


LID Examples in Public Settings

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February 2013

Context

Projects


Who designs, builds, maintains and uses it?

What is the "program" for the landscape?

For you or for a client? A public client?

Other stakeholders? Regulatory considerations?

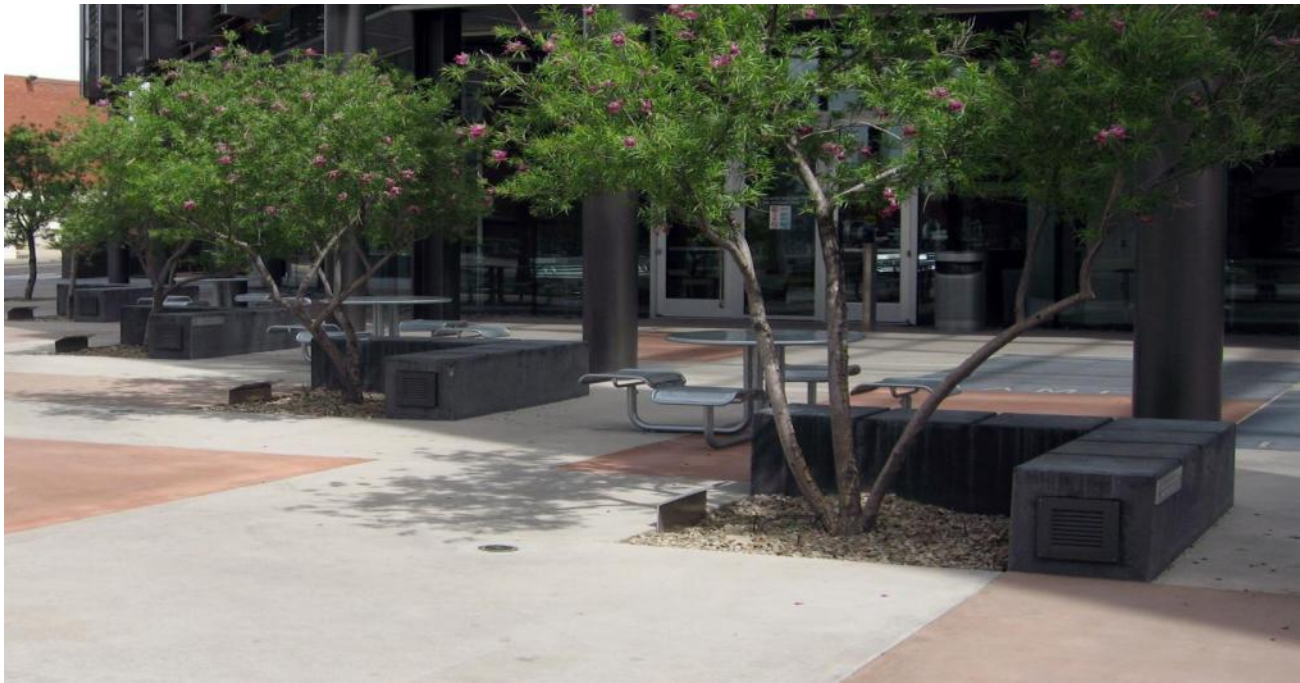
Budget and timeline factors?

Expectations of "landscape performance" and maintenance?

Context: Public / Urban

Integrating the “green” into the “infrastructure”

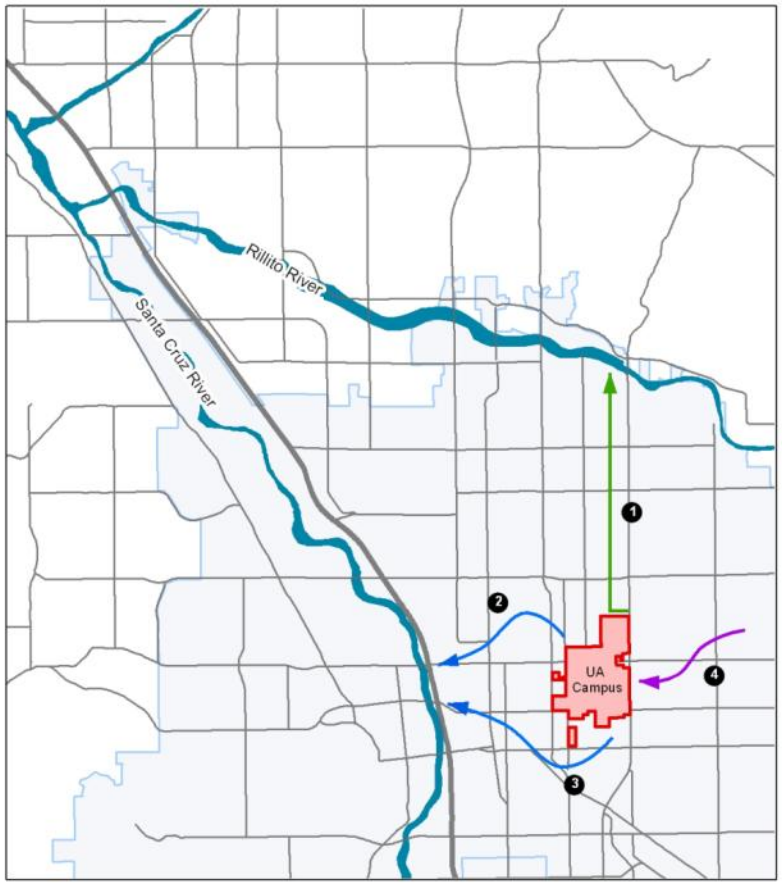
in ways it may thrive and provide services….



Opportunity: **Integrate Green Infrastructure throughout project from the start**

UA Context

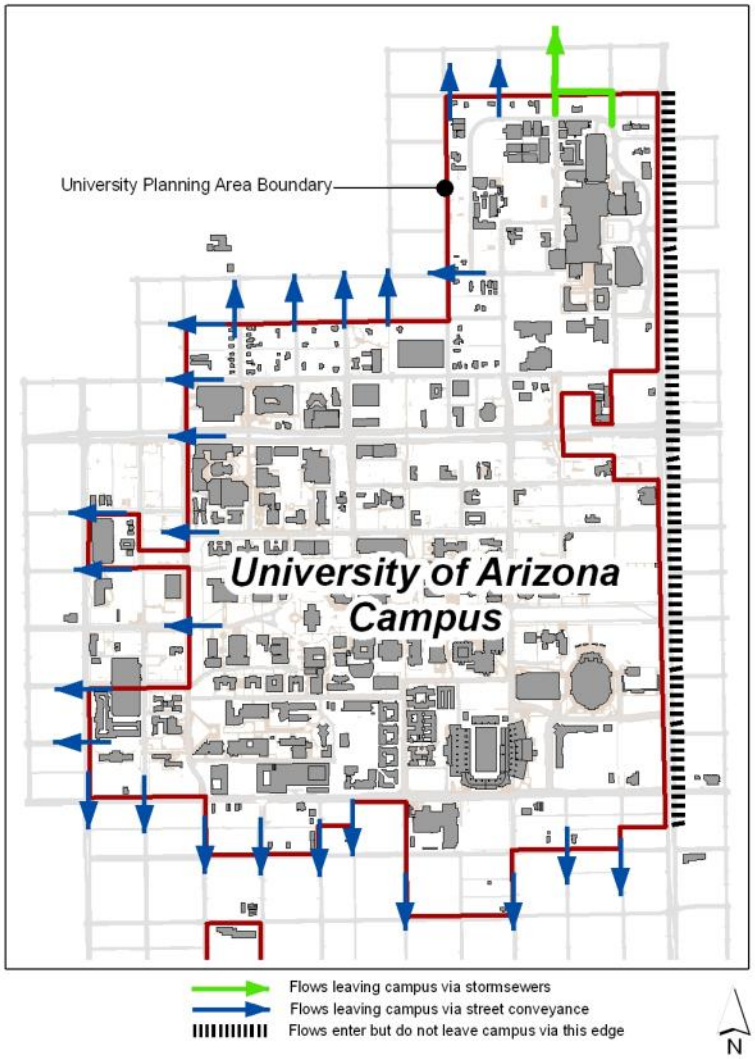
Flow Patterns



1. Stormwater conveyed via the Mountain Ave. stormsewer and City Streets to the Rillito River
2. Stormwater conveyed via City streets and the Bronx Wash to the Santa Cruz River
3. Stormwater conveyed via City streets and the High School Wash to the Santa Cruz River
4. Stormwater from off-site onto the UA Campus

Regional Drainage Patterns To and From the UA Campus, and Watercourses receiving UA drainage

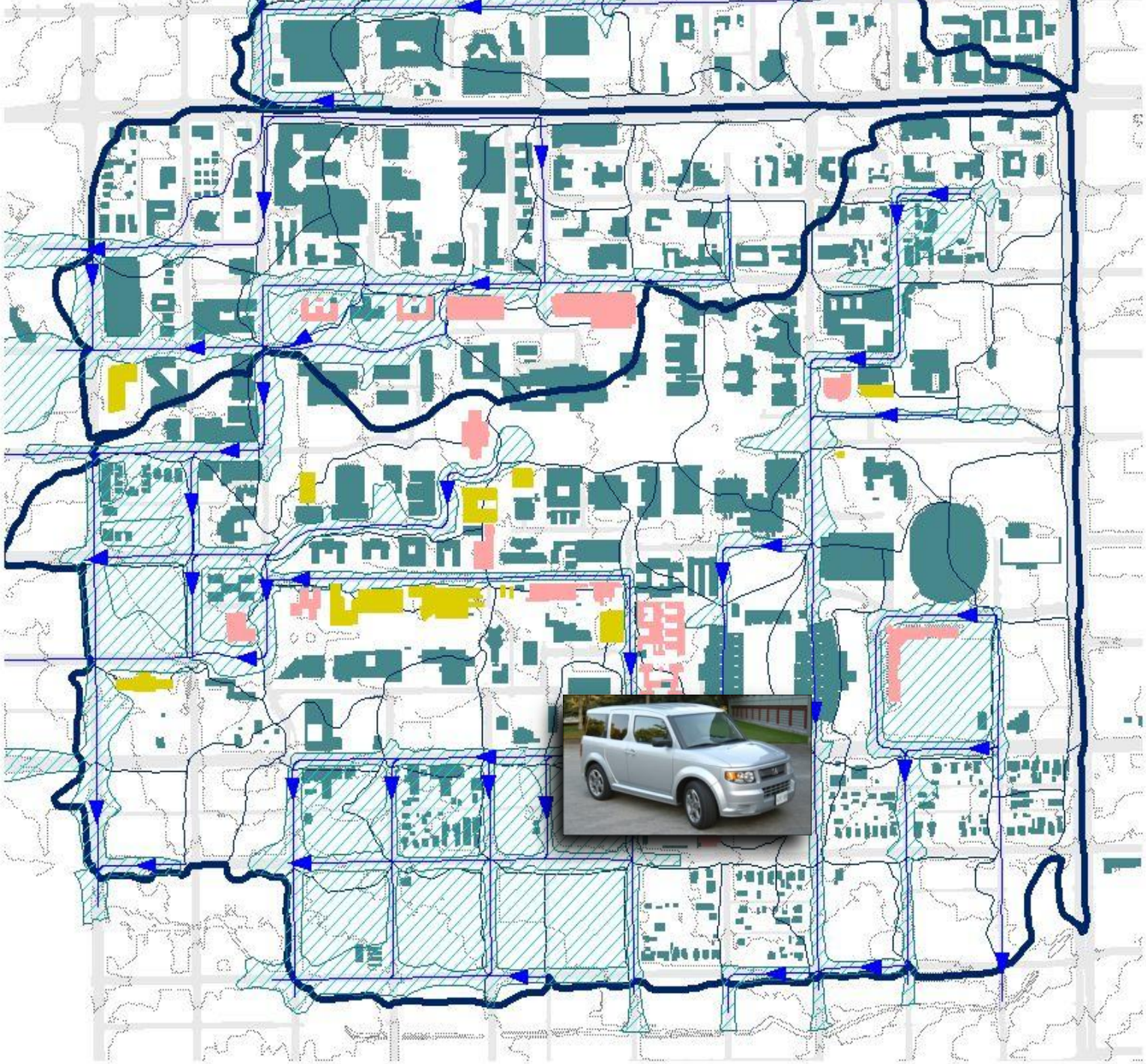
UA CFP - September 2006



Drainage Patterns at the UA Campus Edge

UA CFP - Spetember 2006

The Paradigm - Water is a Problem, not a Resource

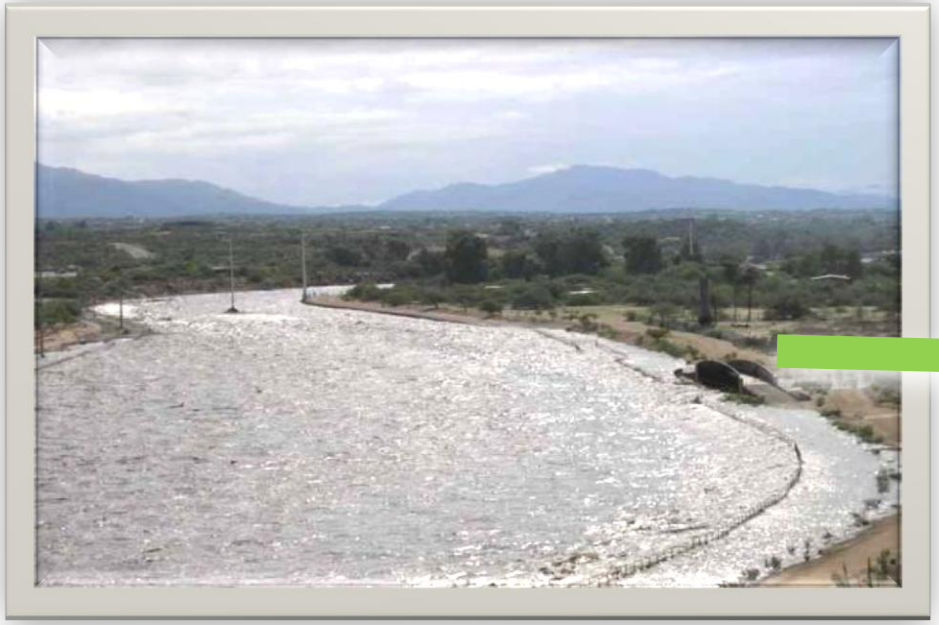


AHSC Open Space & Detention

Single-Purpose Facilities designed for the Worst-Case Scenario

Worst-Case Scenario Driven Design

Design for common, desired activities / events
(made difficult by singular focus on worst-case scenarios

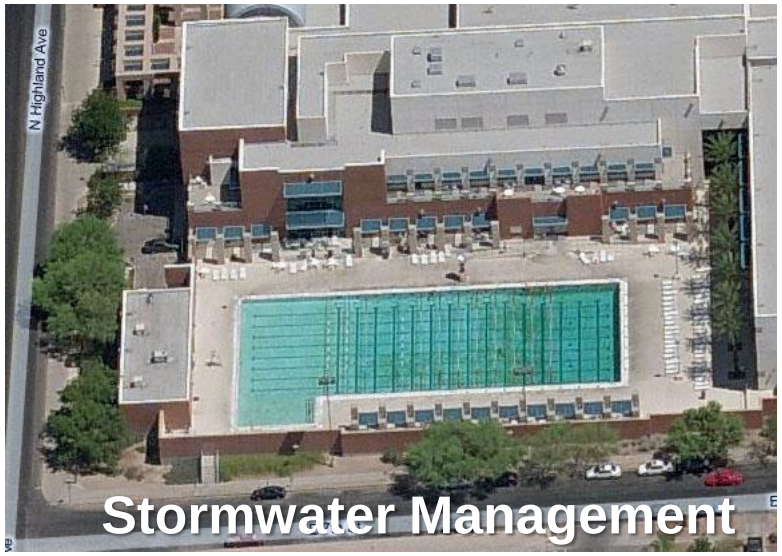


Integrating Stormwater and RWH Practices

Breaking down the magnitude and timing of rain events to allow infiltration

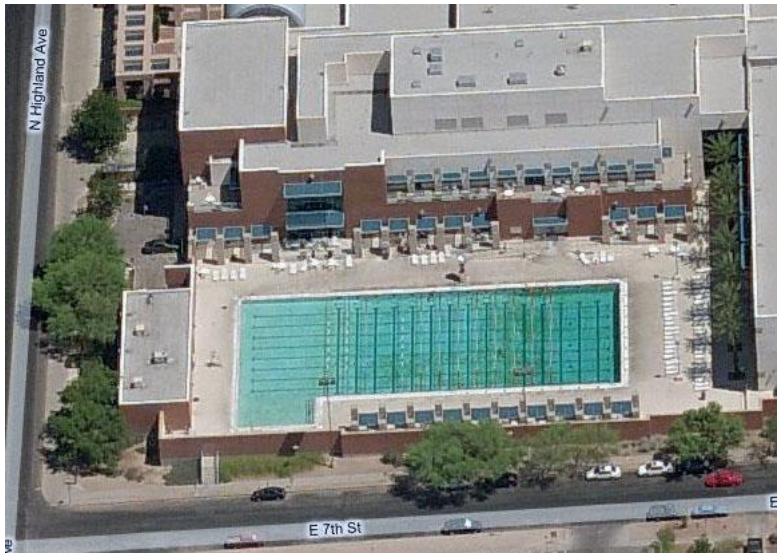
180 gallons

600,000 gallons



Integrating Stormwater and RWH Practices

Smaller volumes / units are more manageable as a resource



Stormwater Management

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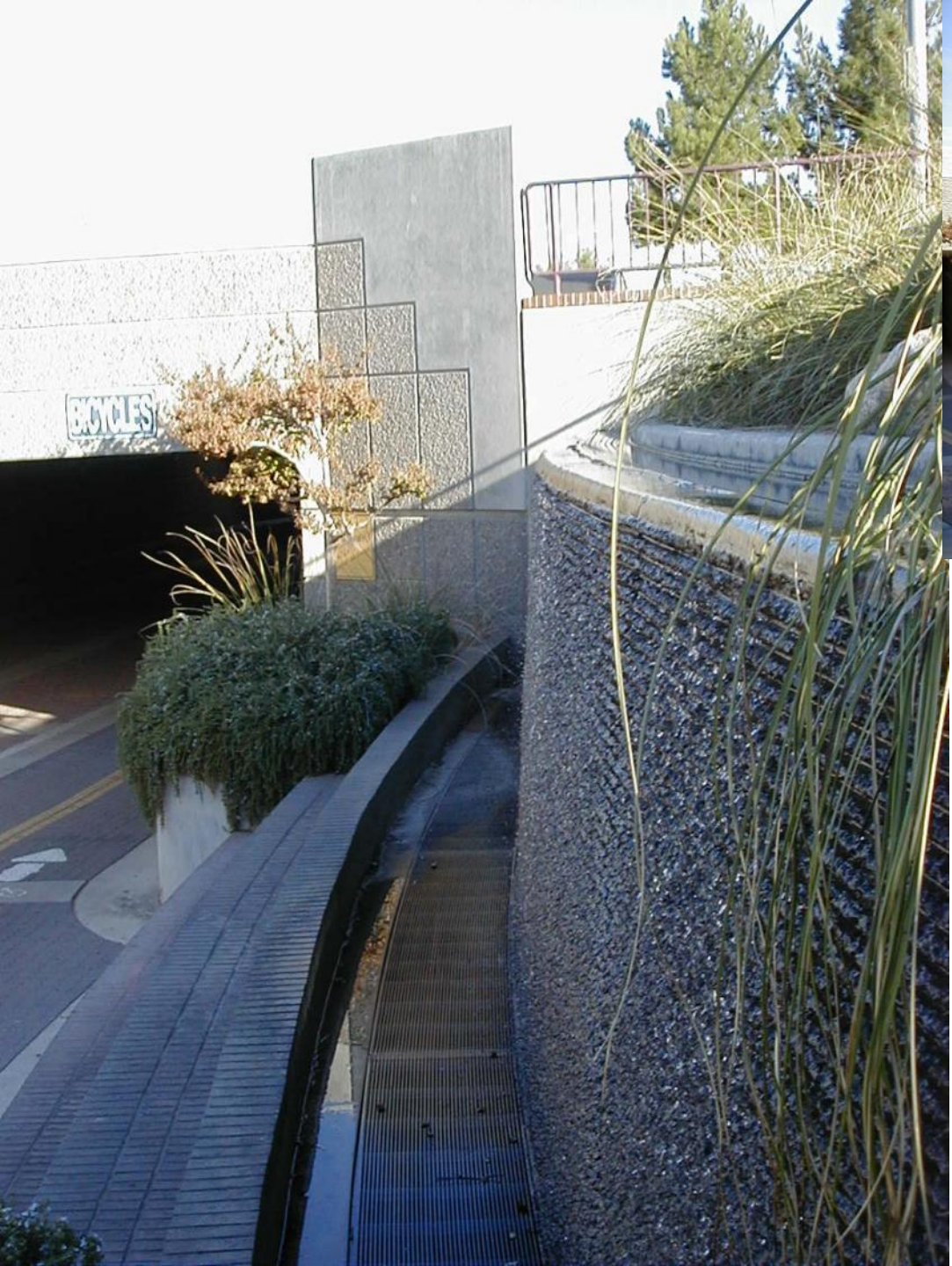
Rain Water Harvesting and Stormwater Integrated

UA Projects

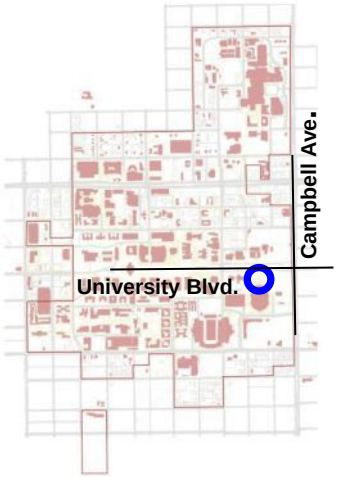


Warren Underpass Water Feature

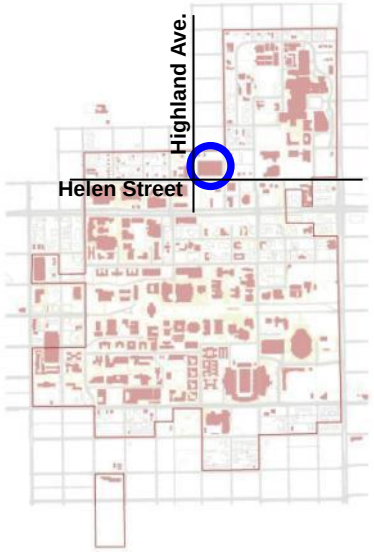
with

supply from water harvesting cistern

Lynch Pavilion Landscape Storm Water Terraces



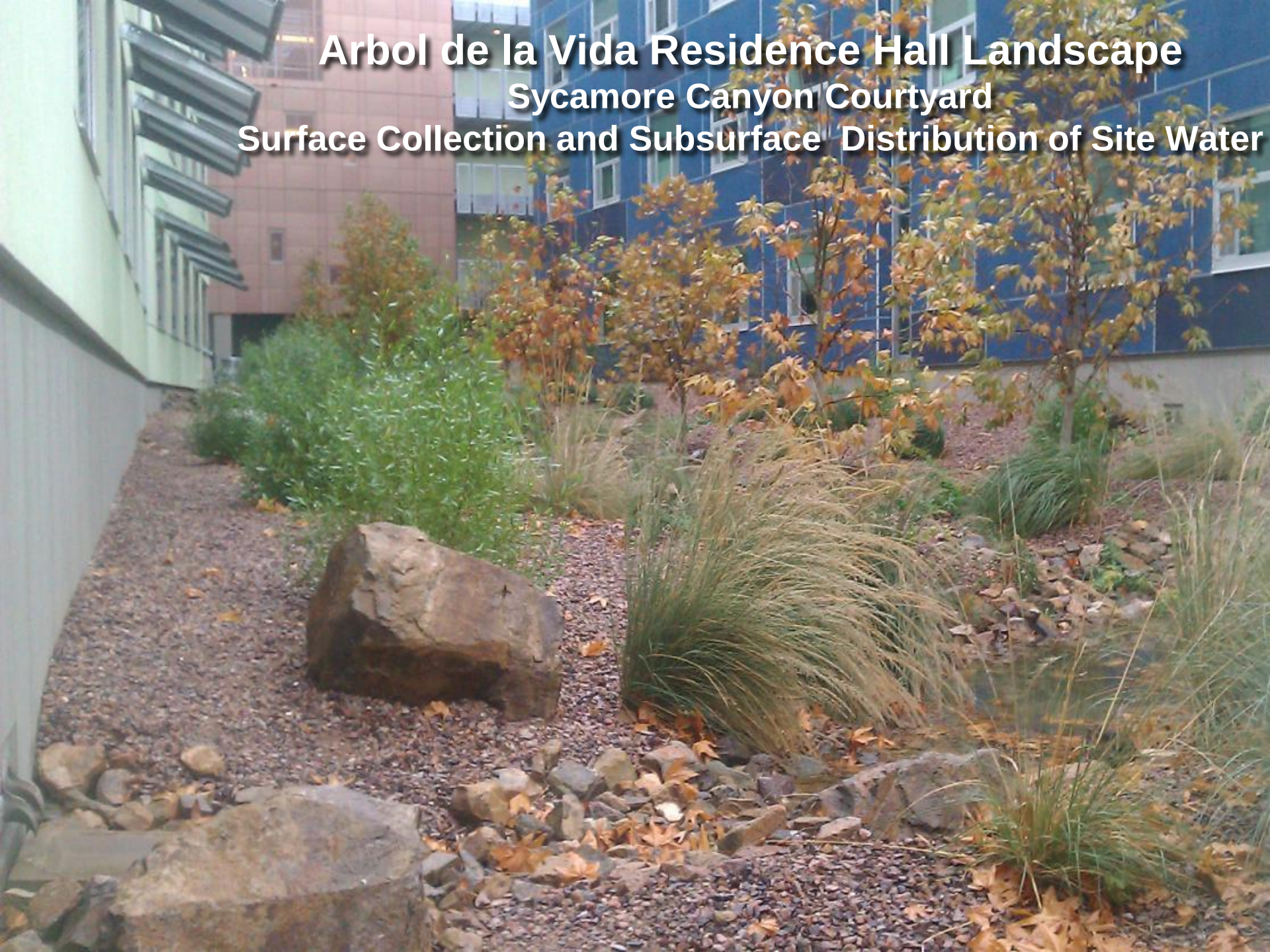
Highland Parking Garage Multi-purpose Basin / Open Space and Water Harvesting Micro-basins



Student Recreation Center Expansion

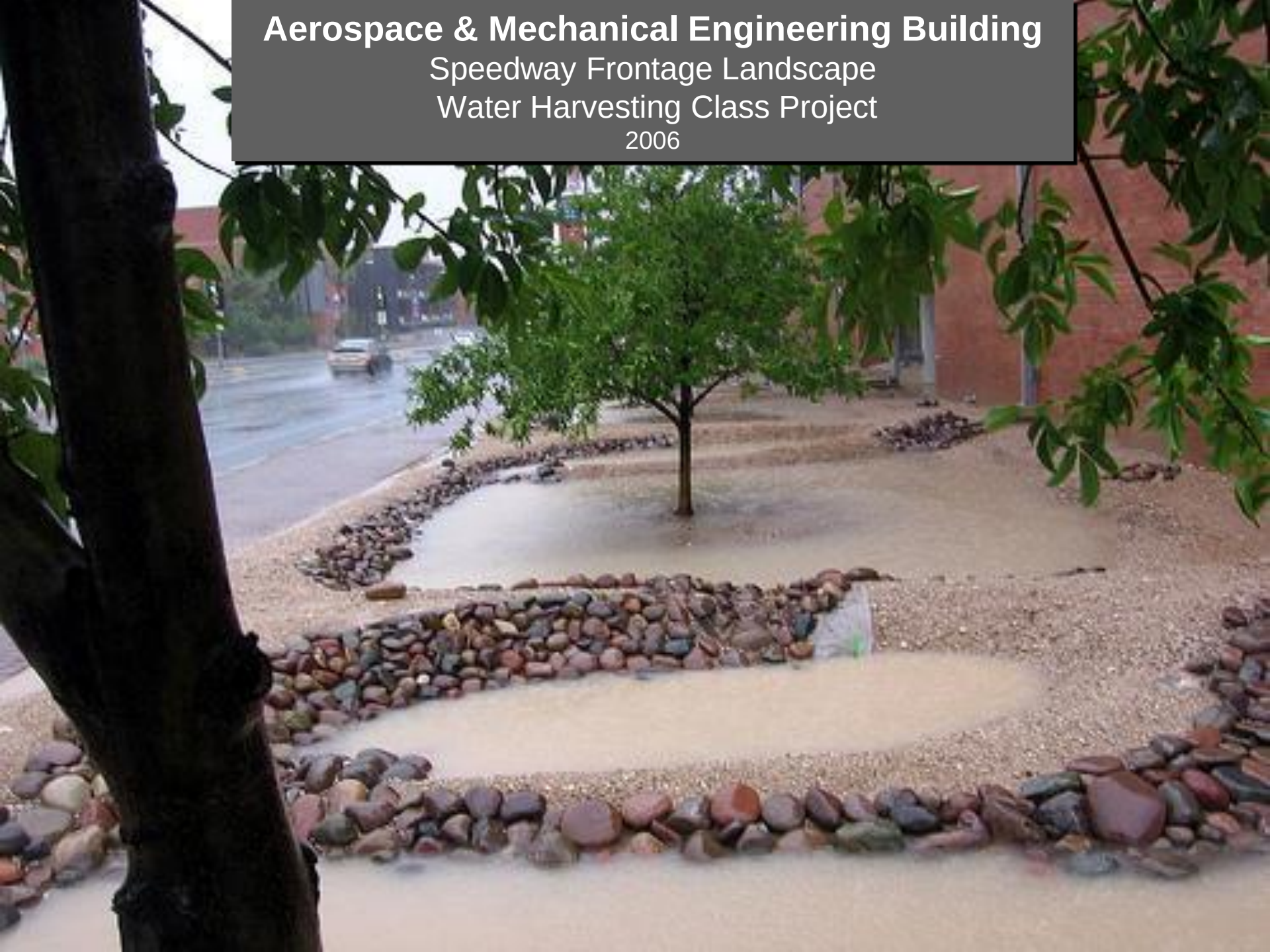
2010


Lester Landscape Buffer
Integrated Water Harvesting and Storm Water Basins


Arbol de la Vida Residence Hall Landscape
Sycamore Canyon Courtyard
Surface Collection and Subsurface Distribution of Site Water

Arbol de la Vida Residence Hall Landscape

Perimeter water harvesting



Aerospace & Mechanical Engineering Building

Speedway Frontage Landscape

Water Harvesting Class Project

2006

AME Water Harvesting Project

Construction

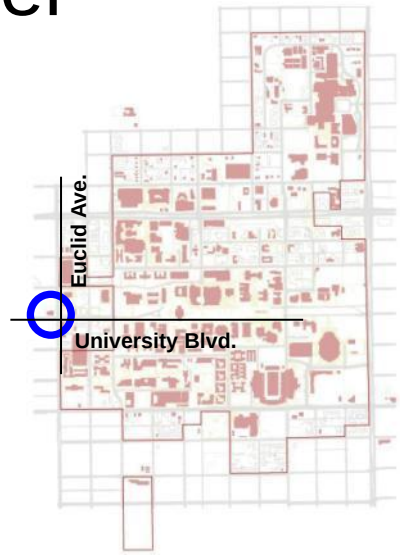
and

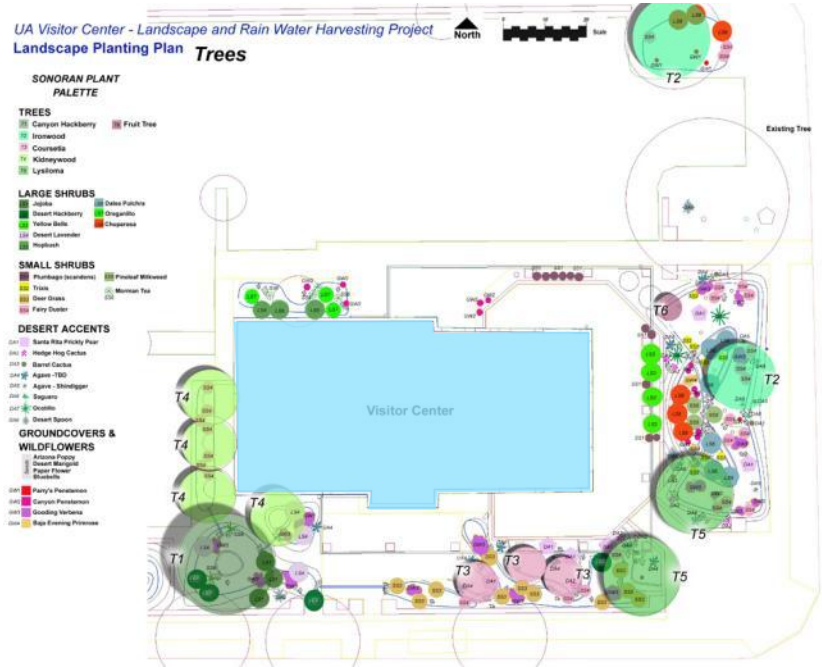
Opening Ceremony

UA Visitor Center

Landscape Revitalization & Water Harvesting Demonstration

2007






VISITOR CENTER

Water Harvesting Goals:

Support landscape

Benefit vegetation

Conserve water

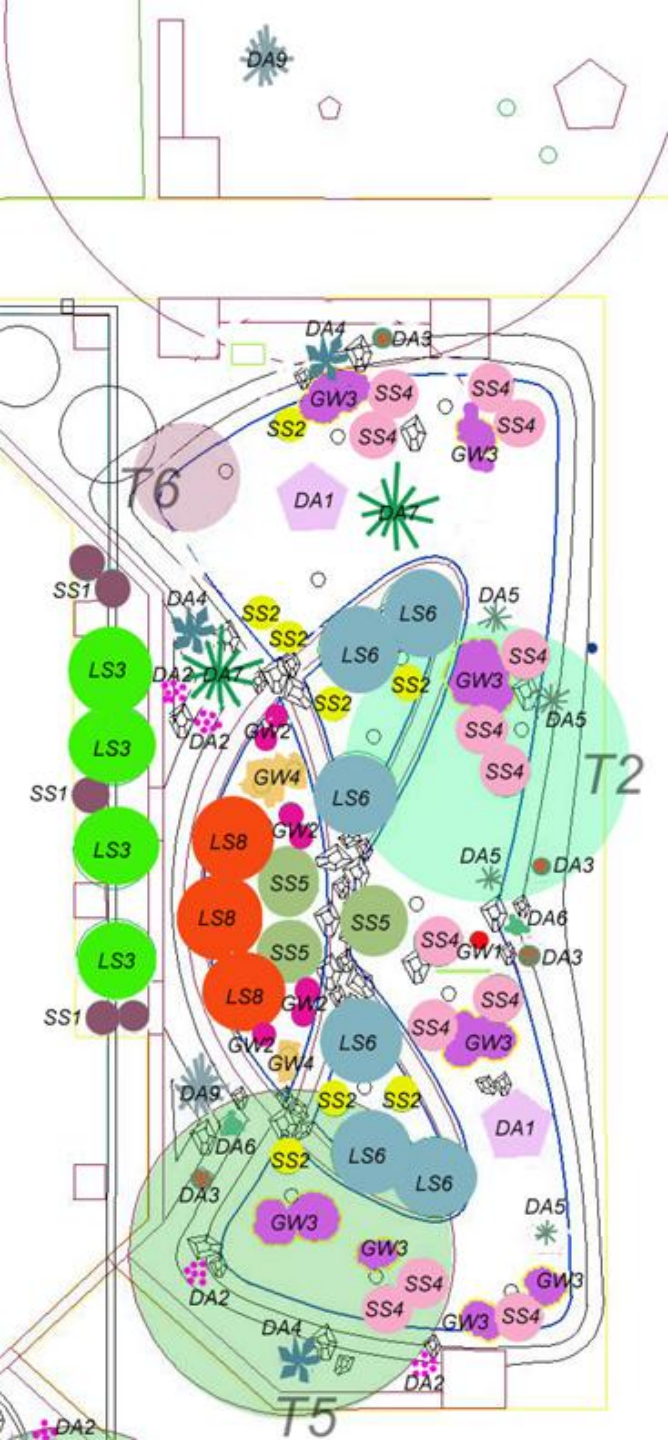
Educate

Demonstrate RWH potential

- *Estimated 242,000 gallons annual rainfall*
- *Estimated 132,000 gallons held on site*

- *Total Area: 31, 900 sq. ft*
  - Rooftop: 6,500 sq. ft
  - Paved: 17,575 sq. ft
  - Unpaved: 7,825 sq. ft

75% impervious



SONORAN PLANT PALETTE

- T1 Canyon Hackberry
- T2 Ironwood
- T3 Coursetia
- T4 Kidneywood
- T5 Lysiloma
- T6 Fruit Tree

LARGE SHRUBS

- LS1 Jojoba
- LS2 Desert Hackberry
- LS3 Yellow Bells
- LS4 Desert Lavender
- LS5 Hopbush
- LS6 Dalea Pulchra
- LS7 Oreganillo
- LS8 Chuparosa

SMALL SHRUBS

- SS1 Plumbago (scandens)
- SS2 Trixis
- SS3 Deer Grass
- SS4 Fairy Duster
- SS5 Pineleaf Milkweed
- SS6 Morman Tea

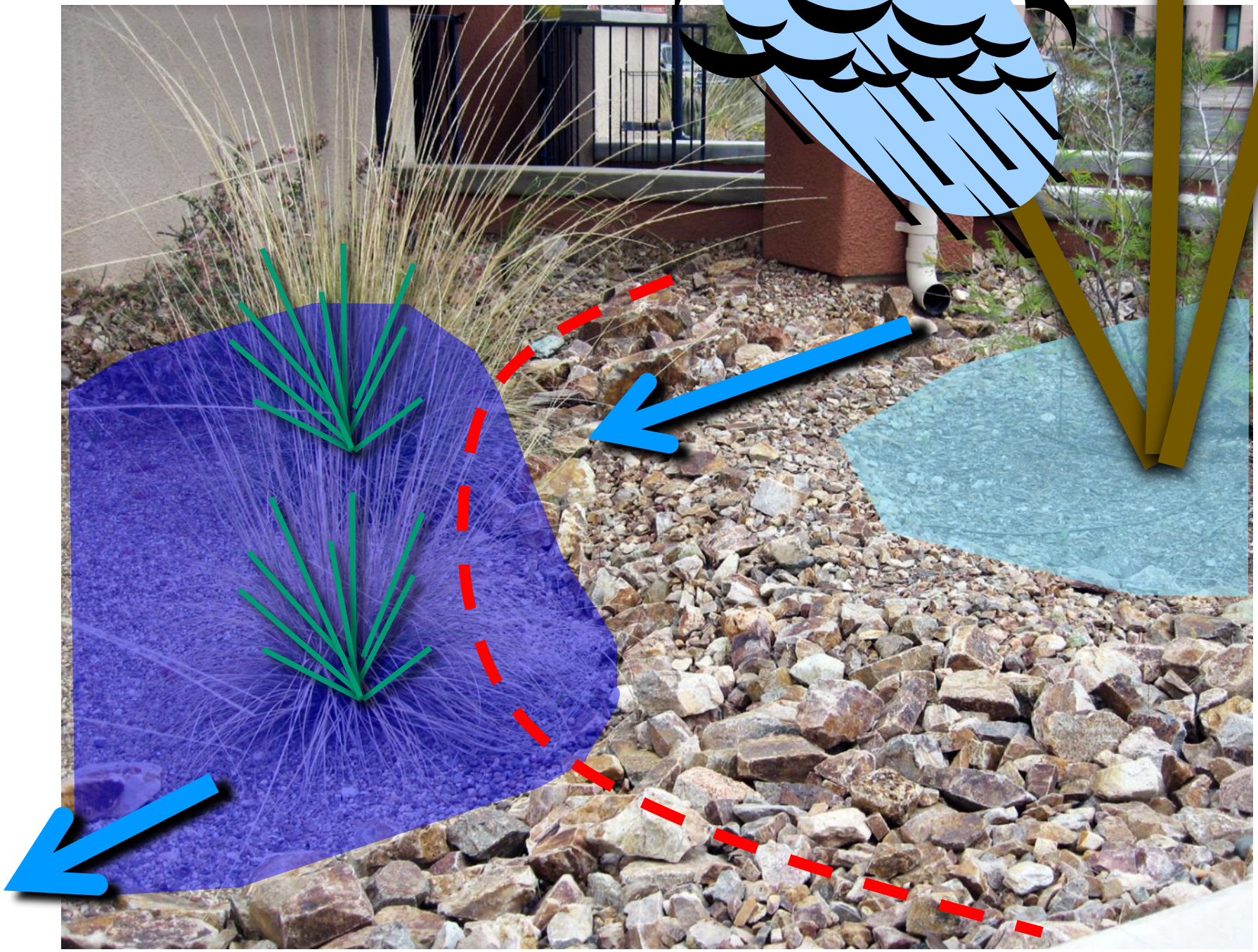
DESERT ACCENTS

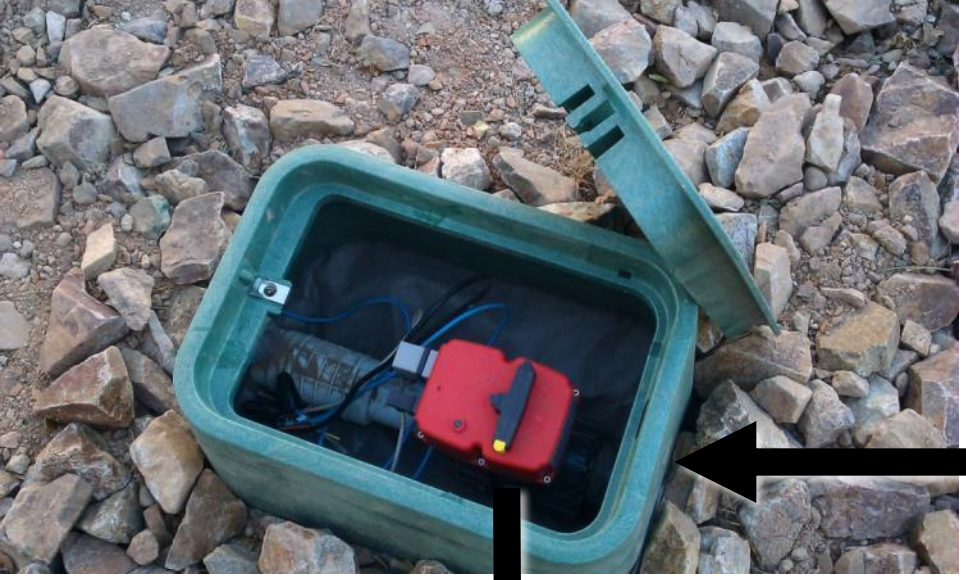
- DA1 Santa Rita Prickly Pear
- DA2 Hedge Hog Cactus
- DA3 Barrel Cactus
- DA4 Agave -TBD
- DA5 Agave - Shindigger
- DA6 Saguaro
- DA7 Ocotillo
- DA9 Desert Spoon

GROUNDCOVERS & WILDFLOWERS

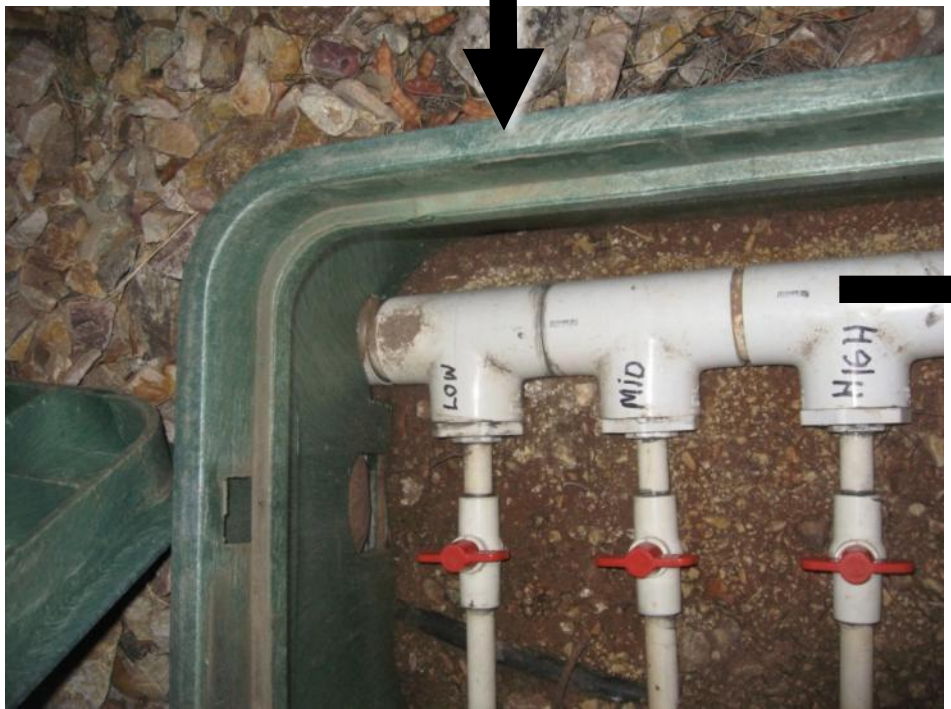
Seeds
- Arizona Poppy
- Desert Marigold
- Paper Flower
- Bluebells

- GW1 Parry's Penstemon
- GW2 Canyon Penstemon
- GW3 Gooding Verbena
- GW4 Baja Evening Primrose

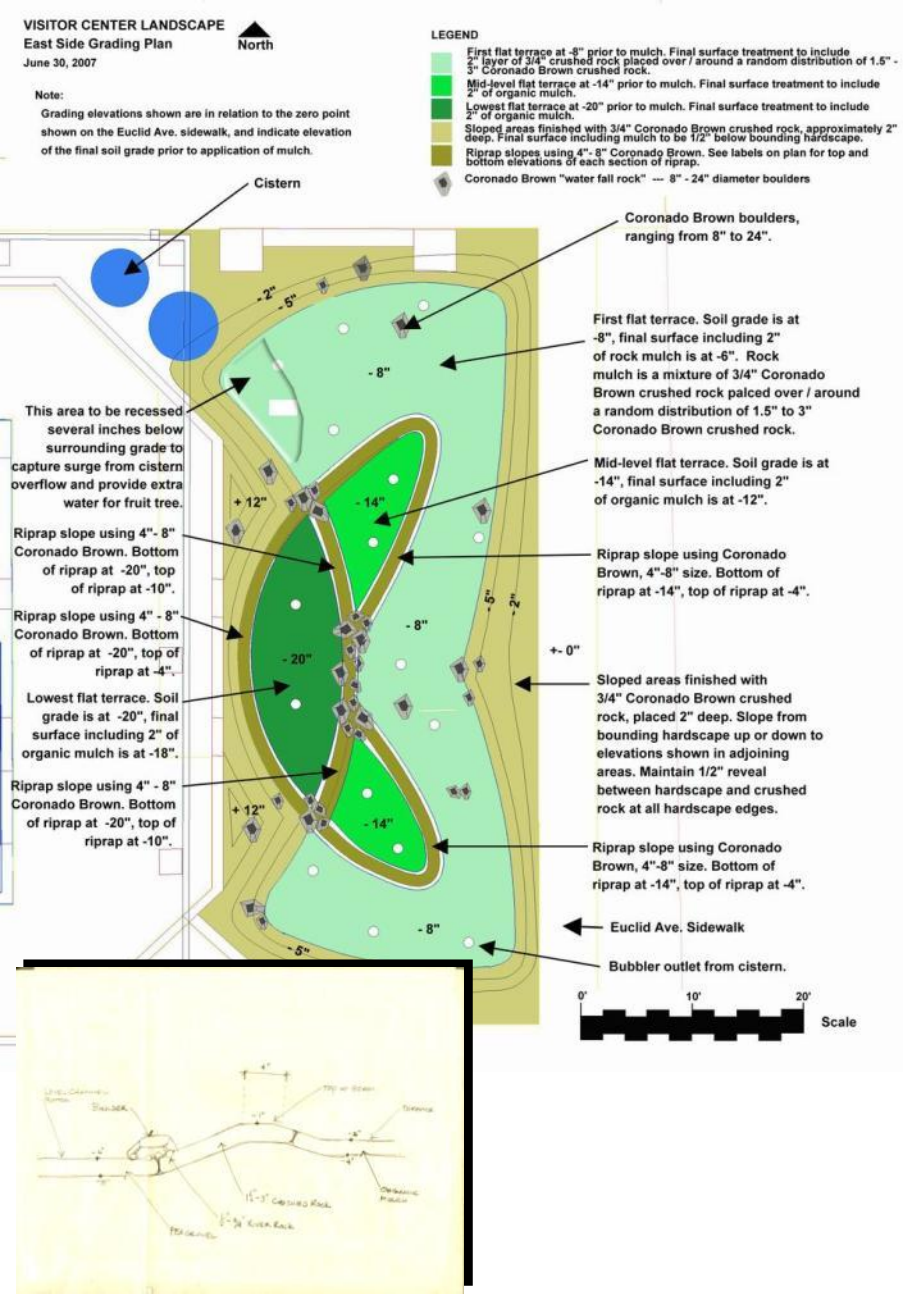


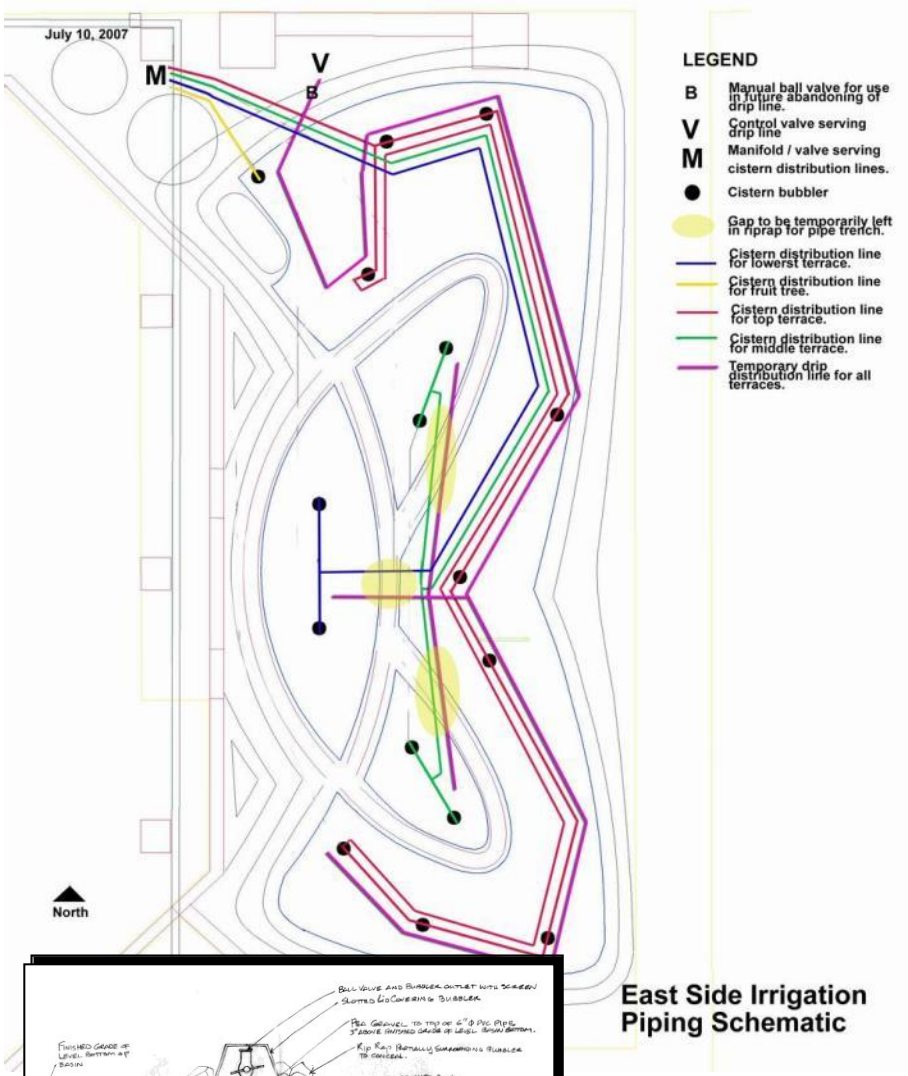


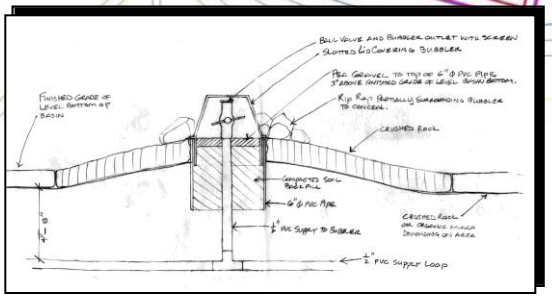

UNIVERSITY OF ARIZONA


LOW
MID

UA Visitor Center Landscape Renovation



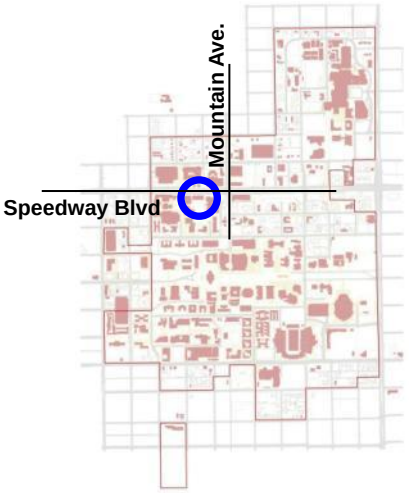




East Side Irrigation Piping Schematic

CALA Expansion

Underwood Family Sonoran Landscape Laboratory



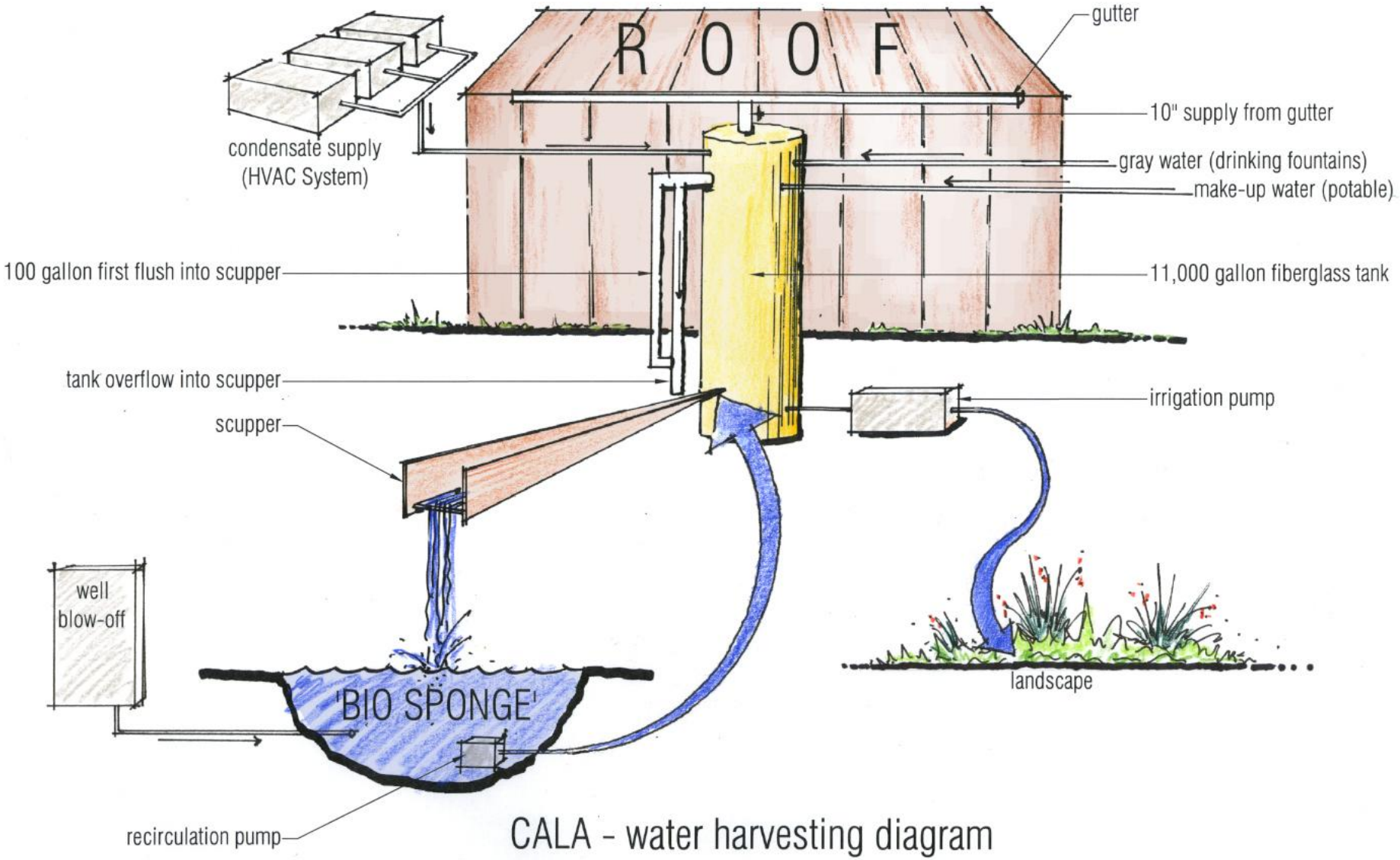
Water Collection and Storage

Well blow down

CALA Water Balance

Landscape needs: 280,310 gal
Water captured: - 230,000 gal
Deficit: 50,310 (met by potable water)

Reduction of potable water use: 83%
Projected reduction of 100% by 2010

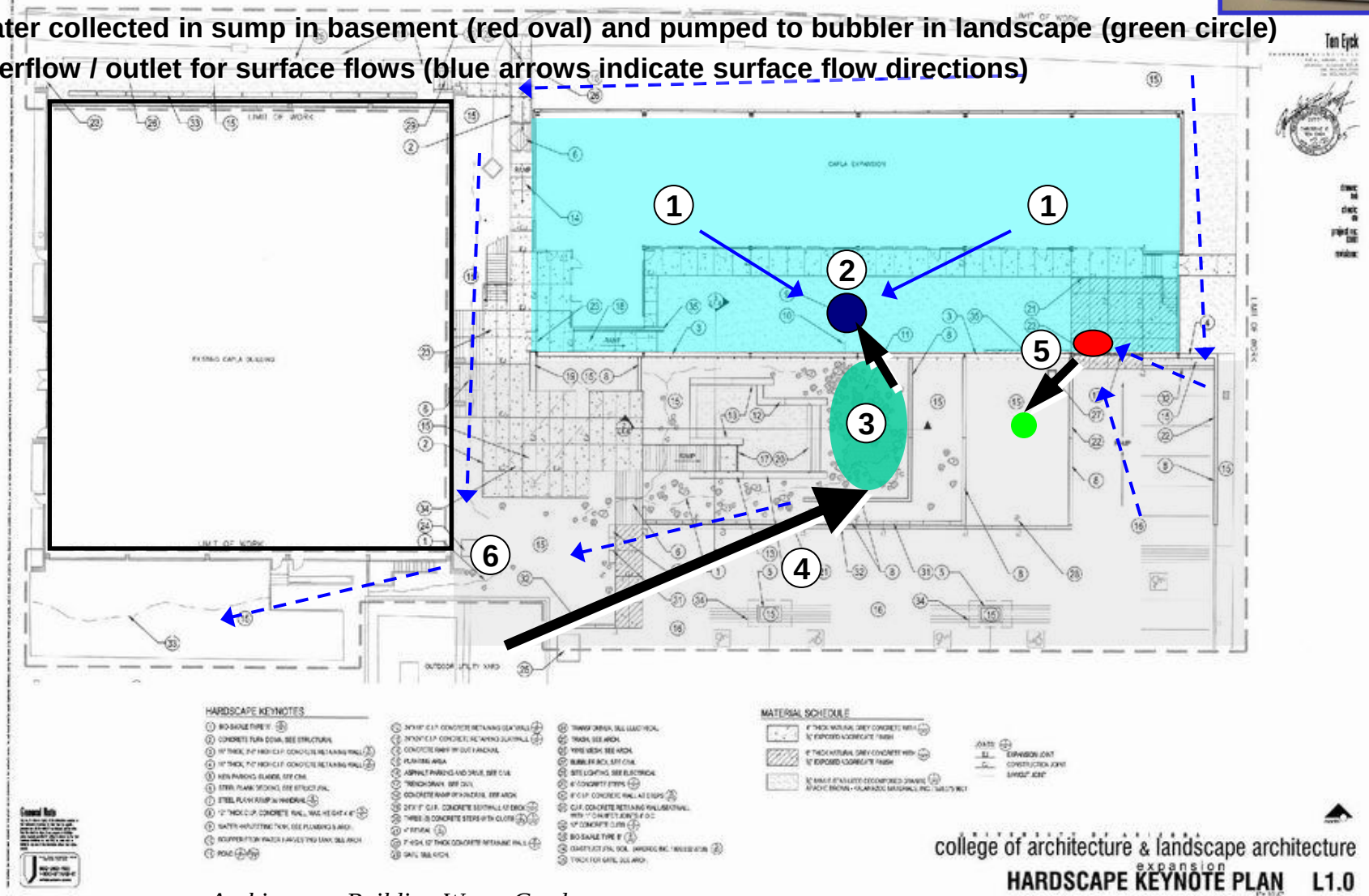


CALA - water harvesting diagram

Flows

Urban Response – Surface and Subsurface Structures - Tanks

1. **Watershed – CALA building addition roof runoff & AC condensate directed to cistern**
2. **Cistern (blue circle) integrated into 3-story building. Overflows via scupper into pond. Water is used to irrigate landscape using pump.**
3. **Pond – fed by cistern, surface collection. Re-circulates through scupper**
4. **Supplemental water source for pond – well water flushed as part of normal operation**
5. **Water collected in sump in basement (red oval) and pumped to bubbler in landscape (green circle)**
6. **Overflow / outlet for surface flows (blue arrows indicate surface flow directions)**



Architecture Building Water Garden

Bear Down Field Detention Tanks

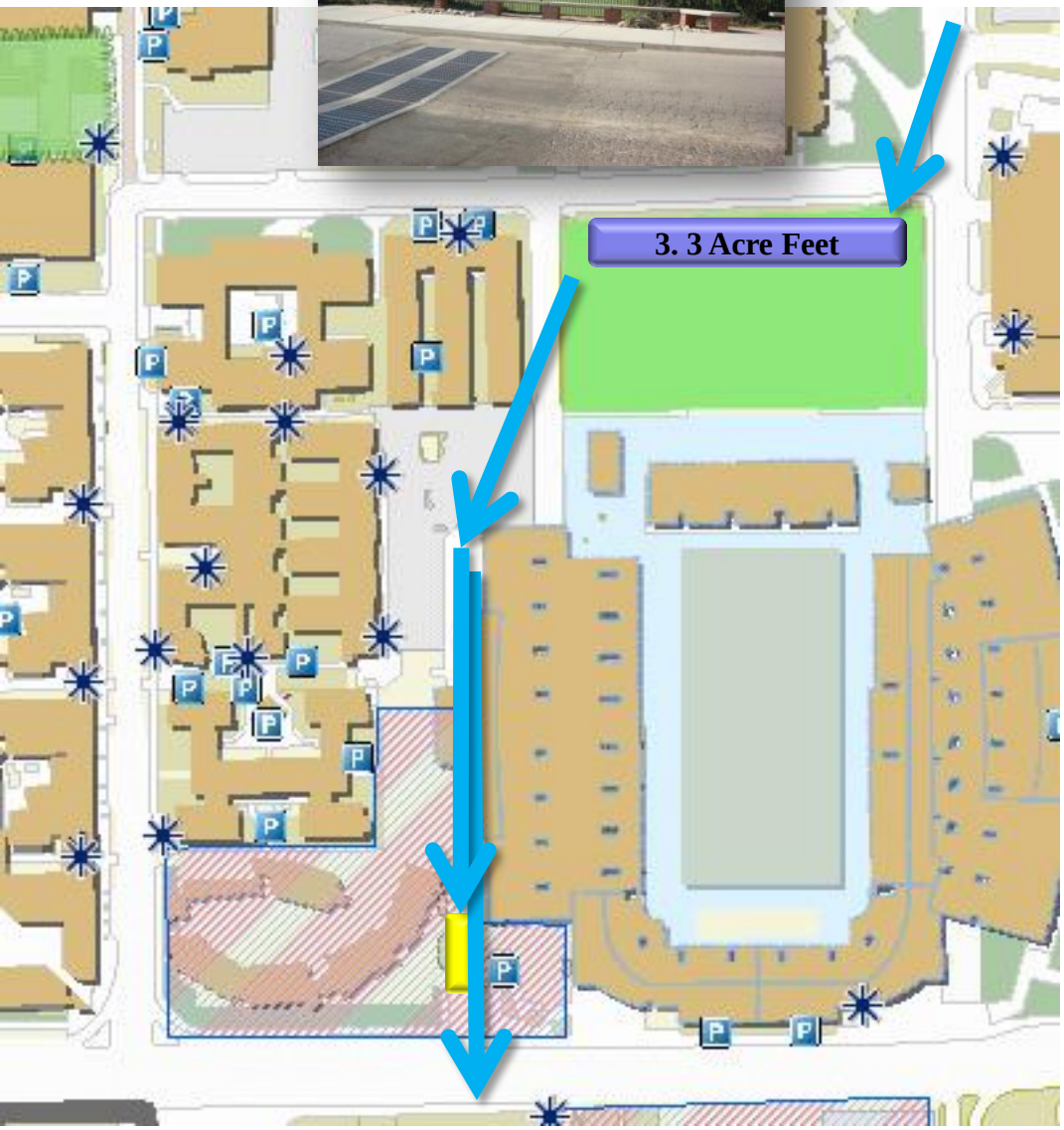
and

Likens Residence Hall

2010


OVERSIZE LOAD

Bear Down Field Tank



Bear Down Field tank and Sixth Street Residence Hall Landscape Integration

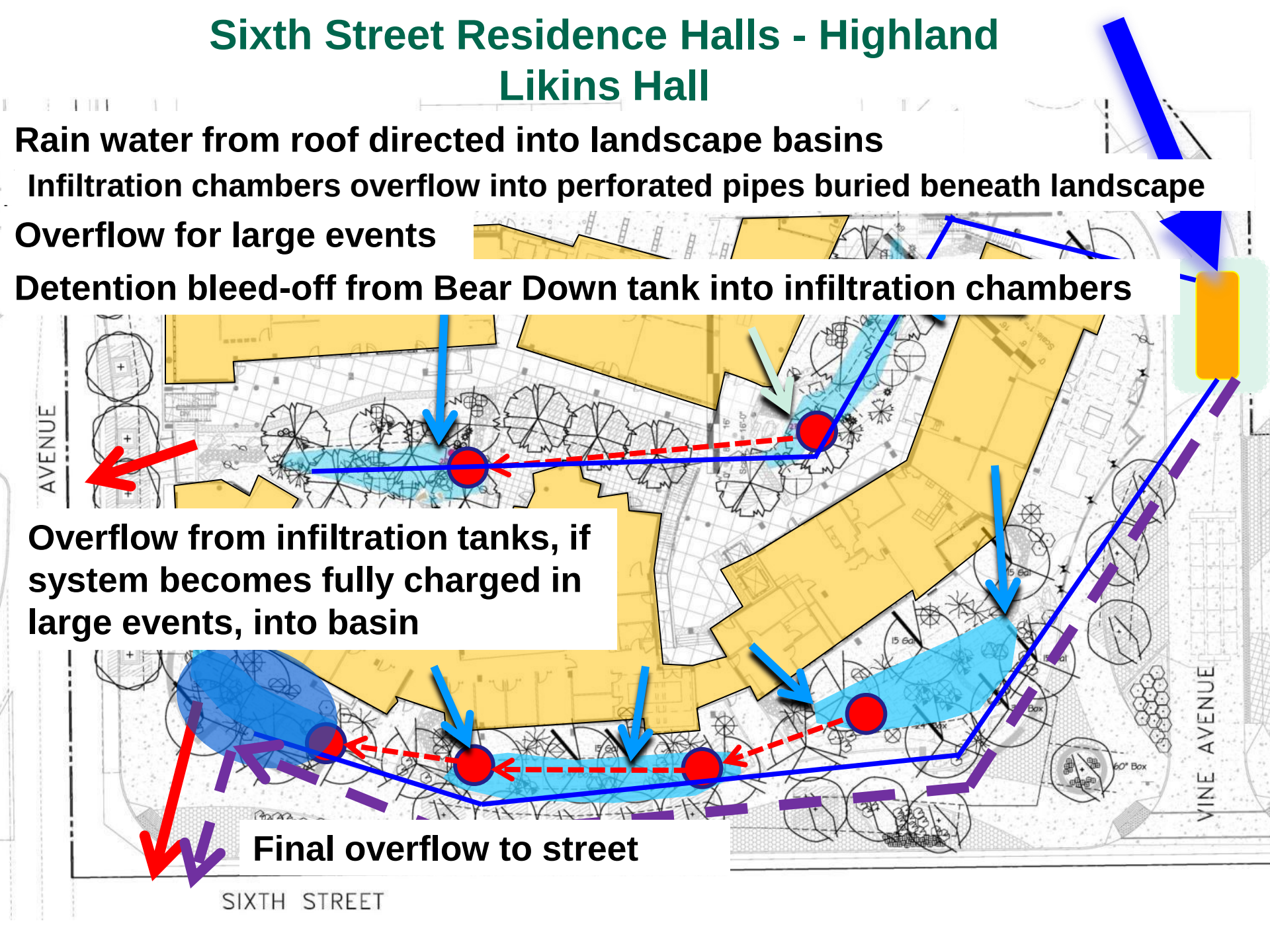
Sixth Street Residence Halls - Highland
Likins Hall

Rain water from roof directed into landscape basins

Infiltration chambers overflow into perforated pipes buried beneath landscape

Overflow for large events

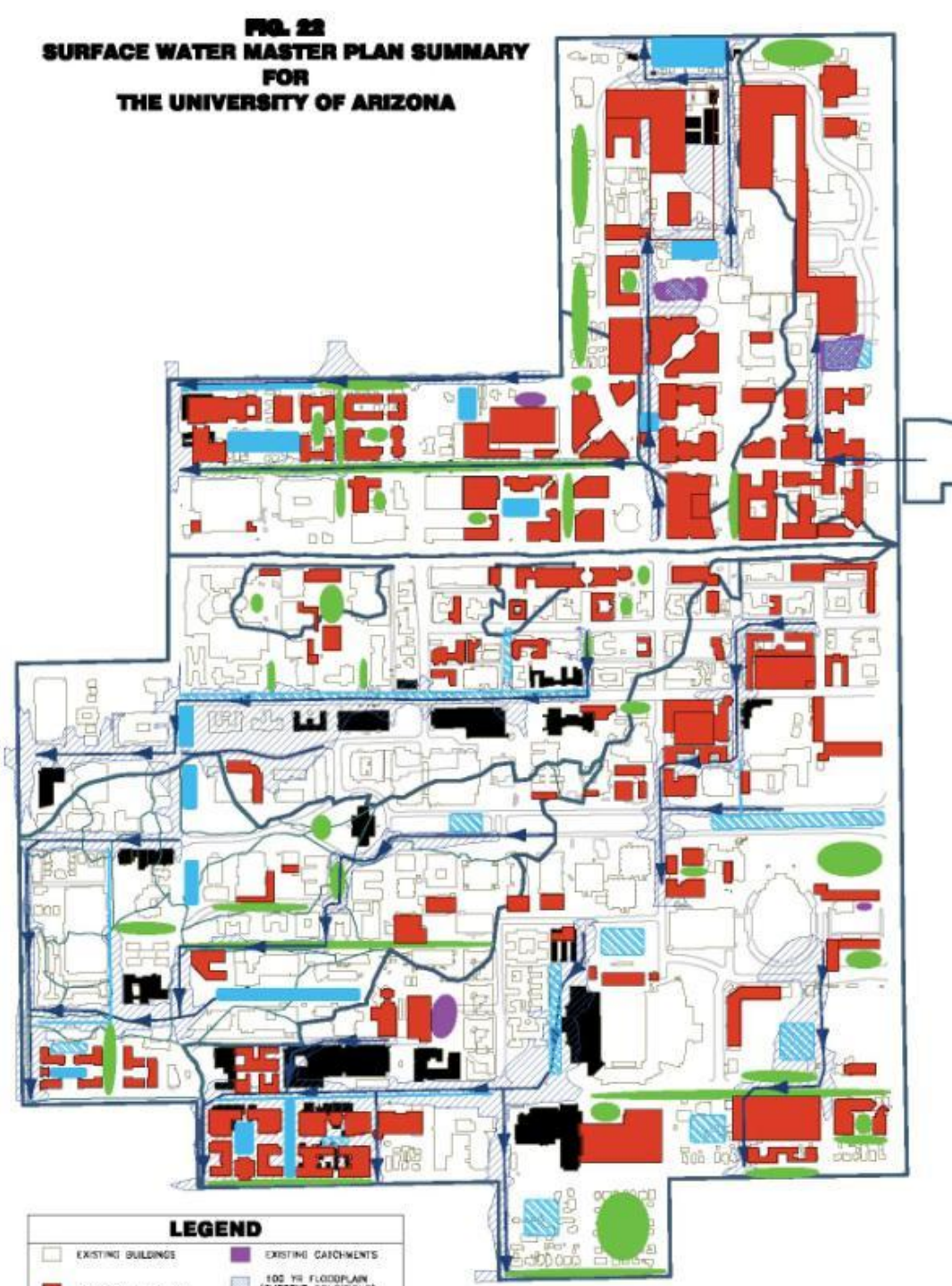
Detention bleed-off from Bear Down tank into infiltration chambers



Overflow from infiltration tanks, if system becomes fully charged in large events, into basin

Final overflow to street

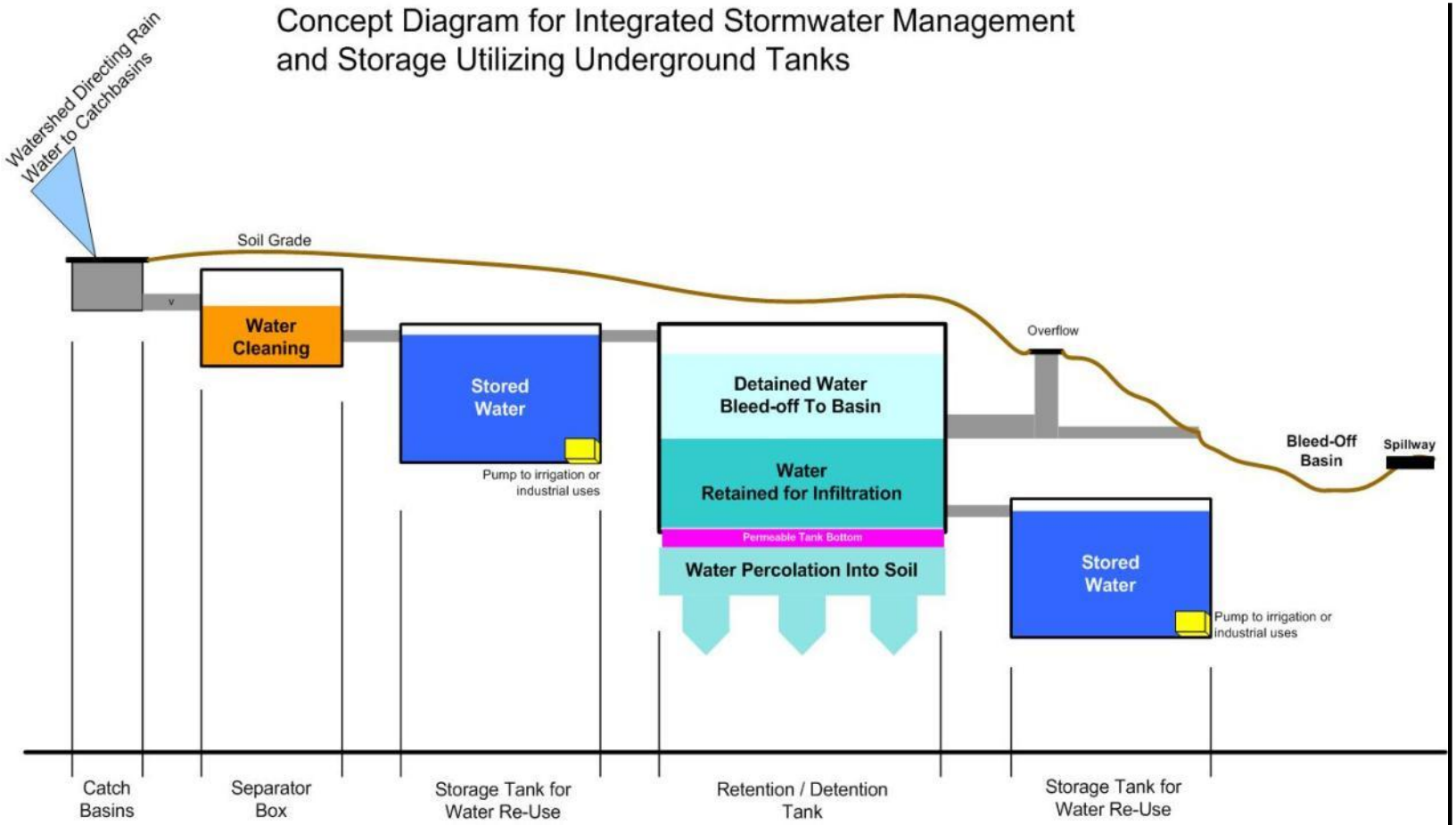
Surface Water Master Plan



Air Conditioning Condensate

UNDERGROUND STORMWATER
COLLECTION AT MALL

U OF A
STORMWATER UPDATE



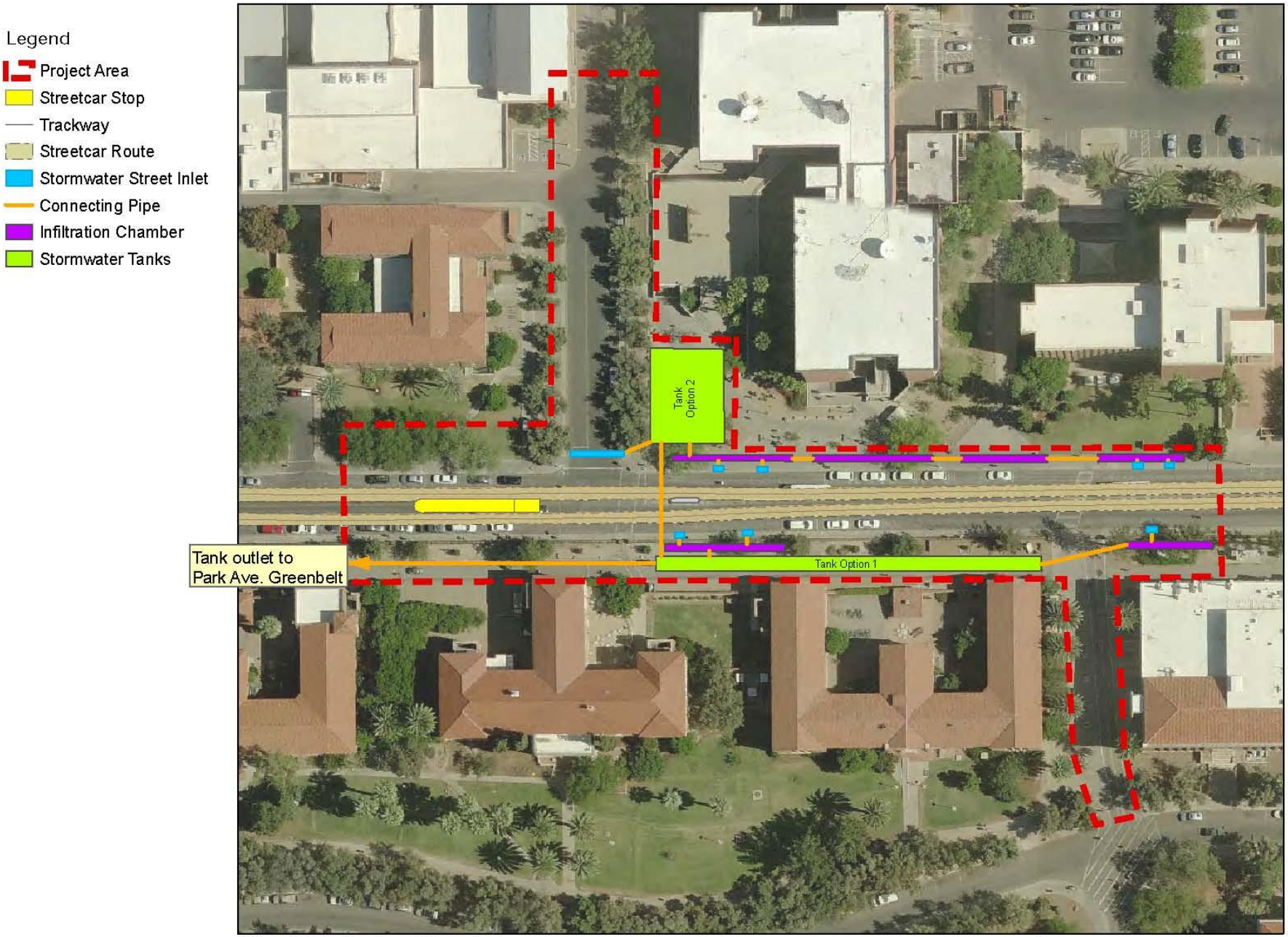


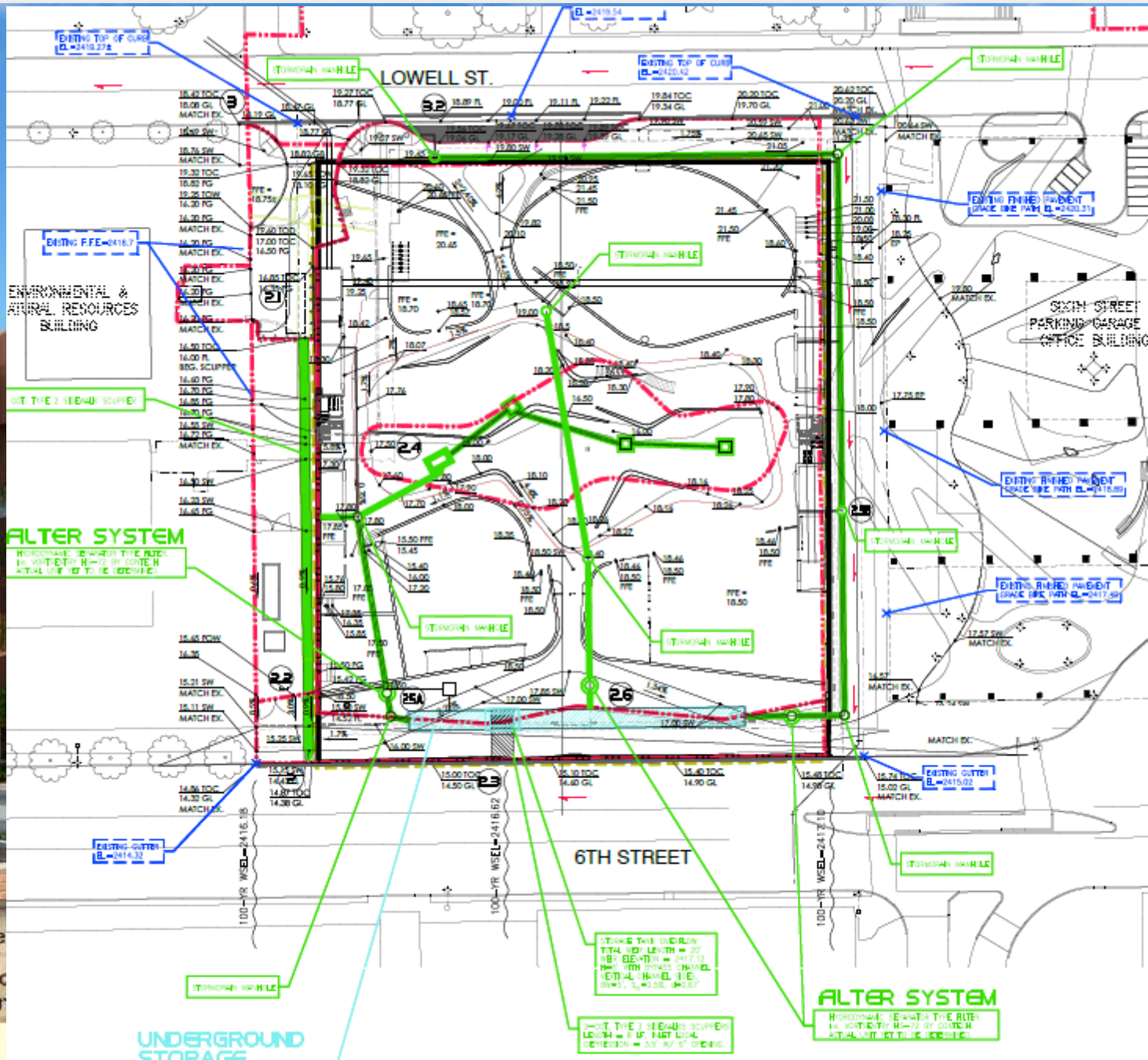
FIGURE 5

Olive Site - Surface Water Improvements

Planning, Design, and Construction - June 2012

ENR2


Subsurface Ciste
Internal Co
Landscape In


LOWELL ST.
6TH STREET
ENVIRONMENTAL & NATURAL RESOURCES BUILDING
SIXTH STREET PARKING GARAGE OFFICE BUILDING
ALTER SYSTEM
ALTER SYSTEM
UNDERGROUND STORAGE
STORMDRAIN MANHOLE
EXISTING TOP OF CURB
EXISTING GUTTER
EXISTING FINISHED PAVEMENT GRADE BIKE PATH
100-YR WSEL=2416.18
100-YR WSEL=2416.62
100-YR WSEL=2417.10

Other Tucson Sites

Via Campestre Streetscape

Nature Conservancy Building

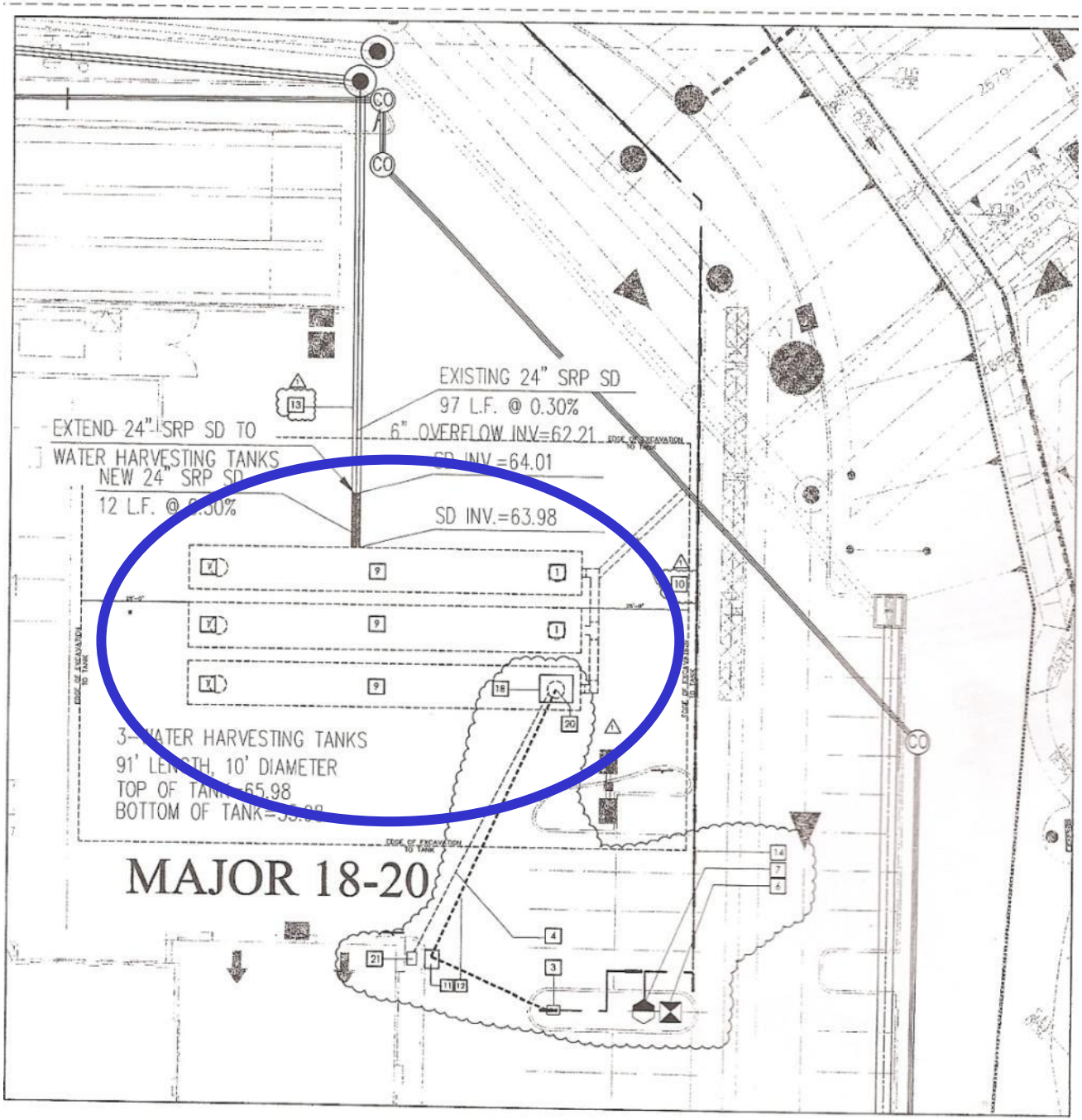
Oro Valley Marketplace

Target

Via Compestre Streetscape

Iconic Cistern


Oro Valley Marketplace


EXISTING 24" SRP SD
97 L.F. @ 0.30%
6" OVERFLOW INV=62.21
SD INV.=64.01
EXTEND 24" SRP SD TO
WATER HARVESTING TANKS
NEW 24" SRP SD
SD INV.=63.98
3- WATER HARVESTING TANKS
91' LENGTH, 10' DIAMETER
TOP OF TANK=65.98
MAJOR 18-20

Target