'Yellow'
Yellow Hesperaloe
native

Jatropha dioica
Leatherstem
clump among boulders
for best effect; slow
rhizomatous spreader

Manfreda maculosa
Texas Tuberose
native

Manfreda x 'Macho Mocha'
Macho Mocha Texas Tuberose
native

Nolina lindheimeriana
Lindheimer's Grass, Devil's Shoestring
native

Nolina microcarpa
Littleseed Beargrass
native*

Nolina nelsoni
Blue Nolina
adapted

Nolina texana
Texas Sacahusita
native*

Opuntia basilaris
Beavertail Prickly Pear
adapted

Opuntia engelmannii
Engelmann's Prickly Pear
native*

Opuntia imbricata
Tree Cholla
native*

Opuntia macrocentra (O. violaceae)
Purple Prickly Pear
native*

Opuntia santa-rita
Tubac
adapted

Yucca australis
Torrey's Yucca
adapted

Yucca baccata
Datil or Banana Yucca
native*

Yucca baileyi
Navajo Yucca
adapted

Yucca constricta
Buckley Yucca
native

Yucca elata
Soaptree Yucca
native*

Yucca faxoniana (Y. carnerosana)
Giant or Faxon Yucca
native

Yucca pallida
Pale Leaf Yucca
native

Yucca rigida
Blue Yucca
native

Yucca rostrata
Beaked Yucca
native

Yucca rupicola
Twisted Leaf Yucca
native

Yucca schidigera
Mojave Yucca
adapted

Yucca thompsoniana (Y. rostrata)
Thompson Yucca, Beaked Yucca
native

Yucca torreyi (Y. treculana)
Shaggy or Torrey Yucca
native*

BULBS/ANNUALS

Zephyranthes candida
White Rain Lily
adapted

Zephyranthes x 'Prairie Sunset'
Prairie Sunset Rain Lily
adapted
“The Case for Sustainable Landscapes”
(Excerpted from pages 8-9)

A collaboration of The American Society of Landscape Architects, The Lady Bird Johnson Wildflower Center at The University of Texas at Austin and The United States Botanic Garden

Published by The Sustainable Sites Initiative 2009

Guiding Principles
Throughout the life cycle of each site—from design and construction through operations and maintenance—sustainable performance benchmarks will enable built landscapes to support natural ecological functions by protecting existing ecosystems and regenerating ecological capacity where it has been lost. To that end, the Initiative’s guiding principles (see next page) not only inform its own work but should also inform all aspects of sustainable site development.

Growing Awareness
The Millennium Ecosystem Assessment, a United Nations study completed in 2005, highlighted the need for all development to address considerations in three key arenas: social, environmental, and economic. Unless all three aspects are equally vibrant, true sustainability is not possible. As with sustainable development in general, a sustainable site also needs to take into account the challenges on all three fronts. An environmentally sustainable site that does not engage its users on multiple levels—physical, aesthetic, cultural, spiritual—will lose crucial human stewardship. By the same token, creation and maintenance of the site must be economically feasible for the site to exist at all.
The ten guiding principles of the Sustainable Site Initiative are listed below and should be considered when developing all UTEP projects.

**Do no harm**
Make no changes to the site that will degrade the surrounding environment. Promote projects on sites where previous disturbance or development presents an opportunity to regenerate ecosystem services through sustainable design.

**Precautionary principle**
Be cautious in making decisions that could create risk to human and environmental health. Some actions can cause irreversible damage. Examine a full range of alternatives—including no action—and be open to contributions from all affected parties.

**Design with nature and culture**
Create and implement designs that are responsive to economic, environmental, and cultural conditions with respect to the local, regional, and global context.

**Use a decision-making hierarchy of preservation, conservation, and regeneration**
Maximize and mimic the benefits of ecosystem services by preserving existing environmental features, conserving resources in a sustainable manner, and regenerating lost or damaged ecosystem services.

**Provide regenerative systems as intergenerational equity**
Provide future generations with a sustainable environment supported by regenerative systems and endowed with regenerative resources.

**Support a living process**
Continuously re-evaluate assumptions and values and adapt to demographic and environmental change.

**Use a systems thinking approach**
Understand and value the relationships in an ecosystem and use an approach that reflects and sustains ecosystem services; re-establish the integral and essential relationship between natural processes and human activity.

**Use a collaborative and ethical approach**
Encourage direct and open communication among colleagues, clients, manufacturers, and users to link long-term sustainability with ethical responsibility.

**Maintain integrity in leadership and research**
Implement transparent and participatory leadership, develop research with technical rigor, and communicate new findings in a clear, consistent, and timely manner.

**Foster environmental stewardship**
In all aspects of land development and management, foster an ethic of environmental stewardship—an understanding that responsible management of healthy ecosystems improves the quality of life for present and future generations.