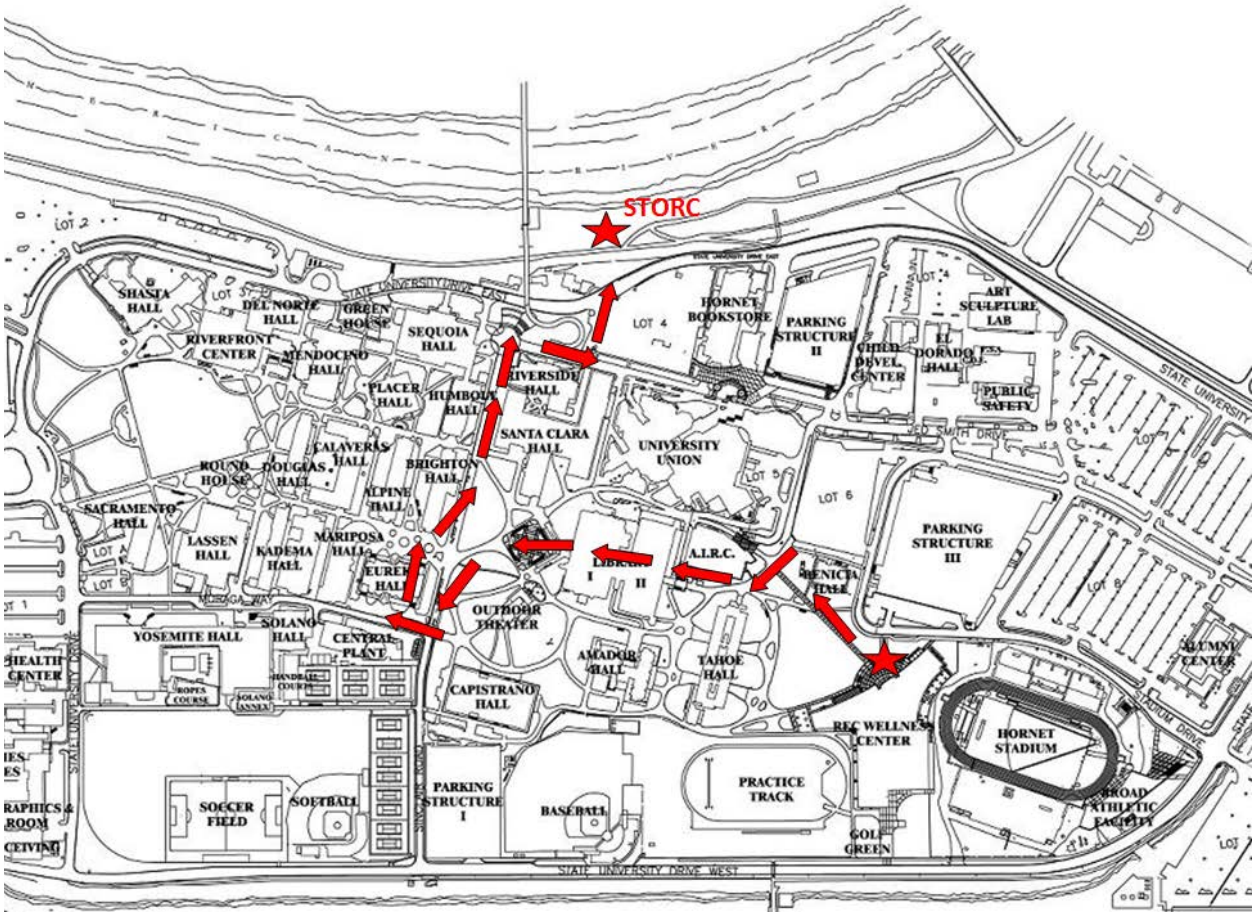
Campus Sustainability Highlights Walking Tour – 45 Minutes Length

Start at WELL entrance, exterior

1. The WELL – LEED gold, pharmacy Rx disposal, Peak Adventures Bike Shop
2. Solar panel ready PS#3 & The WELL Solar Panels
3. Hornet Stadium – artificial turf
4. Induction Lighting Poles
5. Lot 9 & 10 – Future home of solar farm, Composting Yard, Grounds to Grounds
6. Hornet Shuttles & Capital Public Radio
7. Benicia Hall Bike Compound
8. Benicia Hall Drought Tolerant Landscaping
9. Library Solar Panels
10. Grumpy Mule
11. Recycling and Waste Receptacle Signage
12. Library Quad – LID – Low Impact Development Project: rain gardens, bio swales, OWP water grant info
13. Redwoods – Earth Day Tree & Mulching
14. Redwoods – Tree Campus USA, Arboretum
15. Library Quad – Bike compound
16. Central Plant – Smart Grid
17. Brighton Hall – Sustainable plants, retaining wall
18. Humboldt – Toilets/bathroom fixture replacements, IR Faucets & Mendocino lighting project
19. Riverside – Engineering dept., Sr. students projects at STORC
20. American River – Guy West Bridge – River, bike path, mile 7/8 adoption, river clean-ups
21. Ernest E. Tschannen Science Complex – LEED highlights

End at STORC

Campus Sustainability Highlights Walking Tour – 45 Minutes Length



1. **The WELL** **(spoken at: The front of the WELL and inside the WELL lobby)**
   The WELL was awarded LEED Gold in 2010 for its many sustainable features like skylights and windows that let in natural lighting, gym wall panels made from the agricultural waste sunflower seeds and even—as you can see beneath your feet—broken Heineken bottles that were used as filler for the construction of the lobby floor. This building also features the Peak Adventures Bike Shop and our WELLness Center Pharmacy which features a collection bin for anyone in the Sacramento area to bring their unused or expired medication for responsible destruction ensuring that such items will not be flushed down the drain further polluting our drinking water.

2. **Solar Panels: The WELL and PS 3** **(spoken at: leaving from the WELL, walking)**
   There are 952 solar panels located on top of the WELL, visible from the Hornet Stadium stands, and generates 16% of the total energy for The WELL. Currently, there are no solar panels located on top of Parking Structure 3, however the infrastructure was built to be solar-ready.

3. **Hornet Stadium – artificial turf** **(spoken at: leaving from the WELL, walking)**
   Because we understand lawn-watering is the largest source of irrigation water use, we have changed out the football field to artificial turf, which means it doesn't have to be watered.

4. **Induction Light Poles** **(spoken at: leaving from the WELL in front of one of the green light poles)**
   The pathway induction lighting project produces 42% energy savings and lasts approximately 100,000 hours. The project removed 100 watt and 150 watt lamps and replaced them with 85 watt lamps throughout campus.

5. **Lot 9 & 10: Future Solar Farm Composting Yard** **(spoken at: leaving from the WELL, walking)**
   There are plans for parking lots 9 & 10 to have solar covered parking in the future. We are currently working on the scope of work for this project, which could include other areas on campus too.

   Also in that area, our composting yard in Lot 10 takes in campus green waste such as tree leaves and grass trimmings and students work to turn this waste into compost used all throughout campus. The University generates between 400 and 450 tons of green waste each year. Various technology including vermicomposting is found in our composting yard. This area is a hands-on learning facility for students. Another composting program at Sac State is our Grounds to Grounds program. Working together with our Dining Services department, we collect used coffee grounds from coffee shops throughout campus and our campus Grounds and Landscaping department uses the coffee grounds in the soils for our lawns and plants.

6. **Hornet Shuttles & Capital Public Radio Garden** **(spoken at: leaving from the WELL pointing out bus stop near Benicia Hall)**
   Sacramento State created a closed-loop system through a comprehensive organic waste diversion program benefitting our Hornet Shuttle system. The campus sends organic waste collected in Housing and Residential Life's Dining Commons to the local Clean World anaerobic digestion facility where the material is made into bio-compressed natural gas (bio-CNG). This bio-CNG is used to power the fleet of campus shuttles creating a sustainable transportation source for the entire campus community. This process helps to offset 301.5 metric tons of greenhouse gas emissions annually!

   Capital Public Radio, located right here toward the Folsom Blvd entrance of campus has a backyard garden that includes a series of raised beds for plantings, fruit trees, and even beehives. The garden provides fresh fruit and vegetables to local Sacramento food banks, and plans to work to support and enhance school lunch programs in select urban schools.

7. **Benicia Hall Bike Compound** **(spoken at: Benicia Hall Bike Compound)**
   In spring 2014 a Bicycle Task Force comprised of members of Facilities Management and University Transportation and Parking Services created a plan to transform Sac State into a more

bicycle-friendly campus. These changes included three new bicycle compounds with over 400 new parking spots; two new skateboard towers capable of holding up to 40 skateboards and scooters; and new bicycle traffic lanes throughout campus consisting of designated "Pedestrians Only" zones to ensure the safe passage of both pedestrian and bicyclist. We are now registered with the League of American Bicyclists, an organization that promotes using bikes on campus. This is also the first step toward becoming an officially recognized Bike Friendly Campus.

8. **Benicia Hall Drought Tolerant Landscaping (spoken at: Next to Benicia Hall bike compound in front of new landscaping)**
   Here is another effort to save water. Sac State has a continuing effort to identify areas of the campus in which grassy areas can be replaced with drought tolerant landscaping such as climate appropriate plants, which require little water, to decomposed granite and rocks which require no water at all!

9. **Library Solar Panels (spoken at: walking toward Library Breezeway, referencing the roof)**
   There are 1134 panels atop the Library and can be seen from the 5th floor of Amador Hall. The system has been operational since April 2013 and generates 40% of the building's total energy. The total combined solar from the WELL and Library combined is approx. 440 kilowatts with an annual approx. production of 700,000 kilowatt hours per year. **That's enough energy to supply more than 64 US homes' average energy needs a year! (source: https://www.eia.gov/tools/faqs/faq.php?id=97&t=3)** Our carbon footprint will be reduced by approx. 216 metric tons of CO_2 per year because of it.

10. **Grumpy Mule – Library breezeway (spoken at: inside Library Breezeway in front of Grumpy Mule)**
    Sac State is the first location in the United States to have a Grumpy Mule Coffee Shop. Originating in the UK, Grumpy Mule's coffee sourcing practices are Fairtrade, organic, and part of the Rainforest Alliance, and they stand behind every single bean reflecting their commitment to sustainable business. Fun fact, they also do fun latte art!

11. **Recycling & Waste Receptacle Signage (spoken at: Bottom of Library Ramp, Union side)**
    Educational signage on campus recycling and waste receptacles are a result of a thesis project conducted by Sac State MBA students whose findings showed that signage with pictures help increase the probability the correct receptacle is chosen for disposal needs. This signage is now the new campus standard.

12. **LID – Low Impact Development Project: rain gardens, bio swales, OWP water grant info (spoken at: after Library Fountain, walking through the Quad)**

    In 2015, Sacramento State's Office of Water Programs (OWP) and Facilities Management teamed with the City of Sacramento to install new stormwater management devices on campus. The $3 million granted-funded project removed large areas of turf and included the construction

of 25 LID stormwater capture and treatment devices on campus. The devices included bioretention planters, bioswales, rain gardens, rooftop disconnects, porous pavement, and a green street. The devices are designed to capture and treat over 13 acre-feet of stormwater runoff every year and increase ground water used for campus irrigation. As a result of the implementation of Sacramento State's stormwater management system, 3.2 million gallons of rainwater were harvested by the University in 2015. There are currently 7 bioretention devices that treat stormwater runoff throughout campus. A link to a walking tour can be found on the OWP website.

13. **Earth Day Tree & Mulching** **(spoken at: Redwoods corner)**
    During the 2016 campus Earth Day celebration, President Nelsen helped in planting our Earth Day tree using Sac State made compost from our Composting Yard. The campus adds different types of mulching agents such as wood chips, organic compost and used coffee grounds to trees and plants to reduce the need for water. As you know, mulch keeps more moisture in the soil which means less watering overall. We also place educational signage in the places we have mulched.

14. **Tree Campus USA** **(spoken at: in front of the Arbor Day planted tree, across the street from Eureka)**
    There's nothing greener than a tree and this campus has over 3,000 of them including 1200 located in our University Arboretum at the North end of campus. Here, however you can see our first Arbor Day tree. This tree and the successive trees that have been planted each year since this tree have helped us to qualify as a Tree Campus USA! We have earned this designation every year since 2012.

15. **Library Quad Bike Compound** **(spoken at: New bike compound at the corner of Eureka Hall, standing on the Eureka Hall side of the street)**
    This is the largest of the campus bicycle compounds. The compounds added over 400 new bicycle parking spots, 80 skateboard parking spots and, as you can see, Public Safety Officers are on duty to help ensure that all bikes and skateboards go home with their rightful owners.

16. **Central Plant & Smart Grid grant** **(spoken at: the corner of Eureka Hall, standing on the Eureka Hall side of the street, facing the big green water tower tank)**
    Central Plant is the heart of the campus. The big green tower is a thermal storage tank. The water is chilled at night in the cooling tower, located next to the big green tank, and then is stored in the thermal storage tank so that it can be dispensed during the day to help cool the buildings. Technology at Central Plant, implemented through the Smart Grid project completed in 2013, is the central control center and monitors the chiller system (air conditioning), boiler system (heating system), electrical system and metering for utilities. The Smart Grid project also financed 14 campus electric vehicle charging stations and each unit has its own electric meter to track electrical usage. Locations are Lot 1 (qty 3), PS 1 (qty 4) and PS 2 (qty 7).

17. **Brighton Hall Sustainable Landscaping (spoken at: the corner of Brighton Hall, in front of retaining wall)**
    Here is another example of sustainable landscaping: these retaining walls have been constructed around trees all over campus. Aside from adding seating to the campus, they keep people from walking near the base of the trees and therefore compacting the soil. Compacted soil is less permeable to water and therefore requires much more water to stay green. You can also see this long strip of decomposed granite which does not require watering at all.

18. **Humboldt – Toilets/bathroom fixture replacements & Mendocino lighting project (spoken at: side of Humboldt)**
    A big water conservation project on campus occurred in 2014 when Facilities Management changed out Sac State's pre-1992 restroom plumbing fixtures for water efficient fixtures in all older buildings. The new toilets use only 1.28 gallons compared to the older models which use 4-6 gallons. The new model urinals use only 0.5 gallons while the older models used 3-4 gallons. Additionally, Facilities updated faucet aerators on Sac State's bathroom sinks to just 0.5 gallons per minute down from 2 gallons per minute! The next phase of bathroom water saving upgrades is examining if automatic faucets save more water than manual faucets. To determine this, a Sac State student assisted in conducting an experiment to test this theory. Her study found that using infrared faucets result in a reduction of approximately 54% of water use with a .35 aerator compared to manual faucets using .5 aerators. Retro-fits throughout campus are under discussion.

    Mendocino is currently in the process of a new lighting pilot project. LED lighting with special features like new controls, day light harvesting technology, dimming features and occupancy sensors are currently under construction.

19. **Riverside – Engineering dept., Sr. students projects at STORC (spoken at: front of Riverside)**
    Riverside house our engineering departments. This is notable in sustainability because STORC began by Senior student engineering projects leading to the expansion of STORC and supporting such projects as:
    - Aquaponics – The joining of aquaculture (raising fish) and hydroponics (the soil-less process of growing plants) that grows fish and plants together in one integrated system. Fun Fact: Campus aquaponics has grown enough lettuce to serve salads to an event of a couple hundred attendees at a campus luncheon.
    - Biodiesel Production System (BPS) – Converting kitchen waste vegetable oil, produced by campus eateries, to biodiesel for powering Facilities' grounds maintenance equipment is the ultimate goal of this technology.
    - Tiny House – The net-zero energy tiny house is 184 square feet of sustainable living, complete with a mini kitchen, a desk/dining space, a living room, a bathroom, and a sleeping loft.

- Trommel – ASI Green Team was awarded a grant. System filters any contaminants from finished vermicompost and will be used at the campus composting yard.
- Muffin Monster - A group of students retrofitted a donated muffin monster to include a support stand and loading shoot to ensure safe operation at the composting yard.
- Solar Golf Cart – Mechanical Engineering students worked for 2 semesters to design and retrofit a campus golf cart to receive power from left over photovoltaic panels mounted on the roof of the cart.

20. **American River (spoken at: walking from Riverside, pointing to Guy West Bridge)**
The Guy West Bridge is a campus landmark—one that connects us to the American River and the American River Parkway which of course has a bicycle path and makes Sac State a destination of bicyclists from throughout the region. Sac State Sustainability adopted Mile 7 South of the parkway and now acts as the official steward for what is now known as the Hornet Mile. We coordinate volunteers to help keep the parkway free from litter and invasive plant species. Peak Adventures has since adopted mile 8. Each year Sac State participates in the Great American River Parkway Clean Up event and this last clean up event in September 2016 generated nearly 36 tons of trash from just 3 hours of clean-up work collectively for the entire event, and Sac State volunteers made up a third of all volunteers. There were over 500 Sac State volunteers at our two locations we normally host: Guy West Bridge & Discovery Park.

21. **Ernest E. Tschannen Science Complex** – **(spoken at: In front of Science Complex)**
The Ernest E. Tschannen Science Complex is named after Philanthropist and Swiss immigrant Ernest E. Tschannen, honored for his $9 million gift toward the building. The building is LEED Gold certified with many sustainable features both visible to all of us and also behind the scenes in the energy operations and efficiency of the inter-workings of the building. Highlights include:
    - Daylight harvesting and an abundance of natural lighting throughout, intentionally designed to optimize the natural environmental surroundings of the building while creating an optimal learning environment.
    - A 235-pound polished cast brass Foucault pendulum hangs from the lobby ceiling and mark the Earth's 24-hour rotation. It also serves as an art piece for the building. The pendulum was the gift of the late Chien Yuan Hu, a Sac State professor of astronomy from 1966 to '92.
    - The terrace of the building is also a living roof, or also called a green terrace, that helps insulate a section of the building and capture storm water runoff. Visitors to the second-floor rooftop green terrace are also able to see the pendulum's movement through a skylight.
    - A PG&E gas pipeline upgrade required the removal of select trees throughout campus. Rather than discarding the wood, they were sustainably reused in many different aspects of this Complex. The wood was milled down into beautiful planks and stored at the local Sacramento Tree Foundation until they were installed here at the building. This

reclaimed wood can be seen in the outdoor benches and tables, and cladding in the lobby and student alcoves.

Additional: Tiny House

Details: 20 feet long, 184 square feet, net zero home, wood accents are from reclaimed pallets. The kitchen sink is recycled, heated floor. The innovative vacuum-tube solar system will provide plenty of hot running water, built over three months by 24 students and alumni from the Mechanical Engineering, Civil Engineering, and Construction Management departments right here on campus. SMUD's Tiny House Competition at Cosumnes River College in Oct, with 9 houses total (In addition to Sac State, the competitors were: Chico State, Fresno State, Cosumnes River College, Laney College, College of the Sequoias, UC Berkeley, Santa Clara University, San Jose City College, and UC Santa Cruz/Cabrillo College), over 20,000 people in attendance, they won best mechanical layout and best bathroom, with their 4 foot bath tub! They spent approximately $27k to build the Tiny House.

Contact info:

Please contact Sac State Sustainability team members for more questions:

Ryan Todd, Sustainability Manager, ryan.todd@csus.edu

Joey Martinez, Recycling and Sustainability Coordinator, jmartinez@csus.edu

Kristina Cullen, Sustainability Analyst, kristina.cullen@csus.edu

www.csus.edu/sustainability