



USC Native and Climate Adapted Plant MASTER PLAN

A Toolkit For Planning and Implementation of
Nature-Based Resiliency and Sustainability Measures

Contents

01 Introduction

| | |
|----------------------------|----|
| GLOSSARY | 6 |
| EXECUTIVE SUMMARY | 7 |
| VISION | 8 |
| ALIGNMENT WITH CAMPUS | |
| SUSTAINABILITY INITIATIVES | 10 |

02 Inventory and Analysis

| | |
|--------------------------|----|
| EXISTING CONDITIONS | 14 |
| Process and Methodology | |
| Current Water Use | |
| Campus Biodiversity | |
| Tree Canopy | |
| ANALYSIS | 22 |
| Temperature: Heat Study | |
| Programming | |
| Sustainability Matrix | |
| CAMPUS MAPS OF POTENTIAL | |
| IMPLEMENTATION SITES | 29 |

03 Toolkit

| | |
|---------------------------|----|
| TYPOLGY | 36 |
| Corridor | |
| Gateway | |
| Quad | |
| Perimeter | |
| Foundation | |
| Plaza | |
| Courtyard | |
| Garden | |
| PLANT LIST | 54 |
| CAMPUS LIFE & BLOOM CYCLE | 55 |
| SPECIES INTERACTION | 56 |

04 Implementation

| | |
|-----------------------------------|----|
| PILOT SITE DESIGNS | 60 |
| PSD Parking Garage | |
| Weather Station | |
| Doheny Memorial Library Courtyard | |
| Queens Court | |
| Stormwater Garden | |

05 Appendix

| | |
|------------------|-----|
| PLANT CUTSHEETS | 92 |
| WORKSHOP SUMMARY | |
| REPORT | 101 |



01

Introduction



Glossary

Biodiversity and Native Biodiversity: A measure of the variety of life on Earth or in a specific region (species richness), which provides an indicator of the health of an ecosystem. Biodiversity indices include non-native plants and animals; Native Biodiversity measure only the native plants and animals that occur naturally in the region in which they evolved.

California Floristic Province: The name for the biodiversity hotspot located along the Pacific coast, characterized by a Mediterranean climate with dry summers and cool, wet winters, as well as a wide variety of ecosystems. The California Floristic Province is one of the earth's most biologically rich and threatened regions.

California Native Plant: Plants that could be found in the California landscape before the arrival of European settlers. Native plants have evolved along with California's environmental conditions such as climate, soil types, and animals.

Climate-Adapted Plant: These plants do not need additional irrigation or nutrients to grow and survive.

ETo: An abbreviation of Reference Evapotranspiration.

Evapotranspiration is the total amount of water plants lose through evaporation and transpiration. ETo is a weather-based data reference plant that measures the effect of weather on evapotranspiration and is used to estimate irrigation needs.

Hydrozone: Plants grouped together that have the same level of moisture needs.

Invasive species: Non-native plants that can take over natural and disturbed landscapes, displacing supportive food sources for wildlife.

MAWA: An abbreviation of maximum applied water allowance, which is a water budget formula determining the upper limit of annual applied water for a landscape project within the State of California.

Typology: The classification of landscape spaces into types having shared or common characteristics, function, and scale.

WUCOLS: An abbreviation of Water Use Classification of Landscape Species, which provides an evaluation of irrigation water needs by climactic regions within California.



Executive Summary

As temperatures rise, mega-droughts continue, and species decline, the USC campus community will continue to adapt and advance work already underway to build social and ecological resilience. This Master Plan offers a comprehensive vision and set of strategies for replacing existing turf and other high-water-using landscapes with California native and climate-adapted plantings.

The USC University Park Campus uses a lot of water to support its 33 acres of planting—over 66 million gallons per year. Clearly, that number highlights that business as usual is not sustainable. UCS's water usage is 1.4 times the state mandated maximum applied water allowance (MAWA). And, under current Phase 3 watering restrictions implemented by the Los Angeles Department of Water and Power, the campus landscape may also be vulnerable to plant mortality.

What was discovered during the inventory and analysis of campus water use?

- Achieving 30% water reduction over current baseline water use will require transitioning all non-functional turf area plus 30% of turf used for tailgating and other programmed events to low water using plants.

- Achieving 50% water reduction over current baseline water use will require transitioning all turf area except the baseball and football fields and Alumni Park to low water using plants.
- Achieving 75% water reduction over current baseline water use will require transitioning the entire campus to low water using plants.

What was discovered developing the pilot sites?

- 1.4% water reduction in total annual campus outdoor water use can be achieved through implementation of the five selected pilot sites.
- Approximately one half acre of new habit space can be created through implementation of the five selected pilot sites.
- 16% water reduction in total annual campus outdoor water use can be achieved through implementation of all 57 potential pilot sites evaluated.

Transitioning the campus landscape extends the priorities and commitments of USC sustainability initiatives, including Assignment: Earth, USC's Sustainability Framework and the 2022 Sustainability

Design & Construction Guidelines. The strategies, toolkit and pilot sites provided in the following pages will guide creating a more healthy and resilient campus landscape by reducing potable water use, maintaining and enhancing biodiversity, and expanding the health benefits of the landscape.

This document is divided into the following five sections—providing the through-line from campus vision to on-site implementation:

INTRODUCTION - The overall vision for the campus landscape transformation, which aligns with campus sustainability initiatives was developed in collaboration with USC stakeholders to reflect campus priorities.

INVENTORY AND ANALYSIS - Beginning with the process and methodology for establishing a campus-wide water use baseline, this section describes and maps what we discovered in our investigations. From these findings, we developed a sustainability matrix that quantifies benefits of potential projects for meeting campus priorities. We used the sustainability matrix—along with input from USC stakeholders and the USC Facilities Planning and Management (USC FPM) team—to assign a benefits value to 57 potential landscape transformation sites.

TOOLKIT - Landscape spaces within the campus that

share common characteristics, functions, and scale, are categorized into landscape typologies with shared landscape transformation solutions. This section defines eight campus landscape typologies and suggested plantings for each. It also includes a native and climate-adapted plant list, a guide to coordinating plant bloom time with major campus activities, and a guide to the interconnections between common native plant and animal species.

IMPLEMENTATION - This section focuses on the conceptual design of five specific pilot sites. Each pilot site's value—derived from the sustainability matrix—and potential benefits show the priorities for selecting that pilot site. Conceptual cost estimates are provided for each pilot site.

APPENDIX – Finally, we provide tools to ensure the ongoing usefulness of this document and a reference and guide for future landscape transformation projects. It includes selected plant cutsheets with culture, application, and growth requirements, along with a map identifying each of the potential 57 potential landscape transformation sites. USC can use this map, along with the sustainability matrix, to identify future projects as funding becomes available. Selected workshop meeting notes provide a visual record of stakeholder feedback, which is tied to maps and diagrams presented in the workshop.

01

Introduction

Vision

USC is a beloved, iconic campus with a strong architectural and landscape architectural presence. That is both the core challenge and overarching opportunity of this project.

The physical setting is intertwined with fond memories and foundational experiences for students, alumni, and the larger USC community. These associations need to be integrated into the landscape transformation, rather than erased. The landscape vision translates the significant changes proposed in this document, and moves the campus into the future. The typologies and pilot projects presented in following sections refine that vision by preserving the landscape structure and transforming the landscape into a more healthy, sustainable, and resilient version of itself. Charting a path for this evolution and aligning perceptions and expectations of students, alumni, and staff is critical—these first steps are important to building strong momentum and support for moving ahead.

A key concept guiding the recommendations—in addition to the quantifiable and measurable metrics established in following sections—is in strengthening the USC landscape vernacular. This plan builds on the existing structure, program uses, and unique outdoor experiences so the future campus landscape becomes as familiar as today's, yet uses substantially less water and still highlights the local beauty and diversity of the Southern California region.

While the groundwork has been laid for implementing the changes and adaptation measures proposed in this Plan—adapting the landscape will still be challenging. How the campus landscape changes over time will reflect the values and priorities of the USC community. As the campus implements the pilot sites, communicating the benefits of native and climate-adapted plants and meaningfully engaging everyone affected by the proposed changes is key to the integrating and adapting this landscape vision.



Alignment With Campus Sustainability Initiatives

The Master Plan was developed in collaboration with the USC Landscape Advisory Committee and the USC Facilities Planning and Management team. It augments campus-wide priorities and strategies developed in Assignment: Earth, USC's 2028 Sustainability Framework and the 2022 USC Sustainability Design & Construction Guidelines. These guidelines provided the structure and order for the data inputs and assigned values in the sustainability matrix. Specifically, the Plan follows the required measures outlined in the landscape section of the USC SDCG including, potable water use reduction, maintaining and enhancing biodiversity, and expanding the health benefits of the landscape. In turn, the sustainability matrix informs the priorities for selecting pilots recommended for implementation.

The USC SDCG established what was measured. It is also a launching point for further study and investigations using the USC campus as a living laboratory. Future, more sophisticated, studies developed around measuring and recording human health benefits would greatly advance the ability to quantify benefits and better value the full picture of a return on investment.

As a point of clarification, the USC SDCG measures outlined below are required measures for the design and construction of new buildings, renovations, and asset renewal projects. The recommendations in this document apply to existing landscape transformation and are not required measures.



POTABLE WATER USE REDUCTION

- **Minimum requirements:** Outdoor water use reduction of 30% over calculated baseline, incorporate California native and climate-adapted plants, install high-efficiency irrigation equipment, prohibit irrigation water runoff, and reduce soil evapotranspiration.
- **Best practices:** Outdoor water use reduction of 50% over calculated baseline, increase soil health and soil carbon storage, expand alternative sources of water.
- **Aspirational measures:** Outdoor water use reduction of 75% over calculated baseline.

BIODIVERSITY

- **Minimum requirements:** Habitat preservation, reduced turf areas on campus, and native species protection.
- **Best practices:** Create new pollinator gardens and pathways.
- **Aspirational measures:** Dedicate 25% of new and renovated landscape areas to native Southern California plant species.

HEALTH BENEFITS OF LANDSCAPE

- **Minimum requirements:** Increase tree canopy coverage.
- **Best practices:** Preserve and create open, green space.
- **Aspirational measures:** Create meditation gardens and community gardens with herbs and medicinal plants.

Assignment: Earth formalizes USC's commitment to addressing climate change and creating a more sustainable future. Key components of this initiative guide the recommendations of the USC SDCG:

- Align university operations with natural systems and their capacities.
- Align with new water realities and adapt to the continuing mega-drought in the western United States.
- Use the optimal source, quantity, and quality of water for USC operations, and use that water as many times as possible before returning it to the broader water cycle.
- Campuses and buildings will promote human wellbeing, ecosystem biodiversity, and the connections between people and nature.
- Develop and begin implementing a long-term plan for grounds and landscaping, and strategic planting standards by fiscal year 2024.
- Update USC's Design Guidelines to incorporate health and wellness strategies into facilities designs by fiscal year 2023.



02

Inventory and Analysis



Existing Conditions

Southern California's beautiful weather has made it an ideal location to grow a remarkably large variety of plants from around the world. The influence of the Pacific Ocean and a Mediterranean climate of mild, wet winters and warm, dry summers makes it ideal for growing agricultural crops and an expansive variety of ornamental plants. The USC landscape includes a wide array of plants originating from around the globe, including from tropical and sub-tropical climates, and many need moderate to high amounts of supplemental irrigation water to thrive. Southern California native plants and climate-adapted plants have evolved to survive within a cycle of summer drought and winter rains. Transitioning the campus to these species will help achieve university goals and make sustainability visible and accessible to students, staff, and visitors.

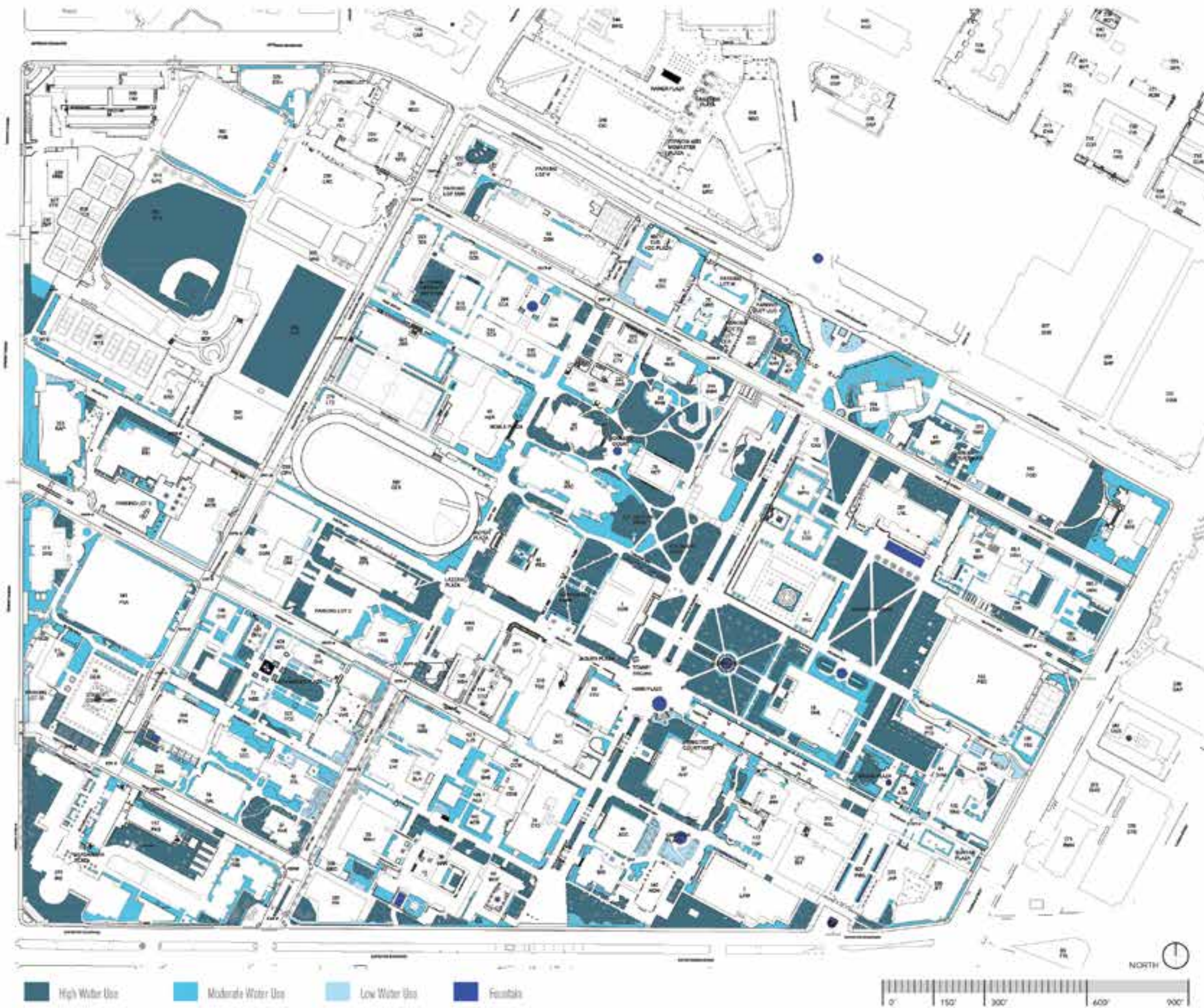
Process and Methodology

This Master Plan was developed together with Facilities Planning and Management and the USC Landscape Advisory Group. Four workshops at key points in the planning process included USC stakeholders and contributors representing university staff, faculty, and students. These workshops engaged stakeholders from different interests across the University to identify opportunities and solicit input on a vision for the campus landscape, and to establish what has been successful in the existing campus native gardens.



Current Water Use

The first step toward measuring progress on campus-wide outdoor water use reduction was establishing an outdoor water use baseline. The MIG team created a keyed map and database of the 1,293 distinct planting areas on the University Park campus. The team inventoried planting areas and assigned values to each, based on observation of existing plant type, irrigation type, and estimated water use (high, moderate, and low). We then factored in area and local reference evapotranspiration rates to determine estimated water use for individual planting areas. The individual areas were combined to establish a campus-wide estimated outdoor water use. The methodology for establishing this baseline data follows the EPA



WaterSense Water Budget Tool, an industry standard.

What we discovered was not a big surprise. The USC University Park Campus uses a lot of water to support its 33 acres of planting—over 66 million gallons per year. Clearly, that number highlights that business as usual is not sustainable. UCS's water usage is 1.4 times the state mandated maximum applied water allowance (MAWA). And, under current Phase 3 watering restrictions implemented by the Los Angeles Department of Water and Power, the campus landscape may also be vulnerable to plant mortality.

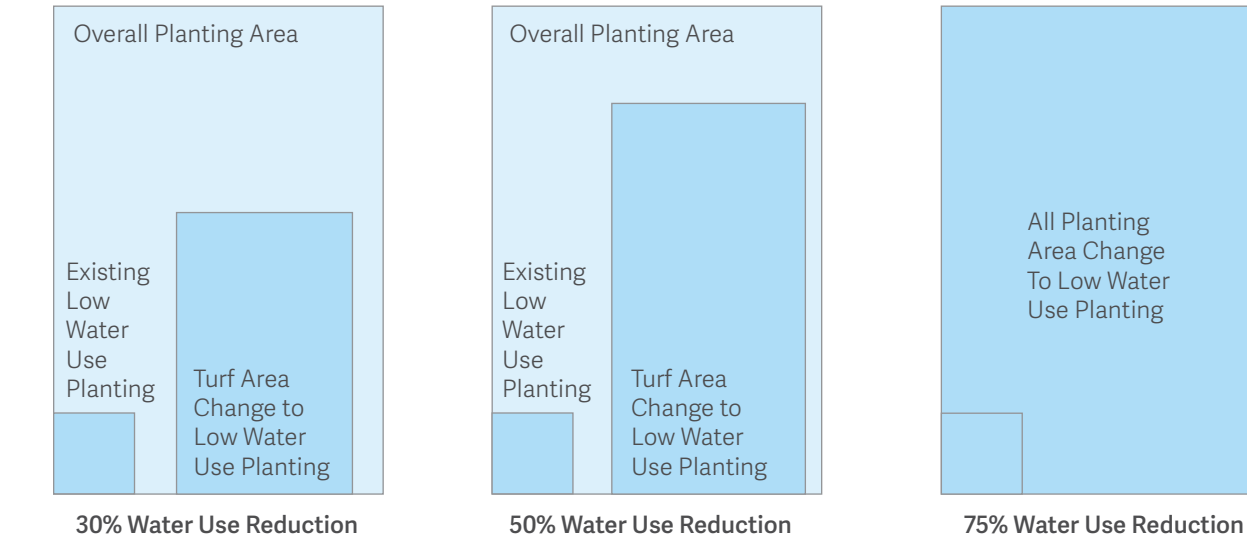
The team utilized the spatial and water use data to map the areas of transition that could meet a 30% reduction in water use over baseline. Converting turf that uses spray irrigation to low-water using plants using drip irrigation achieves the largest amount of water savings. We used this to calculate that the total area needed for this transition is 396,180 square feet. We found that USC will need to transition all turf areas (except for baseball and football recreational natural turf) that are not used for tailgating and also about 30% of turf currently used for tailgating, achieve a 30% reduction in water use.

To achieve a 50% water use reduction over baseline requires converting 652,223 square feet of turf. Under this scenario, the only turf areas remaining would be recreational fields and Alumni Park.

A 75% reduction would require converting the entire campus to low-water using plants with drip irrigation, including all the recreational fields.

However, turf is an integral feature of non-paved outdoor activities, which provide social and health benefits to the USC campus community. The water use for those turf areas that are identified as a high priority to preserve, can be offset by landscape zones that require no supplemental irrigation at all after establishment, or from alternate sources of water such as stored and treated stormwater, or building-generated greywater.

Water Use Reduction



Estimated Annual Landscape Water Use

66,710,356 gallons per year

101 Olympic Swimming Pools

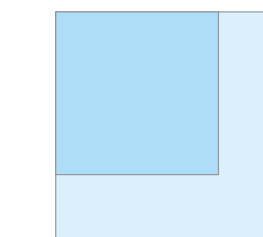


Annual Water Use for 2,229 people

Estimated Monthly Peak Water Use

5,950,553 gallons per month

4,165,387 gallons per month landscape water allowance



1.4x water allowance

02

Inventory and Analysis

Campus Biodiversity

Increasing the biodiversity of the USC campus aligns with the campus sustainability initiative, as well as with several local and regional priority initiatives, including The Sustainable City pLAN, and the City of Los Angeles 2020 Biodiversity Report. The campus lies within the California Floristic Province, which is a globally significant native biodiversity hotspot. This designation is an indicator of both the rich diversity of plant and animal species endemic to the region, and also the critical threats to their survival.

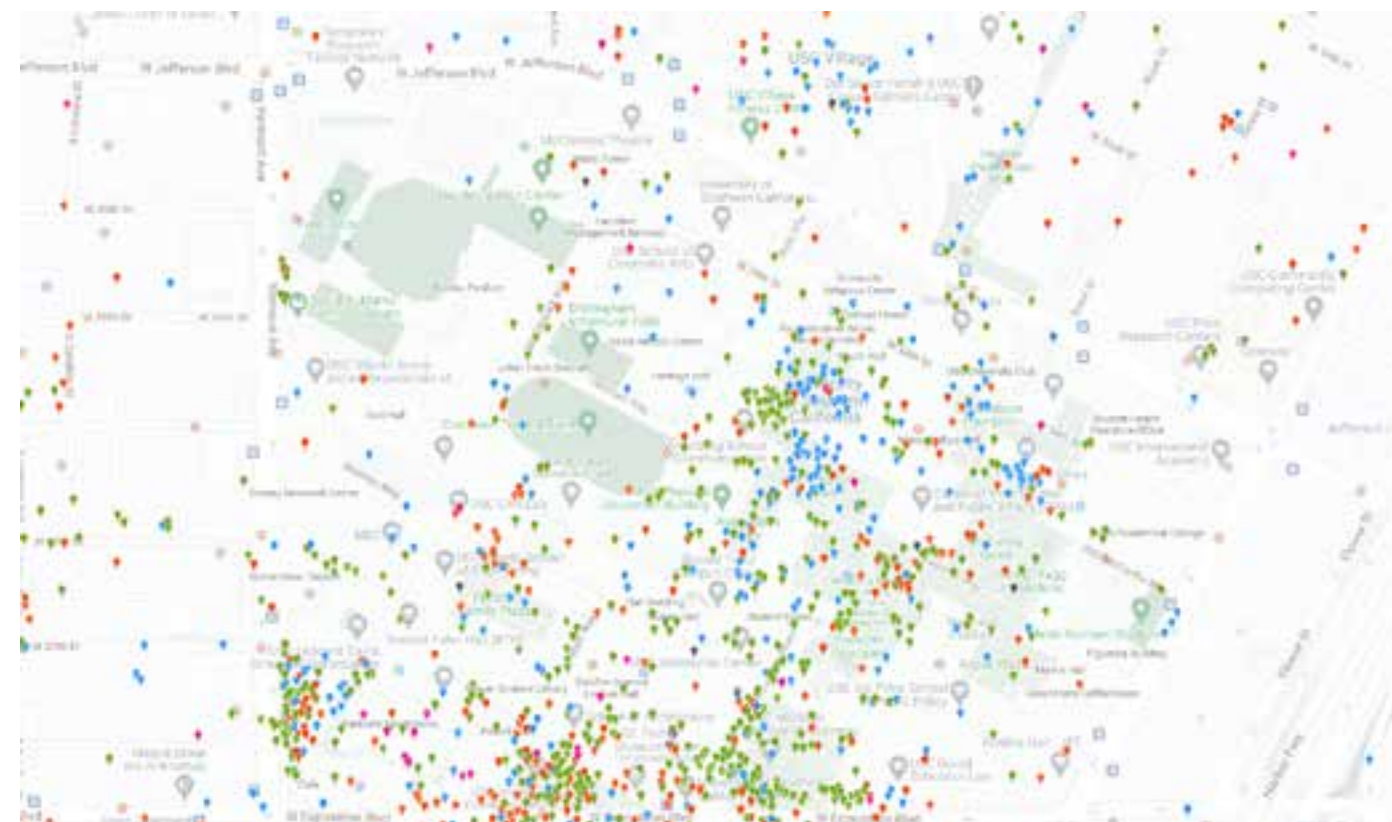
With 229 acres, the USC University Park Campus can have a large impact on supporting local ecology with habitat patches and corridors linking to nearby green spaces, including Exposition Park and regional links to increasing urban habitat quality and connectivity. The campus is isolated from natural systems by the I-110 and I-10 freeways and adjacent industrial and commercial properties with a low percentage of tree canopy and green spaces. Having limited access to natural areas and low urban tree canopy is a key indicator of environmental inequality and accounts

for a high proportion of impacts on community health and wellness. The USC campus and Exposition Park combined provide much-needed green space for both human and non-human species. Transitioning the campus to California native species will help to repair natural food chains and, when this occurs, species reappear and productivity and diversity increases.

The native plants and animals of the Los Angeles Basin reflect the beauty and appeal of the area. In addition, many benefits—such as improving mental and physical health, reducing air pollution and establishing habitat connections between plant and animal species—are integrally tied to a biodiverse ecosystem. The conceptual designs for the pilot sites identify the plant species supporting native birds and pollinators and their habitat needs are integrated into the planting design.

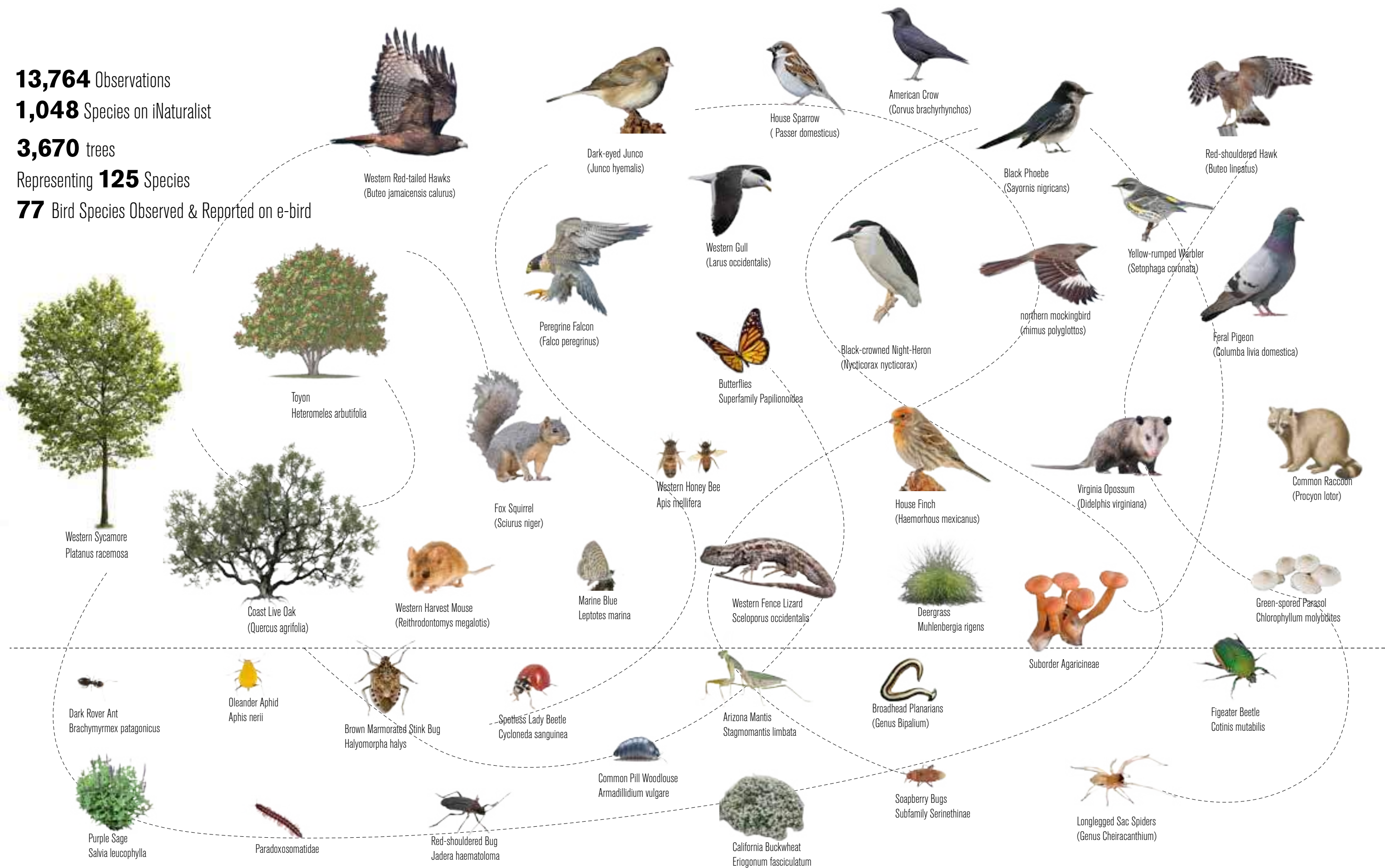


Regional Observation Map



USC Area Observation Map

13,764 Observations
1,048 Species on iNaturalist
3,670 trees
 Representing **125** Species
77 Bird Species Observed & Reported on e-bird



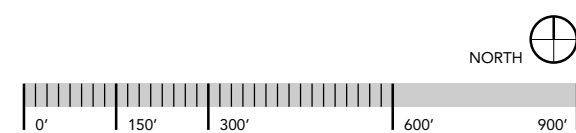
02

Inventory and Analysis

Tree Canopy

The USC University Park campus has more than 3,700 trees that line streets and shade seating areas and buildings. This valuable inventory of trees contributes significantly to the campus character, outdoor thermal comfort, air quality improvements, and biodiversity benefits. These trees also contribute to a significant amount of carbon capture and storage. Their continued health and survival is a top campus priority. Part of the transition includes increasing overall campus canopy coverage and replacing unhealthy trees or trees at end of life-cycle with native and climate-adapted species.

To determine the cooling benefit of the campus tree canopy, we mapped trees in a three dimensional model, integrated with the temperature/heat study.

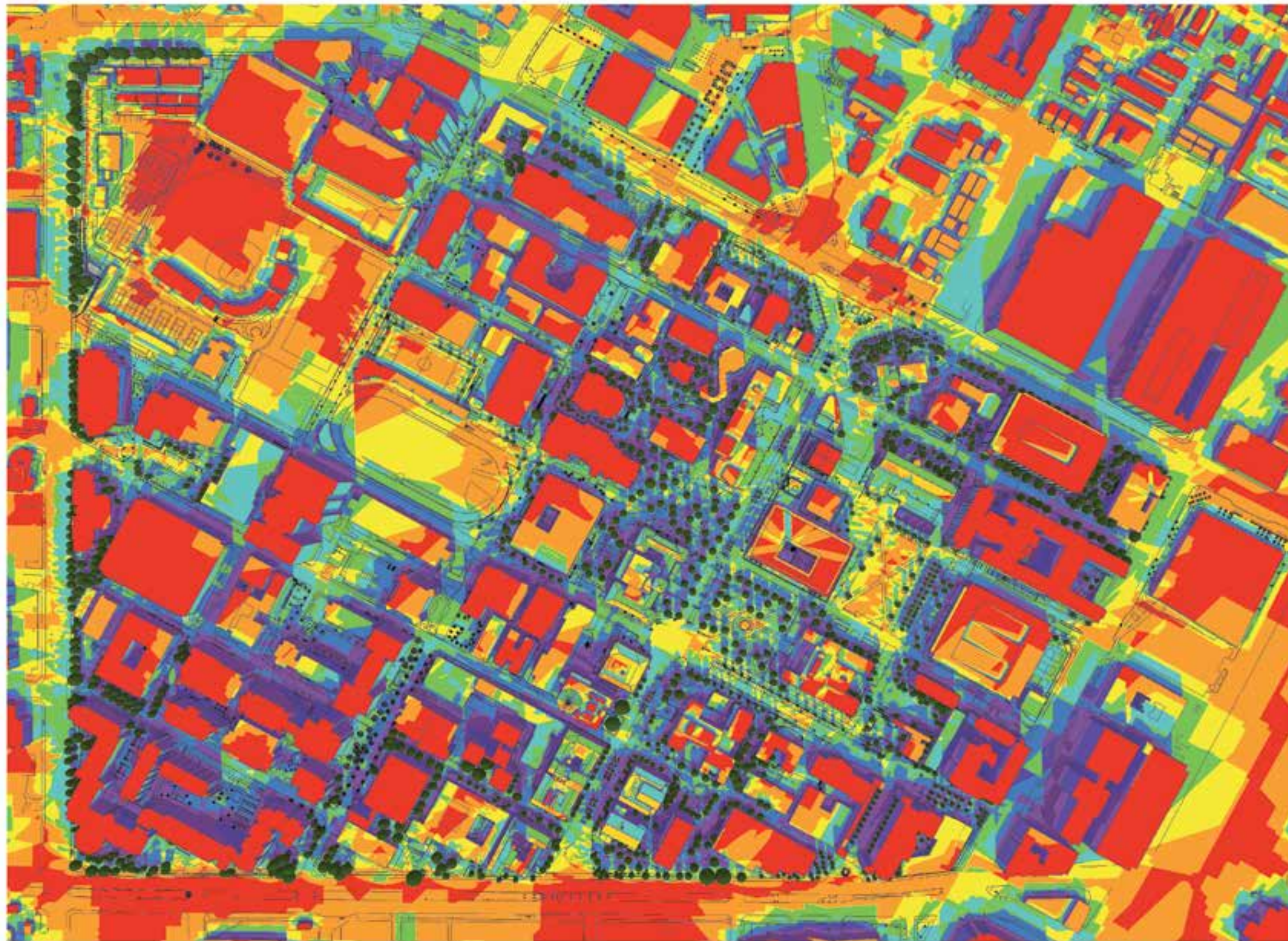


02

Inventory and Analysis

Temperature/ Heat Study

Outdoor thermal comfort is critical for the health of students, visitors, and staff. Reducing heat impacts in outdoor spaces and pedestrian corridors can improve the health benefits of the campus and support the adoption of increased use of alternative types of transportation. This Temperature / Heat Study was developed by creating a three-dimensional model of campus structures and tree canopies. A sun and shade study were generated from the model and is a composite of studies taken three times a day (9am, noon, and 5pm) and four times a year (winter, spring, summer and fall). Color values from low to high were assigned with low being spaces with the longest time in shade. The temperature values are relative and not derived from recorded temperature data. While future studies can be made to determine actual temperature changes in shaded areas, this diagram provides a generalized demonstration of the shade value and cooling benefit of the campus tree canopy.



Note: Temperatures are estimated based on the surface temperature measure recorded in Lincoln Heights on September 15, 2020 in "Maximizing the benefits of increased urban canopy on the eastside of Los Angeles" report. "Tree canopies reduce solar radiation between 60-90% and surface temperatures under tree canopies are up to 55°F cooler than adjacent exposed asphalt paving."

According to the EPA, trees and vegetation lower surface and air temperatures by providing shade and through evapotranspiration. The temperature reductions can be significant—20-45 degrees Fahrenheit during peak heat days. Trees with large, dense canopies are more effective at reducing temperatures than trees with open canopies. However, considerations of tree water use, spacing, arrangement, and support of native biodiversity should be evaluated when selecting tree species for maximum cooling benefits.

02

Inventory and Analysis

Programming

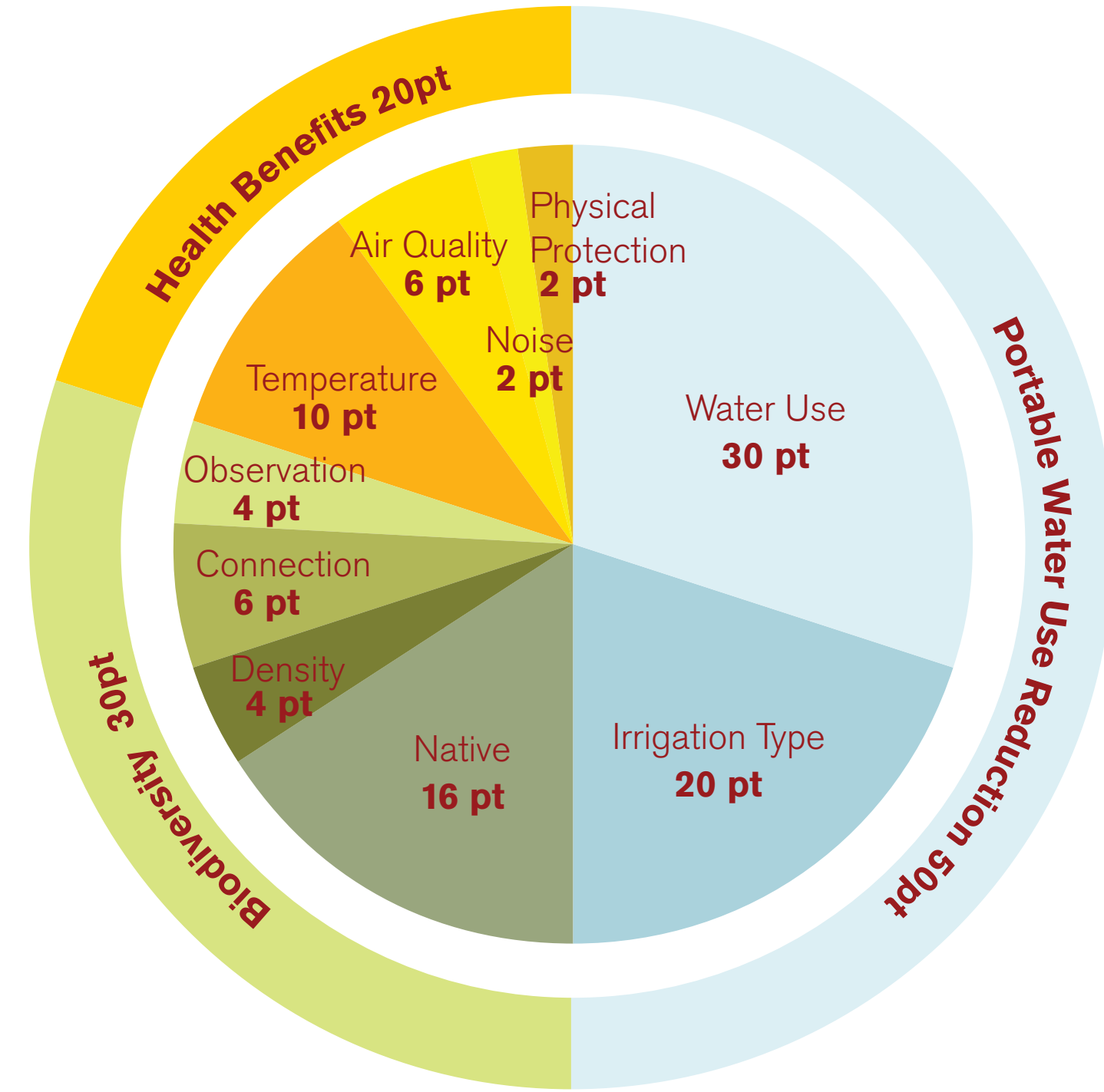
Campus landscape spaces are used by students, staff, and visitors throughout the year for programmed events and informal gatherings. The landscape supports and enhances the unique and vibrant campus life characteristic of USC. However, many of the frequently programmed outdoor spaces are covered with lawn, which requires high amounts of supplemental irrigation to support. To evaluate areas of turf that could potentially be converted to low water using landscapes, event rental spaces were mapped. Turf spaces frequently used for events, were assigned a lower priority for near-term turf conversion projects.



Sustainability Matrix

The methodology for creating the sustainability matrix follows campus priorities for potable water reduction, biodiversity, and health benefits. The matrix assigns values to these priorities for a total value of up to 100. Because water use reduction is a high priority and quantifiable, these items have the greatest value at 50 points. Biodiversity items have a total of 30 points and health benefits a total of 20 points. Because quantifying health benefits would require sophisticated monitoring equipment and is outside the scope of this project, we assigned a lesser value to these factors in the matrix. Multiplying the base value with the coefficient established the weighted value for each factor. Biodiversity measures potential impact with the highest weight given to transitioning non-native to native, aggregating and where possible connecting to areas where existing biodiversity is already observed on campus e-bird and i-naturalist databases.

Human health values included transitioning of hot areas of campus based on the 3-D heat model of solar exposure. We made assumptions about air quality and noise proximity to roadways and areas of enclosure with plant material. We then applied these metrics across 56 potential transition sites we identified together with the USC FPM team, and assigned numeric scores. From these scores we identified five high-priority pilot sites that offer a high potential impact on landscape performance.



| | | Potable Water Use Reduction (50) | | | | | Biodiversity (30) | | | | | | | | | | | Health Benefits (30) | | | | | | | | | TOTAL (100) | Area (SF) | | | | | |
|-------------------|---------------------------------|----------------------------------|----------|-----|-----------------|------|-------------------|-------|--------|---------|----------|-------|------------|---------|---------|---------|--------------|----------------------|-----|-------------|----------|-----|-------------|----------|-----|-------|-------------|-----------|---------------------|-----|------|----------|-------|
| | | Water Use | | | Irrigation Type | | Native | | | Density | | | Connection | | | | Observations | | | Temperature | | | Air Quality | | | Noise | | | Physical Protection | | | | |
| | | High | Moderate | Low | Spray | Drip | Non Native | Combo | Native | 0-500 | 500-5000 | 5000+ | 1-side | 2-sides | 3-sides | 4-sides | 1-5 | 5-10 | 10+ | High | Moderate | Low | High | Moderate | Low | High | | | Moderate | Low | High | Moderate | Low |
| | Base Value | 2 | 1 | 0 | 2 | 0 | 4 | 2 | 1 | 2 | 1 | 0 | 3 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 48 | 6,512 |
| | Coefficient | 15 | 15 | 15 | 10 | 10 | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 5 | 4 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 80 | 1,900 |
| Typologies | Weighted Value | 30 | 15 | 0 | 20 | 0 | 16 | 8 | 2 | 4 | 2 | 0 | 6 | 4 | 2 | 0 | 4 | 2 | 0 | 10 | 4 | 0 | 6 | 3 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 60 | 1,528 |
| Corridor | C1. PSB & BDx | | x | | | x | x | | | | x | | x | | | x | | | | x | | | x | | | x | | | x | | 48 | 6,512 | |
| Corridor | C2. Trousdale Pkwy | x | | | x | | | | | x | | | x | | | | | x | | x | | | x | | | x | | | x | | 80 | 1,900 | |
| Corridor | C3. McClintock Avenue | | x | | | x | x | | | x | | x | | | | x | | | x | | | | x | | | x | | | x | | 60 | 1,528 | |
| Corridor | C4. Childs Way | | x | | x | x | x | | | | x | | x | | | x | | | x | | | | x | | | x | | | x | | 73 | 8,215 | |
| Gateway | W1. Gavin Hebert Plaza | | x | x | x | | | x | | | x | | x | | | x | | | x | x | | | x | x | | | | | x | | 63 | 4,674 | |
| Gateway | W2.KAP Entry | x | | | x | | x | | | x | | | x | | | x | | | x | | | | x | | | x | | | x | | 81 | 945 | |
| Gateway | W3. USC Pardee Way | | x | | x | | x | | | x | | x | | | | x | | | | x | | | x | | | x | | | x | | 68 | 2,565 | |
| Gateway | W4. Entrance 2 | x | | | x | | x | | | x | | x | | | | x | | | x | | | | x | x | | | | | x | | 90 | 430 | |
| Quad | Q1.Meldman Cinematic Art Park | x | | | x | | x | | | x | | x | | | | x | | | x | | | | x | | | x | x | | | | 82 | 10,787 | |
| Quad | Q2.CAS Triangle | x | | | x | | x | | | x | | x | | | | x | | | x | | | | x | | | x | | | x | | 85 | 1,076 | |
| Quad | Q3. NCT | x | | | x | | x | | | x | | | x | | | | x | | | x | x | | | | | x | x | | | | 76 | 11,655 | |
| Quad | Q4. Associates Park | x | | | x | | x | | | x | | x | | | | x | | | | x | | | x | | | x | x | | | | 72 | 5,175 | |
| Perimeter | P1. Gavin Hebert Plaza Entry | | x | | | x | x | | | | x | | x | | | x | | | x | | | | x | x | | | | | x | | 41 | 9,562 | |
| Perimeter | P2. KAP | | x | | x | | x | | | | x | x | | | | x | | | | x | | | x | | | x | | | x | | 67 | 9,390 | |
| Perimeter | P3. IRC | x | | | x | | x | | | | x | | x | | | | x | | | x | | | x | x | | | | | x | | 78 | 13,900 | |
| Perimeter | P4. LAW | x | | | x | | x | | | | x | x | | | | | x | | | | | | x | | | x | | | x | | 74 | 12,090 | |
| Perimeter | P4. Exposition Blvd Along Metro | x | | | x | | x | | | | x | | x | | | | x | | x | | | | x | | | x | | | x | | 82 | 8,605 | |
| Foundation | F1. PSD | x | | | x | | x | | | | x | | x | | | x | | | | x | | | x | | | x | | | x | | 81 | 4,610 | |
| Foundation | F2. SWC | x | | | x | | x | | | | x | | x | | | x | | | | x | | | x | | | x | | | x | | 81 | 915 | |
| Foundation | F3. MRF | x | | | x | | x | | | | x | | x | | | x | | | | x | | | x | x | | | | | x | | 78 | 895 | |
| Foundation | F4. JEP | | x | | | x | x | | | | x | | | x | | x | | | | x | | | x | | | x | | | x | | 46 | 2,695 | |
| Foundation | F5 .DEN | | x | | x | | x | | | | x | | x | | | x | | | | x | | | x | | | x | | | x | | 68 | 5,665 | |
| Foundation | F6 .PSB | | x | | | x | x | | | | x | | x | | | x | | | | x | | | x | | | x | | | x | | 46 | 1,710 | |
| Foundation | F7. MUS | x | | | x | | x | | | | x | | | x | | x | | | | x | x | | | | | x | x | | | | 84 | 2,715 | |
| Foundation | F8. BMH | x | | | x | | x | | | | x | | | x | | | x | | | x | x | | | | | x | | | x | | 77 | 4,210 | |
| Foundation | F9. THH | x | | | x | | x | | | | x | | | x | | x | | | | x | | | x | | | x | x | | | | 78 | 1,285 | |
| Foundation | F10. BSR | | x | | | x | x | | | | x | | | x | | x | | | | x | | | x | | | x | | | x | | 50 | 486 | |
| Foundation | F11. BIT | x | | | x | | x | | | | x | | | x | | x | | | | x | x | | | | | x | | | x | | 81 | 3,895 | |
| Foundation | F12. ASC | x | | | x | | x | | | | x | | | x | | | x | | | x | x | | | | | x | x | | | | 76 | 2,085 | |
| Foundation | F13. DRC | | x | | | x | x | | | | x | | | x | | | x | | | x | | | x | | | x | | | x | | 48 | 1,125 | |
| Foundation | F14. RRI | x | | | x | | x | | | | x | | x | | | x | | | | x | | | x | | | x | | | x | | 81 | 5,750 | |
| Foundation | F15. MCB | | x | | | x | x | | | | x | | | x | | | x | | | x | | | x | | | x | | | x | | 48 | 3,375 | |
| Foundation | F16. DML | x | | | x | | x | | | | x | | | x | | | x | | | x | | | x | | | x | x | | | | 76 | 9,125 | |
| Foundation | F17.AHF | x | | | x | | x | | | | x | | | x | | | x | | | x | x | | | | | x | x | | | | 82 | 2,090 | |
| Foundation | F18.OHE | x | | | x | | x | | | | x | | | x | | | x | | | x | | | x | | | x | | | x | | 81 | 1,700 | |

| | | Potable Water Use Reduction (50) | | | | | Biodiversity (30) | | | | | | | | | | Health Benefits (30) | | | | | | | | | TOTAL (100) | Area (SF) | | | | | | | | |
|-------------------|-----------------------------|----------------------------------|----------|-----|-----------------|------|-------------------|-------|--------|---------|----------|-------|------------|---------|---------|---------|----------------------|------|-----|-------------|----------|-----|-------------|----------|-----|-------------|-----------|-------|----------|-----|---------------------|----------|--------|--|--|
| | | Water Use | | | Irrigation Type | | Native | | | Density | | | Connection | | | | Observations | | | Temperature | | | Air Quality | | | | | Noise | | | Physical Protection | | | | |
| | | High | Moderate | Low | Spray | Drip | Non Native | Combo | Native | 0-500 | 500-5000 | 5000+ | 1-side | 2-sides | 3-sides | 4-sides | 1-5 | 5-10 | 10+ | High | Moderate | Low | High | Moderate | Low | | | High | Moderate | Low | High | Moderate | Low | | |
| | Base Value | 2 | 1 | 0 | 2 | 0 | 4 | 2 | 1 | 2 | 1 | 0 | 3 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | | | | |
| | Coefficient | 15 | 15 | 15 | 10 | 10 | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 5 | 4 | 3 | 2 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Typologies | Weighted Value | 30 | 15 | 0 | 20 | 0 | 16 | 8 | 2 | 4 | 2 | 0 | 6 | 4 | 2 | 0 | 4 | 2 | 0 | 10 | 4 | 0 | 6 | 3 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | | | | |
| Foundation | F19. HED & PCE | x | | | x | | x | | | x | | | x | | | | x | | | | | x | x | | | | x | x | | | | 82 | 1,520 | | |
| Foundation | F20. PHE | x | | | x | | x | | | x | | | x | | | | x | | | | | x | x | | | | x | x | | | | 84 | 2,230 | | |
| Foundation | F21.PKS | x | | | x | | x | | | | x | | x | | | | x | | | | | x | | | | | x | | | | | 81 | 5,548 | | |
| Plaza | A1. Gavin Hebert Plaza | | x | | | x | x | | | x | | | | | | x | | | | | | x | | | | | x | | | | | 44 | 1,818 | | |
| Plaza | A2. LRC Entry Plaza | | x | | | x | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 54 | 1,300 | | |
| Plaza | A3. Noble Plaza | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 81 | 4,886 | | |
| Plaza | A4. Lazzaro Plaza | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 77 | 2,763 | | |
| Plaza | A5. Hahn Plaza | | | x | | x | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 26 | 1,930 | | |
| Plaza | A6. Argue Plaza | | x | | x | x | x | | | | x | | | | | x | | | | | | x | | | | | x | | | | | 62 | 5,100 | | |
| Plaza | A7. Crocker Plaza | | | x | | x | x | | | x | | | | | | x | | | | | | x | | | | | x | x | | | | 26 | 4,985 | | |
| Plaza | A8. Security Pacific Plaza | x | | | x | | x | | | x | | | | | | x | | | | | | x | x | | | | x | x | | | | 76 | 862 | | |
| Plaza | A9. Epstein Family Plaza | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 75 | 1,610 | | |
| Courtyard | Y1. Queens Court | x | | | x | | x | | | | x | | | | | x | | | | | | x | | | | | x | x | | | | 68 | 11,395 | | |
| Courtyard | Y2. Franklin Library Garden | | x | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 62 | 9,876 | | |
| Courtyard | Y3. DML | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | x | | | | 76 | 2,204 | | |
| Garden | G1. Water Treatment | | x | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 61 | 11,200 | | |
| Garden | G2. DEN Garden | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | x | | | | 81 | 3,454 | | |
| Garden | G3. FLT Garden | | x | | | x | x | | | x | | | x | | | x | | | | | | x | x | | | | x | | | | | 47 | 1,684 | | |
| Garden | G4. Amelia Taper Garden | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | x | | | | 78 | 8,290 | | |
| Garden | G5. Leavey Library | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 71 | 14,733 | | |
| Garden | G6. EF Hutton Park | x | | | x | | x | | | x | | | x | | | x | | | | | | x | x | | | | x | x | | | | 74 | 10,645 | | |
| Garden | G7. Weather Station | x | | | x | | x | | | x | | | x | | | x | | | | | | x | | | | | x | | | | | 78 | 6,730 | | |

Campus Map of Potential Implementation sites

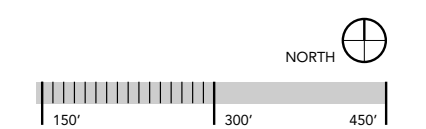
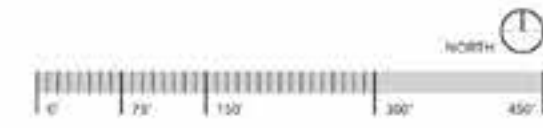
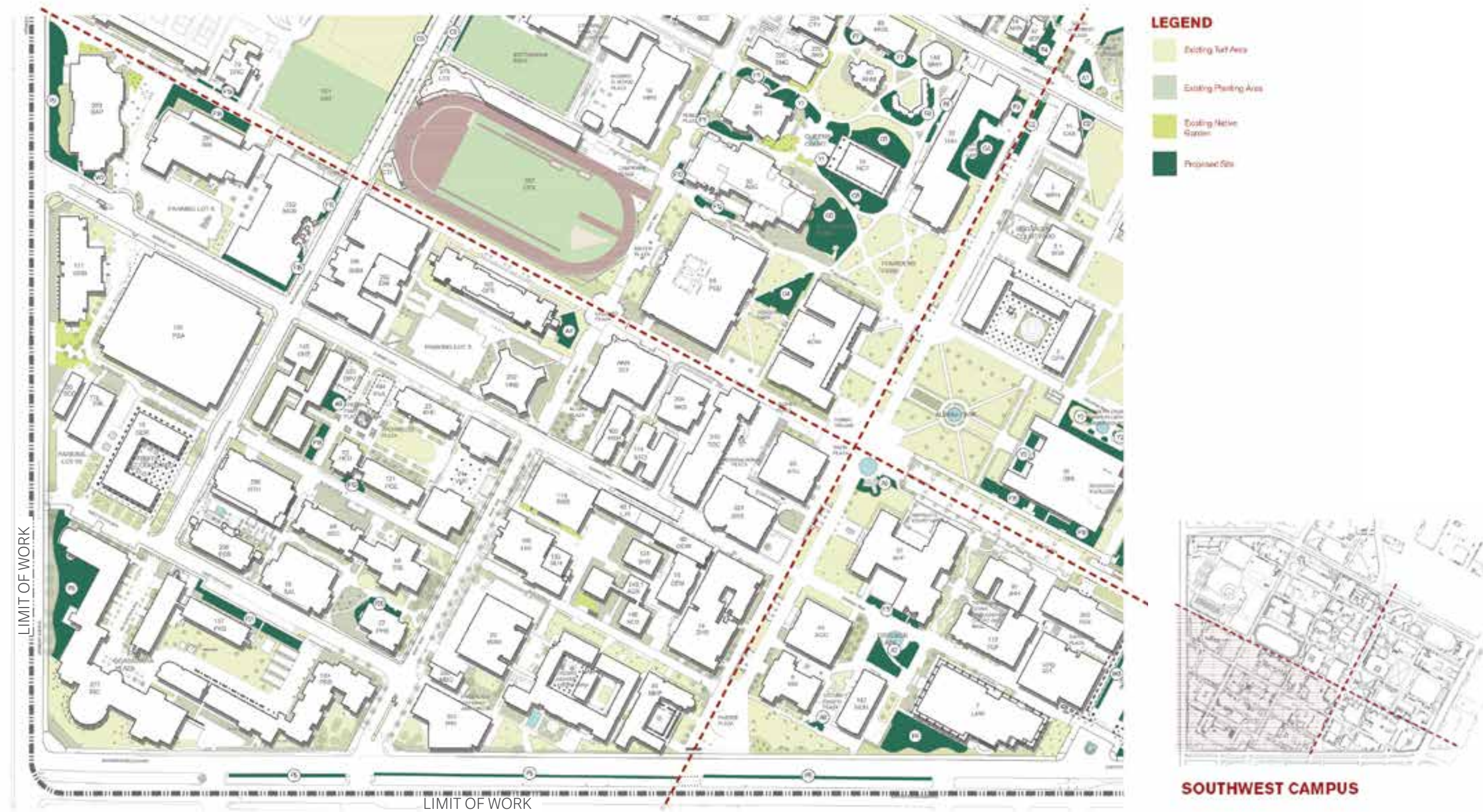


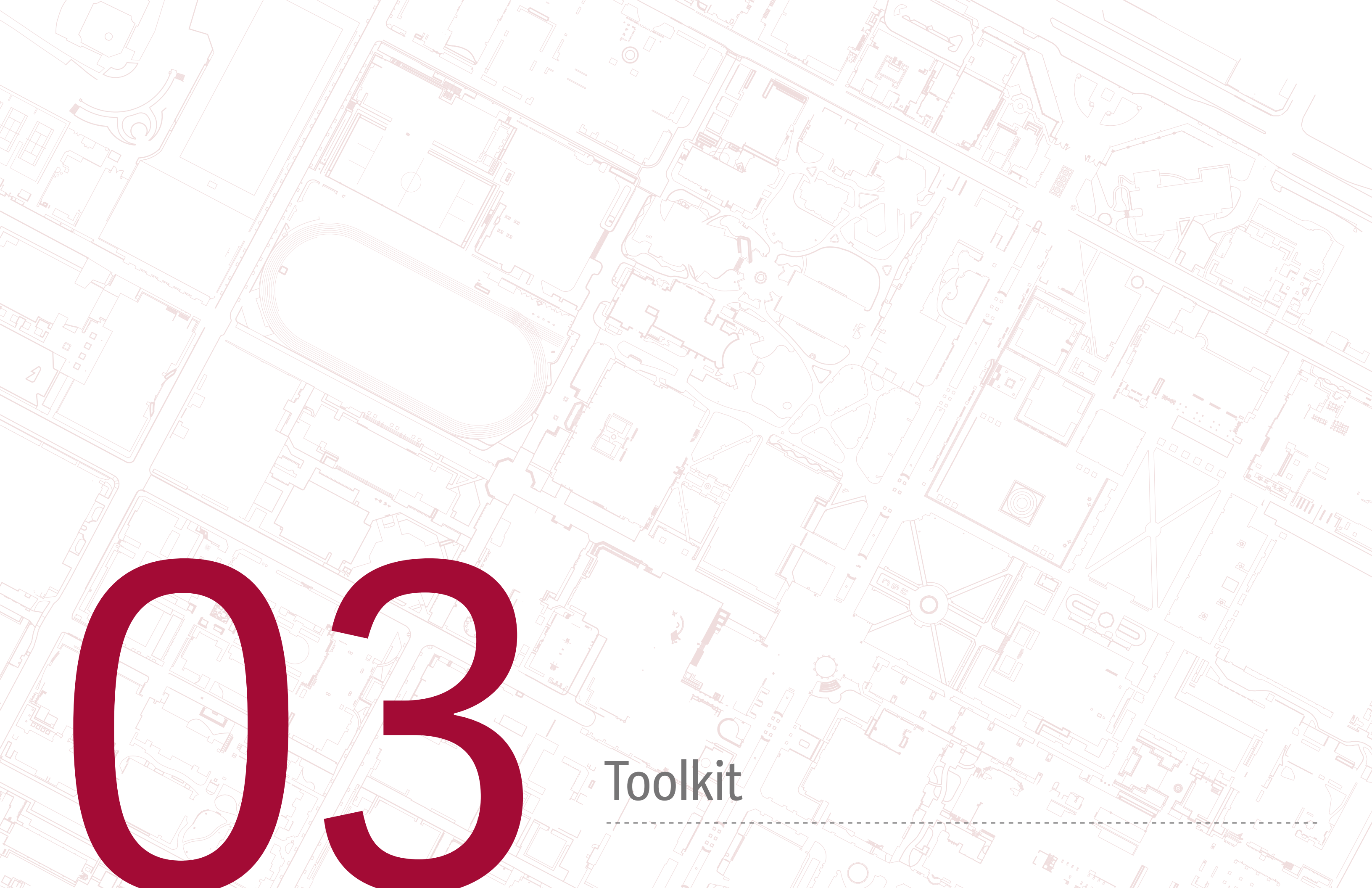
Northwest Campus



Northeast Campus







03

Toolkit



03

Toolkit

Typology

We divided the campus landscape into eight distinct typologies used as a tool for grouping planting strategies. These shared strategies can be applied for the entire campus, over time, as opportunities align with funding or other campus projects. The shared formal features of the typologies such as width of planting in relation to buildings, adjacency to pathways, or semi-enclosure, determine a set of common planting applications. Each planting group tied to a typology has a range of suggested plants that can adapt to the variables of a specific site. Consider variables such as shade and sun exposure, height and width of planting when making plant selections for a specific place. And the desired or expected performance of a specific landscape can also determine plant selection. For example, if a courtyard is used yearly for a graduation ceremony, select plants that either bloom or are not dormant during the ceremony. (See the Campus Life and Bloom Cycle diagram on page 55.)

The sustainability matrix evaluates selected site-specific typologies, but additional sites can be valued using the same methodology. These values can help determine future priority projects for implementation. Priority outcomes include eliminating irrigation runoff and overspray onto sidewalks, increasing outdoor thermal comfort with shade trees along pathways and adjacent to seating areas, and increasing campus biodiversity by planting native plants. Knitting the typology fragments together over time will have a significant transformative impact on the campus.



Corridor



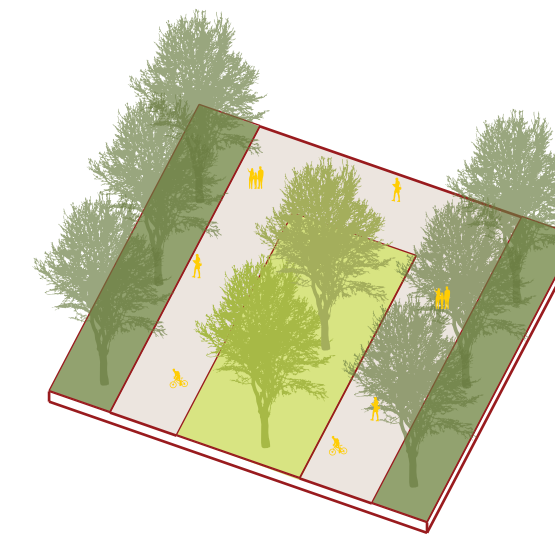
Gateway



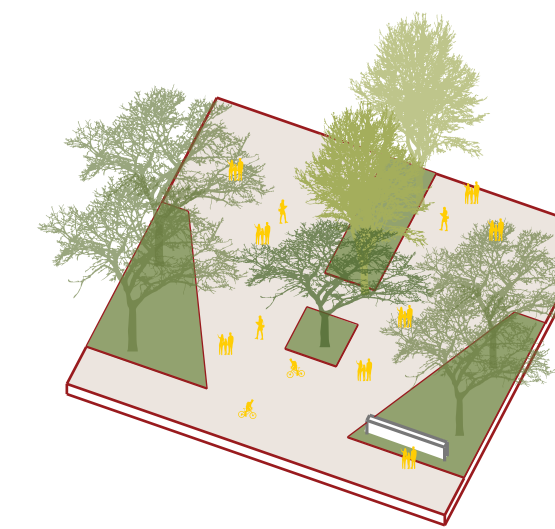
Quad



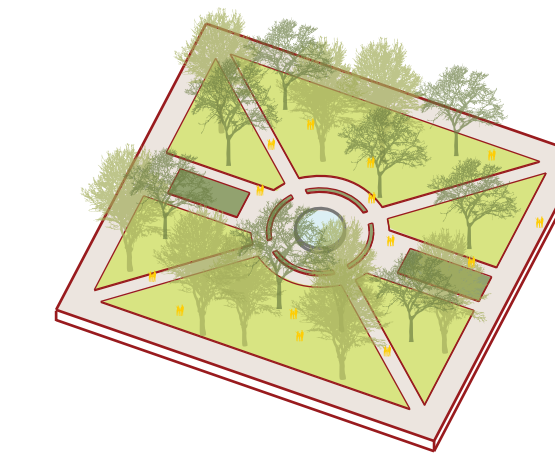
Perimeter



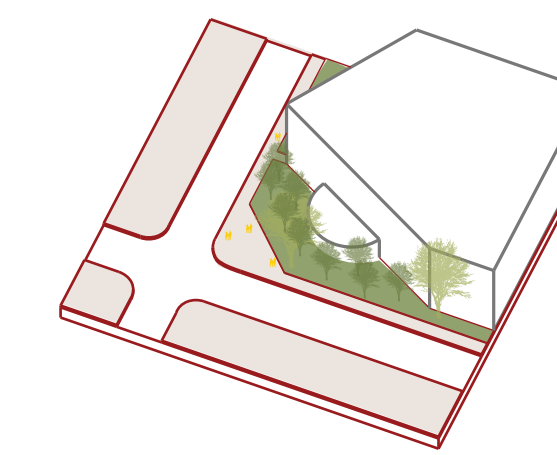
Corridor



Gateway



Quad



Perimeter



Foundation



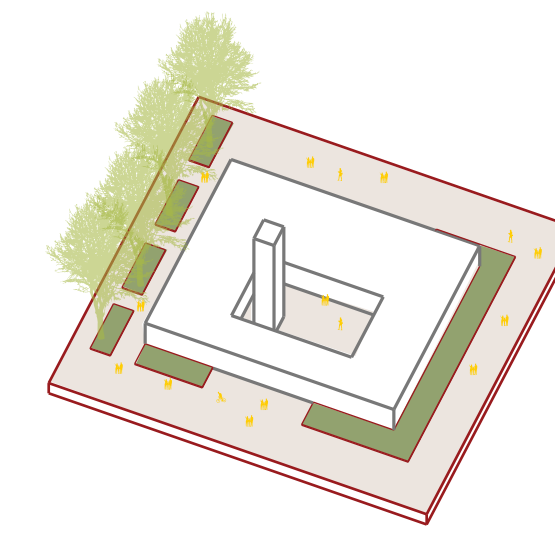
Plaza



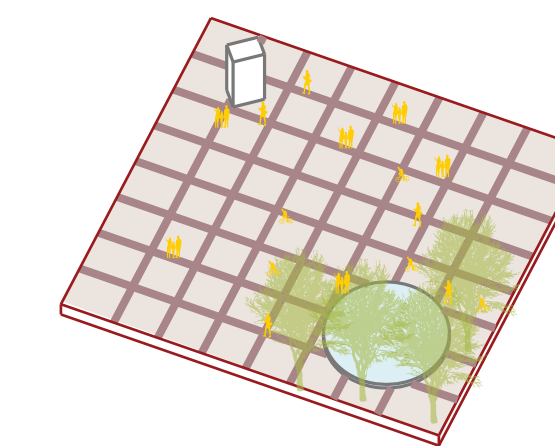
Courtyard



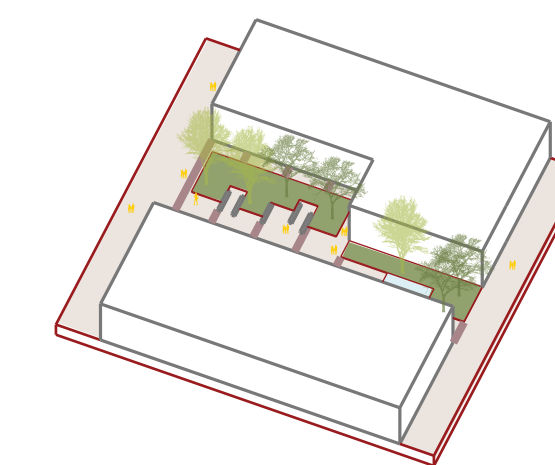
Garden



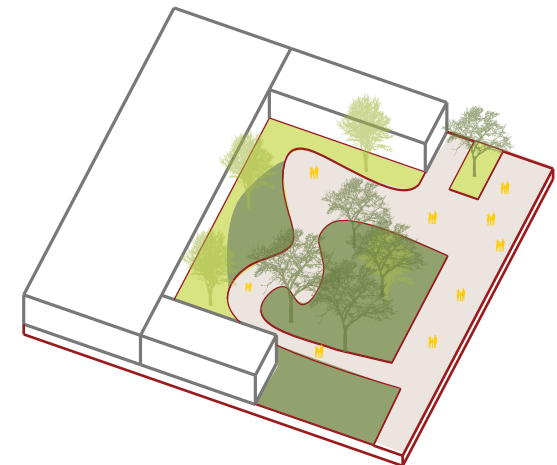
Foundation



Plaza



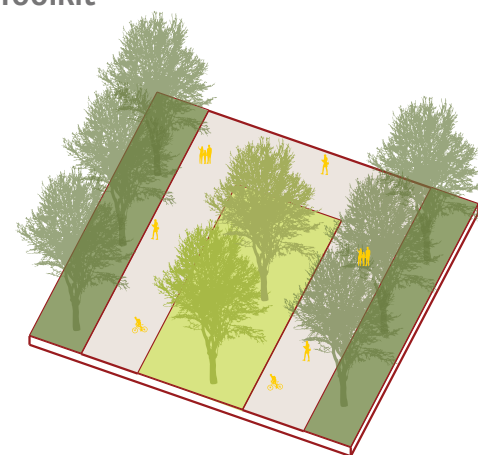
Courtyard



Garden

03

Toolkit



Corridor

Campus corridors define circulation routes and shape the pedestrian experience of the campus landscape. Increasing the overall tree canopy—adding new or replacing declining trees with native species along the corridors—will increase outdoor thermal comfort and support biodiversity goals. The campus has many exceptionally beautiful sections of shaded, leafy corridors such as along Watt Way between Downey and Childs Way. Prioritizing an increase in tree canopy coverage along sections of pedestrian pathways that are currently hot and exposed and linking the shaded corridors can increase pollinator pathways and nectar trails and encourage walking, which will have a positive effect on the health of the campus community.



Existing Corridor Planting: Tree & Turf
Water Use: High



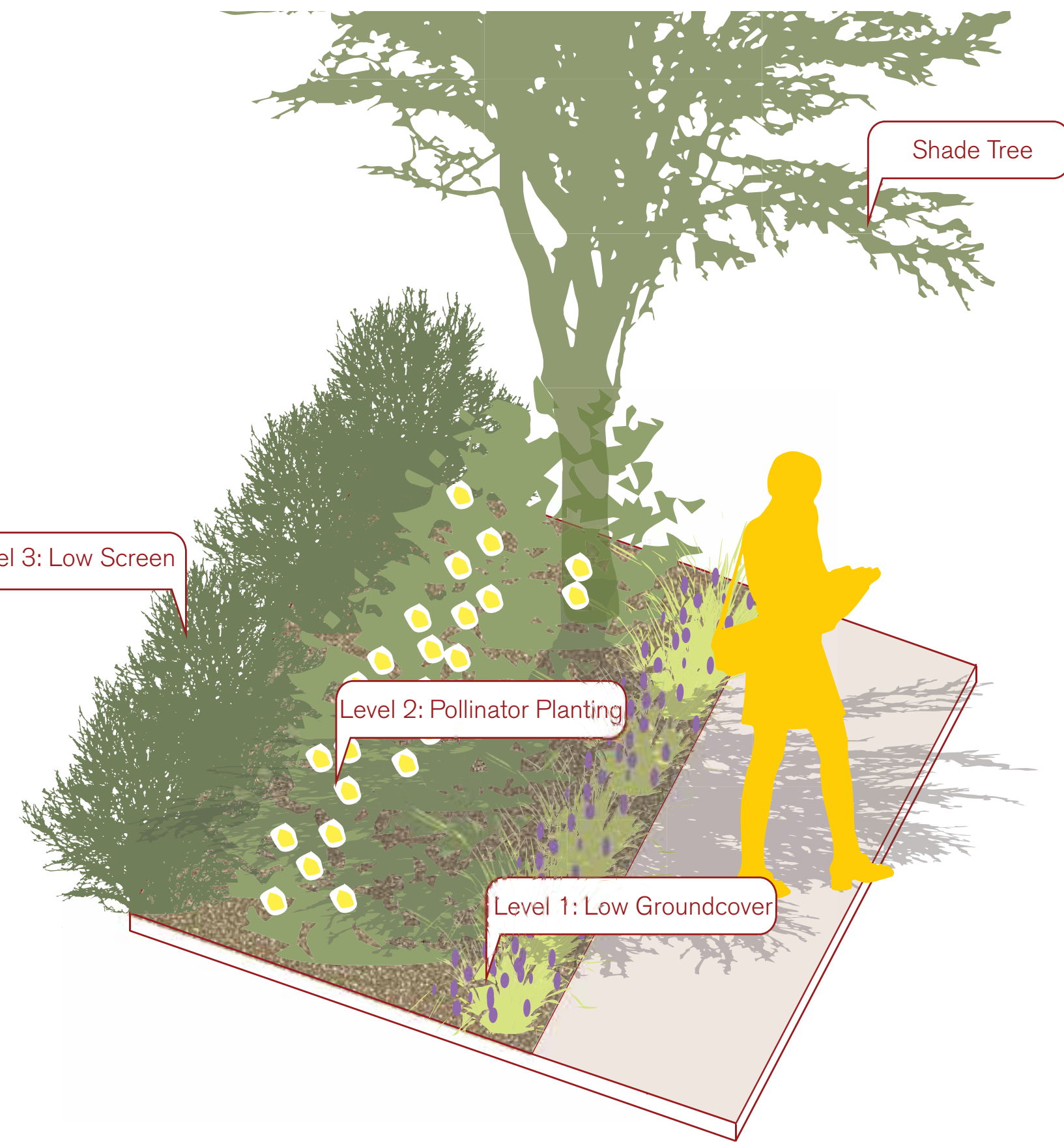
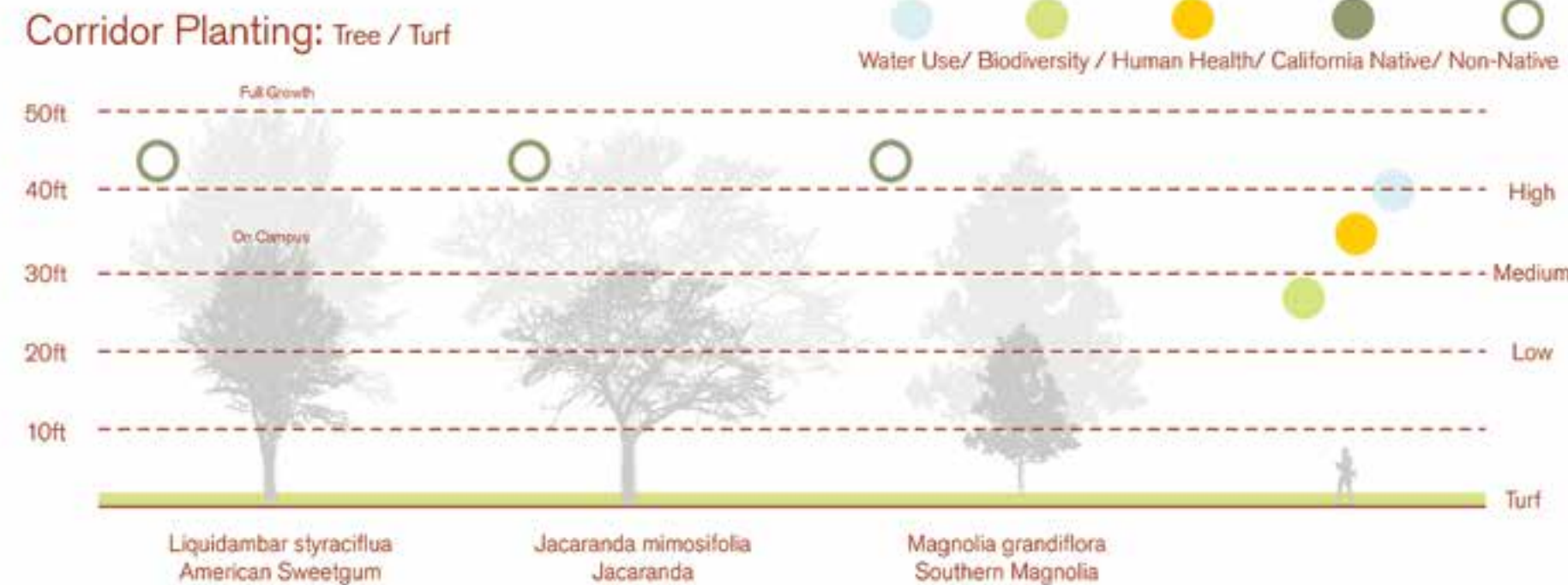
Existing Corridor Planting: Tree
Water Use: Moderate



Existing Corridor Planting: Tree & Groundcover
Water Use: Low for Groundcover, Moderate for Tree



Existing Corridor Planting: Tree & Groundcover & Turf
Water Use: Low on the left, High on the right



Shade Tree Palette

- Coastal Live Oak (*Quercus agrifolia*)
- California Sycamore (*Platanus racemosa*)
- Tipu Tree (*Tipuana tipu*)

Level 1 Low Groundcover

- Seaside Daisy (*Erigeron glaucus*)
- Drawf Coyote Brush (*Bacharis pilularis* 'Pigeon Point')
- Bee's Bliss Sage (*Salvia* "Bee's Bliss")

Level 2 Pollinator Planting

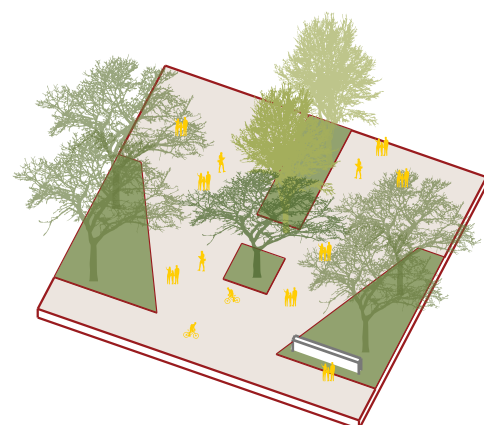
- Sage-leaved Rock Rose (*Cistus salviifolius*)
- California Buckwheat (*Eriogonum fasciculatum* 'Warriner Lytle')
- White Sage (*Salvia apiana*)
- California Lilac (*Ceanothus* "Yankee Point")
- Narrowleaf Milkweed (*Asclepias fascicularis*)

Level 3 Low Screen

- African Boxwood (*Myrsine africana*)
- Cleveland Sage (*Salvia clevelandii*)
- Evergreen Currant (*Ribes viburnifolium*)

03

Toolkit



Gateway

Gateways are key opportunity areas to highlight and build momentum for the landscape transformation outlined in this document. Gateways function similarly to billboards, communicating values and expectations. However, the gateway typology has specific constraints related to adapting native plants to these conditions. The USC gateways are tied to busy pedestrian and vehicular traffic zones, making them highly visible, but relatively small landscape fragments. Gateways are also tied to architectural features and formal geometry. The planting solutions responding to these variables include four layers of masses of planting to create the desired impact. Key to building and retaining soil carbon will be to replace seasonal annual color planting with perennial native and climate-adapted planting that can still deliver the expected visual impact of a campus gateway. The four levels of planting begin with seasonal low flowering plants in the range of campus colors from gold to cardinal.

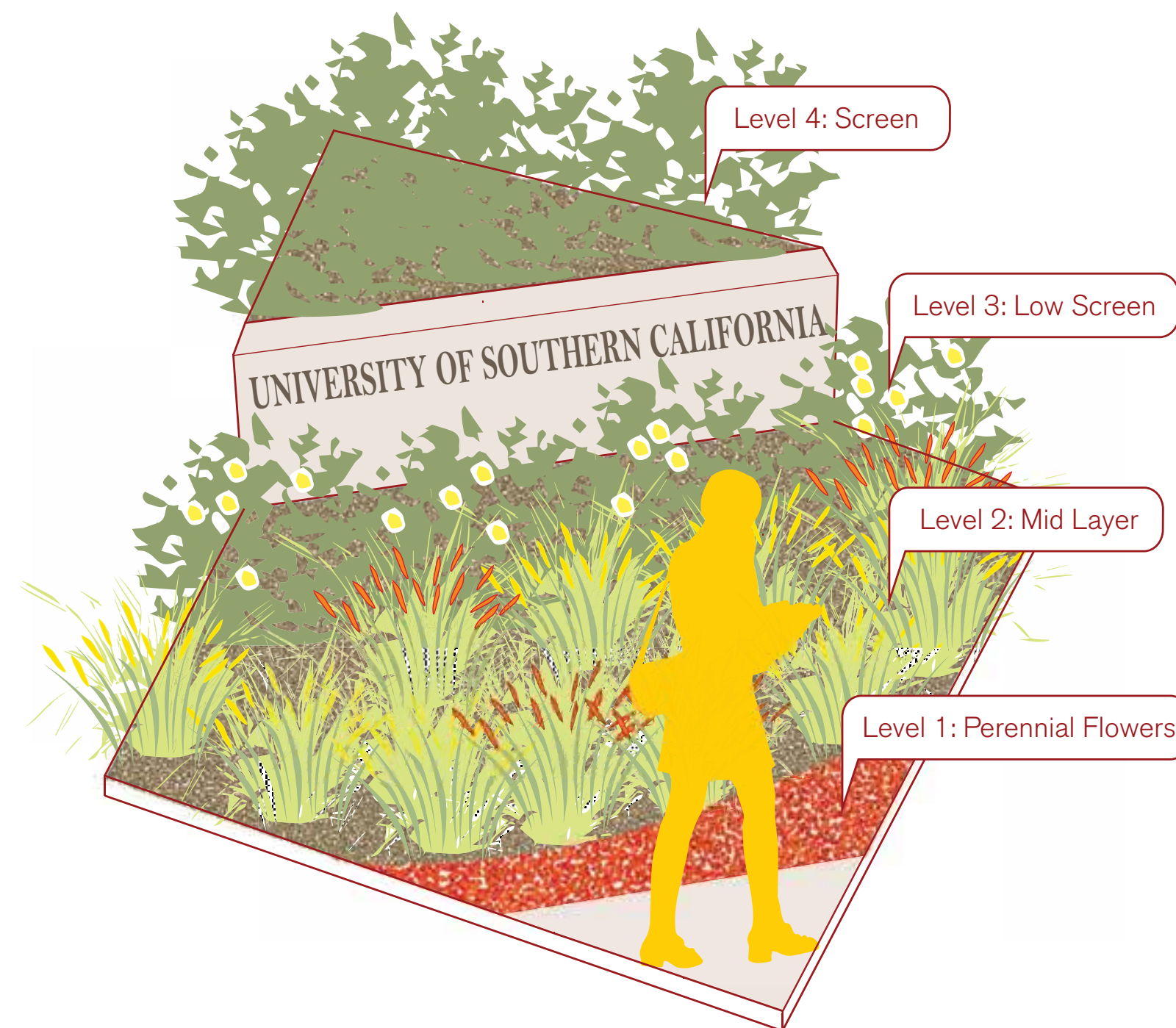
The second level is either grassy or loose-textured planting that accents the planting of level one and three to provide year-round visual interest. Level three planting is more formal and provides a handsome and reliably green backdrop to highlight level one and level two planting. Level four planting is a backdrop to help focus attention on the architectural and colorful planting in the foreground of a gateway.



Typical Gateway Planting: Shrub & Annual Flowers
Water Use: Moderate



Typical Gateway Planting: Tree & Shrub & Annual Flowers
Water Use: Moderate



Level 1 Perennial Flowers

- Texas Sundrop (*Calylophus drummondii*)
- Yarrow (*Achillea 'Moonbeam'*)
- Red Monkey Flower (*Mimulus aurantiacus* var. *puniceus*)
- Santa Ana Cardinal Coral Bells (*Heuchera 'Santa Ana Cardinal'*)

Level 2 Mid Layer

- California Buckwheat (*Eriogonum fasciculatum 'Warriner Lytle'*)
- Blue Elf Aloe (*Aloe 'Blue Elf'*)

Level 3 Low Screen

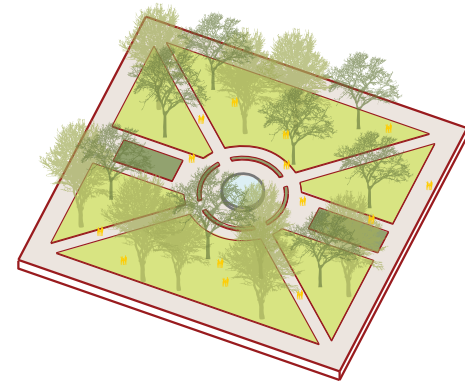
- African Boxwood (*Myrsine africana*)
- Lion's Tail (*Leonotis leonurus*)
- Pine Muhly (*Muhlenbergia dubia*)
- Mexican Bird of Paradise (*Caesalpinia Mexicana*)
- Blood Currant (*Ribes sanguineum* var. *glutinosum*)

Level 4 Screen

- Oragne Bell (*Tecoma alata*)
- Bush Poppy (*Dendromecon rigida*)
- Toyon (*Heteromeles arbutifolia*)

03

Toolkit



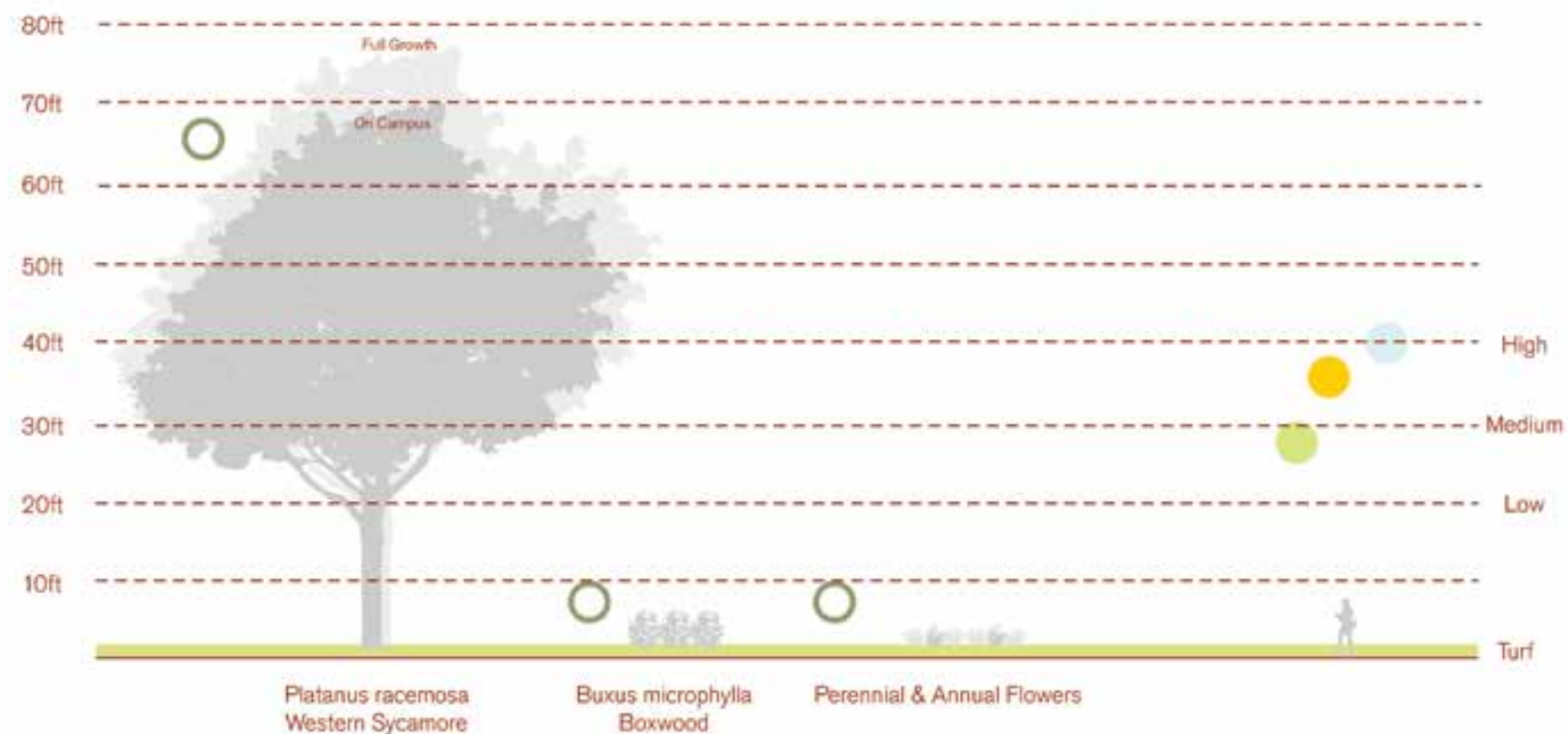
Quad

Quads, large lawn areas, serve as the heart of campus social and ceremonial life. Because turf can take the wear and tear of light pedestrian traffic and recover from the damage caused by more intensive use, it is an ideal application. However, turf requires high amounts of supplemental water to thrive, which is directly at odds with campus and regional water restrictions. One of the simplest and most effective ways to reduce water waste in quad areas is to eliminate or significantly reduce the amount of turf that is adjacent to impermeable surfaces. The state-mandated Model Water Efficient Landscape Ordinance (MWELO) prohibits irrigation runoff in existing and new landscapes.

Several actions can remove this typical condition around the campus:

- Replace sections of turf adjacent to paving with low-water use planting and drip irrigation to reduce or eliminate the interface condition.
- Replace spray irrigation with sub-surface irrigation under turf where turf adjacent to paving cannot be eliminated,
- Irrigate existing turf areas in quads with either stored and treated site-collected, or building-generated graywater to both preserve important and high-use turf areas and achieve needed reductions in potable water use.

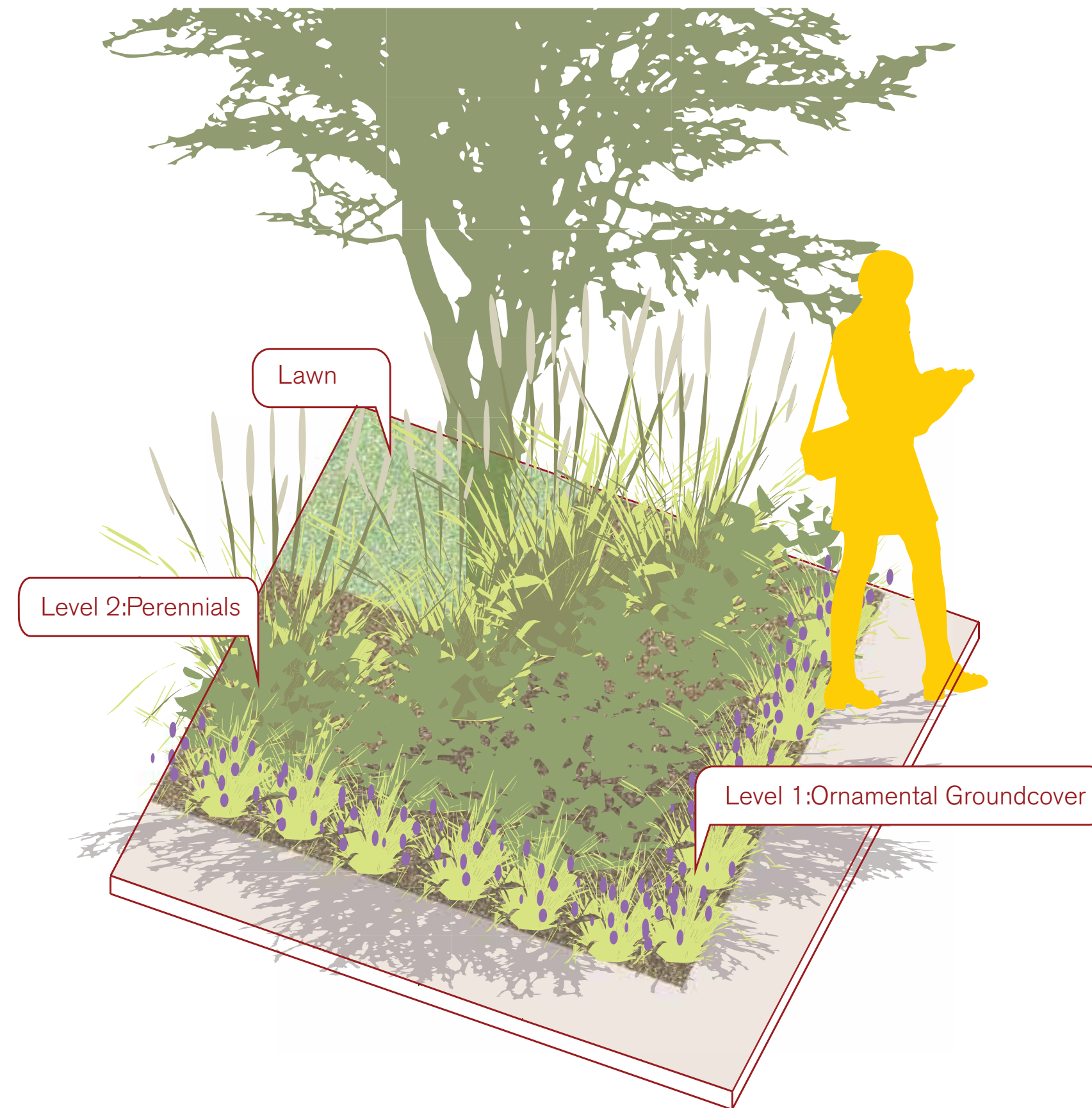
Quad Planting: Tree / Shrubs / Turf



Typical Quad Planting: Turf, Shrub
Water Use: High



Typical Quad Planting: Turf, Shrub & Tree
Water Use: High



Level 1 Ornamental Groundcover

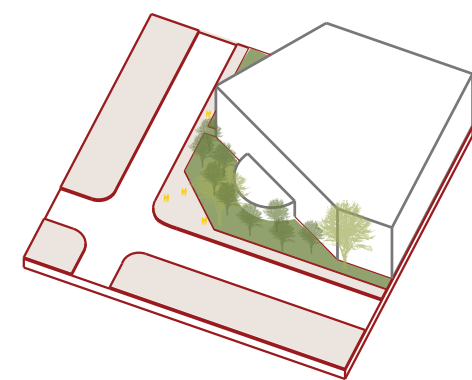
- Bee's Bliss Sage (*Salvia "Bee's Bliss"*)
- Seaside Fleabane (*Erigeron glaucus*)
- Island Alum Root (*Heuchera maxima*)
- Creeping Thyme (*Thymus praecox*)
- Blue Sedge (*Carex glauca*)

Level 2 Perennials

- Epilobium canum* (California fuchsia)
- Blue Grama (*Bouteloua gracilis*)
- Germander (*Teucrium chamaedrys*)
- California Goldenrod (*Solidago californica*)
- Pine Muhly (*Muhlenbergia dubia*)

03

Toolkit



Perimeter

Similar to gateways, perimeter planting provides visual cues to the surrounding community about campus identity. Perimeter planting has a key function in defining the campus-like feel of the University. Layers of trees, shrubs and ground cover combine to provide visual separation from adjacent vehicular traffic, as well as improved air quality and noise buffering. Transitioning to native and climate adapted planting can also provide significant water savings.



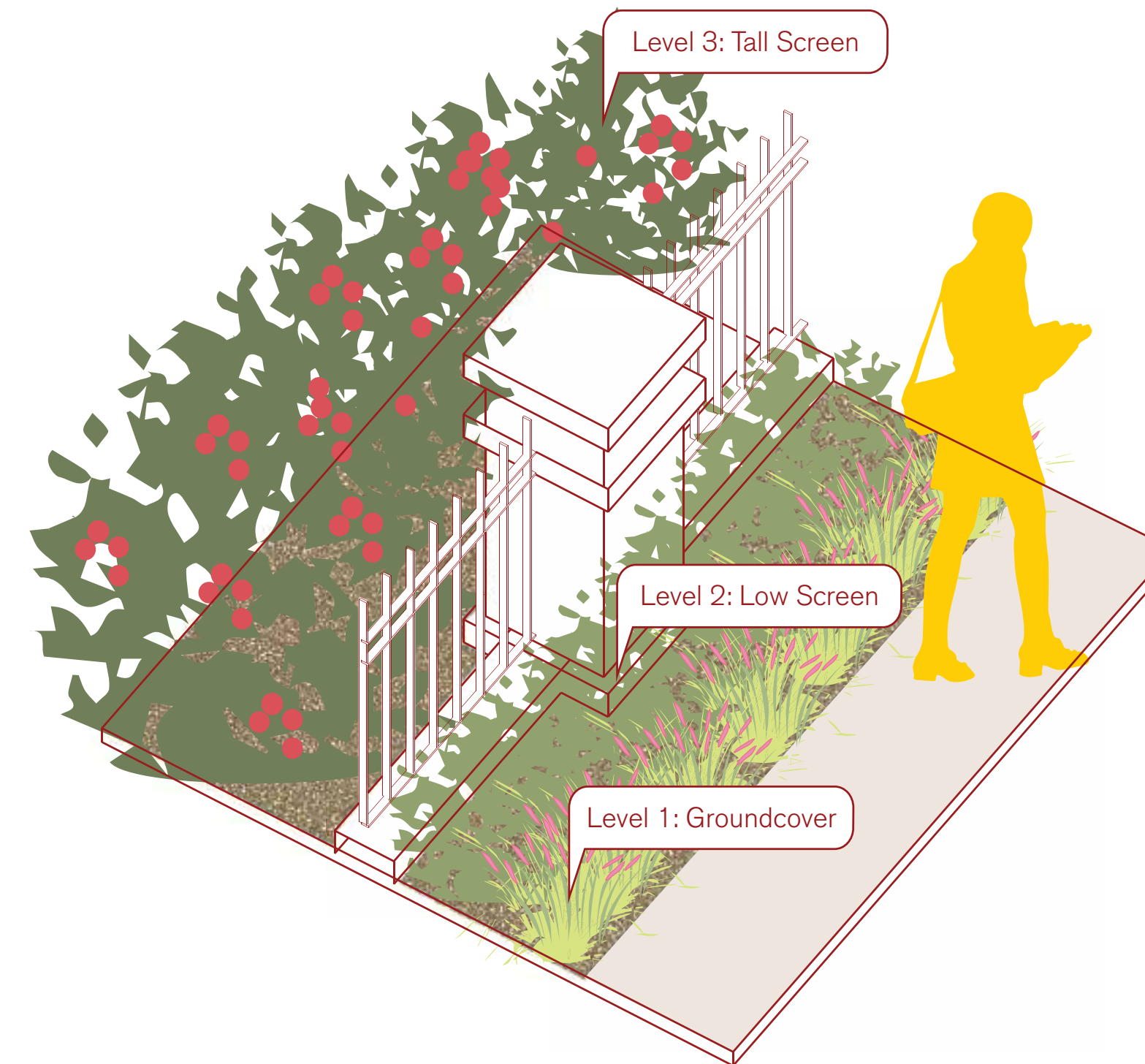
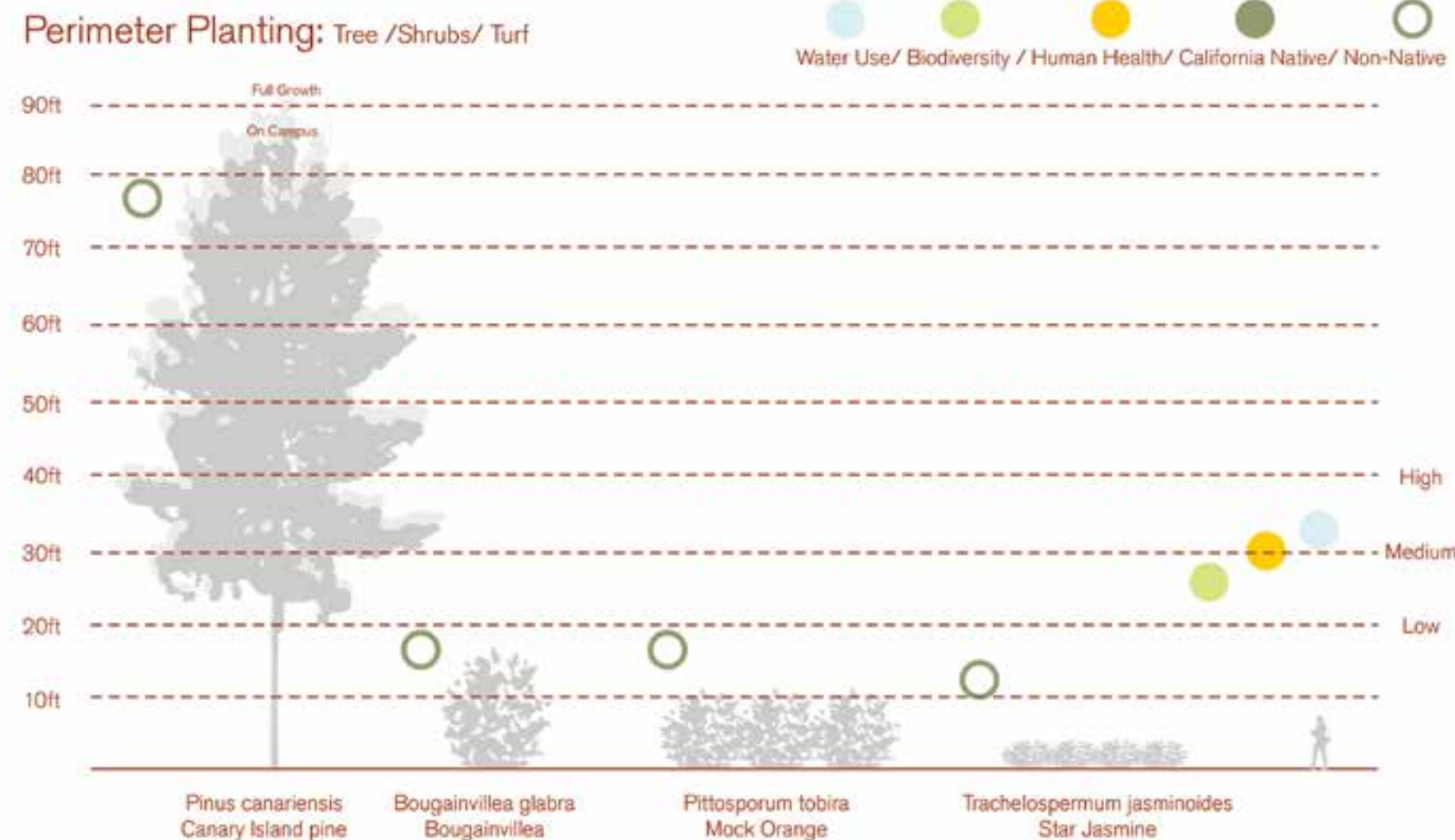
Existing Perimeter Planting: Tree & Shrub & Groundcover
Water Use: Moderate



Existing Perimeter Planting: Tree & Turf
Water Use: High



Existing Perimeter Planting: Tree & Shrub
Water Use: Moderate



Level 1 Groundcover

- Dwarf Coyote Brush (*Baccharis pilularis* 'Pigeon Point')
- Blue Grama (*Bouteloua gracilis*)
- New Gold Iantana (*Lantana* 'New Gold')
- Blue Sedge (*Carex glauca*)

Level 2 Low Screen

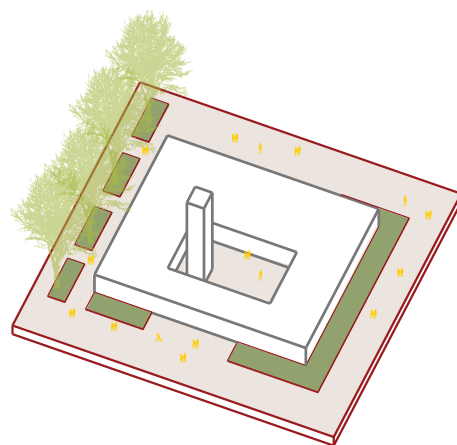
- Deer Grass (*Muhlenbergia rigens*)
- Everyman's Manzanita (Howard McMinn Manzanita)
- Arctostaphylos "Howard McMinn"
- Mexican Bird of Paradise (*Caesalpinia Mexicana*)
- Coast Sunflower (*Encelia californica*)
- Evergreen Currant (*Ribes viburnifolium*)

Level 3 Tall Screen

- California Coffeberry (*Rhamnus californica* coffee berry "Eve Case")
- Catalina Cherry (*Prunus ilicifolia* ssp. *lyonii*)
- Sugar Bush (*Rhus ovata*)
- Toyon (*Heteromeles arbutifolia*)

03

Toolkit



Foundation

Foundation planting is the most common type of planting on campus and defines and links the campus together. These structures are typically composed of trees offset from a building, with one-to-three shrub layers in a tiered height, and either turf, ground cover, or low shrubs adjacent to paved surfaces. The planting areas are often narrow strips between buildings and pedestrian or vehicular paving. These spaces provide important benefits both inside and outside of the buildings they surround. Trees cool interior spaces and provide views of nature from within classrooms and offices. Consider both the interior and exterior experiences of foundation planting when applying the recommendations in this section. The potential for both reducing campus outdoor water use and reducing labor time required for maintaining these hedges and small narrow lawn areas is high in the foundation typology.



Typical Foundation Planting: Groundcover, Shrub & Tree
Water Use: Low to Moderate



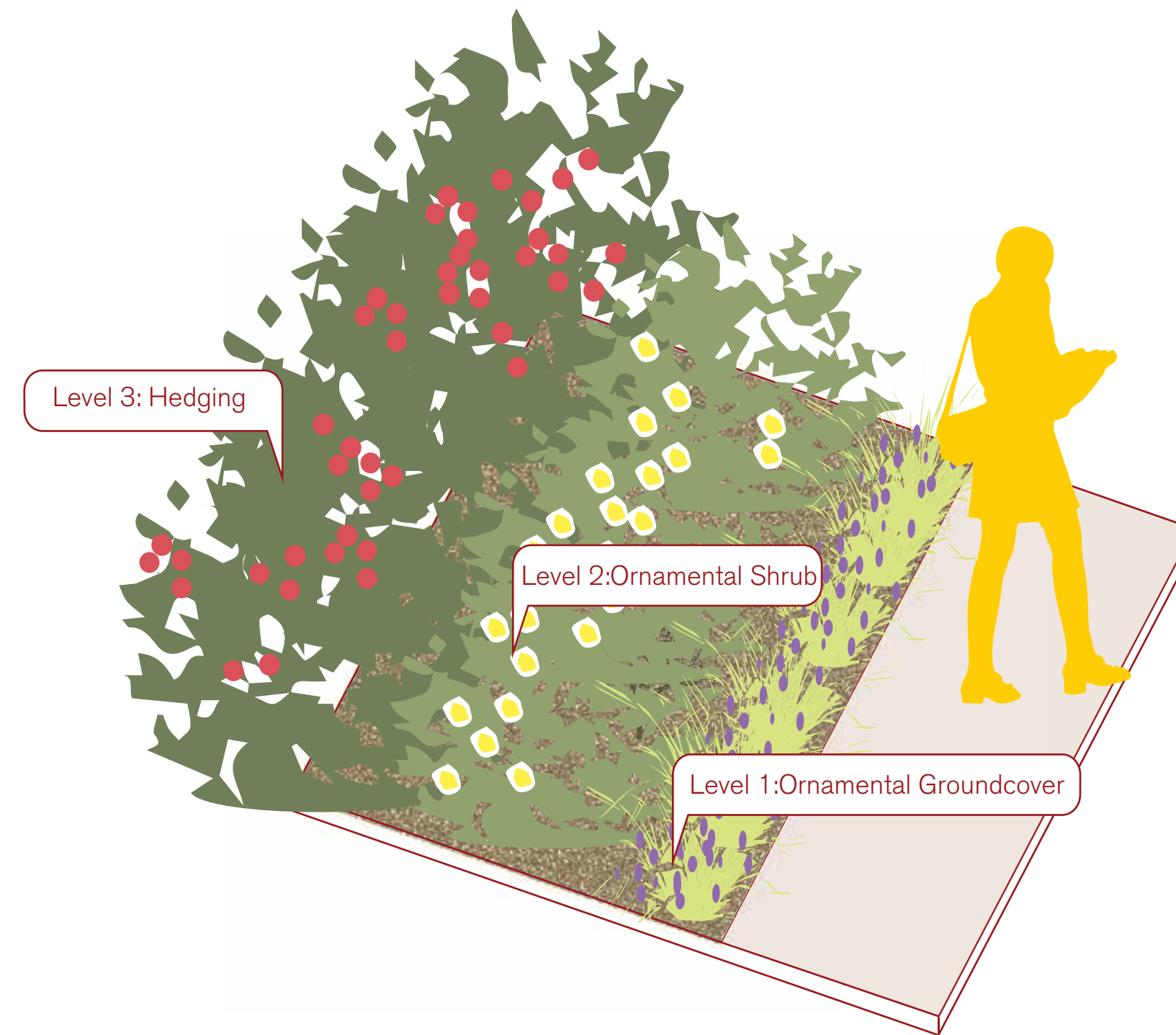
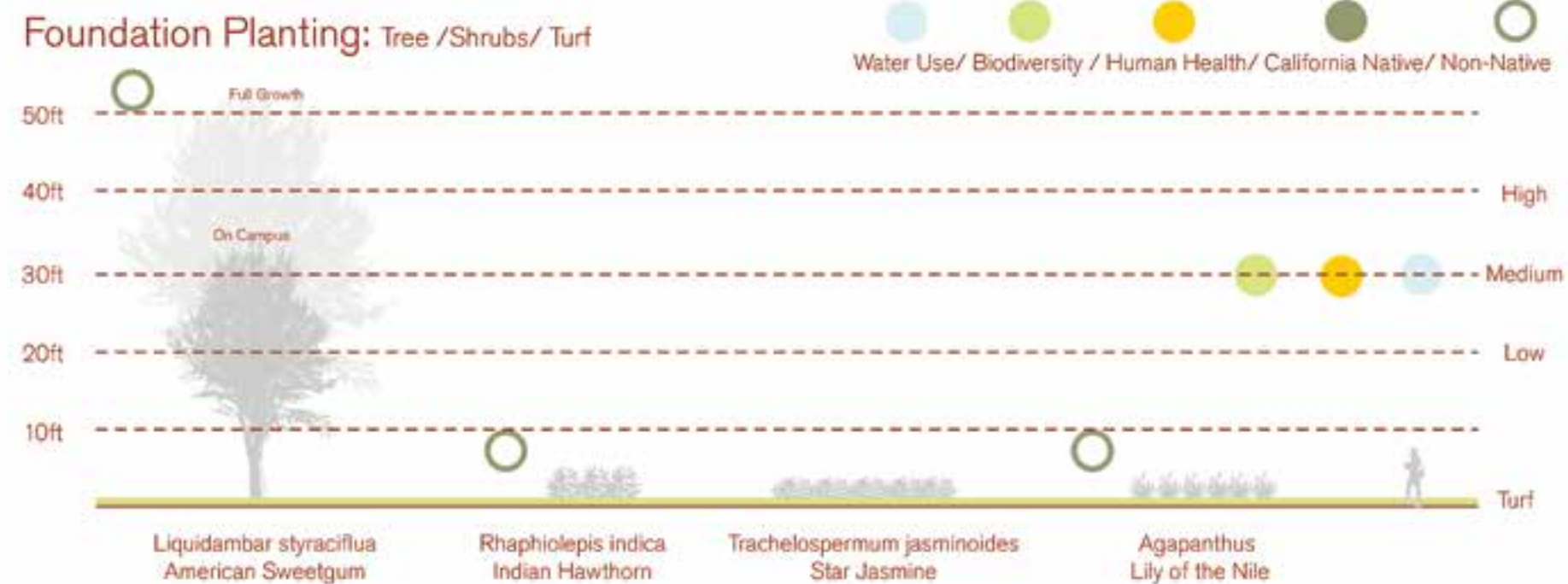
Typical Foundation Planting: Turf, Shrub & Trees
Water Use: High & Moderate



Typical Foundation Planting: Groundcover & Trees
Water Use: Moderate



Typical Foundation Planting: Shrub & Trees
Water Use: Moderate



Level 1 Ornamental Groundcover

- Yarrow (*Achillea* 'Moonshine')
- African Daisy (*Arctotis acaulis* 'Big Magenta')
- Dwarf Orange Bulbine (*Bulbine frutescens* 'Hallmark')
- California Goldenrod (*Solidago velutina* ssp. *californica*)
- Giant Chalk Dudleya (*Dudleya brittonii*)

Level 2 Ornamental Shrubs

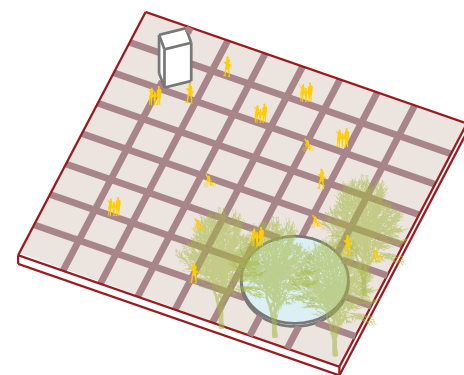
- Bladder Pod (*Cleome isomeris*)
- Cleveland Sage (*Salvia clevelandii*)
- Safari Conebush (*Leucadendron* 'Safari Sunset')
- Sageleaf Rockrose (*Cistus salviifolius* 'Prostratus')
- African Boxwood (*Myrsine africana*)
- Lion's Tail (*Leonotis leonurus*)

Level 3 Hedging

- Toyon (*Heteromeles arbutifolia*)
- Little Sur Manzanita (*Arctostaphylos edmundsii*)
- Sugar Bush (*Rhus ovata*)
- Lemonade Berry (*Rhus integrifolia*)

03

Toolkit



Plaza

Plazas are important campus gathering spaces for scheduled and impromptu meetings. Because of their function of accommodating large and small gatherings, planting opportunities are limited to the perimeter of plazas. An exception would be inserting trees in planting wells within paved plaza areas that do not impede fire access. Plazas can be quite hot because of their solar exposure, so increasing tree canopy around the perimeter of the plazas should be a campus-wide priority. Fountains also provide important cooling benefits in plazas. Concentrating shade and adding recirculating, efficient water fountains can provide much needed cooling spaces within plazas.



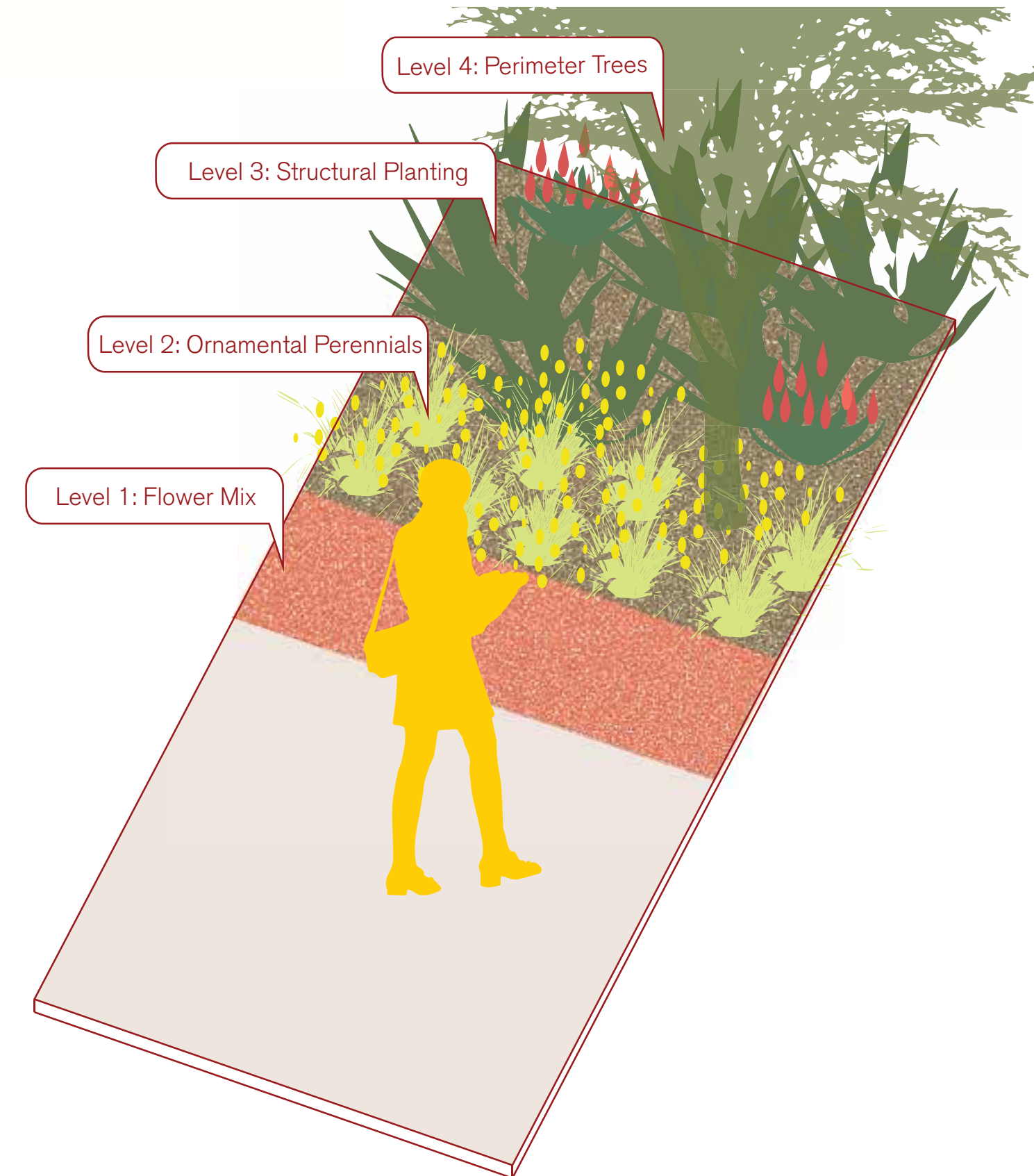
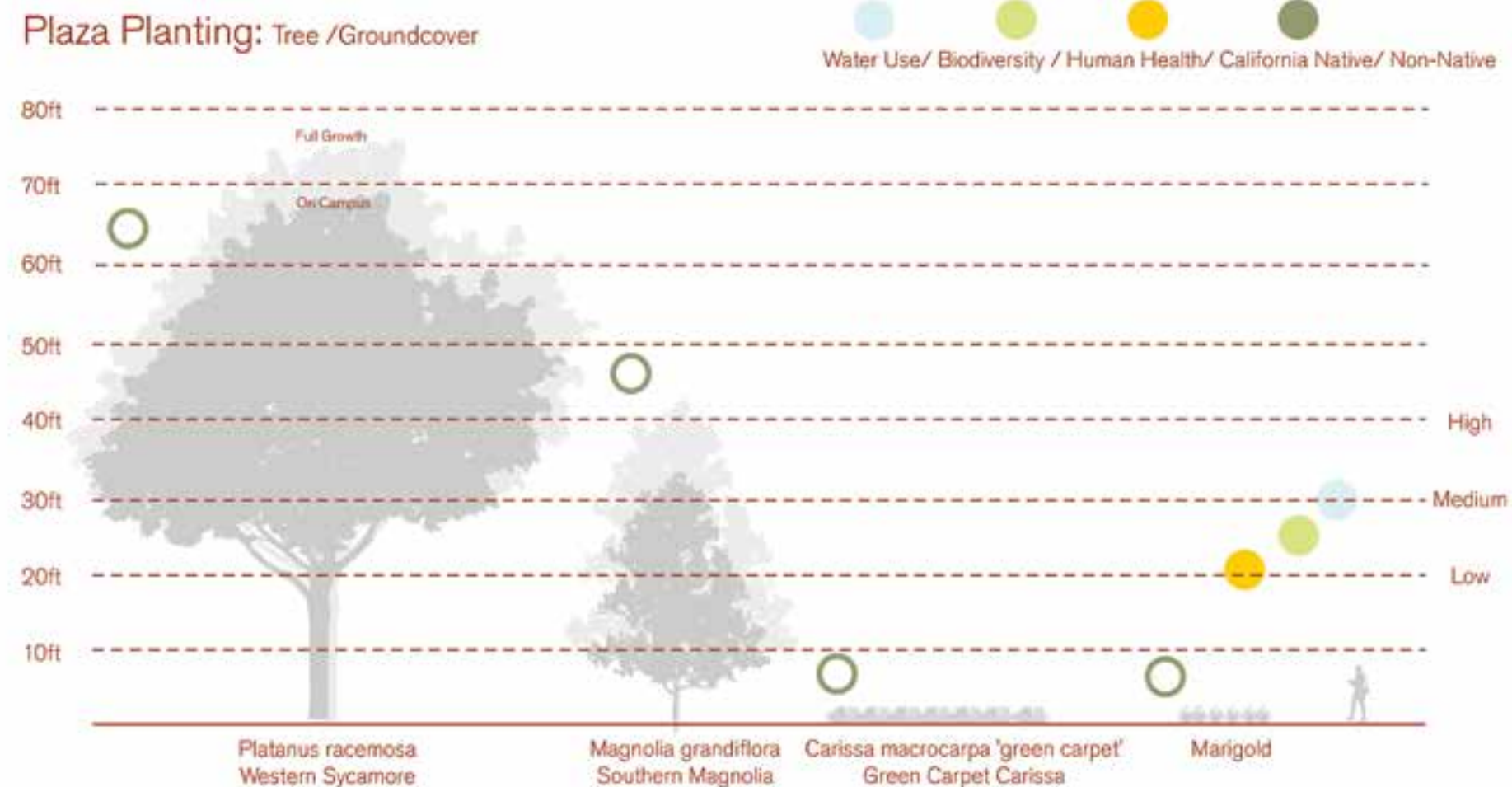
No Planting
Fountain: High



Typical Plaza Planting: Tree & Shrub
Water Use: Moderate



Typical Plaza Planting: Shrub
Water Use: Moderate



Level 1 Flower Mix

- Globe Gilia (*Gilia capitata*)
- California Poppy (*Eschscholzia californica*)
- Farewell-to-Spring (*Clarkia amoena*)
- California Goldenrod (*Solidago velutina* ssp. *californica*)
- Blue-eyed Grass (*Sisyrinchium bellum*)
- Douglas Iris (*Iris douglasiana*)

Level 2 Ornamental Perennials

- Mimulus aurantiacus (Sticky Monkey Flower)
- Dwarf Orange Bulbine (*Bulbine frutescens* 'Hallmark')
- Firecracker Penstemon (*Penstemon eatonii*)
- Epilobium canum (California fuchsia)

Level 3 Structural Planting

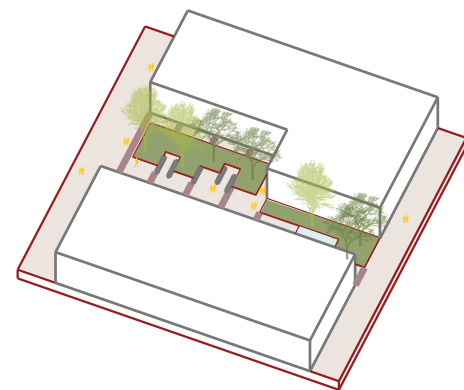
- Coastal Agave (*Agave shawii*)
- Red Yucca (*Hesperaloe parviflora* 'Brakelights')
- Mexican Bird of Paradise (*Caesalpinia Mexicana*)
- Oregon grape (*Mahonia aquifolium*)
- Safari Conebush (*Leucadendron* 'Safari Sunset')

Level 4 Perimeter Trees

- Coastal Live Oak (*Quercus agrifolia*)
- California Sycamore (*Platanus racemosa*)
- Aleppo Pine (*Pinus halepensis*)
- Torrey Pine (*Pinus torreyana*)
- Santa Cruz Island Ironwood (*Lyonothamnus floribundus*)
- Marina Strawberry Tree (*Arbutus* 'Marina')

03

Toolkit



Courtyard

Courtyard spaces are used frequently by students for individual, or group study and for social interactions. These spaces are also settings for programmed outdoor events. Because these spaces are partially or fully enclosed by buildings, plant material that can adapt to shade and sun exposures are needed. Plants are also experienced up-close in these spaces and selection for color, texture, seasonal interest, and fragrance should be considered.



Existing Courtyard Planting: Shrub & Tree
Water Use: Moderate



Existing Courtyard Planting: Turf & Tree
Water Use: High

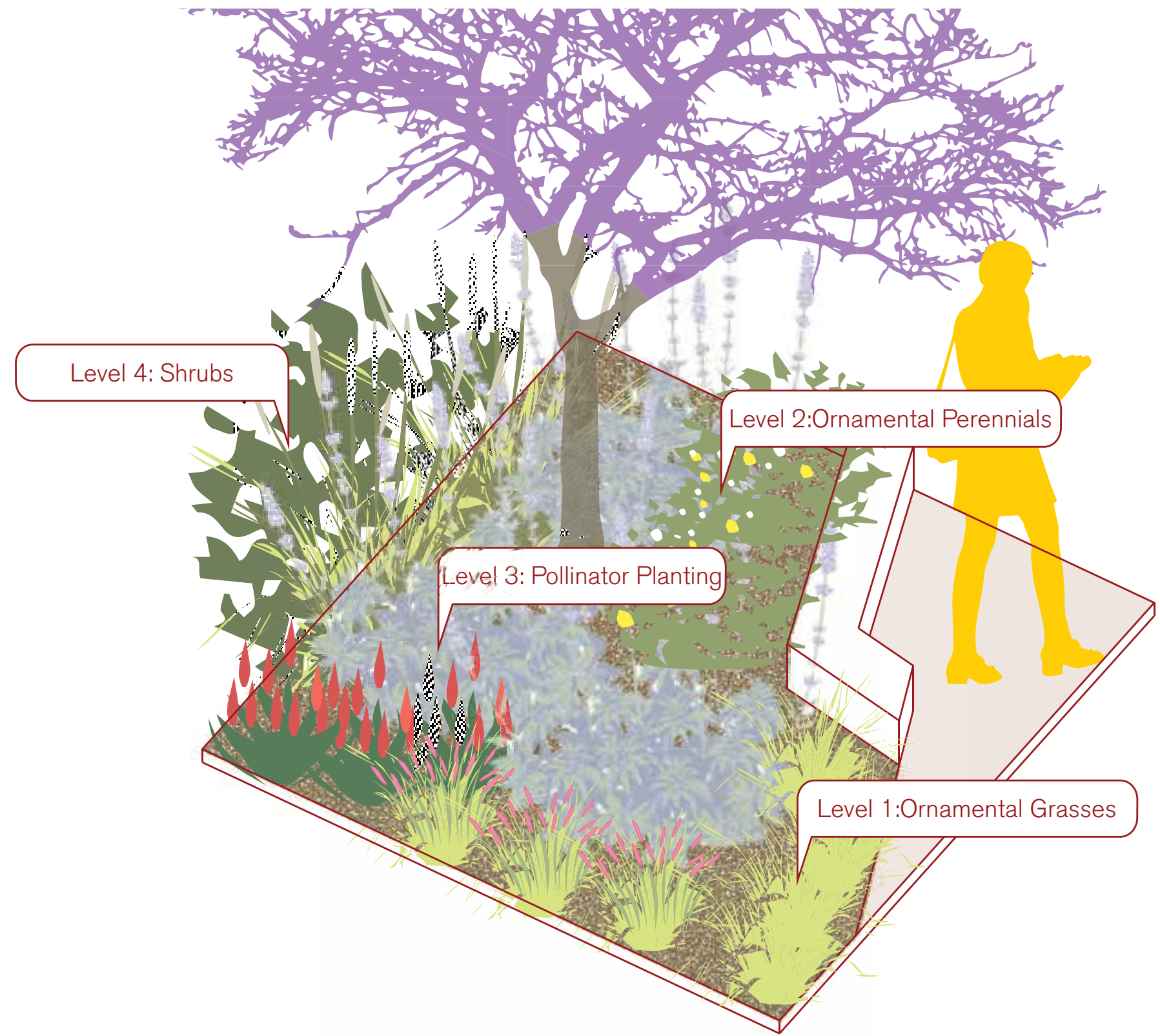
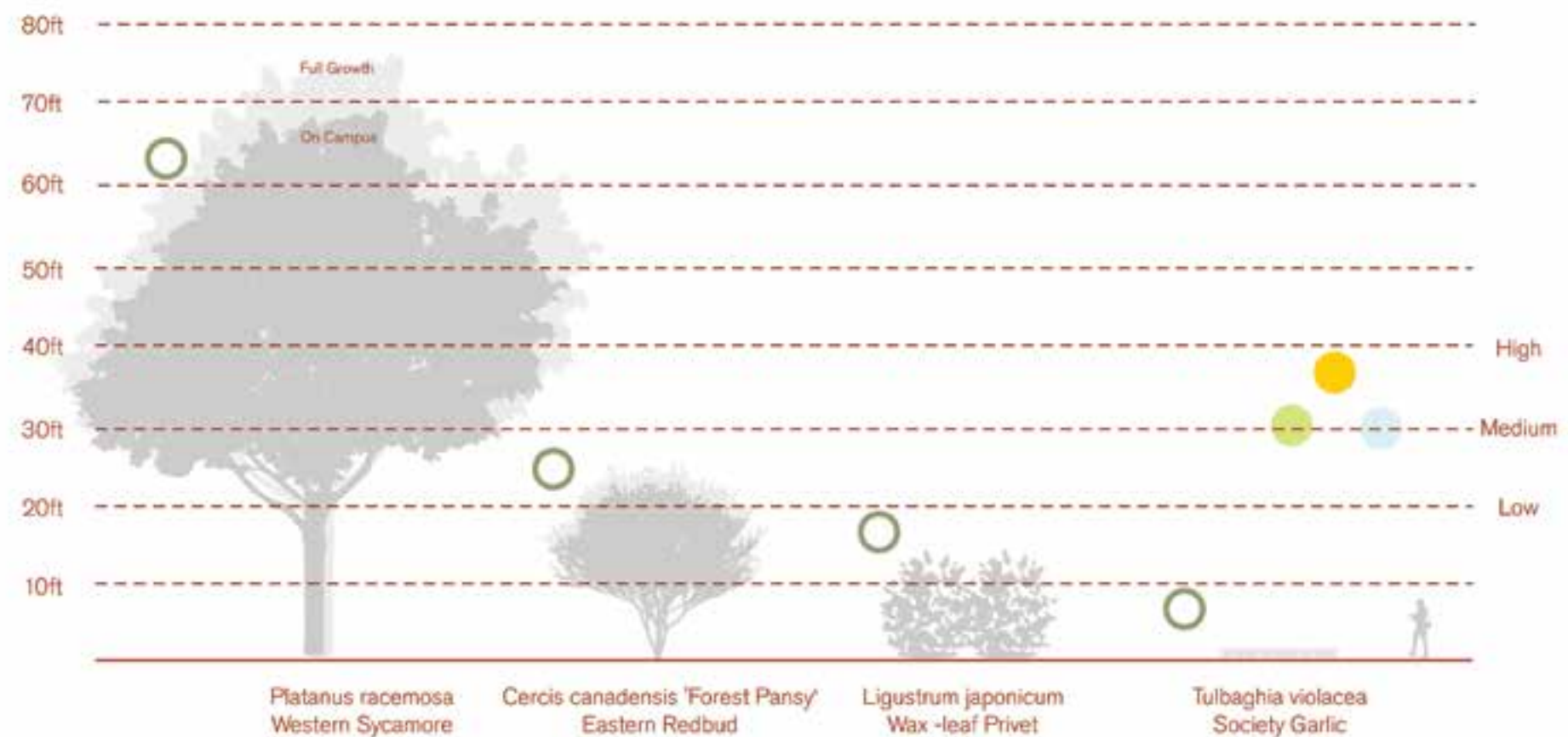


Existing Garden Planting: Groundcover, Shrub
Water Use: Moderate



Existing Garden Planting: Turf & Tree
Water Use: High

Courtyard Planting: Tree /Shrubs/Groundcover



Level 1 Ornamental Grasses

- Blue Sedge (*Carex glauca*)
- Blue Grama (*Bouteloua gracilis*)
- Purple Three Awn (*Aristida purpurea*)

Level 2 Ornamental Perennials

- Hummingbird Sage (*Salvia spathacea*)
- Bee's Bliss Sage (*Salvia x 'Bee's Bliss'*)
- Yarrow (*Achillea 'Moonshine'*)
- Cleveland Sage (*Salvia clevelandii*)
- Epilobium canum (*California fuchsia*)

Level 3 Pollinator Planting

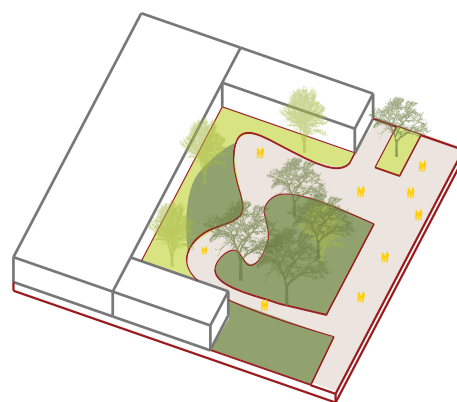
- Ceanothus (*Ceanothus 'Yankee Point'*)
- Bush Sunflower (*Encelia californica*)
- Orange Globe Mallow (*Sphaeralcea munroana*)
- Bush Monkey Flower (*Diplacus aurantiacus*)
- Narrowleaf Milkweed (*Asclepias fascicularis*)
- California Buckwheat (*Eriogonum fasciculatum 'Warriner Lytle'*)

Level 4 Shrubs

- Fuchsiaflower Gooseberry (*Ribes speciosum*)
- Hollyleaf Redberry (*Rhamnus ilicifolia*)
- Yellow Bush Penstemon (*Keckiella antirrhinoides*)
- Bush Sunflower (*Encelia californica*)
- Sea Cliff Buckwheat (*Eriogonum parvifolium*)

03

Toolkit



Garden

Campus garden spaces offer a significant opportunity to increase native plant biodiversity. Garden spaces are typically less formal than the other campus landscape typologies and can accommodate the variable and seasonal changes characteristic of Southern California native plants. Utilizing a variety of trees, shrubs, perennial and annual flowers can enhance the beauty of the gardens and provide fuel for pollinator species. Providing plants favored by pollinators will help to increase opportunities for students, staff, and visitors to experience the native beauty of Southern California plants and animals.



Existing Garden Planting: Shrub & Tree
Water Use: Low
Nice Drought Tolerant Planting Palette



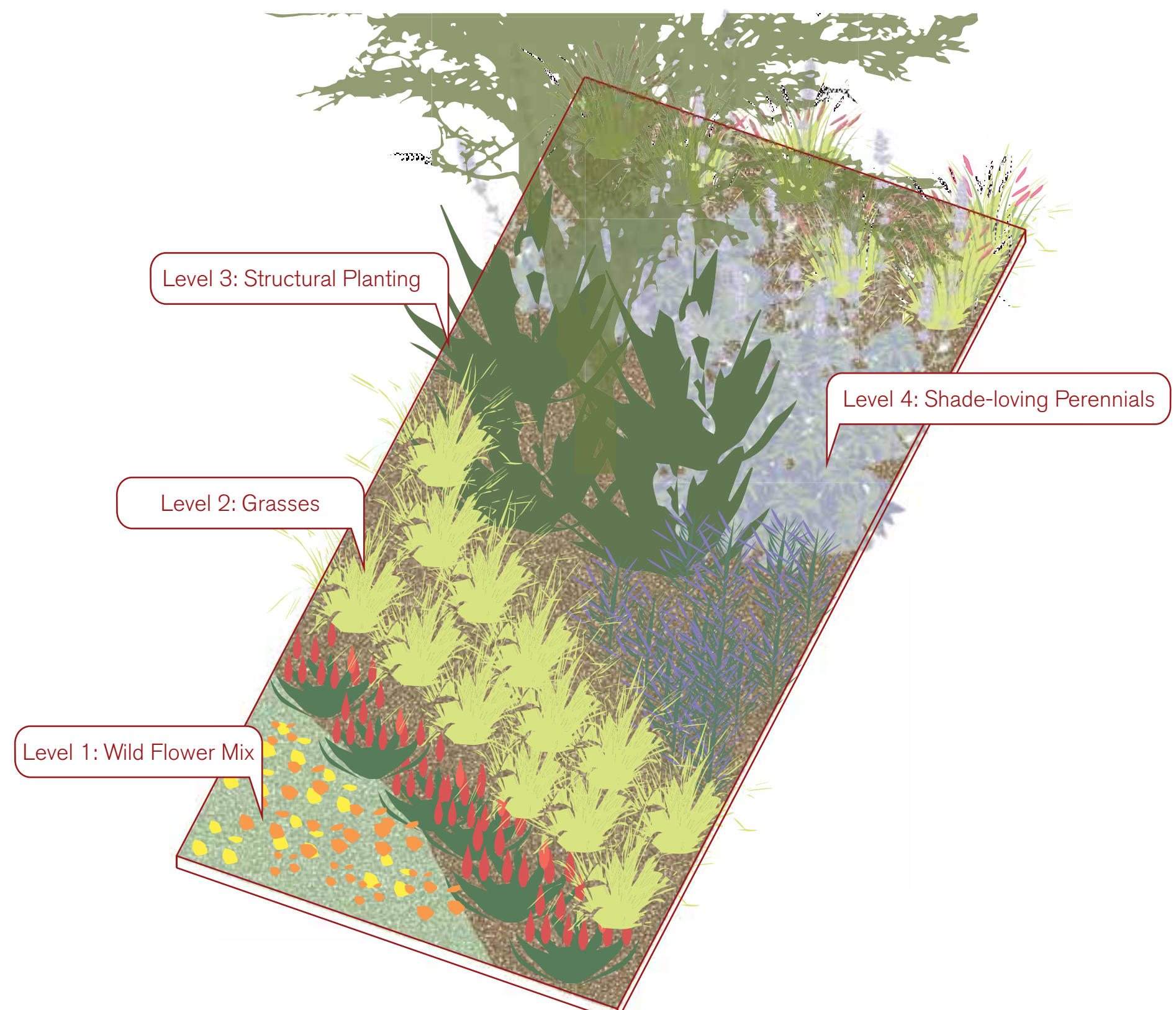
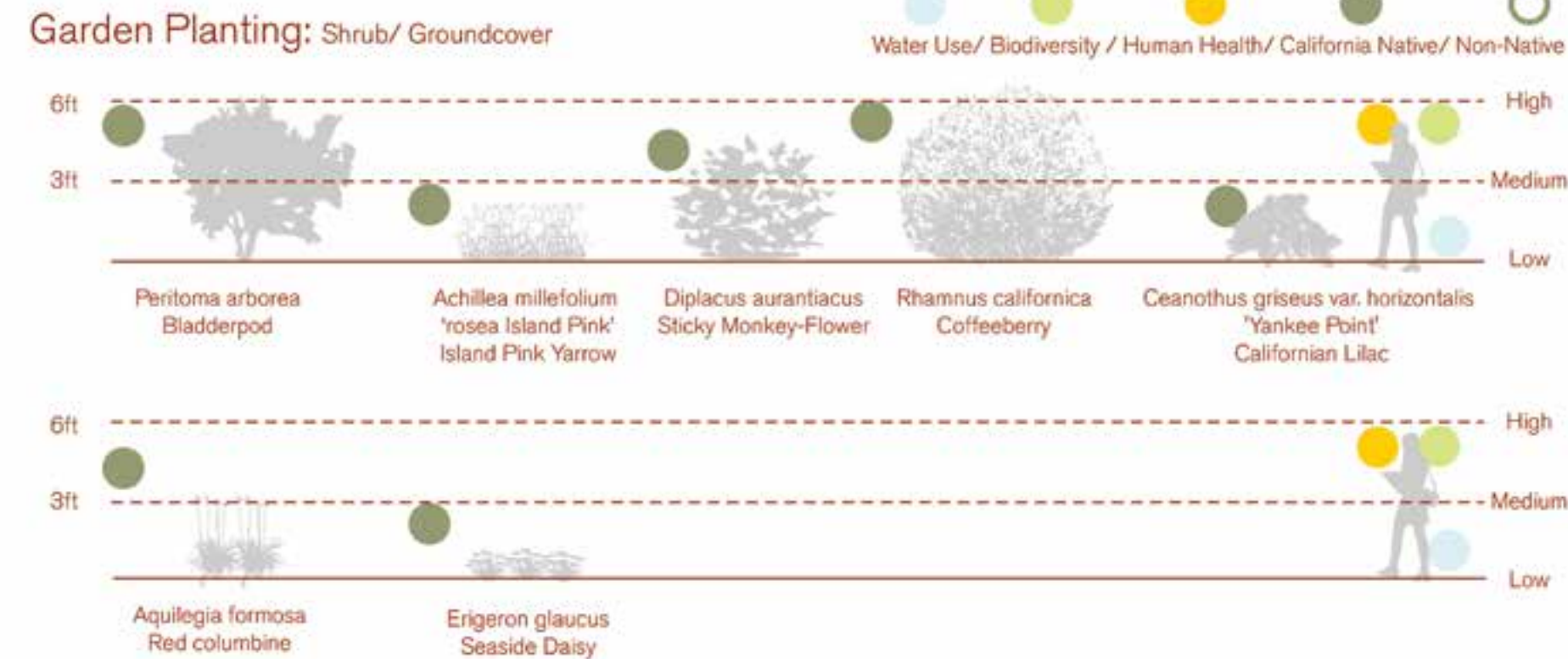
Existing Garden Planting: Shrub
Water Use: Low
Native Garden Test Site



Existing Garden Planting: Groundcover, Shrub & Tree
Water Use: Medium



Existing Garden Planting: Groundcover, Shrub & Tree
Water Use: Medium



Level 1 Wild Flower Mix

- Globe Gilia (*Gilia capitata*)
- California Poppy (*Eschscholzia californica*)
- Farewell-to-Spring (*Clarkia amoena*)
- California Goldenrod (*Solidago velutina* ssp. *californica*)
- Blue-eyed Grass (*Sisyrinchium bellum*)
- California Aster (*Symphyotrichum chilense*)

Level 2 Grasses

- Blue Grama (*Bouteloua gracilis*)
- Purple Three Awn (*Aristida purpurea*)

Level 3 Structural Planting

- Indian Mallow (*Abutilon palmeri*)
- Beavertail Pricklypear (*Opuntia basilaris*)
- Bladder Pod (*Cleome isomeris*)
- Woollyleaf Ceanothus (*Ceanothus tomentosus*)

Level 4 Shade-Loving Perennials

- Hummingbird Sage (*Salvia spathacea*)
- Island Alum Root (*Heuchera maxima*)
- Fuchsiaflower Gooseberry (*Ribes speciosum*)
- Oregon grape (*Mahonia aquifolium*)

Native Planting List

CA NATIVES

Hedges

1. Eve Case Coffeeberry (*Frangula californica* 'Eve Case')
2. Lemonadeberry (*Rhus integrifolia*)
3. Sugar Bush (*Rhus ovata*)
4. Toyon (*Heteromeles arbutifolia*)

Middle layer

5. Evergreen Currant (*Ribes viburnifolium*)
6. Island snapdragon (*Galvezia speciosa*)
7. White Sage (*Salvia apiana*)
8. Yankee Point Ceanothus (*Ceanothus* 'Yankee Point')
9. Oregon grape (*Mahonia aquifolium*)
10. Orange Globe Mallow (*Abutilon palmeri*)
11. Deergrass (*Muhlenbergia rigens*)
12. California Fuchsia (*Epilobium canum*)
13. California buckwheat (*Eriogonum fasciculatum* 'Warriner Lytle')

Low layer

14. Douglas Iris (*Iris douglasiana*)
15. California Poppy (*Eschscholzia californica*)
16. Bee's Bliss Sage (*Salvia* 'Bee's Bliss')
17. Dwarf Coyote Brush (*Bacharis pilularis* 'Pigeon Point')
18. California Goldenrod (*Solidago californica*)
19. Bush Monkey Flower (*Mimulus aurantiacus*)
20. Blue Grama grass (*Bouteloua gracilis*)
21. Berkeley Sedge (*Carex divulsa*)
22. Narrowleaf Milkweed (*Asclepias fascicularis*)

Trees

23. Lyonothamnus floribundus Santa Cruz Island Ironwood
24. *Quercus agrifolia*, Coastal Live Oak
25. *Cercis occidentalis* Western Redbud
26. *Platanus racemosa*
27. Torrey Pine (*Pinus torreyana*)

CA ADAPTED PLANT

Hedges

1. African Boxwood (*Myrsine Africana*)
2. Dwarf Sweet Bay (*Laurus nobilis* 'Little Ragu')
3. Dwarf Olive (*Olea europaea* 'Montra')

Middle layer

4. Red Yucca (*Hesperaloe parviflora* 'Brakelights')
5. Safari Conebush (*Leucadendron* 'Safari Sunset')
6. *Cistus salviifolius* 'Prostratus' (Sageleaf Rockrose)
7. Lion's Tail (*Leonotis leonurus*)
8. Texas sage (*Leucophyllum frutescens*)
9. Desert Agave (*Agave deserti*)

Low layer

10. New Gold lantana (*Lantana* 'New Gold')
11. African Daisy (*Arctotis acaulis* 'Big Magenta')
12. Sageleaf Rockrose (*Cistus salviifolius* 'Prostratus')
13. Dwarf Orange Bulbine (*Bulbine frutescens* 'Hallmark')
14. Creeping Thyme (*Thymus praecox*)
15. Germander (*Teucrium chamaedrys*)
16. Texas Sundrops (*Calylophus drummondianus*)

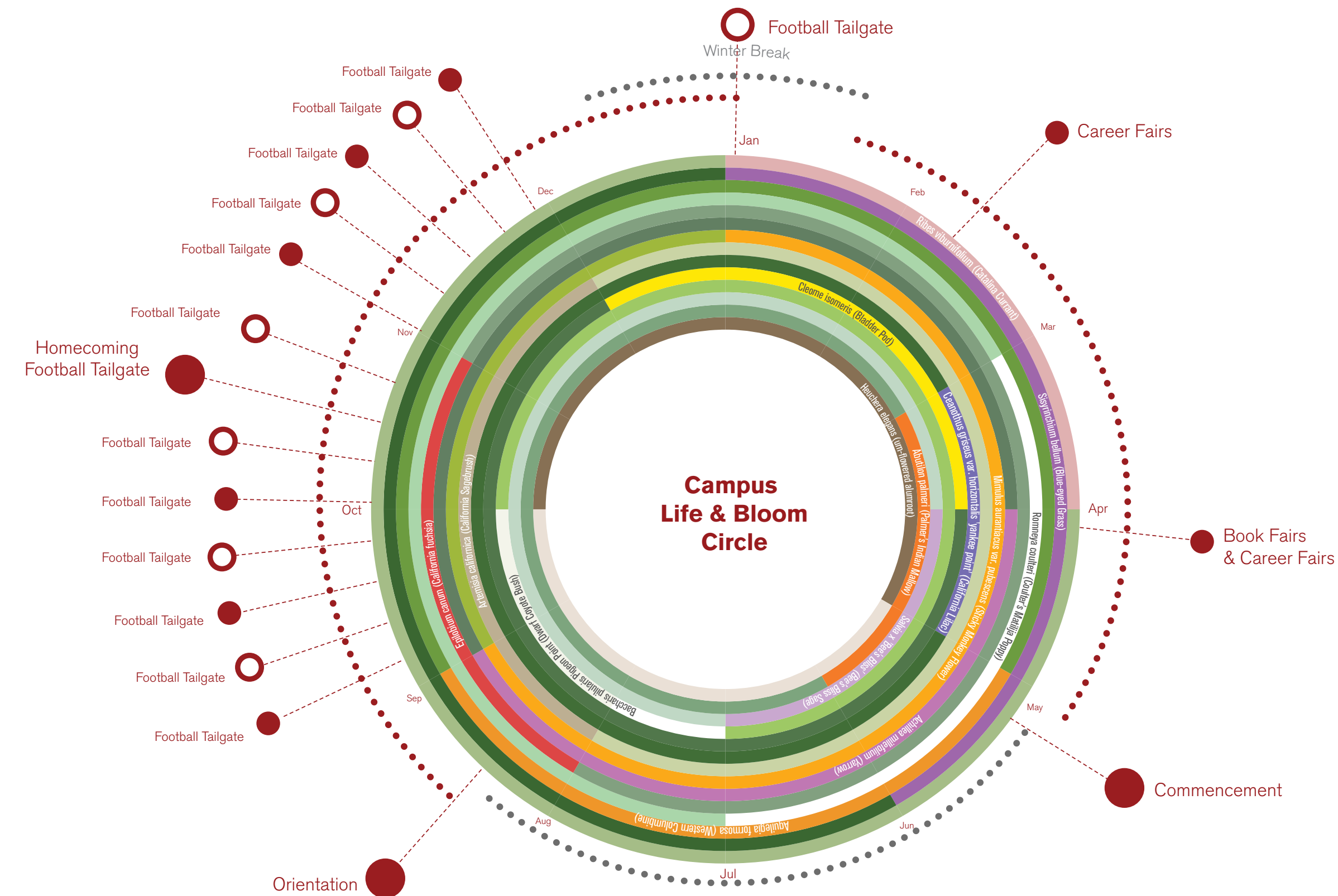
Trees

17. Tipu Tree (*Tipuana tipu*)
18. Aleppo Pine (*Pinus halepensis*)
19. Marina Strawberry Tree (*Arbutus* 'Marina')
20. Cork Oak (*Quercus suber*)

Because Southern California native plants have evolved along with the climate, they have developed adaptations that allow them to preserve and store moisture. For example, small, hairy, and waxy leaves are physical features that allow plants to conserve water during prolonged dry seasons. Many Southern California native and semi-arid plants also have a summer dormancy period during which the plants may look brown, dry, or desiccated. The look of the native summer landscape in wildlands is expected and understood as part of the natural beauty and cycle of Southern California. However, in urban areas, many perceive this natural cycle as a lack of care and maintenance—and even as irresponsible. Working with and understanding these perceptions and expectations will be key in the widespread adoption and positive momentum toward implementing the recommendation of the USC NCAPMP.

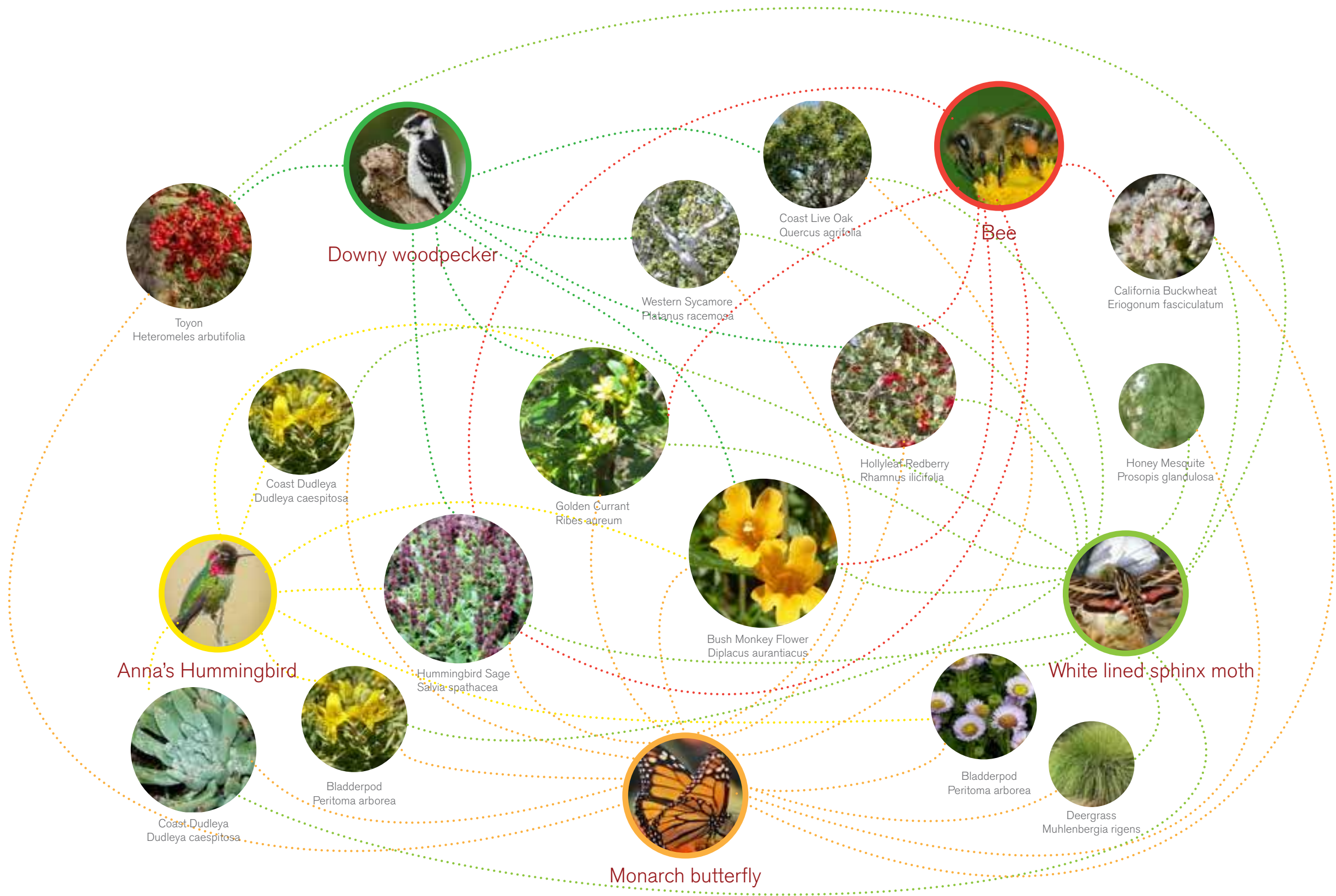
It will be essential to prioritize native planting as a first-choice replacement for achieving water and biodiversity goals, and using climate-adapted species where programmatic, or physical constraints necessitate. Using plants adapted to arid or semi-arid locations with summer monsoons will help achieve the expected landscape performance in areas where summer graduations or fall ceremonies are held.

Providing clues to care during summer dormancy in the native landscape such as trimming or "minding the edges" of native plantings will encourage community-wide adoption of the recommendations in this document.



Species Interaction Diagram

The diagram shows the Species interaction for some selected plants. The wildlife shown in the diagrams are the Downey Woodpecker, Bee, Anna's hummingbird, Monarch butterfly and white lined sphinx moth. The bigger the circle for the plants, the more wildlife it will support. For example, Bushed Monkey Flower (*Diplacus aurantiacus*) shown as the one of the largest circle in the diagram supports all six kinds of wildlife, while Deergrass (*Muhlenbergia rigens*) are shown as much smaller circle because it only supports white lined sphinx moth and monarch butterfly.



Urban areas are considered the new frontier for nature stewardship and the USC University Park campus, at 229-acres, has tremendous potential to support declining species by rebuilding natural food chains. Foundational to changing the trajectory of decline is a scientific understanding of and application of this knowledge to the urban landscape. Because of its role as a leading research university, the USC community can build upon and expand the work they are doing to fill the knowledge gaps on urban biodiversity. Together the USC Landscape Advisory Committee and the USC FPM can work together to apply this knowledge to enhancing the unique web of interrelatedness between soils, organisms, and plant and animal species.

California native plants are the foundation of the food chain for native animal species, but may adapted plants also provide key nutritional, nesting, or other habitat value. In the adjacent diagram, we have identified several charismatic animal species that are already found on campus. Expanding and improving the quality of habitat supporting these and other species will open opportunities for meaningful experiences and connections with nature.

Butterflies and moths are excellent indicators of measuring the abundance and distribution across the campus because they are relatively easy to identify and record observations by non-experts. Many butterfly species are habitat specialists, providing a good indicator of habitat quality, type and pattern. Monarch butterflies were identified on campus by the design team within approximately 100 feet of observed

milkweed species located in southernmost section of campus west of Watt Way. While monarch butterflies feed on a range of nectar sources, but monarch caterpillars feed exclusively on milkweed. Increasing the population of native milkweed plants, such as the narrow-leaved milkweed are critical for the survival of the species.

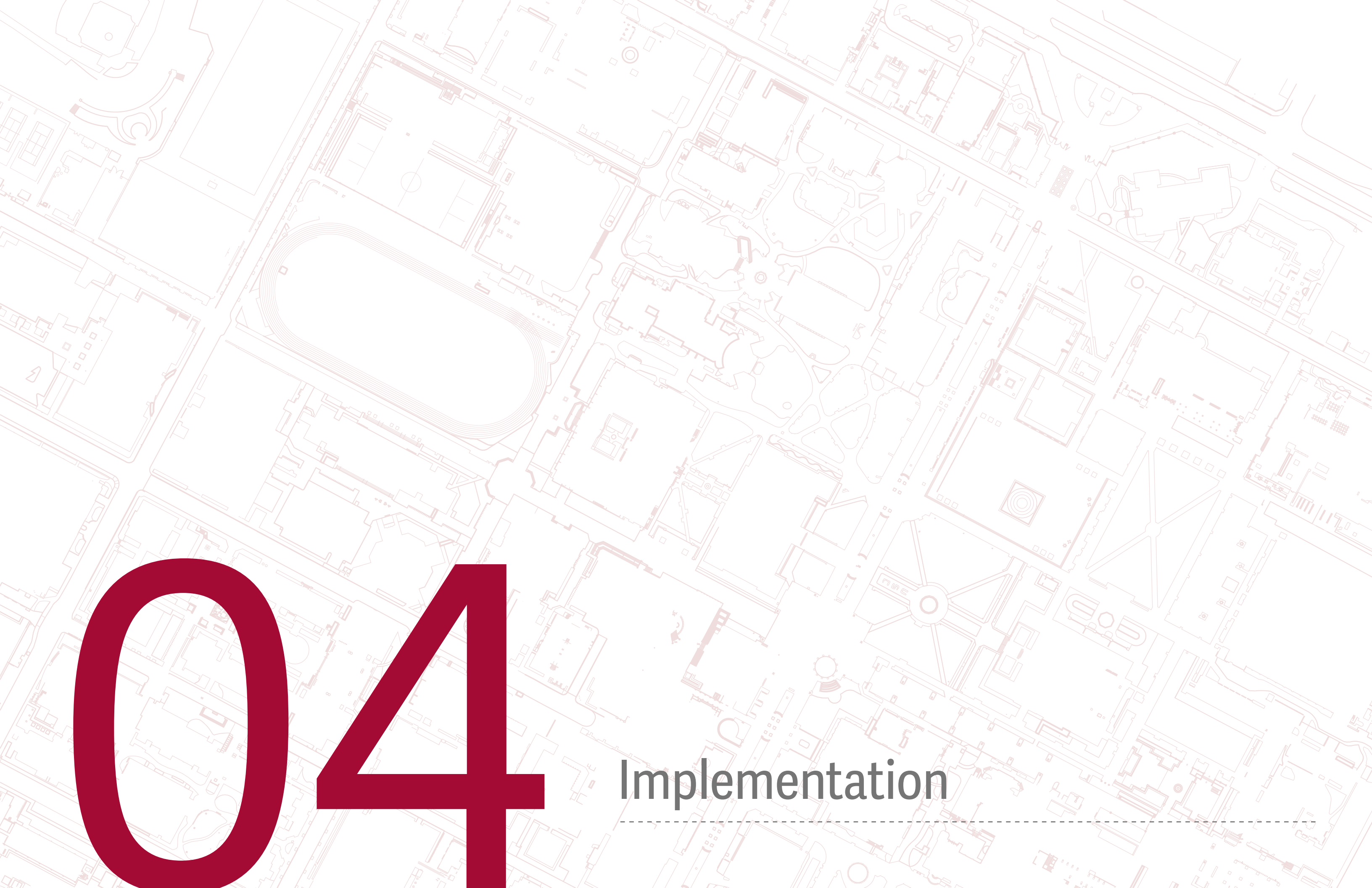
Species such as the downy woodpecker are more generalist species for their food and nesting requirements, but understanding their food source and lifecycle are foundation to supporting their presence on campus. Downy woodpeckers have been overserved nesting in large, mature California sycamore tree on the campus. However, they typically choose dead parts of trees to nest in so coordinating necessary tree pruning outside nesting seasons is critical for this and all bird species. Species like Anna's hummingbird are generalists eating nectar from many flowering plants including introduced species. Providing food sources year-round is keep to supporting this species. Together supporting these species and others helps to reestablish the conditions necessary for biological complexity to proliferate, diversity to increase, and life to regenerate.

plants adapted to arid or semi-arid locations with summer monsoons will help achieve the expected landscape performance in areas where summer graduations or fall ceremonies are held.

Providing clues to care during summer dormancy in the native landscape such as trimming or "minding

the edges" of native plantings will encourage community-wide adoption of the recommendations in this document.





04

Implementation





and tolerates both sun - shade conditions. This plant will not need regular pruning and provides important winter calories for birds. Adjacent to the street cistus can provide durability and predictability and be mixed with native plants that experience summer dormancy. The icons associated with these plants in the diagram above and in following diagrams identify what species the plant supports. Heteromoles is used for calories by monarch and other butterfly species and native bees pollinators feed on them when flowering.

rhapiolepis, with native species that are also predictable and do well in these narrow linear conditions will achieve substantial water savings. Heteromoles is located toward the back of the planter as is selected because it grows 6-8 feet tall 4-5 wide

students, staff, and visitors waiting for the bus in a shaded and check your phone. Introducing another evolution of the USC vernacular taking the brick banding in the paving and extending it to create a permeable, walkable surface to replace narrow strips of lawn and still allow seating.

Native flowering plants in a small area where student / staff spend time – get a break help with human health benefits.

These fragmented areas break the order more organic – mosaic of planting.

Included in the design for this pilot site is protected space off the sidewalk for seating. This is to support



Along this section of West 34th Street, similar conditions can be found from the Norris Dental Science Center to the west through to the eastern edge of the parking garage. Seven foot wide sidewalks and between 15 and 24 feet wide foundation planting. Mature pines and eucalyptus trees within the foundation planting humanize the scale of buildings

along this vehicular and pedestrian corridor.

The planting design for this pilot site plays off the existing USC landscape vernacular—layers shrubs and mass planting, and a monoculture of reliable landscape plant species. Replacing the high and moderate water using plants like ligustrum and

rhapiolepis, with native species that are also predictable and do well in these narrow linear conditions will achieve substantial water savings.

Creating a small native flower garden near seating provides up close interactions with their natural beauty. Separating the seating area from the street

with a low-water using hedge provides a consistent green backdrop to the flowering plants and shapes the experience of a semi-protected space.



The pair of images above illustrates the seasonal changes expected. During the late winter and early spring the garden will be in flower and appear vibrant in response to winter

rains and in the summer and fall the plants will appear grey and neutral as they conserving water. Signage, or other communication methods can be used to help shift perceptions of

expected landscape performance. By celebrating the qualities of these plants, essentially the water budget hawks of the plant world, that have enabled their adaptation to Southern

California's cycle of rain and can help to gain momentum for more native gardens around the campus. Making space for native flower gardens responds to desires expressed during

the stakeholder workshops. Seeing California poppies bloom on campus was a specific request because of the joy sparked by the plant's appearance. California poppies can become a symbolic USC plant mascot, or native plant ambassador. Concentrating their populations in areas of campus where the seedbank becomes established in the soil will help focus maintenance efforts. The process of establishing patches of native flowers will take a few seasons and some experimentation with identifying seedlings and selective weeding to support a robust flush of late winter flowers.



1 SPHAERALCEA MUNROANA "WATERMELON MALLOW"



2 ACHILLEA MOONSHINE "MOONSHINE YARROW"



3 SISYRINCHIUM "BLUE-EYED GRASSES"



4 ESCHSCHOLZIA CALIFORNICA "CALIFORNIA POPPY"



5 MYRSINE AFRICANA "AFRICAN BOXWOOD"



1 CISTUS SALVIIFOLIUS "SAGE-LEAVED ROCK-ROSE"



2 ARTEMISIA LUDOVICIANA "WHITE SAGEBRUSH"



3 MYRSINE AFRICANA "AFRICAN BOXWOOD"



4 ERIGERON GLAUCUS "SEASIDE DAISY"



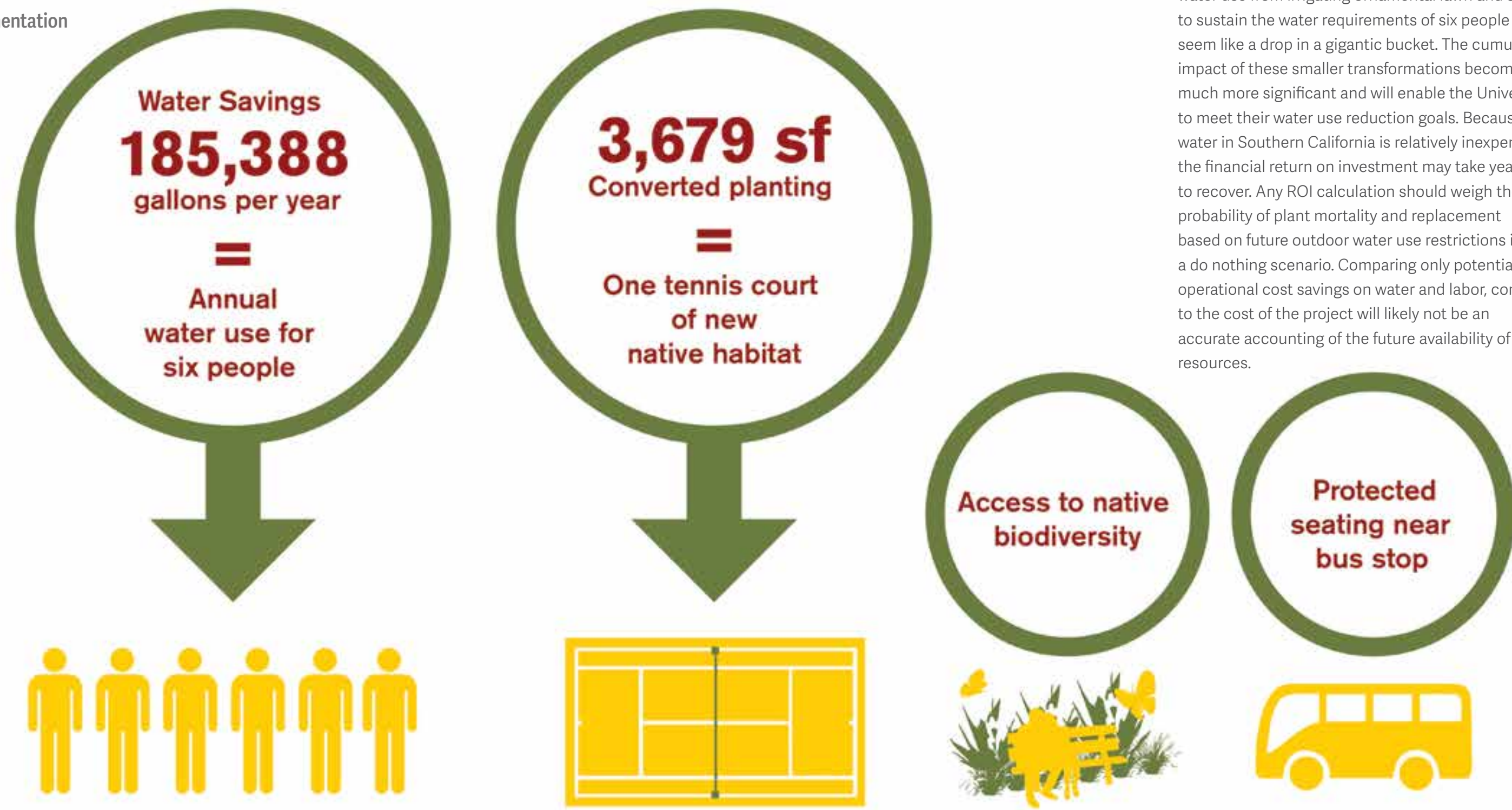
5 DUDLEYA EDULIS "FINGERTIPS"

Included in the design for this pilot site is protected space off the sidewalk for seating. This is to support students, staff, and visitors waiting for the bus in a shaded and check your phone. Introducing another evolution of the USC vernacular taking the brick

banding in the paving and extending it to create a permeable, walkable surface to replace narrow strips of lawn and still allow seating.

04

Implementation



The benefits of this native plant transformation are significant. Potentially redirecting annual potable water use from irrigating ornamental lawn and shrubs to sustain the water requirements of six people may seem like a drop in a gigantic bucket. The cumulative impact of these smaller transformations becomes much more significant and will enable the University to meet their water use reduction goals. Because water in Southern California is relatively inexpensive, the financial return on investment may take years to recover. Any ROI calculation should weigh the probability of plant mortality and replacement based on future outdoor water use restrictions in a do nothing scenario. Comparing only potential operational cost savings on water and labor, compared to the cost of the project will likely not be an accurate accounting of the future availability of water resources.

Weather Station

The triangular wedge of landscape between Vermont Avenue, David X. Marks Tennis Stadium, and the campus weather station is a terrific opportunity area for a pilot site. The space is primarily decorative lawn with tree and shrub planting. Because of its high-water use and absence of native plants, it has a high opportunity value of 90 on the sustainability matrix. Additionally, the site is in a relatively remote location and adjacent to the weather station making it an ideal area to pilot and test a landscape of future climate adapted plant species



Existing Planting Type: Turf & Tree

| | Potable Water Use Reduction (50) | | | | | Biodiversity (30) | | | | | | | | Health Benefits (20) | | | | | | | TOTAL (100) | | | | | | | | | | | | |
|-----------------------------|----------------------------------|----------|-----|-----------------|------|-------------------|-------|--------|---------|----------|-------|------------|---------|----------------------|---------|-----|-------------|-----|------|------------|-------------|-------------|----|-----|-------|----------|---------------------|------|----------|-----|------|----------|-----|
| | Water Use | | | Irrigation Type | | Native | | | Density | | | Connection | | Observations | | | Temperature | | | Tailgating | | Air Quality | | | Noise | | Physical Protection | | | | | | |
| | High | Moderate | Low | Spray | Drip | Non Native | Combo | Native | 0-500 | 500-5000 | 5000+ | 1-side | 2-sides | 3-sides | 4-sides | 1-5 | 5-10 | 10+ | High | Moderate | | Low | No | Yes | High | Moderate | Low | High | Moderate | Low | High | Moderate | Low |
| 4A. Asos Water Station Area | x | | | x | | x | | | | x | | x | | | | x | | | x | x | | | | | x | | | | | | | | 90 |
| 4B. Exposition Blvd Medium | x | | | x | | x | | | | x | | x | | | | x | | | x | x | | | | | x | | | | | | | 84 | |



Experimentation and testing of plant species adapted to the IPCC predicted 1.5 °C and 2.0 °C will help build knowledge and experience with plant species adapted to these climate shifts. Generally, for the USC campus, which is located in the coastal plain of the Los Angeles basin, in a future climate the landscape may more closely resemble ecoregions closer to the equator

toward Baja Mexico. The planting scheme for this site combines drifts of plants from semi-arid climates with Southern California native and current climate adapted plants. The informal geometry of the planting drifts allows for the evolution and merging of plant species. The narrow southern section is composed of plants that thrive in our current climate, the middle

section represents a slightly hotter climate and the norther section more semi-arid planting. It is intended that the boundaries between drifts becomes blurred over time.







Similar to the seasonal changes in the small native flower garden proposed for the parking garage pilot site, planting at the weather station will vary with the seasons as illustrated in the images above. Including species such as Texas sundrops, which is both heat

and drought tolerant and blooms in the spring through summer when California natives are summer dormant, can provide visual interest.

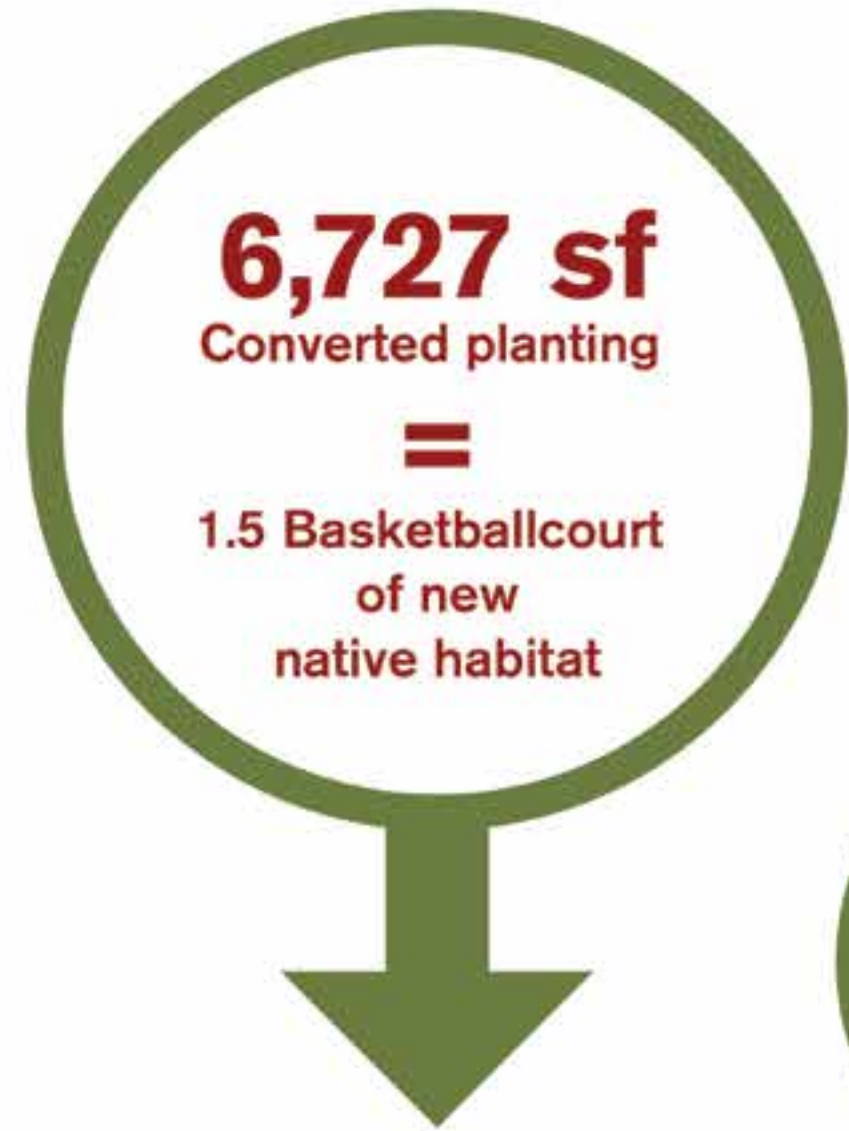




- 
 ①
 CAREX FLACCA
 "BLUE SEDGE"
- 
 ②
 SISYRINCHIUM BELLUM "ROCKY POINT"
 "ROCKY POINT BLUE EYED GRASS"
- 
 ③
 ESCHSCHOLZIA CALIFORNICA
 "CALIFORNIA POPPY"
- 
 ④
 BOUTELOUA GRACILIS
 "BLUE GRAMA"



- 
 ①
 CALYLOPHUS DRUMMONDII
 "TEXAS SUNDROP"
- 
 ②
 AGAVE DESERTI
 "DESERT AGAVE"
- 
 ③
 HESPERALOE PARVIFLORA
 "RED YUCCA"
- 
 ④
 LEUCOPHYLLUM FRUTESCENS
 "WHITE CLOUD"



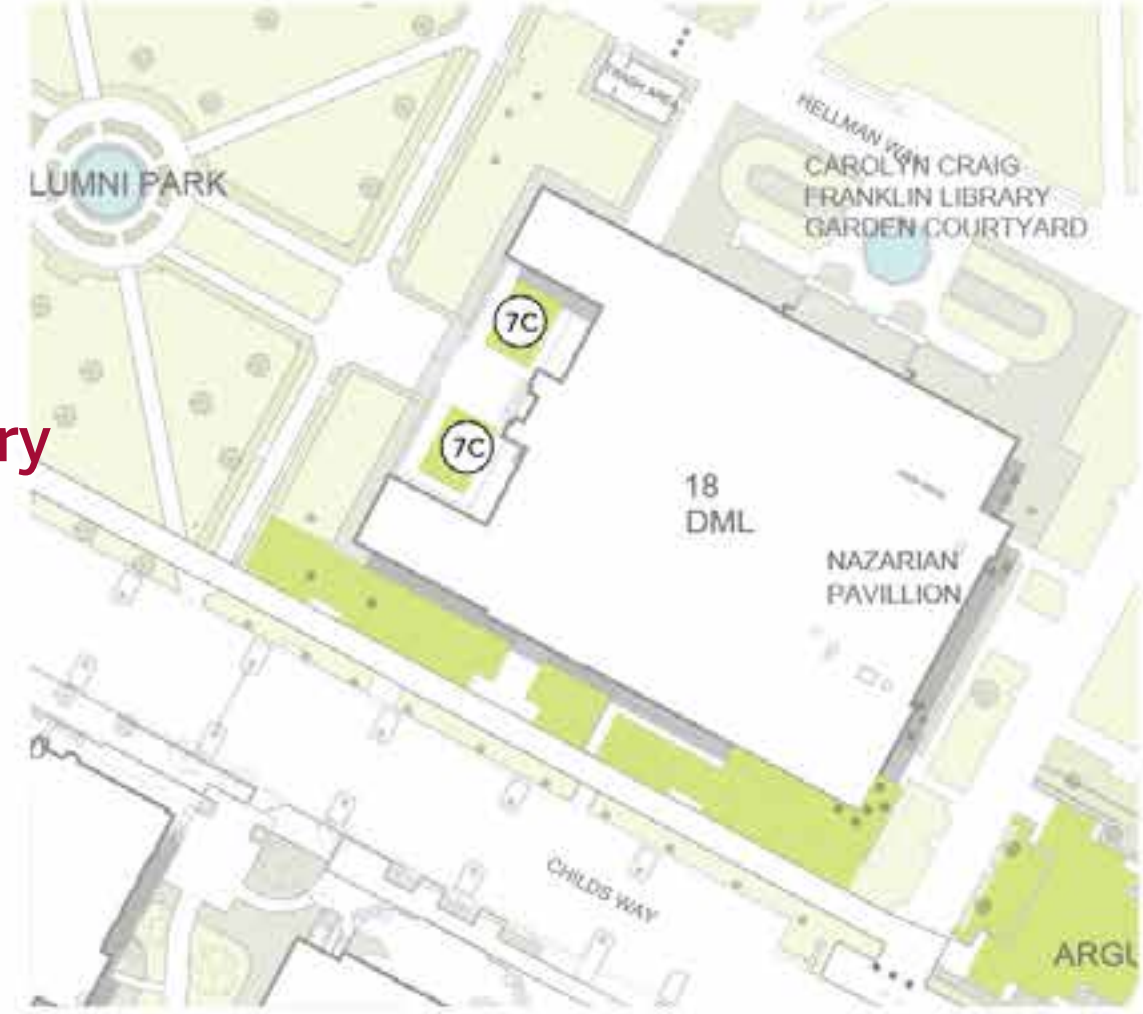
Access to native
biodiversity

View towards
Nature



Doheny Memorial Library Courtyard

The Doheny Memorial Library Courtyard has an opportunity score of 76 on the sustainability matrix. This site was selected as a pilot study because of the desirable qualities of a quiet protected space ideal for a meditation garden.



Existing Planting Type: Turf, Palm

| | Potable Water Use Reduction (50) | | | | | Biodiversity (30) | | | | | | | | Health Benefits (20) | | | | | | | | | TOTAL (100) | | | | | | | | | |
|---|----------------------------------|----------|-----|-----------------|------|-------------------|-------|--------|---------|----------|-------|------------|---------|----------------------|---------|-----|-------------|-----|------|------------|-----|-------------|-------------|-----|-------|----------|-----|---------------------|----------|-----|----|----|
| | Water Use | | | Irrigation Type | | Native | | | Density | | | Connection | | Observations | | | Temperature | | | Tailgating | | Air Quality | | | Noise | | | Physical Protection | | | | |
| | High | Moderate | Low | Spray | Drip | Non Native | Combo | Native | 0-500 | 500-5000 | 5000+ | 1-side | 2-sides | 3-sides | 4-sides | 1-5 | 5-10 | 10+ | High | Moderate | Low | No | | Yes | High | Moderate | Low | High | Moderate | Low | | |
| 7A. Queens Court | | | X | X | | X | | | | X | | | | X | | | X | | | X | | | | | X | | | | | | | 44 |
| 7B. E.F. Hutton Park | X | | | X | | X | | | | X | | | X | | | | X | | | X | | X | | | X | | | | | | 76 | |
| 7C. Doheny Memorial Library Entry Court | X | | | X | | X | | | X | | | X | | | | X | | | X | | X | | X | | X | | | | | | 76 | |

04
Implementation



This space is conceived of as an intimate garden with moveable seating and low planting to accommodate the programming of the space for graduation ceremonies. Because of its demure size, the existing lawn is not frequently utilized by students, making this ideal for turf replacement. The existing foundation planting in this area is also becoming overgrown blocking light into lower-level windows.

Converting planter areas from moderate water using plants to low water using plants with drip irrigation saves 23,340 gallons of water per year = 58 lbs. of almonds.

Converting 2,204sf non-native planting area into a combination of native and climate adapted planting = food chain restoration for pollinator species.

Other benefits of the proposed courtyard transformation are outdoor seating in a quiet area of campus with access to nature.



- 1 LAURUS NOBILIS "BAY LAUREL"  
- 2 ERIGERON GLAUCUS "SEASIDE DAISY"  
- 3 SALVIA "BEE'S BLISS" "BEE'S BLISS SAGE"   
- 4 BOUTELOUA GRACILIS "BLUE GRAMA"  
- 5 MYRSINE AFRICANA "AFRICAN BOXWOOD"  



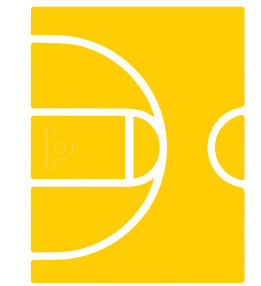
1 LAURUS NOBILIS 'BAY LAUREL'
 2 ERIGERON GLAUCUS 'SEASIDE DAISY'
 3 SALVIA 'BEE'S BLISS' 'BEE'S BLISS SAGE'
 4 BOUTELOUA GRACILIS 'BLUE GRAMA'
 5 MYRSINE AFRICANA 'AFRICAN BOXWOOD'

Water Savings
90,084
 gallons per year
 =
 4,505 showers

2,204 sf
 Converted planting
 =
 Half Basketball Courts
 of new native
 habitat

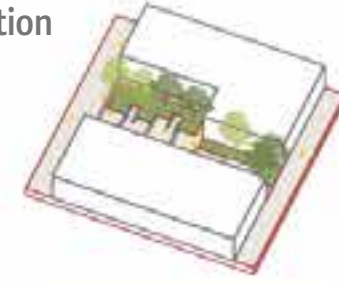
New Outdoor
 Seating In Quite
 Area of Campus

Access to native
 biodiversity



04

Implementation



Existing Planting Type: Turf, Tree

Queens Court

Queens Court is a key opportunity area to highlight the potential for increasing campus biodiversity and build on the work already completed by USC FPM installing and maintaining a native garden. The opportunity score on the sustainability matrix is relatively low at 68, but the reasons for the low score including protection from noise and vehicular emissions and adjacency to other green spaces make it ideal for creating a campus pollinator hub.

| | Potable Water Use Reduction (50) | | | | | Biodiversity (30) | | | | | | | | Health Benefits (20) | | | | | | | | | TOTAL (100) | | | | | | | | |
|---|----------------------------------|----------|-----|-----------------|------|-------------------|-------|--------|---------|----------|-------|------------|---------|----------------------|---------|-----|-------------|-----|------|------------|-----|-------------|-------------|-----|-------|----------|-----|---------------------|----------|-----|----|
| | Water Use | | | Irrigation Type | | Native | | | Density | | | Connection | | Observations | | | Temperature | | | Tailgating | | Air Quality | | | Noise | | | Physical Protection | | | |
| | High | Moderate | Low | Spray | Drip | Non Native | Combo | Native | 0-500 | 500-5000 | 5000+ | 1-side | 2-sides | 3-sides | 4-sides | 1-5 | 5-10 | 10+ | High | Moderate | Low | No | | Yes | High | Moderate | Low | High | Moderate | Low | |
| 7A. Queens Court | | | X | X | | X | | | | X | | | | X | | | X | | | | | X | | | | X | | | | | 44 |
| 7B. E.F. Hutton Park | X | | | X | | X | | | | X | | | X | | | | X | | | | | X | | | | X | | | | | 76 |
| 7C. Doheny Memorial/Library Entry Court | X | | | X | | X | | | | X | | X | | | | X | | | | | | X | | | X | | | | | | 76 |



The site is shaped like a pinwheel of shaded and secluded seating areas around a central fountain and plaza. Increasing the tree canopy with California native trees will, over time, increase the thermal comfort of this space. The planting palette includes species

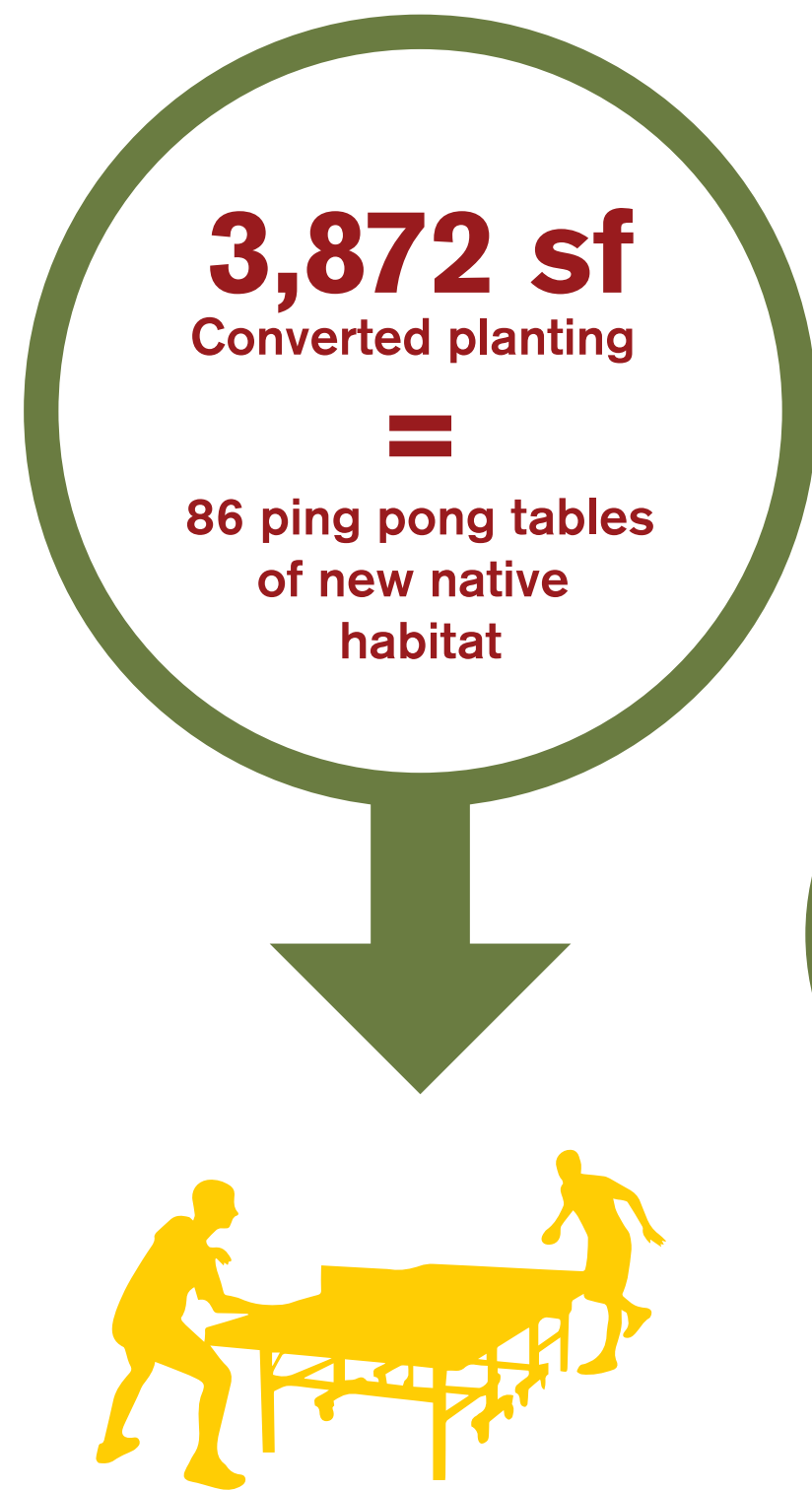
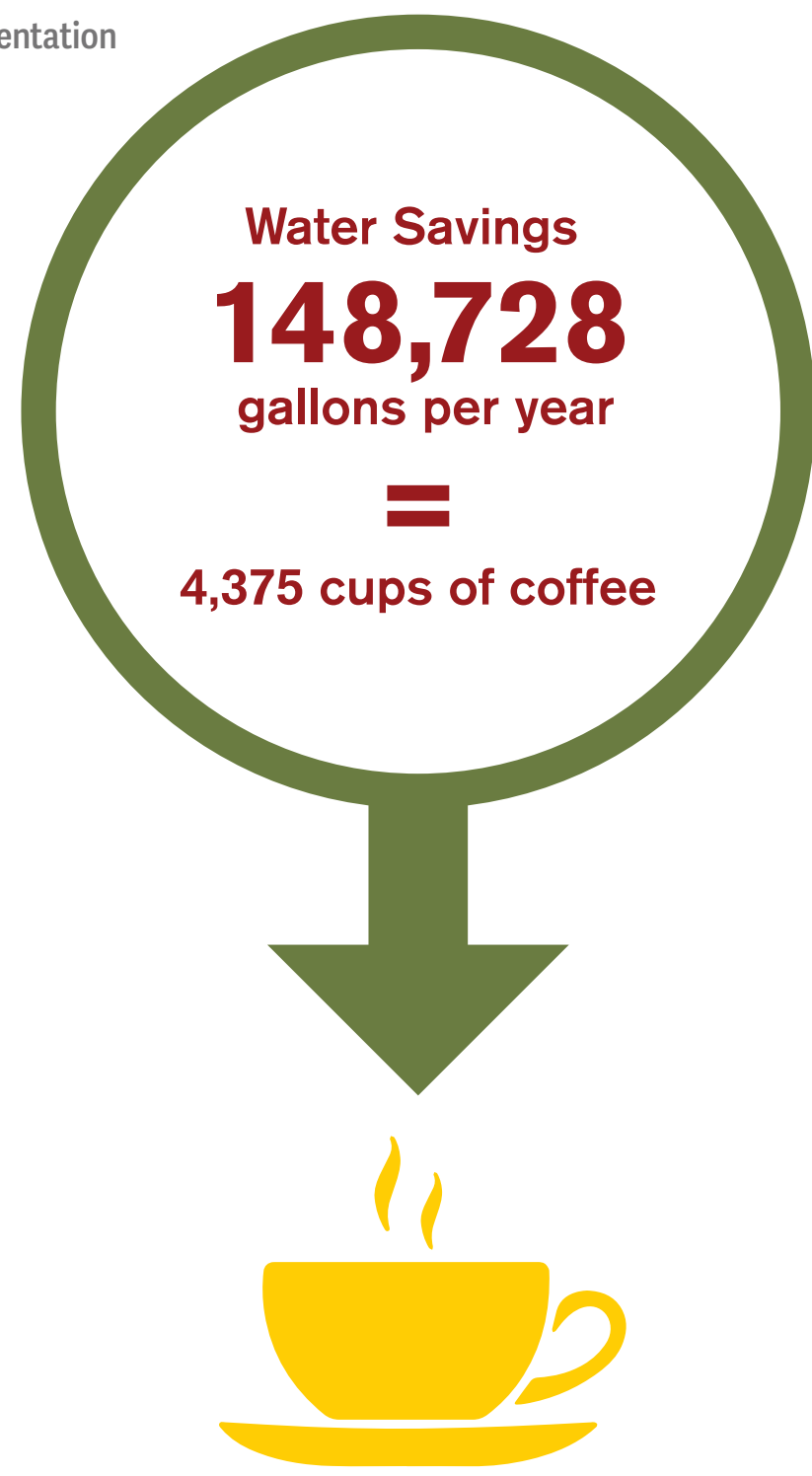
already planted nearby including California buckwheat and sticky monkey flower, and additional species providing seasonal food web support for birds and pollinator species.





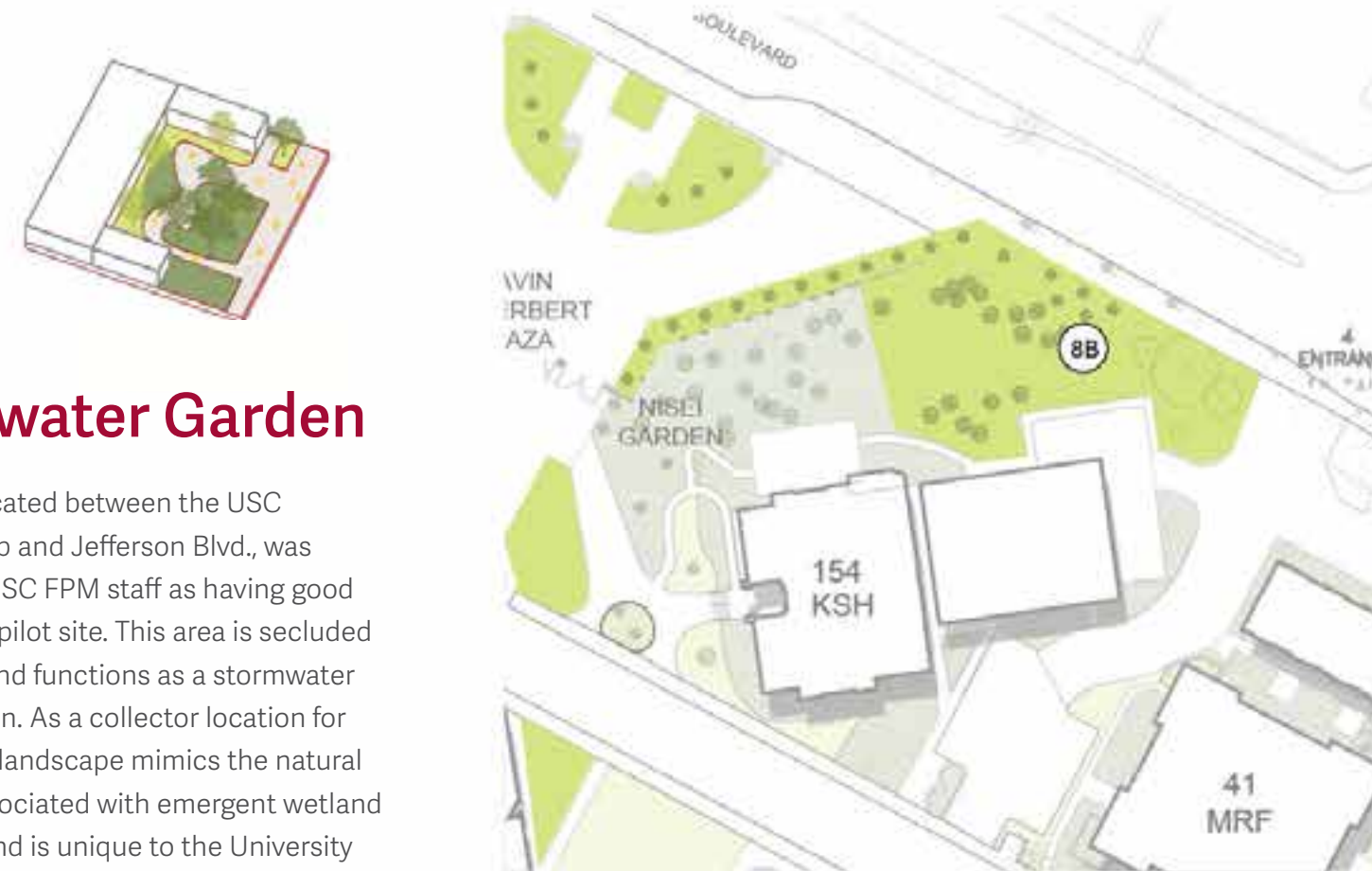
04

Implementation



Stormwater Garden

This space, located between the USC University Club and Jefferson Blvd., was identified by USC FPM staff as having good potential as a pilot site. This area is secluded from access and functions as a stormwater detention basin. As a collector location for rainwater, the landscape mimics the natural processes associated with emergent wetland ecosystems and is unique to the University Park campus. The opportunity score on the sustainability matrix is 66 for this location. The planting in this area requires moderate amounts of supplemental irrigation and has a combination of spray and drip irrigation.



Existing Planting Type: Groundcover, Shrub & Tree

| | Potable Water Use Reduction (50) | | | | | Biodiversity (30) | | | | | | | | | | Health Benefits (20) | | | | | | | | | TOTAL (100) | | | | | | | | | | | | | | | |
|-------------------------|----------------------------------|----------|-----|-----------------|------|-------------------|-------|--------|---------|----------|-------|------------|---------|---------|---------|----------------------|------|-----|-------------|----------|-----|------------|-----|-------------|-------------|----------|-------|------|----------|---------------------|--|--|--|--|--|--|--|--|--|----|
| | Water Use | | | Irrigation Type | | Native | | | Density | | | Connection | | | | Observations | | | Temperature | | | Tailgating | | Air Quality | | | Noise | | | Physical Protection | | | | | | | | | | |
| | High | Moderate | Low | Spray | Drip | Non Native | Combo | Native | 0-500 | 500-5000 | 5000+ | 1-side | 2-sides | 3-sides | 4-sides | 1-5 | 5-10 | 10+ | High | Moderate | Low | No | Yes | High | | Moderate | Low | High | Moderate | Low | | | | | | | | | | |
| 8A. Amelia Taper Garden | X | | | X | | X | | | X | | | X | | | | X | | | X | | | | X | | | | | X | | | | | | | | | | | | 79 |
| 8B. Water Treatment | | X | | X | | X | | | | X | | | X | | | | X | | | X | | X | X | | | X | | X | | | | | | | | | | | | 66 |
| 8C. Leevey Library | X | | | X | | X | | | | X | | | X | | | X | | | | X | | X | X | | | X | | X | | | | | | | | | | | | 71 |



The existing mature pine and California sycamore trees shading the stormwater garden drop large amounts of leaf litter onto understory plants. This leaf litter builds up and if not removed can interrupt the plants ability to photosynthesize and can be unsightly. Leaf drop is a natural process of building the forest floor and if allowed to decay in place, leaf litter can

retain soil moisture and build soil carbon storage capacity. Interrupting this natural cycle of decay and regeneration can require inputs of synthetic fertilizers into soils to increase their fertility and the availability of nutrients to plants. The proposed design for this space allows for the decay and regeneration of plants by moving understory planting away from the pine and replacing them with plants like California

polypody that have adapted to this understory condition. Nurse logs and boulders are added to the landscape to enhance the ecological and habitat value of the landscape. Nurse logs create a microclimate for specialized species to thrive. As the logs decay, it supports seedlings, mycorrhizae, fungi, insects, spiders, and small mammals. The boulders can provide habitat for reptiles and amphibians.

Converting moderate water-using planting with drip irrigation to no irrigation after establishment saves 169,344 gallons of water per year = annual water use for six people.

Converting 6,172 sf of non-native planting area into native planting = potential ecological uplift for the campus.





① HETEROMELES ARBUTIFOLIA
"TOYON"



② RIBES CALIFORNICUM
"HILLSIDE GOOSEBERRY"



③ POLYPODIUM CALIFORNICUM
"CALIFORNIA POLYPODY"



④ SALVIA APIANA
"WHITE SAGE"



⑤ ERIOGONUM FASCICULATUM
"CALIFORNIA BUCKWHEAT"



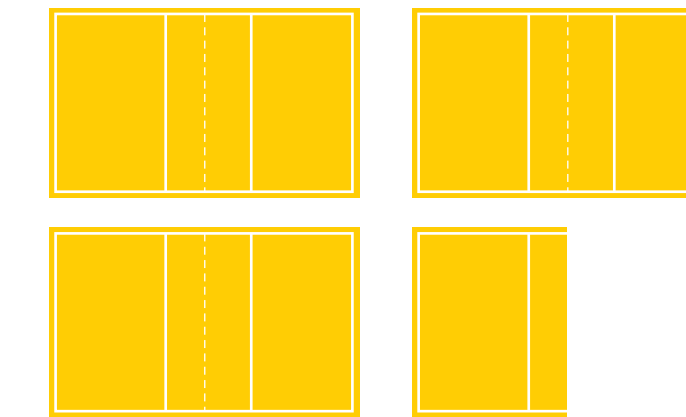
Water Savings
169,344
gallons per year

=
Annual
water use for
six people



6,172 sf
Converted planting

=
3.5 volleyball courts
of new native
habitat



Potential
Ecological Uplift
For Campus

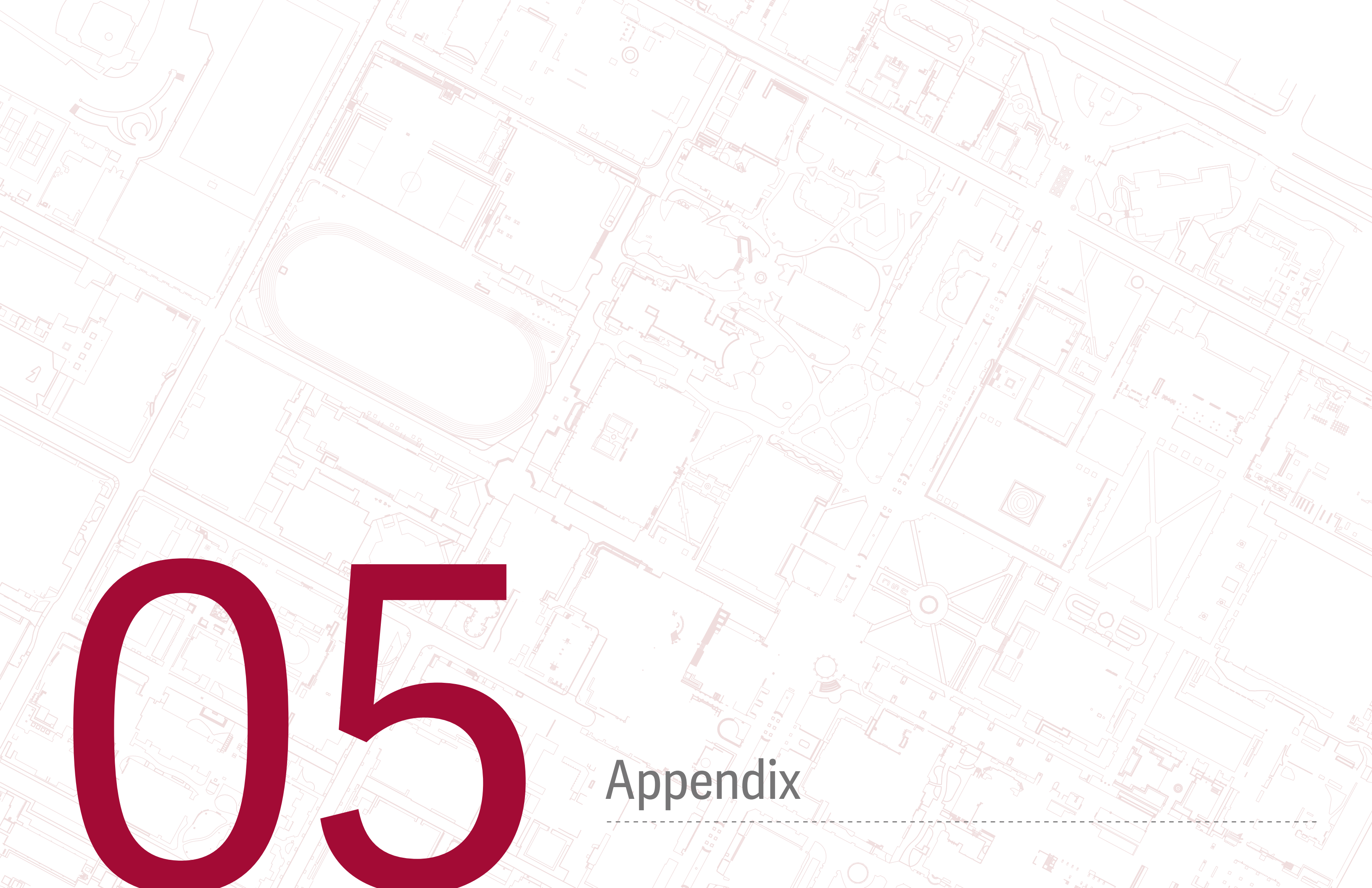


Food chain
restoration
for pollinators



PAGE INTENTIONALLY LEFT BLANK

PAGE INTENTIONALLY LEFT BLANK



05

Appendix



Artemisia / Artemisia



Artemisia x Powis Castle



Artemisia pycnocephala 'David's Choice'



Artemisia douglasiana

CATEGORY
Perennial Groundcover < 14"

NOTABLE VARIETIES
A x Powis Castle, *A. californica* 'Canyon Gray', *A. douglasiana*, *A. palmeri*, *A. pycnocephala* 'David's Choice'

LEAF HABIT
Semi-Evergreen, Deciduous

GROWTH RATE
Moderate

MATURE SIZE
1 - 3' Tall, 2 - 6' Spread

EXPOSURE
Full Sun

FLOWER
Showy

FLOWERING SEASON
Summer, Fall

OGREN PLANT ALLERGY SCALE
9 (High)

FRUIT & NUT
Insignificant to None

USDA HARDINESS ZONE
4 - 9

SUNSET HARDINESS ZONE
Varies by Species

WUCOLS
1 L 2 L 3 L 4 L 5 ? 6 ?

CALIFORNIA REGION
Urban Container, Desert, Hot Valley, Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Mesic, Xeric

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
6.8 minimum - 7.7 maximum

PROPAGATION METHOD
Cutting, Seed

NURSERY CONTAINER AVAILABILITY
#1

SPECIAL FEATURES
Attract Pollinators, Deer Resistant, Strong Resistance to Disease and Pest, Wind Tolerant, Overpruning Tolerant, Seaspray Tolerant, Extremely Drought Tolerant (Water Every Two Weeks), California Native, Green Roof (Less than 10" Substrate)

KNOWN HAZARDS
None Known

LANDSCAPE MAINTENANCE
Low

Baccharis pilularis 'Pigeon Point' / Dwarf Desert Broom



CATEGORY
Shrub, Dwarf < 3' Groundcover < 14"

LEAF HABIT
Evergreen

GROWTH RATE
Moderate

MATURE SIZE
1' Tall 8' Wide

EXPOSURE
Full Sun

FLOWER
Insignificant, Profuse Blooming

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
10 (High)

FRUIT & NUT
Insignificant or None

USDA HARDINESS ZONE
7 - 10

SUNSET HARDINESS ZONE
5 - 11 14 - 24

WUCOLS
1 L 2 L 3 L 4 L 5 M 6 M

CALIFORNIA REGION
Desert, Hot Valley, Windy Fontana, Canyon, Bioswale

BIOSWALE REGION
Xeric, Mesic

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
7.0 minimum - 8.0 maximum

PROPAGATION METHOD
Cutting

NURSERY CONTAINER AVAILABILITY
#1, #5

SPECIAL FEATURES
Strong Resistance to Disease and Pest, Wind Tolerant, Overpruning Tolerant, Deer Resistant, Fire Resistant, Erosion Control, Reclaimed Water Appropriate

KNOWN HAZARDS
None Known

LANDSCAPE MAINTENANCE
Very Low

Bouteloua gracilis 'Blonde Ambition' / Blonde Ambition Grama Grass



CATEGORY
Ornamental Grass: Mounded

LEAF HABIT
Deciduous

GROWTH RATE
Fast

MATURE SIZE
6' - 2' Tall; 12' - 3' Spread

EXPOSURE
Full Sun

FLOWER
Insignificant

FLOWERING SEASON
Summer

OGREN PLANT ALLERGY SCALE
8 (High)

FRUIT & NUT
Insignificant or None

USDA HARDINESS ZONE
6 - 10

SUNSET HARDINESS ZONE
1 - 3, 7 - 11, 14, 19 - 21

WUCOLS
1 L 2 L 3 L 4 L 5 L 6 L

CALIFORNIA REGION
Urban Container, Desert, Hot Valley, Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Mesic

SOIL TYPE
Sandy, Loam

pH REQUIREMENT
6.5 minimum - 8.5 maximum

PROPAGATION METHOD
Division

NURSERY CONTAINER AVAILABILITY
#1

SPECIAL FEATURES
Compact, Strong Resistant to Disease and Pest, Urban Pollution Tolerant, Extremely Water-Wise, Deer Resistant, Erosion Control, Wind Tolerant, Overpruning Tolerant, Impact Resistant, Curtain Wall & Reflective Heat Tolerant

KNOWN HAZARDS
None Known

LANDSCAPE MAINTENANCE
Moderate

Carex divulsa / Berkeley Sedge



CATEGORY
Ornamental Grass: Mounded

LEAF HABIT
Evergreen

GROWTH RATE
Fast

MATURE SIZE
1' Tall and Wide

EXPOSURE
Partial Sun (Less than 50% in the Sun), Full Sun (Coastal Only), Partial Shade Underneath Trees and Overhanging Roof Lines

FLOWER
Insignificant

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
9 (High)

FRUIT & NUT
Insignificant or None

USDA HARDINESS ZONE
7 - 9

SUNSET HARDINESS ZONE
1 - 24

WUCOLS
1 L 2 L 3 L 4 L 5 M 6 M

CALIFORNIA REGION
Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Mesic, Hydric

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
6.0 minimum - 7.0 maximum

PROPAGATION METHOD
Cutting

NURSERY CONTAINER AVAILABILITY
Flat, #1, 2" Plug

SPECIAL FEATURES & NOTES
Strong Resistance to Disease and Pest, Erosion Control, Fountain/Poolside Tolerant, Wind Tolerant, Overpruning Tolerant, Impact Resistant, Seaspray Tolerant

SPECIAL NOTE
Foliage will turn gold without enough water in a full sun, inland location

LANDSCAPE MAINTENANCE
Moderate

Ceanothus / California Lilac (Groundcover)



Ceanothus griseus horizontalis 'Yankee Point'



Ceanothus griseus horizontalis 'Yankee Point'



Ceanothus 'Centennial'



Ceanothus maritimus 'Frosty Dawn'



Ceanothus maritimus 'Valley Violet'

CATEGORY
Groundcover < 14 - 36"

NOTABLE VARIETIES
Yankee Point, Centennial, Joyce Coulter, Frosty Dawn

LEAF HABIT
Evergreen

GROWTH RATE
Moderate

MATURE SIZE
Varies by Variety

EXPOSURE
Full Sun, Partial Shade Underneath trees and overhanging roof lines

FLOWER
Showy, Profuse Blooming

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
5 (Moderate)

FRUIT & NUT
Insignificant or None

USDA HARDINESS ZONE
7 - 10

SUNSET HARDINESS ZONE
5 - 9, 14 - 17, 19 - 24

WUCOLS
1 L 2 L 3 L 4 M 5 I 6 I

CALIFORNIA REGION
Urban Container, Hot Valley, Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Xeric Mesic

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
4.5 minimum - 8.0 maximum

PROPAGATION METHOD
Cutting

NURSERY CONTAINER AVAILABILITY
Quart, #1, #5

SPECIAL FEATURES
Attracts Pollinators, California Native, Extremely Drought Tolerant, Erosion Control, Fire Resistant, Reclaimed Water Appropriate, Seaspray Tolerant.

KNOWN HAZARDS
None

LANDSCAPE MAINTENANCE
Low

Cercis occidentalis / Western Redbud



CATEGORY
Tree: Round, Tree: Multiple Branches from the Base

NOTABLE VARIETIES
Claremont - Single Leader

LEAF HABIT
Deciduous

GROWTH RATE
Fast

MATURE SIZE
15' Tall 10' Spread

EXPOSURE
Partial Shade Partial Shade Underneath Trees and Overhanging Roof Lines, Partial Sun (Less than 50% in the Sun), Full Sun

FLOWER
Showy, Profuse Blooming

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
5 (Moderate)

FRUIT & NUT
Dry Seeds Preferred by Birds

USDA HARDINESS ZONE
6 - 9

SUNSET HARDINESS ZONE
2 - 24

WUCOLS
1 VL 2 VL 3 L 4 L 5 M 6 M

CALIFORNIA REGION
Urban Container, Hot Valley, Windy Fontana, Canyon

BIOSWALE REGION
Xeric, Mesic

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
6.0 minimum - 7.5 maximum

PROPAGATION METHOD
Cutting, Seed, Grafting

NURSERY CONTAINER AVAILABILITY
#5, 24" Box, 36" Box

SPECIAL FEATURES
Attract Pollinators, Deer Resistant, Fire Resistant, Attractive Seasonal Colors, California Native, Wind Tolerant, Overpruning Tolerant, Strong Resistance to Disease and Pest, Extremely Drought Tolerant (Water Every Two Weeks), Reclaimed Water Appropriate, Urban Pollution Tolerant

KNOWN HAZARDS
Heavy Flower and/or Leaf Litter

LANDSCAPE MAINTENANCE
Moderate

Cistus x pulverulentus 'Sunset' / Magenta Rock Rose



CATEGORY
Shrub > 3'

LEAF HABIT
Evergreen

GROWTH RATE
Fast

MATURE SIZE
2 - 3' Tall; 6' Spread. Prune to Maintain Shape

EXPOSURE
Full Sun

FLOWER
Showy, Profuse Blooming

FLOWERING SEASON
Spring, Summer

OGREN PLANT ALLERGY SCALE
3 (Low)

FRUIT & NUT
Insignificant to None

USDA HARDINESS ZONE
8 - 11

SUNSET HARDINESS ZONE
4 - 9 14 - 24

WUCOLS
1 L 2 L 3 L 4 L 5 M 6 M

CALIFORNIA REGION
Urban Container, Hot Valley, Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Mesic, Xeric

SOIL TYPE
Sandy, Loam

pH REQUIREMENT
5.5 minimum - 7.5 maximum

PROPAGATION METHOD
Cutting

NURSERY CONTAINER AVAILABILITY
#1, #5

SPECIAL FEATURES
Attract Pollinators, Deer Resistant, Wind Tolerant, Overpruning Tolerant, Erosion Control, Seaspray Tolerant, Fire Resistant Per San Diego County Fire Department, Extremely Drought Tolerant (Water Every Two Weeks)

KNOWN HAZARDS
None Known

LANDSCAPE MAINTENANCE
Moderate

Eriogonum fasciculatum / California Buckwheat



CATEGORY
Shrub > 3'

LEAF HABIT
Evergreen

GROWTH RATE
Moderate

MATURE SIZE
3 - 4' Tall and Wide

EXPOSURE
Full Sun

FLOWER
Showy, Fragrant, Profuse Blooming

FLOWERING SEASON
Spring, Summer, Fall

OGREN PLANT ALLERGY SCALE
7 (High)

FRUIT & NUT
Dry Seeds Preferred by Birds

USDA HARDINESS ZONE
8 - 10

SUNSET HARDINESS ZONE
7 - 9 12 - 24

WUCOLS
1 L 2 L 3 VL 4 VL 5 VL 6 VL

CALIFORNIA REGION
Urban Container, Hot Valley, Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Mesic, Xeric

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
5.0 minimum - 8.0 maximum

PROPAGATION METHOD
Cutting, Seed

NURSERY CONTAINER AVAILABILITY
#1, #5

SPECIAL FEATURES
Attract Pollinators, Deer Resistant, California Native, Wind Tolerant, Overpruning Tolerant, Seaspray Tolerant, Drought Tolerant (Water Every Two Weeks)

KNOWN HAZARDS
Flower Highly Attractive to Bees.

LANDSCAPE MAINTENANCE
Low

Heteromeles arbutifolia / Toyon



CATEGORY
Tree: Round

LEAF HABIT
Evergreen

GROWTH RATE
Slow

MATURE SIZE
25' Height 15' Width

EXPOSURE
Full Sun, Full Shade, Partial Shade
Underneath Trees and Overhanging Roof Lines, Partial Sun (Less than 50% in the Sun)

FLOWER
Showy

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
9 (High)

FRUIT & NUT
Berries Preferred by Birds

USDA HARDINESS ZONE
8 - 11

SUNSET HARDINESS ZONE
5 - 9, 14 - 24

WUCOLS
1 L 2 VL 3 VL 4 L 5 L 6 I

CALIFORNIA REGION
Hot Valley, Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Mesic

SOIL TYPE
Sandy, Loam

pH REQUIREMENT
4.0 minimum - 8.0 maximum

PROPAGATION METHOD
Seed, Cutting

NURSERY CONTAINER AVAILABILITY
#5, #15, 24" Box, 36" Box

SPECIAL FEATURES
California Native, Attracts Pollinators, Urban Pollution Tolerant, Extremely Water-wise, Wind, Overpruning and Sea Spray Tolerant, Reclaimed Water Appropriate, Privacy Screen, Deer Resistant

KNOWN HAZARDS
Berries are Inedible and May Stain Concrete.

LANDSCAPE MAINTENANCE
Moderate



Mahonia aquifolium 'Compacta' / Compact Oregon Grape Holly

also known as *Berberis aquifolium* 'Compacta'



CATEGORY
Shrub, Dwarf < 3'

LEAF HABIT
Evergreen

GROWTH RATE
Moderate

MATURE SIZE
2 - 3' Tall, 3 - 4' Wide

EXPOSURE
Partial Shade Underneath Trees and Overhanging Roof Lines, Partial Sun (Less than 50% in the Sun), Full Sun (Coastal Only)

FLOWER
Showy

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
2 (Low)

FRUIT & NUT
Fleshy, Edible Fruit Preferred by Birds

USDA HARDINESS ZONE
5 - 9

SUNSET HARDINESS ZONE
2 - 9 14 - 24

WUCOLS
1 L 2 L 3 L 4 L 5 M 6 I

CALIFORNIA REGION
Urban Container, Hot Valley, Windy Fontana, Canyon, Seacoast

BIOSWALE REGION
Xeric, Mesic

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
5.0 minimum - 8.0 maximum

PROPAGATION METHOD
Cutting

NURSERY CONTAINER AVAILABILITY
#1, #5

SPECIAL FEATURES
Attract Pollinators, Compact, Deer Resistant, Attractive Seasonal Colors, Strong Resistance to Disease and Pest, Erosion Control, Fire Resistant Per San Diego County Fire, Reclaimed Water Appropriate

KNOWN HAZARDS
Messy Fruit/Nuts

LANDSCAPE MAINTENANCE
Moderate



Muhlenbergia rigens / Deer Grass



CATEGORY
Ornamental Grass: Upright Arching

LEAF HABIT
Deciduous

GROWTH RATE
Fast

MATURE SIZE
3' Tall and 30" Wide, 5' Plume

EXPOSURE
Full Sun, Partial Shade Underneath Trees and Overhanging Roof Lines, Partial Sun (Less than 50% in the Sun)

FLOWER
Insignificant

FLOWERING SEASON
Summer, Fall

OGREN PLANT ALLERGY SCALE
5 (Low)

FRUIT & NUT
Insignificant or None

USDA HARDINESS ZONE
6 - 10

SUNSET HARDINESS ZONE
4 - 24

WUCOLS
1 L 2 L 3 L 4 L 5 ? 6 ?

CALIFORNIA REGION
Hot Valley, Windy Fontana, Seacoast, Canyon, Bioswale

BIOSWALE REGION
Mesic

SOIL TYPE
Sandy, Loam

pH REQUIREMENT
5.0 minimum - 8.0 maximum

PROPAGATION METHOD
Division, Seed

NURSERY CONTAINER AVAILABILITY
#1, #5

SPECIAL FEATURES
Strong Resistance to Disease and Pest, California Native, Deer Resistant, Erosion Control, Fire Resistant, Urine Tolerant, Wind Tolerant, Overpruning Tolerant, Seaspray Tolerant, Extremely Drought Tolerant (Water Every Two Weeks)

KNOWN HAZARDS
Drought Deciduous. Wear Protective Eye Glasses Whenever Working Near It

LANDSCAPE MAINTENANCE
Moderate



Platanus racemosa / California Sycamore



CATEGORY
Tree: Round Tree Umbrella
Multiple Branches from the Base

LEAF HABIT
Deciduous

GROWTH RATE
Moderate

MATURE SIZE
40 - 60' Tall 30' Spread

EXPOSURE
Full Sun

FLOWER
Insignificant

FLOWERING SEASON
Summer

OGREN PLANT ALLERGY SCALE
9 (High)

FRUIT & NUT
Dry (Nut/Seed)

USDA HARDINESS ZONE
7 - 9

SUNSET HARDINESS ZONE
4 - 24

WUCOLS
1 M 2 M 3 M 4 M 5 H 6 H

CALIFORNIA REGION
Hot Valley, Windy Fontana, Seacoast, Canyon

BIOSWALE REGION
Mesic, Hydric

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
5.0 minimum - 8.0 maximum

PROPAGATION METHOD
Seed

NURSERY CONTAINER AVAILABILITY
#15, 24" Box and Larger, Standard & Multi

SPECIAL FEATURES
California Native, Urban Pollution Tolerant, Attractive Seasonal Color, Fire Resistant, Wind Tolerant, Reclaimed Water Appropriate, Overpruning Tolerant, Seaspray Tolerant

KNOWN HAZARDS
Heavy Flower and/or Leaf Litter. Highly Susceptible to Anthracnose, Alelopathic

LANDSCAPE MAINTENANCE
Moderate



Quercus agrifolia / Coastal Live Oak



CATEGORY
Tree: Umbrella

LEAF HABIT
Evergreen

GROWTH RATE
Slow

MATURE SIZE
30' - 70' Tall and Wide

EXPOSURE
Partial Sun (Less than 50% in the Sun), Full Sun

FLOWER
Insignificant

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
9 (High)

FRUIT & NUT
Acorns Preferred by Birds

USDA HARDINESS ZONE
7 - 10

SUNSET HARDINESS ZONE
7 - 9, 14 - 24

WUCOLS
1 VL 2 VL 3 VL 4 L 5 L 6 L

CALIFORNIA REGION
Hot Valley, Windy Fontana, Canyon

BIOSWALE REGION
Xeric, Mesic

SOIL TYPE
Sandy, Loam

pH REQUIREMENT
4.0 minimum - 8.0 maximum

PROPAGATION METHOD
Seed, Cutting

NURSERY CONTAINER AVAILABILITY
24" Box and Larger, Available in a Multi - Branched or Standard Tree Form

SPECIAL FEATURES
California Native, Fire Resistant, Reclaimed Water Appropriate

KNOWN HAZARDS
High Biogenic Emissions, Acorns and Periodic Leaf Litter is easily maintained.

LANDSCAPE MAINTENANCE
Moderate



Rhamnus californica 'Eve Case' / Eve Case Coffeeberry
also known as *Frangula californica*



CATEGORY
Shrub > 3'

LEAF HABIT
Evergreen

GROWTH RATE
Fast

MATURE SIZE
4 - 8' Tall and Wide

EXPOSURE
Full Sun, Partial Shade Underneath Trees and Overhanging Roof Lines

FLOWER
Insignificant

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
9 (High)

FRUIT & NUT
Fleshy Fruit Preferred by Birds

USDA HARDINESS ZONE
7 - 10

SUNSET HARDINESS ZONE
4 - 9 14 - 24

WUCOLS
1 L 2 L 3 VL 4 L 5 I 6 ?

CALIFORNIA REGION
Urban Container, Desert, Hot Valley, Windy Fontana

BIOSWALE REGION
Xeric, Mesic

SOIL TYPE
Sandy, Loam

pH REQUIREMENT
5.0 minimum - 8.0 maximum

PROPAGATION METHOD
Cutting

NURSERY CONTAINER AVAILABILITY
#5, #7, #15

SPECIAL FEATURES
Strong Resistance to Disease and Pest, Wind Tolerant, Overpruning Tolerant, Extremely Drought Tolerant (Water Every Two Weeks), Erosion Control, Attracts Pollinators, Deer Resistant, Erosion Control. California Native

KNOWN HAZARDS
Berries and Foliage are Inedible.

LANDSCAPE MAINTENANCE
Moderate



Rhus integrifolia / Lemonadeberry



CATEGORY
Shrub > 3'

LEAF HABIT
Evergreen Shrub

GROWTH RATE
Moderate

MATURE SIZE
8' Tall, 8" Spread; Prune to maintain shape.

EXPOSURE
Full Sun

FLOWER
Showy, Profuse Blooming

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
Unknown

FRUIT & NUT
None Known

USDA HARDINESS ZONE
9 - 10

SUNSET HARDINESS ZONE
Unknown

WUCOLS
1 ? 2 ? 3 ? 4 ? 5 ? 6 ?

CALIFORNIA REGION
Hot Valley, Canyon, Seacoast, Desert

BIOSWALE REGION
Xeric, Mesic

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
6.0 minimum - 9.0 maximum

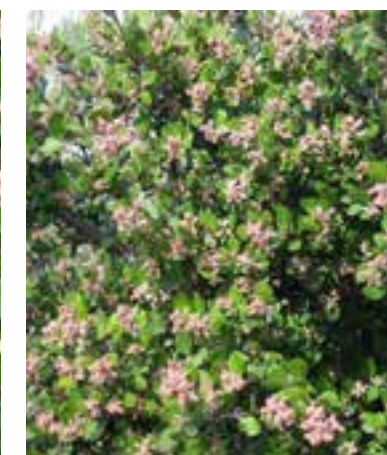
PROPAGATION METHOD
Seed

NURSERY CONTAINER AVAILABILITY
#1

SPECIAL FEATURES
California Native, Seaspray Tolerant, Wind Tolerant, Attracts Pollinators

KNOWN HAZARDS
Attractive to Bees and Wasps

LANDSCAPE MAINTENANCE
Low



Rhus ovata / Sugar Bush



CATEGORY
Shrub > 3'

LEAF HABIT
Evergreen Shrub

GROWTH RATE
Fast

MATURE SIZE
10' Tall, 8 - 18" Spread

EXPOSURE
Full Sun

FLOWER
Showy, Profuse Blooming

FLOWERING SEASON
Spring

OGREN PLANT ALLERGY SCALE
Unknown

FRUIT & NUT
None Known

USDA HARDINESS ZONE
9 - 10

SUNSET HARDINESS ZONE
Unknown

WUCOLS
1 ? 2 ? 3 ? 4 ? 5 ? 6 ?

CALIFORNIA REGION
Hot Valley, Canyon, Seacoast, Desert

BIOSWALE REGION
Xeric, Mesic

SOIL TYPE
Sandy, Loam, Clay

pH REQUIREMENT
6.0 minimum - 9.0 maximum

PROPAGATION METHOD
Seed

NURSERY CONTAINER AVAILABILITY
#1

SPECIAL FEATURES
California Native, Seaspray Tolerant, Wind Tolerant, Attracts Pollinators

KNOWN HAZARDS
Attractive to Bees and Wasps

LANDSCAPE MAINTENANCE
Low



Salvia apiana / White Sage

| |
|---|
| CATEGORY Perennial |
| LEAF HABIT Evergreen |
| GROWTH RATE Fast |
| MATURE SIZE 3 - 4' Tall and Spread, 5' Tall Flower Stems |
| EXPOSURE Partial Shade Underneath Trees and Overhanging Roof Lines, Partial Sun (Less than 50% in the Sun), Full Sun |
| FLOWER Fragrant, Profuse Blooming, Reblooming |
| FLOWERING SEASON Spring, Summer |
| OGREN PLANT ALLERGY SCALE 4 (Low) |
| FRUIT & NUT Insignificant or None |
| USDA HARDINESS ZONE 9 - 10 |
| SUNSET HARDINESS ZONE 7 - 9, 11, 13 - 24 |
| WUCOLS 1 L 2 L 3 VL 4 L 5 M 6 M |
| CALIFORNIA REGION Urban Container, Hot Valley, Windy Fontana, Seacoast, Canyon |
| BIOSWALE REGION Mesic, Xeric |
| SOIL TYPE Sandy, Loam, Clay |
| pH REQUIREMENT 6.0 minimum - 6.5 maximum |
| PROPAGATION METHOD Cutting, Seed |
| NURSERY CONTAINER AVAILABILITY #1, #5, Seed |
| SPECIAL FEATURES Attract Pollinators, Deer Resistant, Attractive Seasonal Colors, Wind Tolerant, Overpruning Tolerant, Seaspray Tolerant, California Native, Extremely Drought Tolerant (Water Every 2 Weeks) |
| KNOWN HAZARDS None Known |
| LANDSCAPE MAINTENANCE Moderate |



Workshop 1B

Summary Report

INTRODUCTION

On Wednesday, June 22nd, 2022, the University of Southern California (USC) conducted the second workshop as part of the process for the Native and Climate Adapted Plant Master Plan. This workshop was held virtually as an addition to the first workshop that was held in person on the campus and was considered workshop 1b. The purpose of this workshop was to engage stakeholders from different interests across the University and present a vision for the campus landscape, identify opportunities for native and climate adapted plants in key areas across the campus, solicit input on the existing landscape typologies, and to establish what has been successful in existing native gardens and climate adapted landscape. This report summarizes the meeting proceedings, key discussions, and feedback received from participants.

BACKGROUND

Human health and the health of the ecosystem are linked. According to CalEnviroScreen 4.0, the USC campus lies within an area of Los Angeles with high pollution burden. To mitigate these impacts and stressors associated with pollution, water scarcity, extreme heat, extreme weather events, and a changing climate, the USC campus will transform and adapt to address these challenges over the coming years. The strategies identified outline a pathway to creating a more healthy and resilient campus landscape. The strategies are consolidated around reducing potable water use, maintaining, and enhancing biodiversity, and expanding the health benefits of the landscape. The standards set by the State of California Model Water Efficient Landscape Ordinance (MWELO) establishes baseline requirements for reductions in

potable water use and minimum requirements. The USC campus community may set more ambitious goals related to outdoor water use reduction to align with local plans such as LA's Sustainable City pLAN. Overall, transitioning to water-efficient landscapes is a high priority. The identified recommendations will contribute to leadership in landscape water conservation and help to embed sustainable design principles into USC campus landscape design to deliver measurable results for landscape performance.

The university has set the following goals to reduce dependence on imported water and increase health and wellness strategies in facilities design. Goals for Assignment: Earth related to landscape are as follows:

- USC will develop and begin implementing a long-term plan for grounds and landscaping and strategic planting standards by Fiscal Year 2024
- USC will update its Facility Design Guidelines to incorporate health and wellness strategies into facilities design by Fiscal Year 2023
- USC will achieve a 20% potable water use reduction per square foot of building space by Fiscal Year 2028 (Fiscal Year 2014 baseline)

Assignment: Earth formalizes USC's commitment to addressing climate change and creating a more sustainable future. It will guide actions through 2028 and beyond to enable the campus to adapt to innovations and new strategies as they emerge.

MEETING FORMAT

The second workshop for the USC Native and Climate Adapted Plant Master Plan occurred on June 22nd, 2022, online in a meeting format using the Zoom Web Conferencing client. This meeting was held virtually as an additional meeting to the first workshop that was held in person to engage with a broader range

of stakeholders and interests across the campus. Presentation materials and facilitated questions for participants were the same as the first workshop that was held in person and this meeting was considered "Workshop 1b" instead of a second workshop. The meeting was initiated with welcoming remarks by key USC staff involved in the planning process before being turned over to Jenni Zell, of MIG, who served as the main meeting facilitator for the project team. After a brief round of introductions, Jenni provided an overview of the sustainability guidelines and a broad look at the vision for the campus landscape. After the project overview Jenni opened the meeting up for a facilitated discussion with participants on ways to measure success in the three goal areas, possible locations for native and climate adapted plants among different quadrants of the campus, and opportunities and constraints of the existing landscape typologies throughout the campus. Project team members recorded discussion points in real time during the meeting on a digital whiteboard too, which is included with the presentation slides at the end of this report. The following sections provide a summary of discussion points from the meeting.

SUMMARY OF DISCUSSIONS

Participants provided input on ways to measure success, possible locations for native and climate adapted plants across the campus, and opportunities and constraints of the existing landscape typologies found on the campus. Facilitated questions and participant comments and feedback can be found below:

How do we measure success in the three goal areas (Water, Biodiversity, and Health Benefits)?

- Water (potable water use reduction) Opportunities

Workshop 1B

05

Appendix

INTRODUCTION

On Wednesday, June 22nd, 2022, the University of Southern California (USC) conducted the second workshop as part of the process for the Native and Climate Adapted Plant Master Plan. This workshop was held virtually as an addition to the first workshop that was held in person on the campus and was considered workshop 1b. The purpose of this workshop was to engage stakeholders from different interests across the University and present a vision for the campus landscape, identify opportunities for native and climate adapted plants in key areas across the campus, solicit input on the existing landscape typologies, and to establish what has been successful in existing native gardens and climate adapted landscape. This report summarizes the meeting proceedings, key discussions, and feedback received from participants.

BACKGROUND

Human health and the health of the ecosystem are linked. According to CalEnviroScreen 4.0, the USC campus lies within an area of Los Angeles with high pollution burden. To mitigate these impacts and stressors associated with pollution, water scarcity, extreme heat, extreme weather events, and a changing climate, the USC campus will transform and adapt to address these challenges over the coming years. The strategies identified outline a pathway to creating a more healthy and resilient campus landscape. The strategies are consolidated around reducing potable

water use, maintaining, and enhancing biodiversity, and expanding the health benefits of the landscape. The standards set by the State of California Model Water Efficient Landscape Ordinance (MWELO) establishes baseline requirements for reductions in potable water use and minimum requirements. The USC campus community may set more ambitious goals related to outdoor water use reduction to align with local plans such as LA’s Sustainable City pLAN. Overall, transitioning to water-efficient landscapes is a high priority. The identified recommendations will contribute to leadership in landscape water conservation and help to embed sustainable design principles into USC campus landscape design to deliver measurable results for landscape performance.

The university has set the following goals to reduce dependence on imported water and increase health and wellness strategies in facilities design. Goals for Assignment: Earth related to landscape are as follows:

- USC will develop and begin implementing a long-term plan for grounds and landscaping and strategic planting standards by Fiscal Year 2024
- USC will update its Facility Design Guidelines to incorporate health and wellness strategies into facilities design by Fiscal Year 2023
- USC will achieve a 20% potable water use reduction per square foot of building space by Fiscal Year 2028 (Fiscal Year 2014 baseline)

Assignment: Earth formalizes USC’s commitment to addressing climate change and creating a more sustainable future. It will guide actions through 2028 and beyond to enable the campus to adapt to innovations and new strategies as they emerge.

MEETING FORMAT

The second workshop for the USC Native and Climate Adapted Plant Master Plan occurred on June 22nd, 2022, online in a meeting format using the Zoom Web Conferencing client. This meeting was held virtually as an additional meeting to the first workshop that was held in person to engage with a broader range of stakeholders and interests across the campus. Presentation materials and facilitated questions for participants were the same as the first workshop that was held in person and this meeting was considered “Workshop 1b” instead of a second workshop. The meeting was initiated with welcoming remarks by key USC staff involved in the planning process before being turned over to Jenni Zell, of MIG, who served as the main meeting facilitator for the project team. After a brief round of introductions, Jenni provided an overview of the sustainability guidelines and a broad look at the vision for the campus landscape. After the project overview Jenni opened the meeting up for a facilitated discussion with participants on ways to measure success in the three goal areas, possible locations for native and climate adapted plants among different quadrants of the campus, and opportunities and constraints of the existing landscape typologies throughout the campus. Project team members recorded discussion points in real time during the meeting on a digital whiteboard too, which is included with the presentation slides at the end of this report. The following sections provide a summary of discussion points from the meeting.

SUMMARY OF DISCUSSIONS

Participants provided input on ways to measure success, possible locations for native and climate adapted plants across the campus, and opportunities and constraints of the existing landscape typologies found on the campus. Facilitated questions and

participant comments and feedback can be found below:

How do we measure success in the three goal areas (Water, Biodiversity, and Health Benefits)?

- Water (potable water use reduction) Opportunities
 - Water reduction based on building square footage
 - Long term/permanent solutions
 - Meter usage on the irrigation side
 - Measurement based on efficiency and meeting other goals (biodiversity & health)
 - Grey water use to help supplement resources
 - Capturing rainwater in new buildings
 - More stormwater capture & understanding the potential
 - Centralized water storage for stormwater capture
 - Address fountains & expected evaporation

Water (potable water use reduction) Constraints

- Restrictions from the State and City
- Timeframe to update metering capabilities
- Costs associated w/ stormwater capture

Biodiversity (globally significant biodiversity hotspot) Opportunities

- Pitfall trap study to measure insect diversity
- Malaise traps & other traps to measure biodiversity
- Overall health of plants & measuring resiliency of existing plants
- Tree inventory - which are resilient and identify

what species may need to be replaced

- Tap into student resources for citizens science
- Biodiversity baseline
- Communication of values to public (i.e., signage)
- Increasing awareness of climate resilience in plants/biodiversity
- Signage for construction (current & future)
- Collaboration with partners (bio-blitz, i-naturalist, etc.)

Health Benefits (positive effects of a healthy environment) Opportunities

- Fountains can help to cool areas
- Data on improved performance (mental health benefits, academic success, etc.)
- Well-being survey correlated w/ changes on campus (how students interact w/nature)
- Healthy campus framework
- Measuring air quality, classes that can be held outside, etc.
- Connection to health benefits and coursework
- More student surveys
- Overall, targets, metrics, socialization of initiatives, collaboration with courses/students/ staff and faculty

What are the opportunities and constraints for the four identified quadrants of the USC campus (Northwest, Northeast, Southwest, and Southeast)?

Opportunities for the Northwest Quadrant of Campus

- Creating biodiversity in smaller spaces without existing vegetation

- Opportunities for more signage - regularly used areas
- Pollinator garden in a highly visible place
- Identify areas that are not heavily used
- Identify areas that are easy to replace (turf, native plants, etc.)
- Have individual schools take ownership of their spaces
- Increase awareness of work being done - educations and partnerships w/ community
- Increase collaboration with partners & integrate work w/ education

- A partnership with Payne or another great native nursery would be a great relationship to foster!

- Tailgate tolerant plants

- Promote sustainable & resilient campus

- More interactive fundraising

- Pollinator Garden at the Student Parkside Gardens

- Biodiversity surveys for pollinators and arthropods

- Is USC working w/ the Theodore Payne Nursery on how to incorporate more ground cover that is drought tolerant

Constraints for the Northwest Quadrant of Campus

- Constraints around shade across the entire campus
- Constraint with donated spaces and features
- Conflicting opinions on lawn areas
- Climate change
- Declining pollinator populations

Opportunities for the Northeast Quadrant of Campus

- Opportunity to increase utilization
- School of social work has planters in place w/ non-native plants
- Improve spaces that are currently underutilized
- Tree removal to increase sunlight and promote pollinators
- Opportunities to engage with students on potential changes
- Student interest in gardens focused on nopales and cactuses

Opportunities for the Southwest Quadrant of Campus

- Hedging along lawn spaces could be replaced
- Mapping of existing ecological conditions and footprint of buildings
- Zoning to identify what plants would fit based on building footprints & shade cover
- Identify water use and efficiency of existing plants and areas on campus
- Bloom walk to parking structure could use revitalization
- Pilot projects with high visibility

- Identify areas w/turf that are highly utilized for events - consider alternative surfacing

- Chaparral Honeysuckle & California Honeysuckle are very drought tolerant

- Native plants that work with our existing color palate from golden rod to indian paintbrush

- Would incorporating microclover into current lawns be feasible for events if it is a mix of clover/ grass?

- Diplacus ‘Fiesta Marigold’—monkey flower—is a great USC colors plant. Check out the test plot.

Constraints for the Southwest Quadrant of Campus

- Artificial turf is considered hazardous when removed

Opportunities for the Southeast Quadrant of Campus

- Plants that can have additional benefits - cooling buildings, increased shade, etc.
- Landscape around Bovard to serve as a pilot project for what a native and biodiverse landscape could look like
- Survey schools to identify spaces that could be transformed
- Identify areas that are most difficult to maintain
- Rooftop gardens and planters on the sides of buildings can be effective
- Vertical gardens on the sides of buildings
- North side of library is prime space
- Pardee plaza has a lot of opportunity for transformation
- Exposition blvd can be a great place for a highly visible pilot

Constraints for the Southeast Quadrant of Campus

- Construction and impact of dust



Opportunities

Opportunities

Opportunities

| | | |
|---|--|--|
| Water reduction based on building square footage | Long term/permanent solutions | Meter usage on the irrigation side |
| Measurement based on efficiency and meeting other goals (biodiversity & health) | Grey water use to help supplement resources | Capturing rainwater in new buildings |
| More stormwater capture & understanding the potential | Centralized water storage for stormwater capture | Address fountains & expected evaporation |

| | | |
|--|---|--|
| Pitfall trap study to measure insect diversity | Malaise traps & other traps to measure biodiversity | Overall health of plants & measuring resiliency of existing plants |
| Tree inventory - which are resilient and identify what species may need to be replaced | Tap into student resources for citizen science | Biodiversity baseline |
| Communication of values to public (i.e., signage) | Increasing awareness of climate resilience in plants/biodiversity | Signage for construction (current & future) |
| Collaboration with partners (bio-blitz, i-naturalist, etc.) | | |

| | | |
|----------------------------------|---|---|
| Fountains can help to cool areas | Data on improved performance (mental health benefits, academic success, etc.) | Well-being survey correlated w/ changes on campus (how students interact w/ nature) |
| Healthy campus framework | Measuring air quality, classes that can be held outside, etc. | Connection to health benefits and coursework |
| More student surveys | Overall, targets, metrics, socialization of initiatives, collaboration with course/students/staff and faculty | |

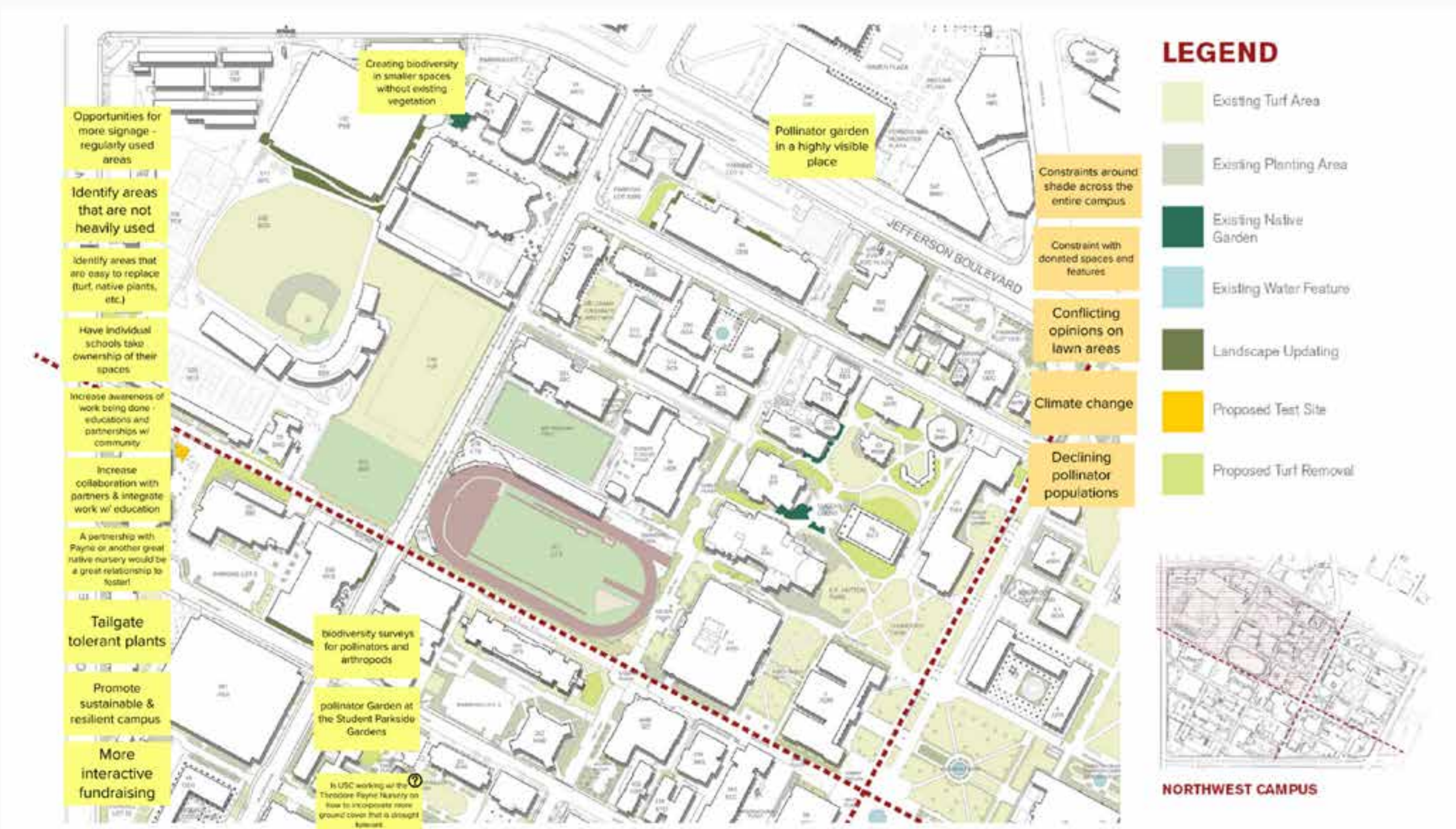
Constraints

Constraints

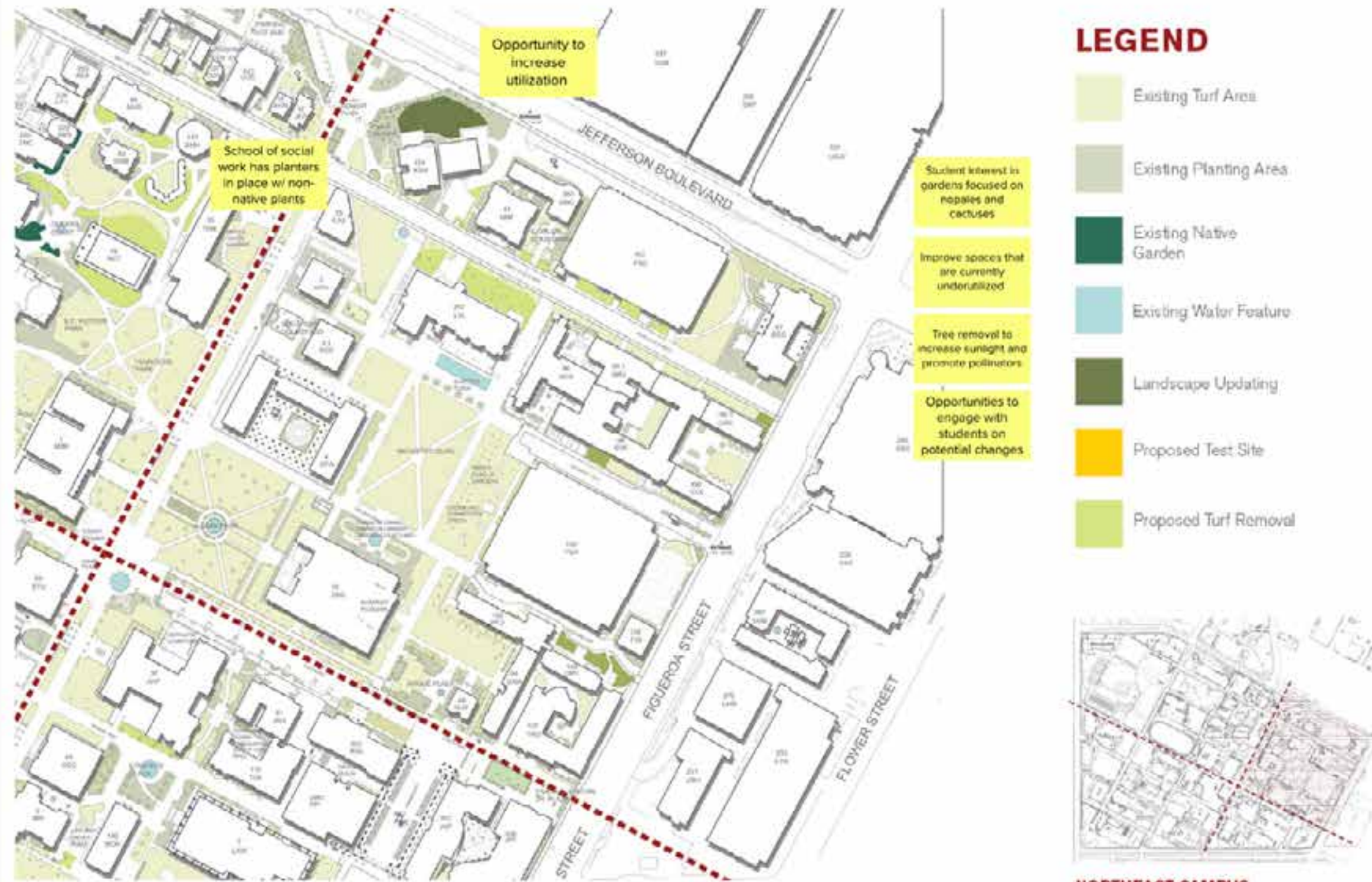
Constraints

| | | |
|--------------------------------------|---|--|
| Restrictions from the State and City | Timeframe to update metering capabilities | Costs associated w/ stormwater capture |
|--------------------------------------|---|--|

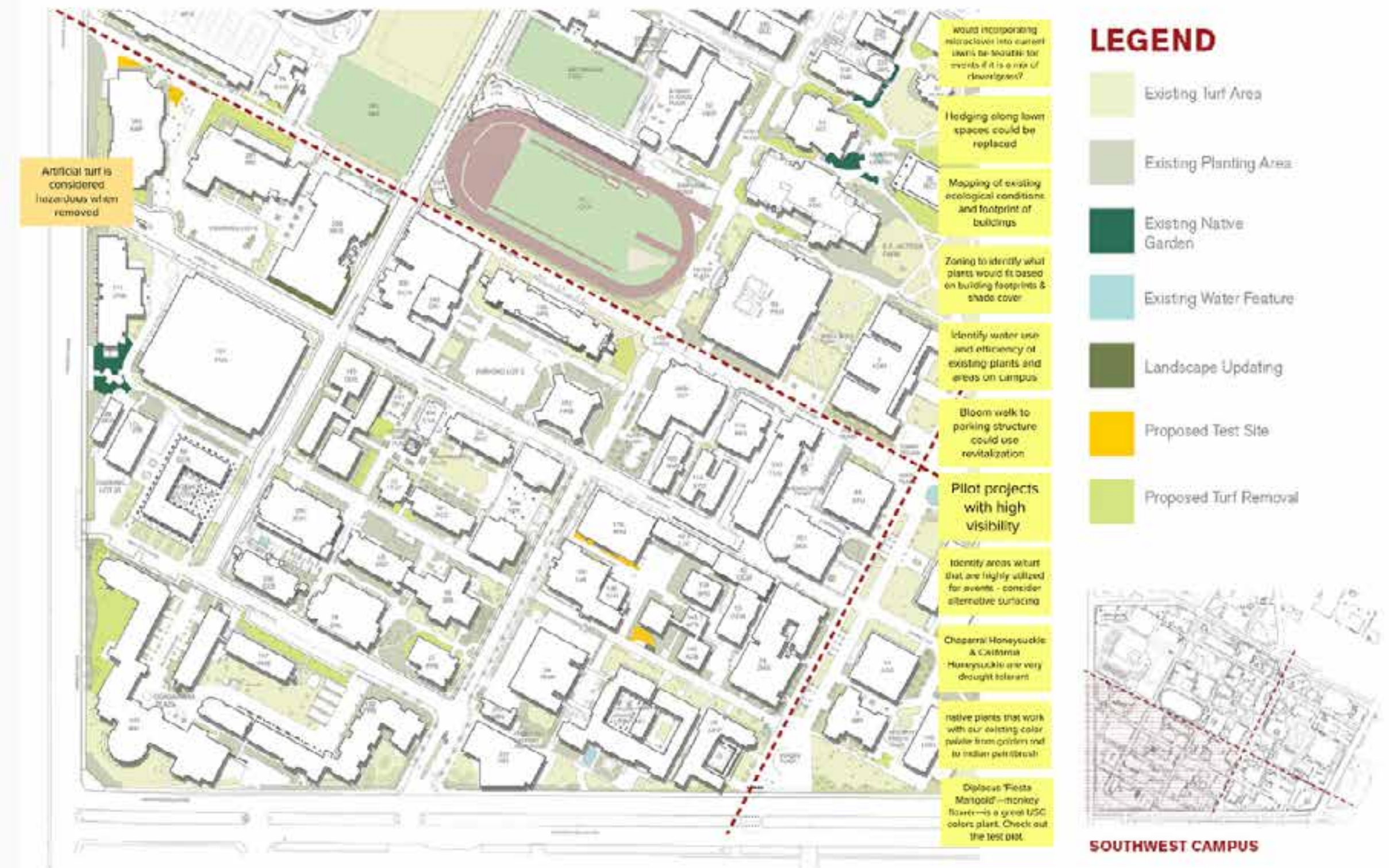
Northwest Campus



Northeast Campus



Southwest Campus



Southeast Campus

