Campus Water and Stormwater Management

Eileen Cashman
Professor, Environmental Resources Engineering

Traci Ferdolage
Associate Vice President, Facilities
Humboldt State University

WRPI Conference, June 20, 2013

Sustainability at HSU

HSU is working on a number of projects related to water sustainability.

Parking lot retrofits

TAKE BACK THE TAP

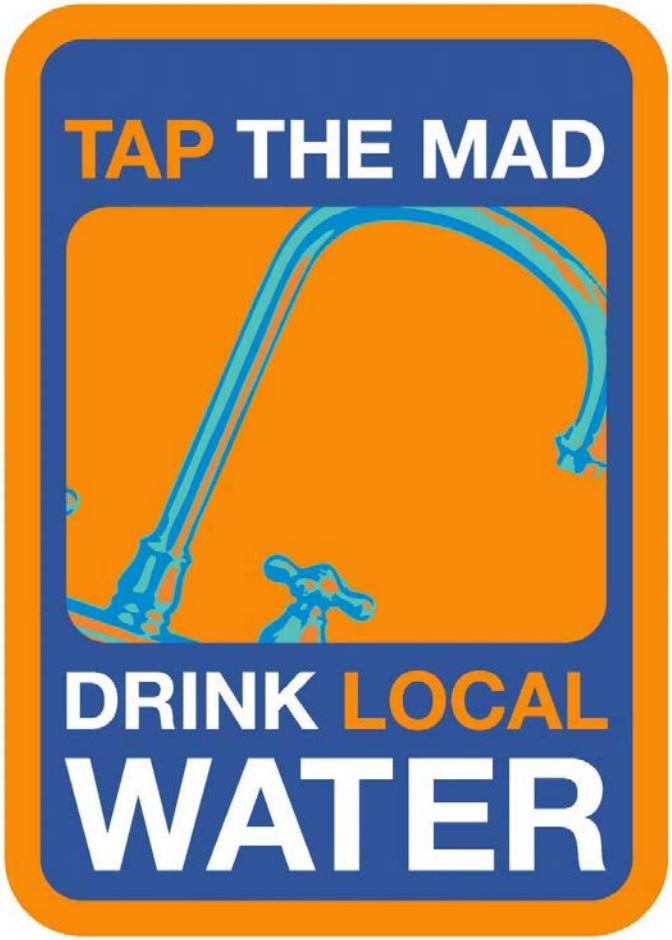
www.foodandwaterwatch.org

"I pledge to consider the social and environmental consequences of my future actions and associations."

https://www.facebook.com/HighSchoolPledge

Photo credit: Kellie Brown, Humboldt State University

Take Back the Tap



http://www.humboldt.edu/wrrap/tbtt

In spring of 2009, two hydration stations were installed as a pilot project sponsored by **Take Back the Tap**.

Photo credit: Kellie Brown, Humboldt State University

The $4500 hydration stations were funded by the Humboldt Energy Independence Fund.

Humboldt State University

Taps into Water and Energy Savings

Humboldt Energy Independence Fund has installed filtered water bottle refill stations on drinking fountains across campus. Filling a reusable bottle helps you save money, reduce the environmental and societal impacts of bottled water production, and increase campus sustainability.

Being #1 Isn't Always a Good Thing

Disposable water bottles are made from #1 plastic called polyethylene terephthalate (PETE). In the U.S., 29 billion bottles of water are sold every year, most of which are never recycled.

1
PETE

Join our campus community by using a reusable water bottle to reduce our energy footprint!

Campus restroom faucets have been retrofit with aerators that reduce flow from 2.2 gpm to 0.5 gpm.

125 faucets have been retrofit since summer 2011 resulting in a 77% reduction in water use from those faucets.

HUMBOLDT STATE HAS STOPPED selling plastic water bottles on campus, making it the first public university in California and just the third in the nation to do so.

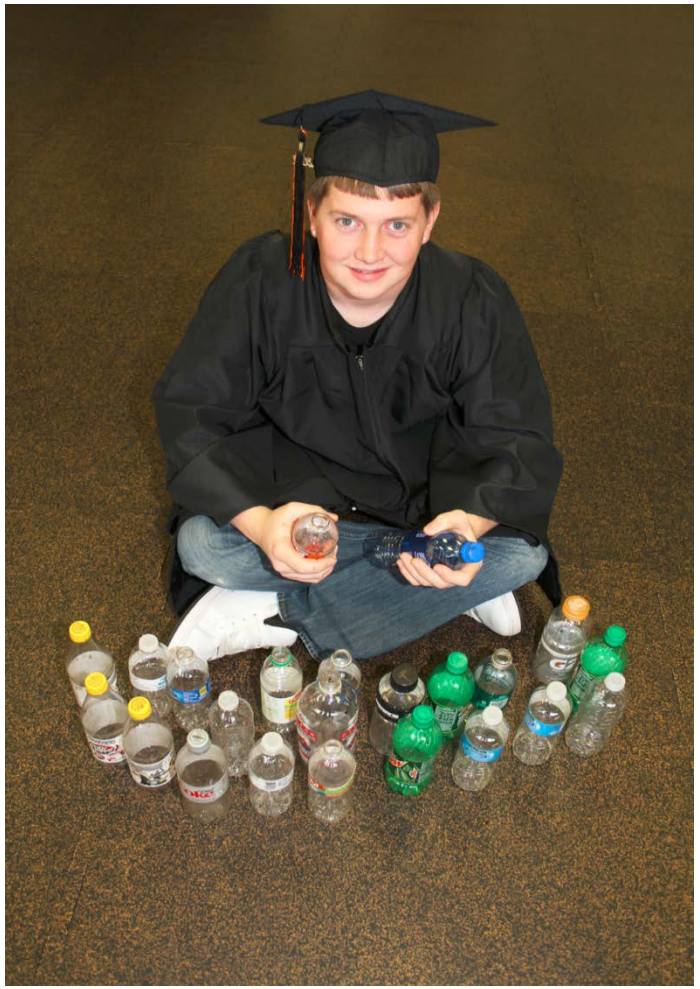
the Green Scene
Sustainability Matters at HSU

Photo credit: Kellie Brown, Humboldt State University

There is no bottled water available at HSU graduation ceremonies.

Photo credit: Kellie Brown, Humboldt State University

The Campus Center for Appropriate Technology rents graduation cap and gowns made out of recycled plastic bottles.



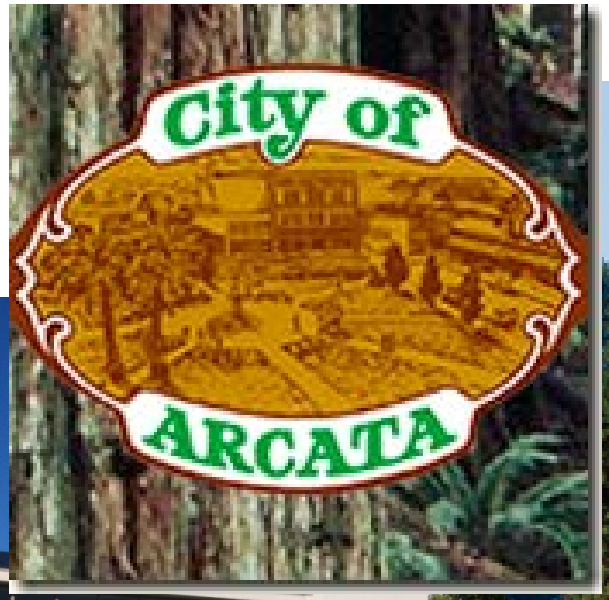
https://oakhalli.com/GreenWeaver-Recycled-Gowns.html

HSU is working to make campus events **Zero-Waste Events**.

Photo credit: Kellie Brown, Humboldt State University

HSU Grounds department has significantly increased the use of natural mulch as ground cover.

The parking lot retrofit is a unique partnership between the City of Arcata, Humboldt State and Arcata High School.




Jolly Giant Creek
Approximate location of underground culvert
Location where Jolly Giant Creek is daylighted
Fern Lake Overflow Culvert
Fern Lake
College Creek
Fern Creek
Campbell Creek
N
0
500 ft

The project targets existing parking lots in need of maintenance and repair.

The focus is on implementation of bioswales and rain gardens.

http://www.water-research.net/images/biorentionparking.jpg

City of Arcata
Environmental Services

City of Arcata

Arcata LID Parking Lot Retrofit Project

HSU-14th St & B St Potential Retrofit Site

NORTH

0 40 Feet

B St

HSU-14TH ST
PARKING LOT

14th St

Union St

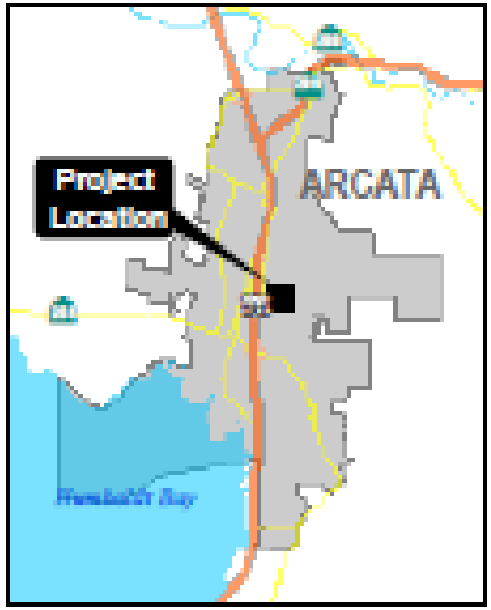
14th St

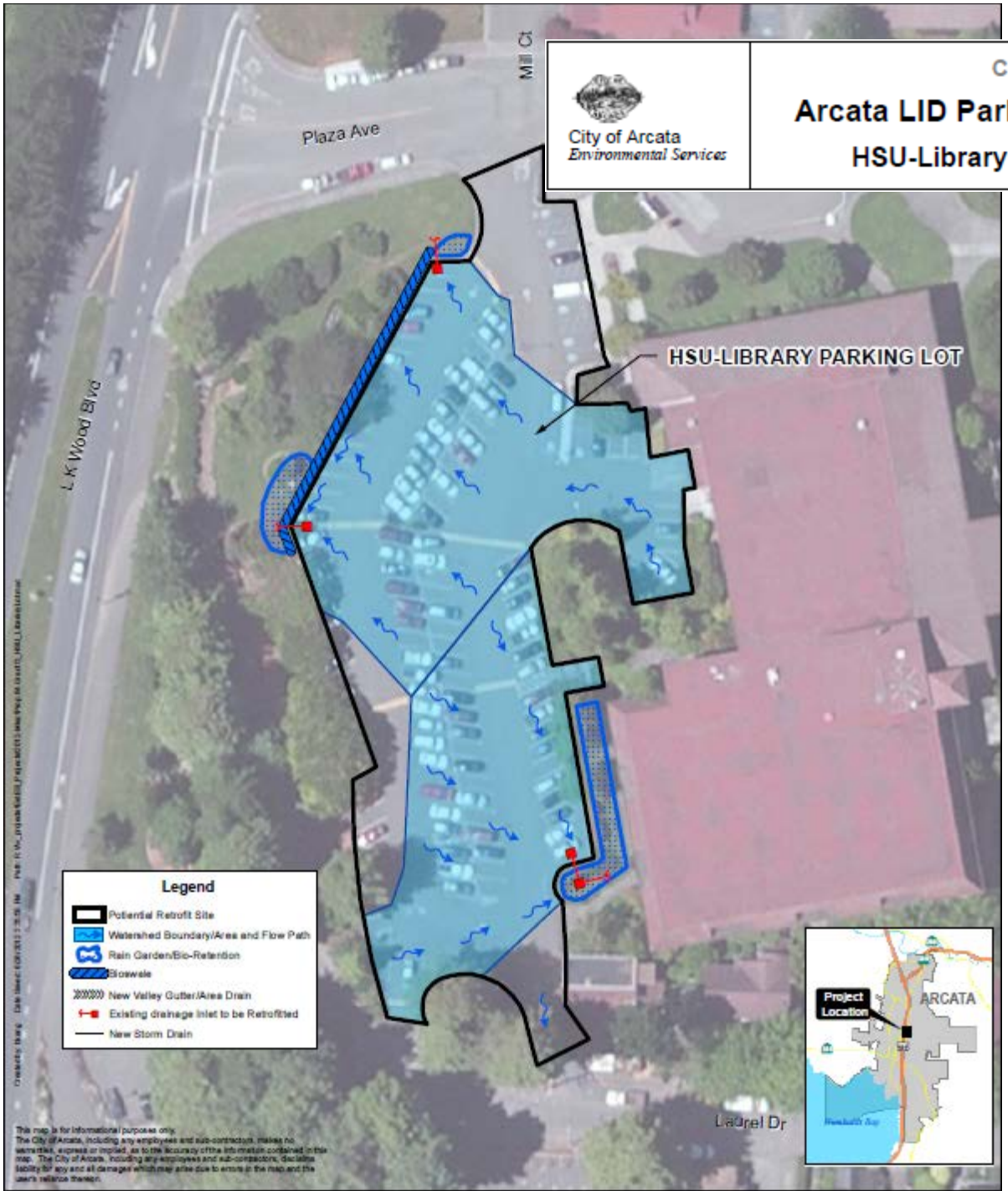
A St

Legend

- Potential Retrofit Site
- Watershed Boundary/Area and Flow Path
- Rain Garden/Bio-Retention
- Bioswale
- New Valley Gutter/Area Drain
- Existing drainage Inlet to be Retrofitted
- New Storm Drain

Legend
Potential Retrofit Site
Watershed Boundary/Area and Flow Path
Rain Garden/Bio-Retention
Bioswale
New Valley Gutter/Area Drain
Existing drainage Inlet to be Retrofitted
New Storm Drain





City of Arcata
Environmental Services

City of Arcata

Arcata LID Parking Lot Retrofit Project

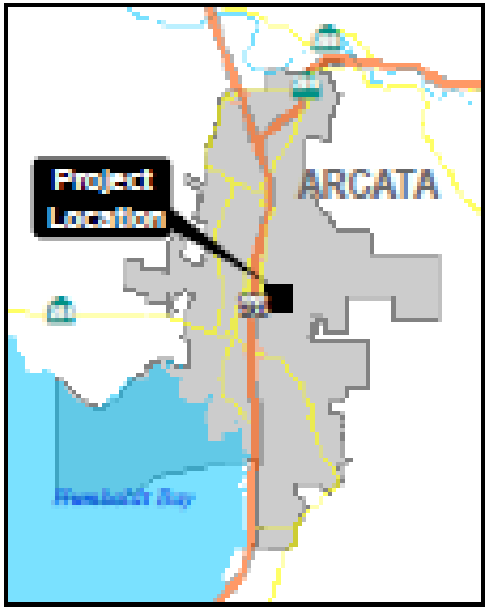
HSU-Library Potential Retrofit Site

NORTH

0 40 Feet

Legend

- Potential Retrofit Site
- Watershed Boundary/Area and Flow Path
- Rain Garden/Bio-Retention
- Bioswale
- New Valley Gutter/Area Drain
- Existing drainage inlet to be Retrofitted
- New Storm Drain



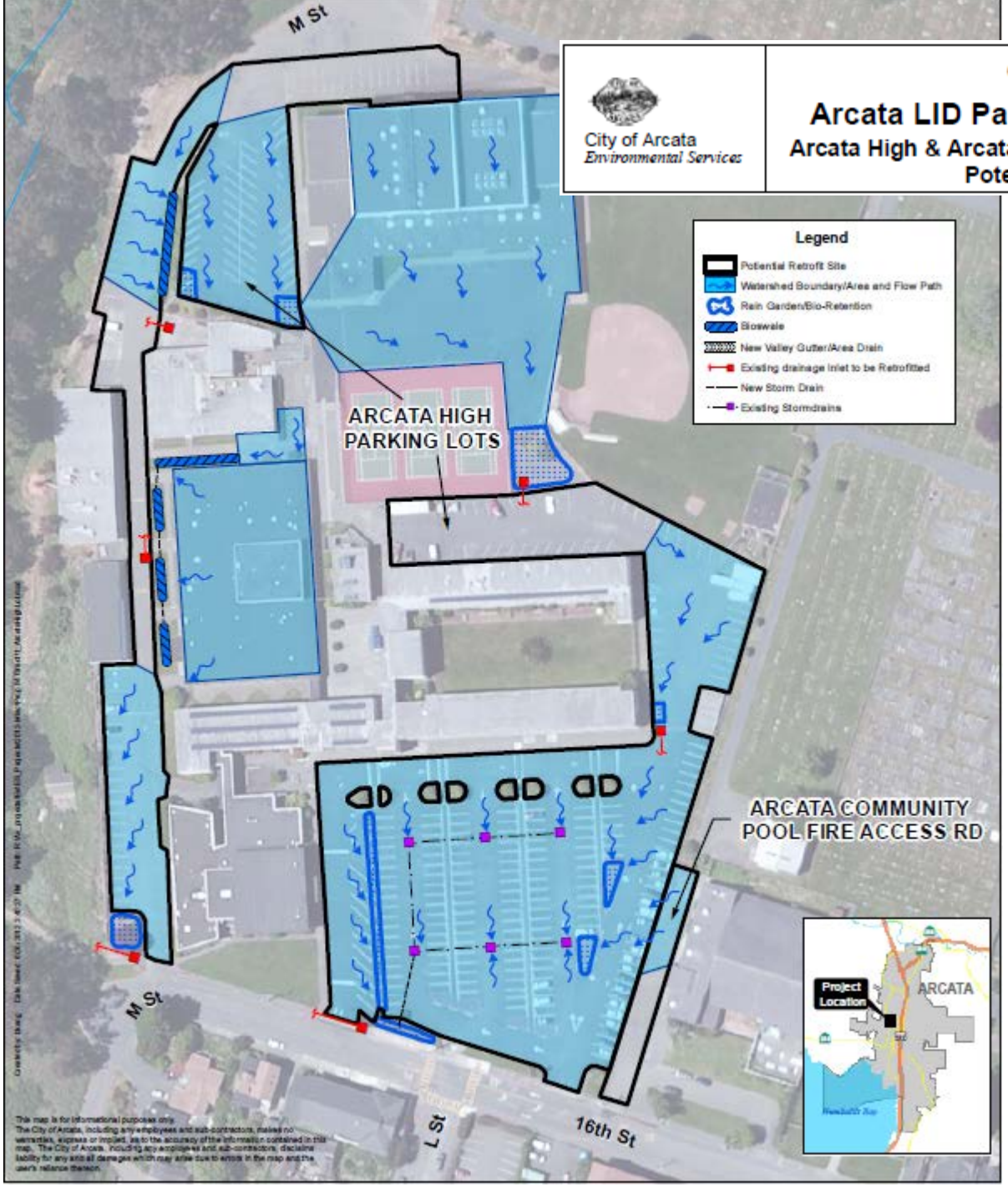
City of Arcata
Environmental Services

City of Arcata

Arcata LID Parking Lot Retrofit Project

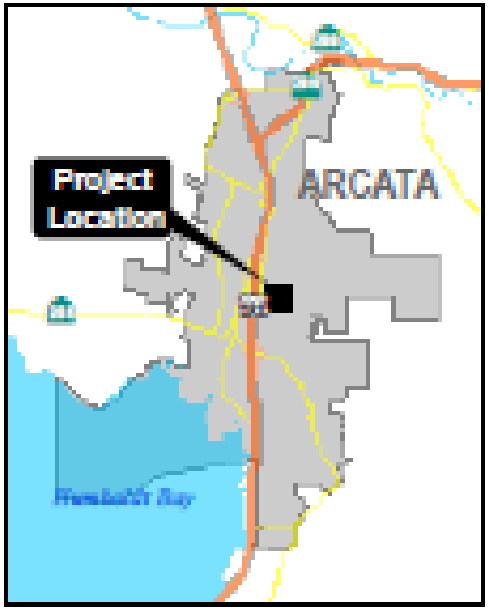
Arcata High & Arcata Community Pool Fire Access Rd
Potential Retrofit Sites

NORTH
0 50 Feet



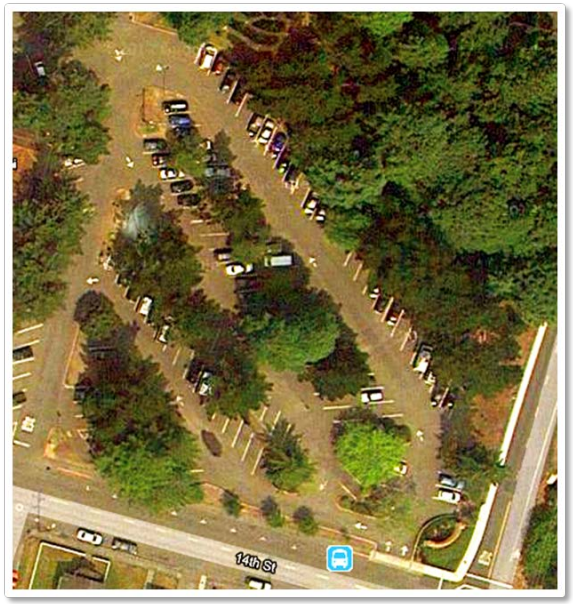
Legend

- Potential Retrofit Site
- Watershed Boundary/Area and Flow Path
- Rain Garden/Bio-Retention
- Bioswale
- New Valley Gutter/Area Drain
- Existing drainage inlet to be Retrofitted
- New Storm Drain



The parking lot retrofits will include students for pre and post monitoring, design review and analysis.

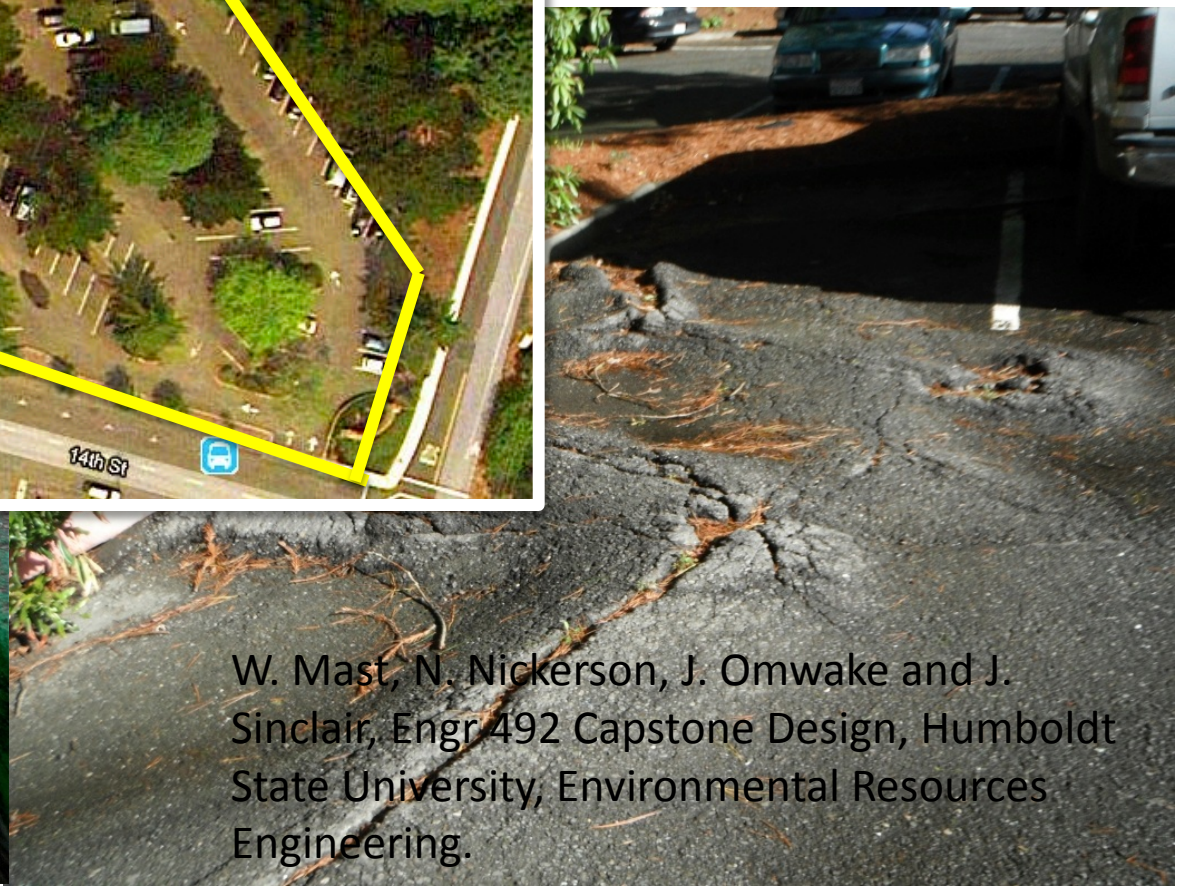
ERE Capstone student design for 14th and Union



14th and Union Parking Lot

W. Mast, N. Nickerson, J. Omwake and J. Sinclair, Engr 492 Capstone Design, Humboldt State University, Environmental Resources Engineering.

ERE Capstone student design for 14th and Union Parking Lot



W. Mast, N. Nickerson, J. Omwake and J. Sinclair, Engr 492 Capstone Design, Humboldt State University, Environmental Resources Engineering.

The parking lot configuration increases the number of parking spaces and preserves trees.

W. Mast, N. Nickerson, J. Omwake and J. Sinclair, Engr 492 Capstone Design, Humboldt State University, Environmental Resources Engineering.

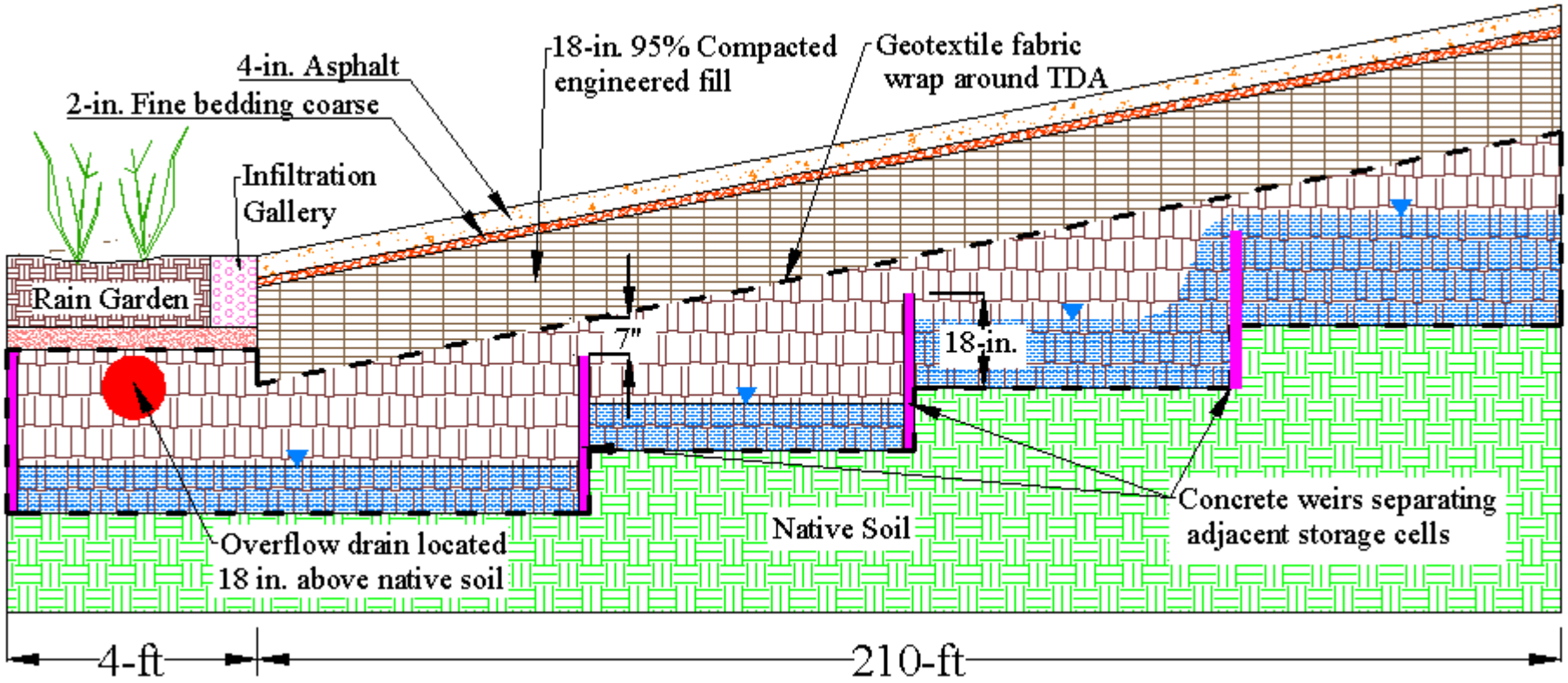
ERE students designed a permeable pavement lot and evaluated two subsurface designs.

Tire Derived Aggregate (TDA)

Shallow Storage

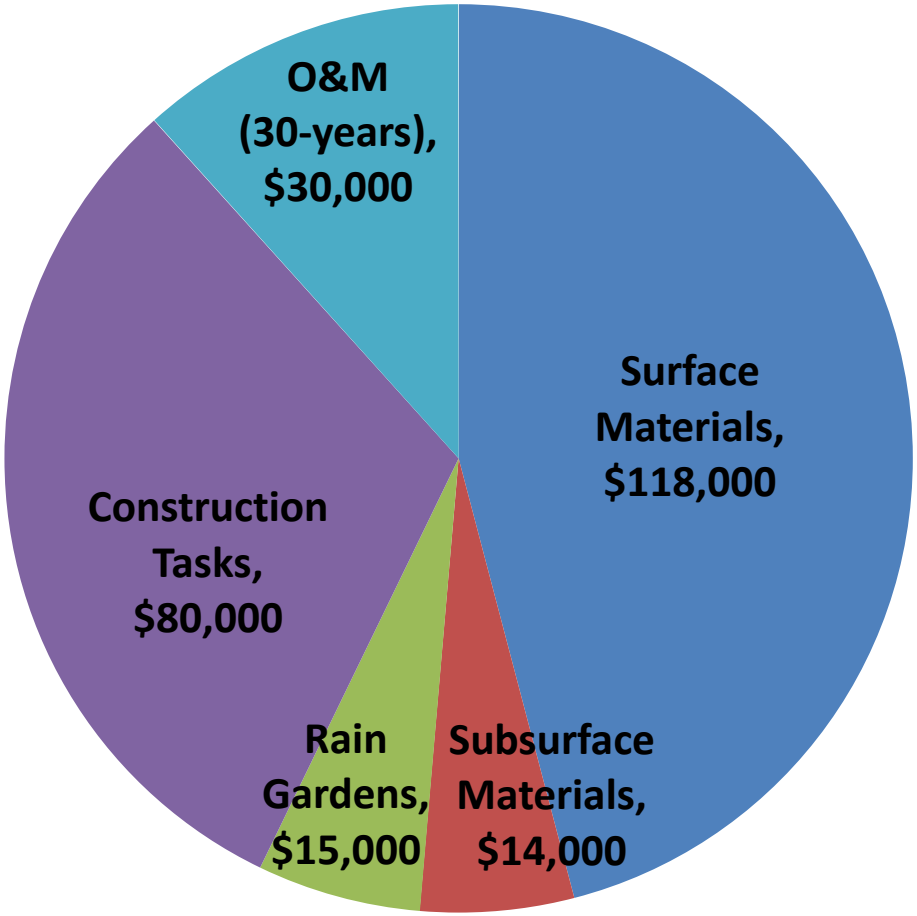
W. Mast, N. Nickerson, J. Omwake and J. Sinclair, Engr 492 Capstone Design, Humboldt State University, Environmental Resources Engineering.

TDA Alternative Cross section



W. Mast, N. Nickerson, J. Omwake and J. Sinclair, Engr 492 Capstone Design, Humboldt State University, Environmental Resources Engineering.

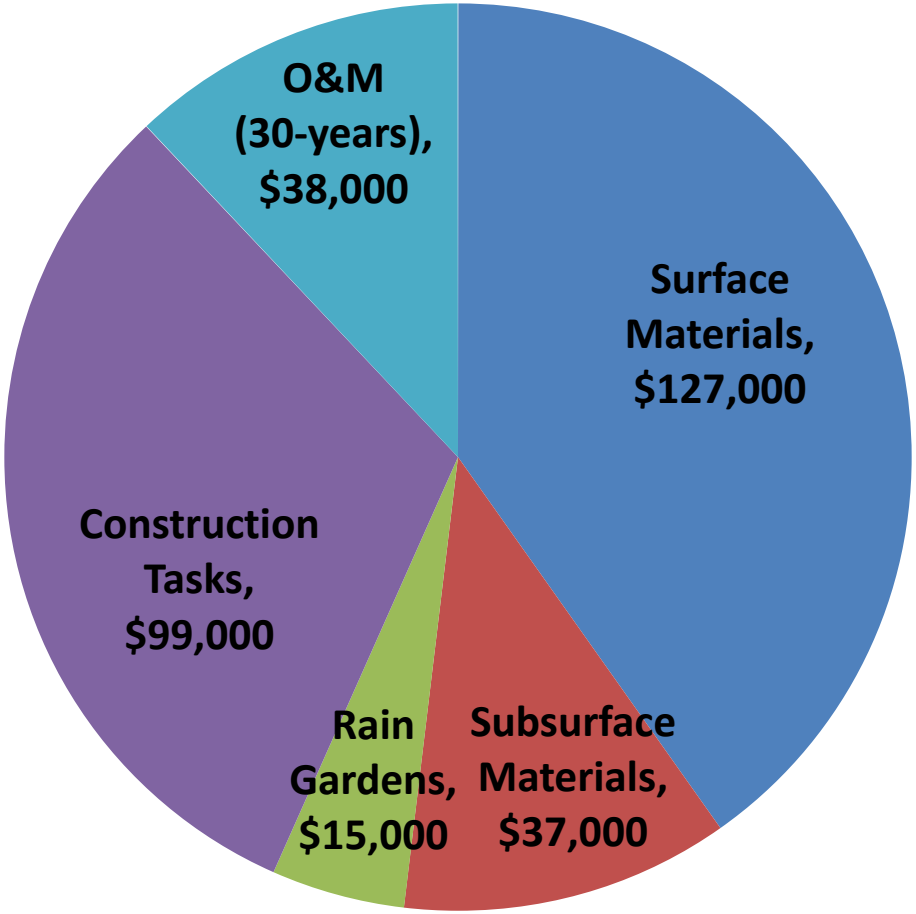
TDA Alternative



Total (With 20% Contingency)

$309,000

Shallow Alternative

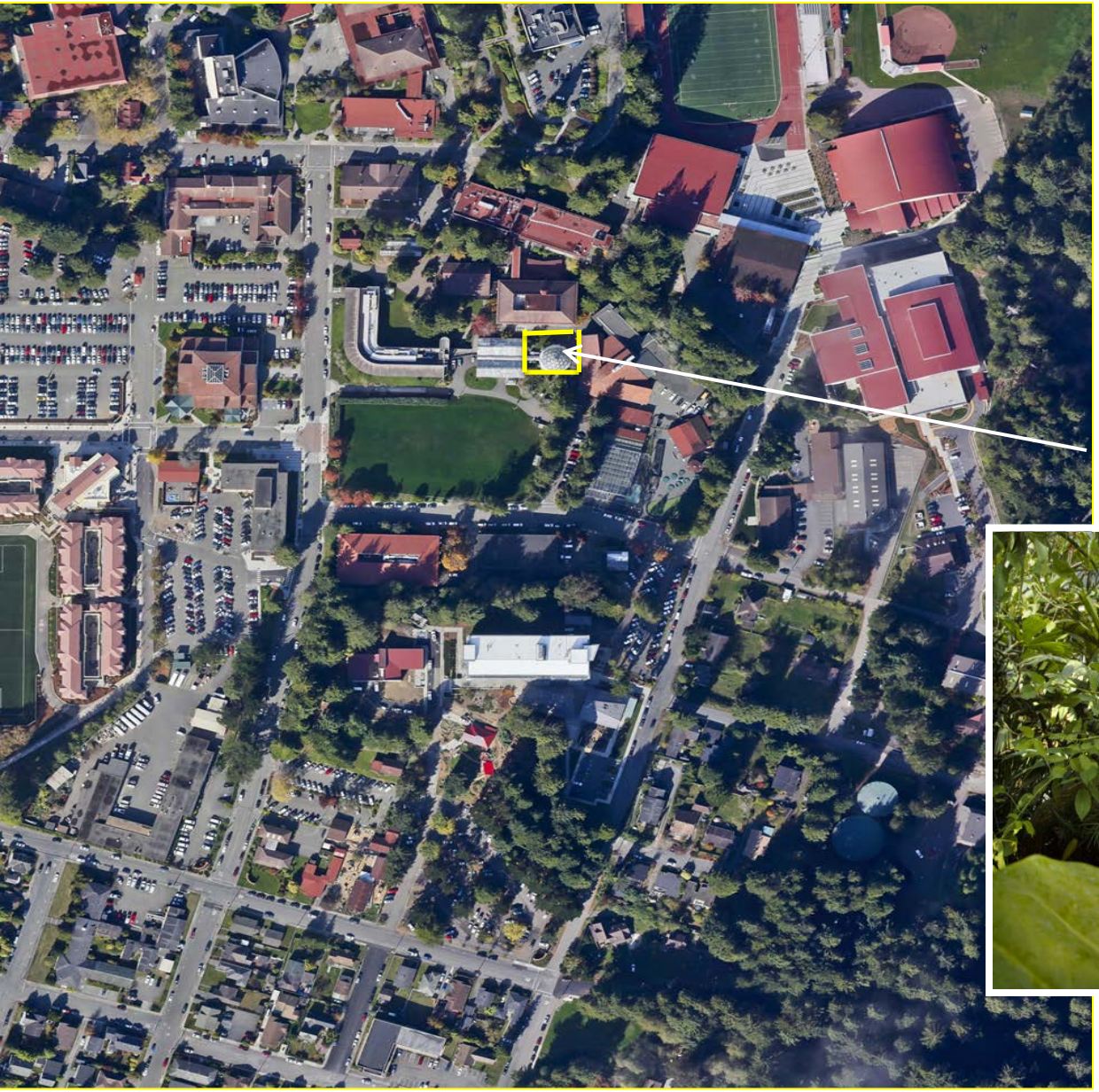


Total (With 20% Contingency)

$378,000

W. Mast, N. Nickerson, J. Omwake and J. Sinclair, Engr 492 Capstone Design, Humboldt State University, Environmental Resources Engineering.

Environmental Resources Engineering Students designed a rainwater catchment system.



HSU's Greenhouse

A system that incorporates a 1,000 gallon tank would have a capital cost of $3400, offset 25% of the annual water demand and result in annual savings of approximately $900.

1,000 gallon tank.

W. Mast, N. Nickerson, J. Omwake and J. Sinclair, Engr 492 Capstone Design, Humboldt State University, Environmental Resources Engineering.

Acknowledgements

- Mark Andres, Brian Kang, Julie Neander, City of Arcata, Environmental Services

- Jeremy Svehla, PE, Josh Wolf, PE, and Greg Garrison, EIT, ERE Alum.

- Sabrina Zink, Environmental Health and Safety, HSU

HSU Campus Stormwater Management Project
Fall 2012

Team PLGTG

John Omwake, Juliene Sinclair, Nanette Nickson, and Luke Mast

Team UA

Sterling Wallstrum, Jason Crowley, Matt Herman, Dane Noland, and Max Petras