UCSC PHYSICAL PLANT
ENGINEERING 2 LEED-EB SUBMITTAL

LEED for Existing Buildings Version 2.0
LEED Project Number: 3438078127134806
Performance Period: May 1st through Sept 30th 2008

Project Contact Information:
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The Engineering 2 Building is a 6-story, 152,077 gross square foot facility located in the Science Hill section of the UCSC campus. Built in 2003, Engineering 2 is home to more than fifteen different departments, focusing mainly on Economics and Engineering.

Engineering 2 includes facilities for two California Institutes for Science and Innovation programs: the Institute for Quantitative Biomedical Research (QB3) and the Center for Information Technology Research in the Interest of Society (CITRIS). Engineering 2 is comprised of 4% classroom space, 22% research lab space and 74% office space.

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INDOOR ENVIRONMENTAL QUALITY CONTINUED

INNOVATION & DESIGN PROCESS

E2 LEED-EB PROJECT NARRATIVE

University of California has one of the most comprehensive and far-reaching institutional sustainability commitments in the nation. The UC Policy on Sustainable Practices are guidelines and goals in the areas of Sustainable Transportation, Climate Protection Practices, Sustainable Operations and Maintenance, Waste Reduction and Recycling, Environmentally Preferable Purchasing, Clean Energy, and Green Building.

The UC Santa Cruz LEED-EB pilot project was delegated to the UCSC Physical Plant Green Operations Group, with Physical Plant Director James Dunne as the project manager. The group consisted of the Energy Manager, HVAC Superintendent, Recycling Coordinator, Custodial Superintendent, Plumbing Supervisor, Arborist/Irrigation Supt., Commissioning Supervisor and a CUIP Student Intern.

The Engineering 2 (E2) building was selected by an initial MBCx study, which showed that retrofitting could produce significant savings in energy and natural gas expenses. A relatively new building, E2 already had in place many energy and water efficient technologies, making it less difficult and expensive for UCSC to retrofit and LEED-EB certify its first building.

In September 2007, the Green Operations Group began the LEED-EB process by selecting credits to achieve and then assigning them to various members of the team. As the first LEED-EB project on campus, the E2 submittal was a learning process for all individuals in terms of LEED requirements, time frames, and documentation. Throughout the LEED-EB process, the Green Operations Group worked diligently to create buy-in from the building occupants by sending e-mails about the project and changes being made in the building. E2 building occupant informational meetings were also held to seek in-put and suggestions for the project.

The E2 LEED-EB Performance Period began on May 1st 2008 and ended on September 30th, 2008. During these five months, the Green Operations Group gathered data and information on existing building practices and policies and also the improved building performance data, based on the changes made for LEED-EB requirements. The E2 project was submitted, via LEED-online, with 41 attempted credits and a potential LEED Silver rating.

E2 LEED-EB PROJECT HIGHLIGHTS

The E2 LEED-EB project was dual process of documenting current sustainable practices and the changes and improvements being made in the building. The project lasted 12 months and involved a wide range of campus administration and staff. The projects success was due to the collaboration organization of the Green Operations Group and effective building occupant participation.

IMPROVED BUILDING PERFORMANCE

69% reduction in irrigation water use from campus baseline
70% reduction in potable water from EPA baseline
Improved Energy Star Rating by 8 points after LEED project
100% electrical energy is offset renewable energy purchases
33% Waste diversion after LEED project

By initially surveying the building and talking to occupants, the Green Operations group realized the biggest changes for building occupants would be in the areas of recycling and green cleaning. To asses the initial building waste stream, the Recycling coordinator and student intern collected the buildings waste and recycling for one week. The project recycling team then separated and weighed actual waste and what could have been recycled. E2 had in place an effective office paper-recycling program yet beverage-recycling bins were only outside the main entrances of the building, making it inconvenient and difficult to recycle. To make a user-friendlier recycling program, the Green Operations group worked collaboratively with the building manager and occupants to identify areas where more recycling bins were needed. After 13 additional bins were installed, another waste stream audit was conducted to show improvement in the recycling rate. Although the data showed only a 34% waste diversion rate, the Green Operations Group is confident that the recycling rate will only improve, as the bins are usually full when recycling is collected.

The E2 LEED-EB Project also provided a tremendous opportunity for the Custodial Supervisor to roll out a green cleaning program for the campus. The E2 custodial closets were equipped with dilution and proportioning systems, Green Seal-37 certified cleaning solutions, micro fiber mops and cloths, and Pro-Team vacuums. 92% of the custodial purchases made during the performance period met the LEED sustainability criteria for cleaning products and materials. In addition, because custodial supplies are purchases in bulk for all academic building on campus, the new green cleaning supplies were introduced to a number of other buildings as well. The central distribution of supplies on the UCSC campus also allowed the Physical Plant to use ultra low-mercury fluorescent lamps in all academic buildings, not only Engineering 2.

LEED for Existing Buildings v2.0
Registered Building Checklist

Project Name: ENGINEERING 2- UCSC
Project Address:

Yes	?	No			
9		5	**Sustainable Sites**		**14** Points
Y			Prereq 1	**Erosion & Sedimentation Control**	Required
Y			Prereq 2	**Age of Building**	Required
1			Credit 1.1	**Plan for Green Site & Building Exterior Management -** 4 specific actions	1
1			Credit 1.2	**Plan for Green Site & Building Exterior Management -** 8 specific actions	1
		1	Credit 2	**High Development Density Building & Area**	1
1			Credit 3.1	**Alternative Transportation -** Public Transportation Access	1
1			Credit 3.2	**Alternative Transportation -** Bicycle Storage & Changing Rooms	1
		1	Credit 3.3	**Alternative Transportation -** Alternative Fuel Vehicles	1
1			Credit 3.4	**Alternative Transportation -** Car Pooling & Telecommuting	1
1			Credit 4.1	**Reduced Site Disturbance -** Protect or Restore Open Space (50% of site area)	1
		1	Credit 4.2	**Reduced Site Disturbance -** Protect or Restore Open Space (75% of site area)	1
1			Credit 5.1	**Stormwater Management -** 25% Rate and Quantity Reduction	1
1			Credit 5.2	**Stormwater Management -** 50% Rate and Quantity Reduction	1
		1	Credit 6.1	**Heat Island Reduction -** Non-Roof	1
1			Credit 6.2	**Heat Island Reduction -** Roof	1
		1	Credit 7	**Light Pollution Reduction**	1

Yes	?	No			
3		2	**Water Efficiency**		**5** Points
Y			Prereq 1	**Minimum Water Efficiency**	Required
Y			Prereq 2	**Discharge Water Compliance**	Required
1			Credit 1.1	**Water Efficient Landscaping -** Reduce Potable Water Use by 50%	1
		1	Credit 1.2	**Water Efficient Landscaping** - Reduce Potable Water Use by 95%	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction -** 10% Reduction	1
1			Credit 3.2	**Water Use Reduction -** 20% Reduction	1

Yes	?	No			
11		5	**Energy & Atmosphere**		**23** Points
Y			Prereq 1	**Existing Building Commissioning**	Required
Y			Prereq 2	**Minimum Energy Performance** - Energy Star 60	Required
Y			Prereq 3	**Ozone Protection**	Required

***Note for EAc1:** All LEED for Existing Buildings projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1.

3			Credit 1	**Optimize Energy Performance**	1 to 10
				Energy Star Rating - 63	1
				Energy Star Rating - 67	2
				3 Energy Star Rating - 71	3
				Energy Star Rating - 75	4
				Energy Star Rating - 79	5
				Energy Star Rating - 83	6
				Energy Star Rating - 87	7
				Energy Star Rating - 91	8
				Energy Star Rating - 95	9
				Energy Star Rating - 99	10
1			Credit 2.1	**Renewable Energy -** On-site 3% / Off-site 15%	1
1			Credit 2.2	**Renewable Energy** - On-site 6% / Off-site 30%	1
1			Credit 2.3	**Renewable Energy** - On-site 9% / Off-site 45%	1
1			Credit 2.4	**Renewable Energy** - On-site 12% / Off-site 60%	1
1			Credit 3.1	**Building Operation & Maintenance -** Staff Education	1
1			Credit 3.2	**Building Operation & Maintenance -** Building Systems Maintenance	1
		1	Credit 3.3	**Building Operation & Maintenance -** Building Systems Monitoring	1
1			Credit 4	**Additional Ozone Protection**	1
1			Credit 5.1	**Performance Measurement -** Enhanced Metering (4 specific actions)	1
		1	Credit 5.2	**Performance Measurement -** Enhanced Metering (8 specific actions)	1
		1	Credit 5.3	**Performance Measurement -** Enhanced Metering (12 specific actions)	1
		1	Credit 5.4	**Performance Measurement** - Emission Reduction Reporting	1
		1	Credit 6	**Documenting Sustainable Building Cost Impacts**	1

Yes	?	No			
6		10	**Materials & Resources**		**16** Points
Y			Prereq 1.1	**Source Reduction & Waste Management** - Waste Stream Audit	Required
Y			Prereq 1.2	**Source Reduction & Waste Management -** Storage & Collection	Required
Y			Prereq 2	**Toxic Material Source Reduction -** Reduced Mercury in Light Bulbs	Required
1			Credit 1.1	**Construction, Demolition & Renovation Waste Management -** Divert 50%	1
		1	Credit 1.2	**Construction, Demolition & Renovation Waste Management -** Divert 75%	1
		1	Credit 2.1	**Optimize Use of Alternative Materials** - 10% of Total Purchases	1
		1	Credit 2.2	**Optimize Use of Alternative Materials** - 20% of Total Purchases	1
		1	Credit 2.3	**Optimize Use of Alternative Materials** - 30% of Total Purchases	1
		1	Credit 2.4	**Optimize Use of Alternative Materials** - 40% of Total Purchases	1
		1	Credit 2.5	**Optimize Use of Alternative Materials** - 50% of Total Purchases	1
		1	Credit 3.1	**Optimize Use of IAQ Compliant Products** - 45% of Annual Purchases	1
		1	Credit 3.2	**Optimize Use of IAQ Compliant Products** - 90% of Annual Purchases	1
1			Credit 4.1	**Sustainable Cleaning Products & Materials** - 30% of Annual Purchases	1
1			Credit 4.2	**Sustainable Cleaning Products & Materials** - 60% of Annual Purchases	1
1			Credit 4.3	**Sustainable Cleaning Products & Materials** - 90% of Annual Purchases	1
1			Credit 5.1	**Occupant Recycling** - Recycle 30% of the Total Waste Stream	1
		1	Credit 5.2	**Occupant Recycling** - Recycle 40% of the Total Waste Stream	1
		1	Credit 5.3	**Occupant Recycling** - Recycle 50% of the Total Waste Stream	1
1			Credit 6	**Additional Toxic Material Source Reduction** - Reduced Mercury in Light Bulbs	1

Yes	?	No			
7		15	**Indoor Environmental Quality**		**22** Points
Y			Prereq 1	**Outside Air Introduction & Exhaust Systems**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
Y			Prereq 3	**Asbestos Removal or Encapsulation**	Required
Y			Prereq 4	**PCB Removal**	Required
		1	Credit 1	**Outside Air Delivery Monitoring**	1
		1	Credit 2	**Increased Ventilation**	1
		1	Credit 3	**Construction IAQ Management Plan**	1
		1	Credit 4.1	**Documenting Productivity Impacts** - Absenteeism & Healthcare Cost Impacts	1
		1	Credit 4.2	**Documenting Productivity Impacts** - Other Productivity Impacts	1
1			Credit 5.1	**Indoor Chemical & Pollutant Source Control** - Reduce Particulates in Air System	1
		1	Credit 5.2	**Indoor Chemical & Pollutant Source Control** - Isolation of High Volume Copy/Print/Fa	1
1			Credit 6.1	**Controllability of Systems** - Lighting	1
		1	Credit 6.2	**Controllability of Systems** - Temperature & Ventilation	1
		1	Credit 7.1	**Thermal Comfort** - Compliance	1
		1	Credit 7.2	**Thermal Comfort** - Permanent Monitoring System	1
		1	Credit 8.1	**Daylight & Views** - Daylight for 50% of Spaces	1
		1	Credit 8.2	**Daylight & Views** - Daylight for 75% of Spaces	1
		1	Credit 8.3	**Daylight & Views** - Views for 45% of Spaces	1
		1	Credit 8.4	**Daylight & Views** - Views for 90% of Spaces	1
		1	Credit 9	**Contemporary IAQ Practice**	1
1			Credit 10.1	**Green Cleaning** - Entryway Systems	1
		1	Credit 10.2	**Green Cleaning** - Isolation of Janitorial Closets	1
1			Credit 10.3	**Green Cleaning** - Low Environmental Impact Cleaning Policy	1
1			Credit 10.4	**Green Cleaning** - Low Environmental Impact Pest Management Policy	1
1			Credit 10.5	**Green Cleaning** - Low Environmental Impact Pest Management Policy	1
1			Credit 10.6	**Green Cleaning** - Low Environmental Impact Cleaning Equipment Policy	1

Yes	?	No			
4		1	**Innovation & Design Process**		**5** Points
1			Credit 1.1	**Innovation in Upgrades, Operation & Maintenance**	1
1			Credit 1.2	**Innovation in Upgrades, Operation & Maintenance**	1
1			Credit 1.3	**Innovation in Upgrades, Operation & Maintenance**	1
		1	Credit 1.4	**Innovation in Upgrades, Operation & Maintenance**	1
1			Credit 2	**LEED™ Accredited Professional**	1

Yes	?	No		
40		38	**Project Totals (pre-certification estimates)**	85 Points

Certified: 32-39 points, **Silver:** 40-7 points, **Gold:** 48-63 points, **Platinum:** 64-85

SUSTAINABLE SITES PREREQUISITE 1:
EROSION AND SEDIMENTATION CONTROL

1. LEED-EB Credit Template
2. UCSC Standard Specifications- Erosion and Sediment Control
3. UCSC Best Management Practices for Construction Project
4. Letter confirming PM and routine inspections of erosion and sediment
5. E2 erosion and sediment logs for performance period

(Responsible Party)

I, Jim Dunne , declare to USGBC that the organization's site erosion and sediment control policy meets the following objectives:

☒ Addresses ongoing maintenance of the facility's site to prevent soil erosion and sediment transfer under ongoing operation.

☒ Addresses erosion and sedimentation control for any future infrastructure repairs or other construction activities.

☒ Addresses restoring eroded soil areas and elimination of conditions that result in erosion or sedimentation.

☒ Prevents loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.

☒ Prevents sedimentation of storm sewer or receiving streams.

☒ Prevents polluting the air with dust and particulate matter.

I have also provided the following to support the selected declaration:

☒ The organization's erosion and sediment control policy that mandates implementation of erosion and sediment control techniques into all site construction plans and requires their inclusion into contract documents for any construction projects carried out onsite.

☐ A building operations and maintenance activity log showing that the erosion and sediment control policy has been followed.

☐ Photos documenting site problems identified and solutions implemented.

(Continued on page 2)

AND

EITHER

(Responsible Party)

I, Jim Dunne , declare to USGBC that I have designed and implemented, specific to the site, a site erosion and sedimentation control policy that incorporates best management practices and that the plan has been followed in any construction projects begun or completed at the building over the performance period. Furthermore, I affirm that the plan conforms to the United States Environmental Protection Agency (EPA) Document No. EPA 832/R-92-005 (1992) Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices – Chapter 3: Sediment and Erosion Control:

Table 1: Narrative Summary of Site Construction and Erosion Control Policy Measures and Corresponding EPA 832/R-92-005 Reference Standard for Each Measure

Brief Description of Measures Implemented	EPA 832/R-92-005 Reference

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(Continued on page 3)

OR

(Responsible Party)

I, Jim Dunne , declare to USGBC that I have designed and implemented, specific to the site, a site erosion and sedimentation control policy that conforms to local erosion and sedimentation control standards and codes and that have been followed in any construction projects begun or completed at the building over the performance period. Furthermore, I affirm that these standards are equally or more stringent than those described by EPA Document No. EPA 832/R-92-005 (1992) Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices – Chapter 3: Sediment and Erosion Control as follows:

Table 2: Narrative Summary of Site Construction and Erosion Control Policy Measures and Corresponding Local Code Citation for Each Measure

List of Measures Implemented	Describe How Local Code Meets or Exceeds EPA 832/ R-92-005
01560, Erosion and Sediment Control, campus standards	see downloaded document
Water Control Board best practices requirements	see downloaded document

Project Name: Engineering 2 LEED EB Submittal

Credit: SS Prerequisite 1: Erosion & Sedimentation Control Prerequisite Documented: No

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	2-1-08	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

SAVE TEMPLATE TO LEED-ONLINE PRINT TEMPLATE

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UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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PHYSICAL PLANT SANTA CRUZ, CALIFORNIA
95064

May 13th, 2008

To: US Green Building Council- LEED-EB Program
Re: Documentation for SS PreReq1: Erosion & Sedimentation Control for E2-UCSC

This letter is to confirm that UCSC Physical Plant has an erosion control policy in place and this policy meets or exceeds the EPA standard 832-R-92-005. The UCSC campus construction standards detail required procedures fao all construction projects on campus. Projects require a Civil engineer to certify the project meets the erosion control standards. The Campus is also required to submit a SWPPP, storm water pollution prevention plan, to the San Louis Obisbo Regional Water Quality Control Board.

University of California- Standard Specifications

SECTION 01560
EROSION AND SEDIMENT CONTROL
1.01 GENERAL
A. This section includes procedures, requirements and guidelines for Contractor designed, constructed, and maintained erosion and sediment control measures.
1.02 RELATED SECTIONS
A. Section 01060 – Regulatory Requirements
B. Section 01090 – Reference Standards
C. Section 01100 – Special Project Procedures
D. Section 01500 - Construction Facilities and Temporary Controls
E. Division 2 — Sitework
1.03 EROSION AND SEDIMENT CONTROL
A. General:
1. Be responsible for erosion and sediment control within the Project site or anywhere that Project construction disturbs the surface vegetation or soil.
a. Prevent erosion of graded areas during construction and until permanent planting will provide protection and permanent drainage and erosion control measures are installed.
b. Prevent any sediment from leaving the Project site, either water-borne, air-borne, on the tires of vehicles, or by spillage from off-site hauling of soils.
2. Include the cost of all erosion and sediment control measures in the price bid.

3. The Contractor is required to develop a Storm Water Pollution Prevention Plan (SWPPP) as required by the State Water Resources Control Board, current SWPPP requirements can be found at www.swrcb.ca.gov, due to the size of the Construction Project, The Contractor shall bear all costs associated with the development of the SWPPP report, installation of erosion/sediment control measures and the maintenance of said control measures as outlined in the Contractor's SWPPP report.

B. Work Restrictions:

1. No clearing, brushing, or grading shall begin until temporary desilting facilities are in place at each watercourse leaving the Project site, and any portion of the site which slopes toward the perimeter has adequate perimeter control facilities in place. The Storm Water Pollution Prevention Plan (SWPPP) report shall be completed and approved by the.
2. Submit an Erosion and Sediment Control Plan to The University's Representative for review prior to scheduled implementation. Refer to Section 01300 - Submittals. At the completion of The University's Representative review, a meeting will be conducted by The University's Representative with the Contractor to discuss and agree upon the implementation of the plan.
3. Agreement to the plan by other parties does not relieve the Contractor from full responsibility for its effectiveness.

C. Winter Erosion and Sediment Control Plan: Whenever construction is planned during the period October 1 through May 31, submit an erosion and sediment control plan prepared by a registered civil engineer or qualified environmental protection company for any denuded soil area within the Project site or any other area where the soil surface will be disturbed by construction operations.

1. Implement the plan by October 15 or by the date scheduled for commencing construction after October 15, with all required features in place.
2. Submit an Erosion and Sediment Control Plan to The University's Representative for review prior to scheduled implementation. Refer to Section 01300 - Submittals. At the completion of The University's Representative review, a meeting will be conducted by The University's Representative with the Contractor to discuss and agree upon the implementation of the plan.
3. Agreement to the plan by other parties does not relieve the Contractor from full responsibility for its effectiveness.

D. Erosion and Sediment Control Plan Requirements:

1. Temporary soil stabilization measures installed on graded slopes steeper than a ratio of three (horizontal) to one (vertical), and/or greater than 10 feet in height.
2. Desilting facilities at all drainage outlets from the graded site, designed for a 25-year storm intensity. They must be detailed on the plans. Submit design and specific recommendations for the following:

a) Desilting basin volume based on gradient and nature of soils.
b) The actual extent of all graded areas and identification of any temporary soil stabilization measures.
c) Size of desilting basin outlet pipe and overflow.
d) Dike requirements. Minimum wall width, slope of walls, percent compaction, etc.

e) Indicate method of embedment into earth for silt control fences, hay bales and/or sandbags.
3. Show the placement of devices to reduce erosion damage within the Project site. Include details indicating the installation of silt fence or reference Cal-Trans standard installation detail(s).
4. Outlet conditions from the desilting basin shall not exceed downstream limitations, with the exception of overflow which is to be designed to provide capacity of 1.5 times the maximum design flow.
5. Provide for:
a) Adjustment of the plan as grading progresses.
b) Control of the grading work so as not to violate assumptions of the plan.
6. Include the following notes on the plan:
a) In case of emergency call

_____
(Responsible person)
at_____
(24 hour phone no.)
b) The undersigned civil engineer will review the erosion control work.
(Signature) (Date)
California Registered Civil Engineer No.
c) A standby crew for emergency work shall be available at all times during the rainy season, October 15 through April 15. Necessary materials shall be available on the Project site and stockpiled at convenient locations to facilitate rapid construction of temporary devices or to repair any damaged erosion control measures when rain is imminent.
d) Do not move or modify devices without the approval of The University's Representative.
e) All removable protective devices shown shall be in place at the end of each working day when the five-day rain probability forecast exceeds 40 percent.
f) Perform inspections of erosion and sediment control measures and complete project/site specific inspection sheet if five-day rain forecast exceeds 40%, during a prolonged storm event (perform inspection every 24 hours), and after every storm event. Submit all completed inspection sheets to the University Representative upon completion of inspection.
g) After a rainstorm, remove all silt and debris from check berms and desilting basins. Immediately repair any graded slope surface protection measures damaged during a rainstorm.
h) Fill slopes at the Project perimeter must drain away from the top of the slope at the conclusion of each working day.
i) Whenever the depth of water in any device exceeds two feet, barricade or guard the Project site for public safety until the water has subsided.
j) Do not pump or otherwise drain unfiltered water from the basins until sediment has settled.
k) Do not fill sand bags with gravel; use only sand or granular soil.
l) Do not use perforated risers as pond outlets.
m) Do not use filtering devices as a means of control.
n) Completely cover any pipe outlet from a desilting basin with sandbags filled with coarse sand as a final means of protection.
o) Dechlorinate all water leaving the project site.

p) Indicate method of embedment into earth for silt control fences, hay bales and/or sandbags.

E. Inclusion of Storm Water Pollution Prevention Permit Requirements into Erosion and Sediment Control Plan.

1. A Storm Water Pollution Prevention Plan (SWPPP) will need to be completed and approved by the University prior to commencement of any soil disturbance. The SWPPP report shall be inclusive of both the requirements in the Specification Section 1560 and the requirements set by the State Water Resources Control Board. The SWPPP report shall be completed by a registered civil engineer or qualified environmental protection company. The SWPPP shall follow the requirement outlined in the current version of the Waste Discharge Requirements For Discharges of Storm Water Runoff Associated with Construction Activities, as provided by the State Water Resources Control Board per attached General Construction Storm Water Permit Check list. See attached SWPPP checklist, included in Specification Section 01560, for University's and Contractor's responsibilities required for General Construction Storm Water Permit. The SWPPP shall also include items identified in Section 1.03 (C) above. Note that attached checklist has been reduced for inclusion in specification format. Spreadsheet blank file is available from University's Representative.

J.Dunne

1. Influence of Ongoing Routine Maintenance on Erosion and Sediment Control:

Mulch groundcovers:
Wood chip mulch was installed with the landscape to reduce erosion, reduce weed growth, and reduce soil moisture evaporation. Over time, mulch decomposes and shifts, reducing its effectiveness in the functions listed above. As part of routine gardener landscape care, wood chip mulch cover is maintained by delivery of additional campus derived wood chip mulch and the application to any areas with less than adequate cover.

Replanting
Landscape plants reduce soil erosion by shielding the soil surface from droplet impact, and by binding the soil with their root system. Gardener maintenance maximizes this effect by providing good conditions for plant growth, increasing the area protected, and by replacing any plants that die to sustain the landscape design and covered surface area.

Catch Basin Inlet Protection
During the storm season, Gardeners are instructed to install gravel filter bag perimeter barriers around any storm drain catch basin inlets that appear to be receiving sediment runoff and then apply rice straw and or straw wattles to the surrounding grade to dampen runoff velocity and reduce erosion.

Dicouragement of unauthorized pedestrian pathways.
Repeated foot traffic in the landscape dislocates the soil mulch cover and compacts the soil surface to that water infiltration is reduced and runoff rates are increased. Routine gardener maintenance includes discouragement of unauthorized pedestrian pathways through the landscape by using educational signage, planting in the route, blockage with boulders, rope and post fencing, or other means.

Discouragement of vehicles on the landscape.

There is a great temptation for service vehicles to jump a couple of wheels over the curb and into the landscape to park as close as possible to their service destination. Over time, this creates an increase in erosion potential similar to repeated foot traffic. Gardeners and other Grounds personel work to discourage off pavement parking through the use of blocking devices similar to unauthorized pedestrian pathway discouragement.

Slope protection.
Where slope steepness proves to be too great to retain wood chip mulch soil cover, gardeners request and apply shredded redwood bark (“gorilla hair”) which has better holding properties on a slope to maintain soil cover.

Hardscape maintenance.
Gardeners clean the hardscape of dirt and dust, which prevents these materials from running off site in hardscape drains.

2. Additional Erosion and Sediment Control Measures Implemented.

During the course of the performance period, no sediment or erosion control problems were encountered or reported by the landscape staff requiring anything other than routine maintenance practices listed above.

APPENDIX E
BEST MANAGEMENT PRACTICES
FOR
CONSTRUCTION PROJECTS LESS THAN 1 ACRE IN AREA INVOLVING SOIL DISTURBANCE GREATER THAN 50 CUBIC YARDS

All Construction Sites

- ☐ Delineate clearing limits, sensitive or critical areas, trees, drainage courses, and buffer zones to prevent excessive or unnecessary disturbance and exposure of soil.
- ☐ Identify all storm drains, drainage swales and creeks located near the construction site and make sure all subcontractors are aware of their locations to prevent pollutants from entering them.
- ☐ Preserve existing vegetation, where required and when feasible, to the maximum extent practicable.
- ☐ Phase grading operations, to the extent possible, to limit areas of disturbance and time of exposure
- ☐ Avoid and/or minimize impacts of excavation and grading during wet weather and immediately preceding expected wet weather.
- ☐ Minimize cuts and fills.
- ☐ Implement measures to minimize erosion, manage storm water runoff, and prevent pollutants from construction activities from entering storm drains.
- ☐ Align temporary and permanent roads and driveways along slope contours.
- ☐ Wash vehicles at an appropriate off-site facility. If equipment must be washed on-site, use wash down areas developed for specific site requirements and approved by the University Representative. Do not use soaps, solvents, degreasers, or steam cleaning equipment, and prevent wash water from entering storm drains.

Minimize Soil Movement

- ☐ Stockpiled soil and materials should be covered and stabilized with tarps, geotextile fabric, hydroseeding and/or erosion control blankets.
- ☐ Create a berm and/or install silt fencing around stockpiled materials to prevent storm water runoff from transporting sediment offsite.
- ☐ Use campus standard erosion control seeding, planting, mulching, geotextile fabric and/or erosion control blankets to stabilize disturbed soil and reduce the potential for erosion.
- ☐ Use other soil stabilizers as approved by the University Representative.

Structures to Control and Convey Runoff

- ☐ Convey runoff by use of earth dikes, drainage swales and/or ditches when feasible.
- ☐ Use slope drains to collect and convey water for discharge below slopes when feasible.
- ☐ Use velocity dissipation devices, flared culvert end sections and/or check dams to reduce runoff velocity and mitigate erosion when feasible.

Capture Sediment

- ☐ Use terracing, riprap, sand bags, rocks, straw bales, approved temporary vegetation and/or other approved BMP's on slopes to reduce runoff velocity and trap sediments. Do not use asphalt rubble or other demolition debris for this purpose.
- ☐ Protect storm drain inlets from sediment-laden runoff. Storm drain inlet protection devices include sand or gravel bags, filter fabric fences and block and gravel filters.

Other Runoff Controls

- ☐ Temporary sediment basin
- ☐ Sediment trap
- ☐ Brush or rock filter
- ☐ Silt fence
- ☐ Sand or gravel bag barrier

APPENDIX E
BEST MANAGEMENT PRACTICES
FOR
CONSTRUCTION PROJECTS LESS THAN 1 ACRE IN AREA INVOLVING SOIL DISTURBANCE GREATER THAN 50 CUBIC YARDS

Tracking Control

- ☐ Implement measures as necessary to minimize tracking of soil off site
- ☐ Use dry sweeping methods when cleaning sediments from streets, driveways and paved areas by hand. When using mechanical street sweepers, use fine water spray to reduce dust and improve sediment removal while minimizing runoff.

Paint Work

- ☐ Do not clean paint brushes or rinse paint containers into a street, gutter, storm drain, or creek.
- ☐ For water-based paints, paint out brushes to the extent possible and rinse to a drain leading to the sanitary sewer (*i.e.*, indoor plumbing).
- ☐ For oil-based paints, paint out brushes to the extent possible, and filter and reuse thinners and solvents. Dispose of unusable thinners, oil-based paint, sludges and residue as hazardous waste.
- ☐ Non-hazardous paint chips and dust from dry stripping and sand blasting may be swept up or collected in plastic drop cloths and disposed of as trash. Chemical paint stripping residue and chips and dust from marine paints or paints containing lead or tributyl tin must be disposed of as a hazardous waste.
- ☐ When stripping or cleaning building exteriors with high-pressure water, cover or berm storm drain inlets. Collect (mop or vacuum) building cleaning water for disposal in a pre-authorized manner.
- ☐ Recycle, return to supplier or donate unwanted water-based (latex) paint.
- ☐ Dried latex paint may be disposed of in the trash.

Cement and Concrete Work

- ☐ Avoid mixing excess amounts of fresh concrete or cement mortar on-site.
- ☐ Store dry and wet concrete and cement under cover, protected form rainfall and runoff.
- ☐ Wash out concrete transit mixers only in designated wash-out areas. Whenever possible, recycle washout by pumping back into mixers for reuse. Do not dispose of washout into the street, storm drains, drainage ditches, or creeks. Designated wash-out areas must be maintained to prevent over flow.
- ☐ Whenever possible, return contents of mixer barrel to the off-site yard for recycling. Dispose of small amounts of excess concrete, grout, and mortar in the trash.

Roadwork/Pavement

- ☐ Apply concrete, asphalt, and seal coat during dry weather to prevent contaminants from contacting stormwater runoff.
- ☐ Cover storm drain inlets and manholes when paving or applying seal coat, slurry seal, fog seal, and similar materials.
- ☐ Always park paving machines over drip pans or absorbent materials, since they tend to drip continuously.
- ☐ When making saw-cuts in pavement, use as little water as possible. Cover potentially affected storm drain inlets completely with filter fabric during the sawing operation and contain the slurry by wet-vacuuming, or by placing straw bales, sandbags, or gravel dams around the catch basins. After the liquid drains or evaporates, shovel or vacuum the slurry residue from the pavement or gutter and remove from site.
- ☐ Wash down exposed aggregate concrete only when the wash water can: (1) flow onto a dirt area; (2) drain onto a bermed surface from which it can be pumped and disposed of properly; or (3) be vacuumed from the area along the curb where sediment has accumulated by blocking a storm drain inlet.
- ☐ Allow aggregate rinse to settle, and pump the water to the sanitary sewer if allowed by your local wastewater authority.
- ☐ Do not wash sweepings from exposed aggregate concrete into a street or storm drain. Collect and return to aggregate base stockpile, or dispose with trash.
- ☐ Recycle broken concrete and asphalt.

APPENDIX E
BEST MANAGEMENT PRACTICES
FOR
CONSTRUCTION PROJECTS LESS THAN 1 ACRE IN AREA INVOLVING SOIL DISTURBANCE GREATER THAN 50 CUBIC YARDS

Hazardous Material Spill Prevention,Spill Reporting and Response

- ☐ All hazardous materials shall be stored so that they are protected from inclement weather and vandalism.
- ☐ Motor vehicles shall not be fueled on the Project site.
- ☐ Spill containment measures must be made prior to fueling when fueling equipment other than motor vehicles.
- ☐ Vehicle maintenance, other than emergency repairs, shall not be performed on the Project site.
- ☐ Appropriate emergency spill containment supplies shall be maintained on site by the Contractor.
- ☐ Spills greater than one quart shall be immediately reported to The University's Representative and UCSC's Project Inspector.
- ☐ Spills shall be diked or contained by trained personnel to prevent the spilled hazardous material from entering the storm water system or leaving the Project site.
- ☐ Spills of less than five (5) gallons shall be absorbed using an appropriate material. All contaminated materials shall be containerized, removed from Campus and disposed in accordance with Federal, state and local regulations.
- ☐ Spills in excess of five (5) gallons shall be absorbed using an appropriate material and placed in containers under the direction of UCSC's Office of Environmental Health and Safety.
- ☐ Any contaminated soil shall be removed by the Contractor and replaced with acceptable fresh soil.
- ☐ Response shall be carried out by appropriately trained personnel utilizing safe practices.

Good Housekeeping Practices

- ☐ Do not wash down pavement or surfaces where silt has been deposited or materials have spilled. Use dry cleanup methods.
- ☐ Avoid contaminating clean runoff from areas adjacent to your site by using berms and/or temporary or permanent drainage ditches to divert water flow around the site.
- ☐ Cover exposed piles of soil, construction materials and wastes with plastic sheeting or temporary roofs. Before it rains, sweep and remove materials from surfaces that drain to storm drains, creeks, or channels.
- ☐ Place trash cans around the site to reduce potential litter. Dispose of non-hazardous construction wastes in covered dumpsters or recycling receptacles. Recycle leftover materials whenever possible.
- ☐ Dispose of all wastes properly. Materials that can not be reused or recycled must be taken to an appropriate landfill or disposed of as hazardous waste, as appropriate.
- ☐ Cover open dumpsters with plastic sheeting or a tarp during rainy weather. Secure the sheeting or tarp around the outside of the dumpster. If the dumpster has a cover, close it.
- ☐ Train your employees and inform contractors and subcontractors about storm water management requirements and their responsibilities for compliance.

Sources Of Additional Information

Additional information on Construction Site Controls is available in the publications listed below

- ✓ California Stormwater Quality Association - California Storm Water Best Management Practice Handbook – Construction http://www.cabmphandbooks.com/
- ✓ Caltrans. 2003. Storm Water Quality Handbooks – Construction Contractors Guide and Specifications http://www.dot.ca.gov/hq/construc/stormwater/CSBMPM_303_Final.pdf

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

October 7,2008

LEED Engineering 2 Bldg. Erosion & Sedimentation Control Sustainable Sites Pre-req. 1

The Engineering 2 Building is in the Science Hill area of the campus. The area Groundskeeper/Gardener for that area is Katrina Peirine. Her weekly preventative maintenance task log requires routine inspections of the grounds area. The task log has a check item : report drainage and erosion issues and another check item: storm drain grate /outfall cleaning. The preventative maintenance weekly inspections and logs were 100% completed for May, June, July and August of 2008. No erosion or sedimentation problems were noted. All storm drains and outfalls were cleaned as required.

Craig Bowman
Planned Maintenance Coordinator
Physical Plant Grounds Dept.
UCSC

BASKIN ENG, CORE WEST PARKING, NAT. SCI. I & III, KERR HALL, ENGINEERING II : GROUNDSKEEPER/GARDENER, SUKI PALERMO

MAY — CHECK OFF ON DAY TASKS ARE COMPLETED — MAY

WEEK	MAINTENANCE TYPE: (* = SEE AREA PROCEDURES /MAPS) (DARKEST AREAS : PLEASE COMPLETE TASK THAT WEEK.) (OTHER TASKS TO BE COMPLETED WITHIN MTH.) *(SPECIAL EVENTS AND OTHER FUNCTIONS IN ITALICS)*	NOTES, SUGGESTIONS / REASONS IF MAINTENANCE TASK WAS NOT COMPLETED AS SCHEDULED	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	WEEKLY	ATTAL
44							1	2	
	DAILY SAFETY CHECKS /ADA COMPLIANCE						✓	✓	
	AREA LEAF BLOWING						✓		
	WALK TRANSITION ZONES IN YOUR ASSIGNED AREA.						✓		
	CHECK OUTDOOR FURNITURE CONDITION	broken wooden benches at Thimann					✓		
	CONTROL DERMA REACTIVE PLANTS						✓		SP
	STRING TRIM 10' AROUND BUILDINGS AND SIGNS	NA			-				
	CHECK BOLLARD SYSTEMS FOR DAMAGE	REPORT BROKEN HINGES, PLATES, WELDS, MISSING LOCKS & BOLLARDS TO SUPERVISOR					✓		
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	none					✓		
	CHECK BATTERIES FLUID LEVEL ON E- CART						✓		
	PRUNE SPRING FLOWERING SHRUBS & VINES						✓		
WEEK			5	6	7	8	9		
45	DAILY SAFETY CHECKS /ADA COMPLIANCE		X	X	X	X	X		
	AREA LEAF BLOWING				X				
	PERFORM MAINTENANCE ON ALL POWER EQUIPMENT					X			
	REPORT DRAINAGE AND EROSION ISSUES					X			RW
	HARDSCAPE WEED CONTROL IN KEY AREAS			X		X			
	BUILDING 6" AIR SPACE CLEARANCE					X			
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN					X			
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	none							
	PRUNE SPRING FLOWERING SHRUBS & VINES								
	CHECK BATTERIES FLUID LEVEL ON E- CART					X			
WEEK			12	13	14	15	16		
46	DAILY SAFETY CHECKS /ADA COMPLIANCE			✓	X	X	X		
	AREA LEAF BLOWING			✓		X			BA
	STORM DRAIN AND GRATE CLEANING*					X			
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN					X			RW
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	none				X			
	CHECK TURF IRRIGATION FOR COVERAGE					X			
	STRING TRIM 10' AROUND BUILDINGS AND SIGNS					X			
	CHECK BATTERIES FLUID LEVEL ON E- CART					X			
	FERTILIZATION OF WOODY ORNAMENTALS								
WEEK			19	20	21	22	23		
47	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X		
	AREA LEAF BLOWING		✓	✓		X			BA
	CLEAR OFF UTILITY COVERS & LIGHT POLE BASES					X			
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN					X			R.W.
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	none				X			
	CHECK BATTERIES FLUID LEVEL ON E- CART			✓		✓			
	PREPARE PLANT DISPLAYS IN COLL.KEY AREAS								
WEEK			26	27	28	29	30		
48	DAILY SAFETY CHECKS /ADA COMPLIANCE			✓	X	X	X		
	AREA LEAF BLOWING			✓	X				BA
	STORM DRAIN AND GRATE CLEANING*								
X	CHECK CONDITION OF OUTDOOR FURNITURE				X				R.W.
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN				X				
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	none							
	MONDAY IS A HOLIDAY				✓				
	ENTER HAZMAT INVENTORY				✓				
	CHECK TURF IRRIGATION FOR COVERAGE				X				
	CHECK BATTERIES FLUID LEVEL ON E- CART			✓	X				

* Called in broken picnic table to Rich McMillan @ Thimann

4/30/2008

7:14 AM

BASKIN ENG, CORE WEST PARKING, NAT. SCI. I & III, KERR HALL, ENGINEERING II : GROUNDSKEEPER/GARDENER:

JUNE — CHECK OFF ON DAY TASKS ARE COMPLETED

WEEK	MAINTENANCE TYPE: (* = SEE AREA PROCEDURES /MAPS) (DARKEST AREAS : PLEASE COMPLETE TASK THAT WEEK.) (OTHER TASKS TO BE COMPLETED WITHIN MTH.) (SPECIAL EVENTS AND OTHER FUNCTIONS IN ITALICS)	NOTES, SUGGESTIONS / REASONS IF MAINTENANCE TASK WAS NOT COMPLETED AS SCHEDULED	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	
49			2	3	4	5	6	
	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	
	AREA LEAF BLOWING		✓	✓				RW
	HAZARDOUS PLANT CONTROL(Poison Oak, Thistles)		✓	✓				
	CHECK OUTDOOR FURNITURE CONDITION			✓				BA
	WALK TRANSITION ZONES IN YOUR ASSIGNED AREA.				X			
	PERFORM MAINTENANCE ON ALL POWER EQUIPMENT				X			
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	None						
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	None						
	REPORT DRAINAGE AND EROSION ISSUES							
	DRAIN STANDING WATER	NONE						
WEEK			9	10	11	12	13	
50	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	
	AREA LEAF BLOWING		✓	✓				RW
	STORM DRAIN GRATE/OUTFALL CLEANING							BA
	CHECK TURF IRRIGATION FOR COVERAGE		✓					
	REMOVE EXPIRED POSTERS				X			
	EXTRA THOROUGH TRASH COLLECTION				X			
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN				X			
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	None						
	CHECK ELECTRIC CART BATTERIES ON MONDAY		✓	✓				
	IF COMMENCEMENTS ARE IN YOUR AREA, CHECK IRRIGATION CONTROLLERS							
WEEK			16	17	18	19	20	
51	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	
	AREA LEAF BLOWING			✓				RW
	STORM DRAIN GRATE/OUTFALL CLEANING				X			
	CHECK 6" BUILDING AIR SPACE *				✓			BA
	CHECK BOLLARD SYSTEMS FOR DAMAGE	REPORT BROKEN HINGES, PLATES, WELDS, MISSING LOCKS & BOLLARDS TO SUPERVISOR			✓			
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN				✓			
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	None						
	DRAIN STANDING WATER	NONE						
		~~None~~						
	TURF MOWING ON MONDAY							
WEEK			23	24	25	26	27	
52	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	
	AREA LEAF BLOWING			✓				RW
	STORM DRAIN GRATE/OUTFALL CLEANING							
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	None Noted						BA
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY & PLANT SPECIES.	None						
	CHECK ELECTRIC CART BATTERIES ON MONDAY			✓				
	CHECK TURF IRRIGATION FOR COVERAGE					X		
	CLEANING AND VEG. CONTROL AREA SUBSTATIONS, TRANSFORMERS, GAS METERS, FIRE CONNECTIONS							
WEEK			30					
1	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓					
	AREA LEAF BLOWING		✓					
	STORM DRAIN GRATE/OUTFALL CLEANING							BA
	ENTER HAZMAT INVENTORY							
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN							
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.							
	CHECK ELECTRIC CART BATTERIES ON MONDAY	Heidi Has Cart						
	DRAIN STANDING WATER	None						

~~5/30/2008~~ ~~12:43 PM~~

BASKIN ENG, CORE WEST PARKING, NAT. SCI. I & III, KERR HALL, ENGINEERING II : GROUNDSKEEPER/GARDENER:

JULY

CHECK OFF ON THE DAY TASK IS COMPLETED

WEEK	MAINTENANCE TYPE: (* = SEE AREA PROCEDURES /MAPS) (DARKEST AREAS : PLEASE COMPLETE TASK THAT WEEK.) (OTHER TASKS TO BE COMPLETED WITHIN MTH.) (SPECIAL EVENTS AND OTHER FUNCTIONS IN ITALICS)	NOTES, SUGGESTIONS / REASONS IF MAINTENANCE TASK WAS NOT COMPLETED AS SCHEDULED	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	INITIAL WEEKLY
1				1	2	3	4	
	DAILY SAFETY CHECKS /ADA COMPLIANCE			X	X	X		
	AREA LEAF BLOWING				X			
	REMOVE GRAFFITI AND EXPIRED POSTERS				X			
	CHECK ELECTRIC CART BATTERIES ON MONDAYS			X				R.W.
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN				X			
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	nitroform on ferns			X			
	AREA.							
	REPORT DRAINAGE AND EROSION ISSUES	none						
	STORM DRAIN AND GRATE CLEANING*	Prepare storm drain system for inspection, see workorder for details. Use area SWOs for labor.						
WEEK			7	8	9	10	11	
2	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	BA
	AREA LEAF BLOWING		✓	✓				
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓					R.W.
	CHECK TURF IRRIGATION FOR COVERAGE							
	ANNUAL POWER EQUIPMENT INVENTORY	Please complete inventory list provided and return to Supervisor:						
	QUANITY& PLANT SPECIES.							
	PEST & CONTROL TAKEN							
	PERFORM MAINTENANCE ON ALL POWER EQUIPMENT							
	STORM DRAIN AND GRATE CLEANING*	Prepare storm drain system for inspection, see workorder for details. Use area SWOs for labor.						
	TAKE MEASURES TO CONTROL POISON OAK							
	DRAIN STANDING WATER	NONE						
WEEK			14	15	16	17	18	
3	DAILY SAFETY CHECKS /ADA COMPLIANCE		X	X	X	X	X	BA
	AREA LEAF BLOWING			✓		X		
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		X					R.W.
	QUANITY& PLANT SPECIES.	none						
	PEST & CONTROL TAKEN	none						
	TAKE MEASURES TO CONTROL POISON OAK	none found						
	CHECK BOLLARD SYSTEMS FOR DAMAGE	REPORT BROKEN HINGES, PLATES, WELDS, MISSING LOCKS & BOLLARDS TO SUPERVISOR			X			
	STORM DRAIN AND GRATE CLEANING*	Prepare storm drain system for inspection, see workorder for details. Use area SWOs for labor.	X					
WEEK			21	22	23	24	25	
4	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	BA
	AREA LEAF BLOWING		✓	✓				
	INSPECT OUTDOOR FURNITURE CONDITION							
	CHECK TURF IRRIGATION FOR COVERAGE							
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.							RW
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN							
	TURF MOWING ON MONDAY							
	CHECK ELECTRIC CART BATTERIES ON MONDAYS			✓				
	TAKE MEASURES TO CONTROL POISON OAK							
	DRAIN STANDING WATER	NONE						
	STORM DRAIN AND GRATE CLEANING*	Prepare storm drain system for inspection, see workorder for details. Use area SWOs for labor.		✓				
WEEK			28	29	30	31		
5	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X		BA
	AREA LEAF BLOWING		✓					
	QUANITY& PLANT SPECIES.							
	PEST & CONTROL TAKEN							RW
	ENTER HAZMAT INVENTORY							
	TAKE MEASURES TO CONTROL POISON OAK							
	CHECK ELECTRIC CART BATTERIES ON MONDAYS			✓				
	STORM DRAIN AND GRATE CLEANING*	Prepare storm drain system for inspection, see workorder for details. Use area SWOs for labor.	✓					

BASKIN ENG, CORE WEST PARKING, NAT. SCI. I & III, KERR HALL, ENGINEERING II : GROUNDSKEEPER/GARDENER:

AUGUST

CHECK OFF ON THE DAY TASK IS COMPLETED

WEEK	MAINTENANCE TYPE: (* = SEE AREA PROCEDURES / MAPS) (DARKEST AREAS : PLEASE COMPLETE TASK THAT WEEK.) (OTHER TASKS TO BE COMPLETED WITHIN MTH.) (SPECIAL EVENTS AND OTHER FUNCTIONS ARE IN ITALICS)	NOTES, SUGGESTIONS / REASONS IF MAINTENANCE TASK WAS NOT COMPLETED AS SCHEDULED	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	INITIAL WEEKLY
5								1
	DAILY SAFETY CHECKS /ADA COMPLIANCE							X
	AREA LEAF BLOWING							X
	CHECK 6" BUILDING AIR SPACE *	O.K						X
	STORM DRAIN, GRATE, AND OUTFALL CLEANING *							X
	PERFORM MAINTENANCE ON ALL POWER EQUIPMENT							X
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	O.K.						R.W.
	WALK TRANSITION ZONES IN YOUR ASSIGNED AREA.							X
	CHECK BOLLARD SYSTEMS FOR DAMAGE	REPORT BROKEN HINGES, PLATES, WELDS, MISSING LOCKS & BOLLARDS TO SUPERVISOR						X
	DERMA-REACTIVE PLANT CONTROL	O.K.						X
	DRAIN STANDING WATER							X
WEEK			4	5	6	7	8	
6	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	
	AREA LEAF BLOWING		✓	✓	X	X	X	BA
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN							
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	Fert. ferns Core West & NS EII approx 2 lbs	✓					
	REMOVE EXPIRED POSTERS, GRAFFITI, STICKERS ETC.			✓				
	CHECK ELECTRIC CART BATTERIES ON MONDAYS			✓				R.W.
	WALK TRANSITION ZONES IN YOUR ASSIGNED AREA.							
	CHECK BOLLARD SYSTEMS FOR DAMAGE	REPORT BROKEN HINGES, PLATES, WELDS, MISSING LOCKS & BOLLARDS TO SUPERVISOR		✓				
	REPORT DRAINAGE AND EROSION ISSUES	NONE DRY						
WEEK			11	12	13	14	15	
7	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	
	AREA LEAF BLOWING		✓	✓	X	X	X	BA
	INSPECT OUTDOOR FURNITURE CONDITION							
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	none						
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	Ferns Baskin Eng & EII approx 3 lbs	✓					R.W.
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓					
	TAKE MEASURES TO CONTROL POISON OAK							
	DRAIN STANDING WATER							
WEEK			18	19	20	21	22	
8	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	✓	✓	✓	
	AREA LEAF BLOWING		✓	✓		X		
	REMOVE EXPIRED POSTERS, STICKERS, ETC							
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓					BA
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	~~None~~ ~~Noted~~ Sprayed Roundup ON POISON OAK North-East side PSB	✓					
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	NONE This week						
	CHECK TURF IRRIGATION COVERAGE		✓					
WEEK			25	26	27	28	29	
9	DAILY SAFETY CHECKS /ADA COMPLIANCE		✓	✓	X	X	X	
	AREA LEAF BLOWING		✓	✓	X	X	X	BA
	STORM DRAIN GRATE/OUTFALL CLEANING				X			
	CLEAN OFF UTILITY COVERS, LIGHT POLE BASES.	OK						
	INSURE FIRE HYDRANT ACCESS CLEARANCE		•					R.W.
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓					
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	NONE						
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	None						
	DRAIN STANDING WATER	NONE						

* (student crowds Assistants & R. Wilson covering W-F)

SEPTEMBER — PARKING, NAT. SCI. I & III, KERR HALL, ENGINEERING II : GROUNDSKEEPER/GARDENER:

WEEK	MAINTENANCE TYPE: (* = SEE AREA PROCEDURES /MAPS) (DARKEST AREAS : PLEASE COMPLETE TASK THAT WEEK.) (OTHER TASKS TO BE COMPLETED WITHIN MTH.) (SPECIAL EVENTS AND OTHER FUNCTIONS IN ITALICS)	NOTES, SUGGESTIONS / REASONS IF MAINTENANCE TASK WAS NOT COMPLETED SCHEDULED	CHECK OFF ON THE DAY TASK IS COMPLETED: MONDAY / TUESDAY / WEDNESDAY / THURSDAY / FRIDAY / WEEKLY	INITIAL
10	DAILY SAFETY CHECKS & ADA COMPLIANCE		1 HOLIDAY, 2 ✓, 3 X, 4 X, 5 X	RW
	AREA LEAF BLOWING		✓	
	STORM DRAIN GRATE/OUTFALL CLEANING		X	BA
	CLEAN OFF UTILITY COVERS, LIGHT POLE BASES.			
	INSURE FIRE HYDRANT ACCESS CLEARANCE		✓	
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		X	
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	none		
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	None this week		
	DERMA-REACTIVE PLANT CONTROL	none		
	TURF MOWING ON MONDAY			
WEEK 11	DAILY SAFETY CHECKS & ADA COMPLIANCE		8 ✓, 9 ✓, 10 X, 11 X, 12 X	RW
	AREA LEAF BLOWING		✓ ✓	
	CHECK 6" BUILDING AIR SPACE *			BA
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓	
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	none		
	WALK TRANSITION ZONES IN YOUR ASSIGNED AREA.			
	TAKE MEASURES TO CONTROL POISON OAK	none	X	
	REPORT DRAINAGE AND EROSION ISSUES			
	CHECK BOLLARD SYSTEMS FOR DAMAGE	REPORT BROKEN HINGES, PLATES, WELDS, MISSING LOCKS & BOLLARDS TO SUPERVISOR	X	
	DRAIN STANDING WATER		X	
	TURF MOWING ON MONDAY		X	
WEEK 12	DAILY SAFETY CHECKS /ADA COMPLIANCE		15 ✓, 16 ✓, 17 X, 18 X, 19 X	RW
	AREA LEAF BLOWING		✓ ✓	
	HARDSCAPE WEED CONTROL IN KEY AREAS		✓	
	CHECK OUTDOOR FURNITURE CONDITIONS		X	
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	none		BA
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	feet. ferns around Baskin Aut. Tuesday Nitroformic 2, per fern)		
	TAKE MEASURES TO CONTROL POISON OAK			
	TURF MOWING ON MONDAY		X	
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓	
WEEK 13	DAILY SAFETY CHECKS /ADA COMPLIANCE		22 ✓, 23 ✓, 24 X, 25 X, 26 X	RW
	AREA LEAF BLOWING		✓ ✓	
	REMOVE EXPIRED POSTERS, STICKERS ETC.		X	
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN	Sprayed more weeds E2 NS 2oz Roundup with a	✓	
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.	none		BA
X	LINE TRIMMER MAINTENANCE	PREPARE FOR STORAGE, DRAIN FUEL FROM TANK AND RUN DRY. CLEAN AIR OR REPLACE FUEL FILTERS, SPARK PLUG AND CHECK SHIELD ATTACHMENT (X None on Site)		
	STORM DRAIN PM: WEST CORE			
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓	
	CHECK TURF IRRIGATION COVERAGE		✓	
	TURF MOWING ON MONDAY			
WEEK 14	DAILY SAFETY CHECKS /ADA COMPLIANCE		29 ✓, 30 ✓	BA
	AREA LEAF BLOWING		✓ ✓	
	STORM DRAIN GRATE/OUTFALL CLEANING			
	MONITOR FOR DISEASES & PESTS, DOCUMENT PEST & CONTROL TAKEN			
	NOTE IF FERTILIZER APPLIED, FORMULATION, QUANITY& PLANT SPECIES.			
	CHECK ELECTRIC CART BATTERIES ON MONDAYS		✓	
	ENTER HAZMAT INVENTORY			
	DRAIN STANDING WATER			
	TURF MOWING ON MONDAY			

SUSTAINABLE SITES PREREQUISITE 2: AGE OF BUILDING

1. LEED-EB Template

EITHER

(Responsible Party)

I, Jim Dunne , declare to USGBC that the building covered by the certification application will be at least two years old before certification is received.

OR

(Responsible Party)

I, , declare to USGBC that the building covered by the certification application has been previously certified under LEED-NC if the building will be less than two years old when certification is received.

Project Name: Engineering 2 LEED EB Submittal

Credit: SS Prerequisite 2: Age of Building

Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	10-29-07	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

SUSTAINABLE SITES CREDIT 1.1-1.2
PLAN FOR GREEN SITE & BUILDING EXTERIOR MANAGMENT

1. LEED-EB Template
2. Narrative letter describing:
    a. Building exterior maintenance equipment
    b. E2 plant list
    c. Landscape green cycling
    d. Animal and vegetation pest control
    e. UCSC Integrated Pest Management Policy
    f. Irrigation management and fertilizer use at E2
    g. Cleaning of building exterior
    h. Paints and sealants used on building exterior (includes E2 bid package specifications)

(Responsible Party)

I, Jim Dunne , declare to USGBC that the building has developed and implemented a Green Site and Building Exterior Management Plan that addresses the following topics:

One point for each 4 items addressed:

- [x] Maintenance equipment
- [x] Plantings
- [x] Animal and vegetation pest control
- [x] Landscape waste
- [ ] Irrigation management
- [x] Fertilizer use
- [ ] Snow removal (where applicable)
- [x] Cleaning of building exterior
- [x] Paints and sealants used on building exterior
- [x] Other maintenance of the building exterior

I have also provided the following supplementary information to support the declaration:

- [x] A narrative overview of an organizational management plan for establishing/ maintaining a low impact site and building exterior plan that addresses and specifically highlights the actions from the list in the requirements that are being implemented.

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
(•) 3-5 months	Quarter 1
( ) 6-8 months	Quarter 1 - Quarter 2
( ) 9-11 months	Quarter 1 - Quarter 3
( ) 12+ months	Quarter 1 - Quarter 4

(Continued on page 2)

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Person responsible for making sure that the Building Site and Exterior Management Program continues to work well.	J. Dunne							
Date responsible person provided quarterly report information listed below	8-7-08							
Questions that the responsible person must answer each quarter:								
Have the required Program actions been maintained over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Have the Program actions continued to work well over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Are there any problems with the Program actions that need to be remedied? (Insert a numbered list of problems or insert "None")	none							
If any problem with these Program actions were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	none							
Are there any opportunities for improving the Program actions? (insert a numbered list of opportunities or insert "None")	none							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	none							

SS Credit 1.1 (1 point):
Plan for Green Site and Building Exterior Management >= 4 items

Points Documented: 1

SS Credit 1.2 (1 additional point):
Plan for Green Site and Building Exterior Management >= 8 items

Points Documented: 1

Project Name: Engineering 2 LEED EB Submittal

Credit: SS Credit 1 (2 points possible): Plan for Green Site and Building Exterior Management

Points Documented: 2

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	92-08	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT SANTA CRUZ, CALIFORNIA 95064

May 6th, 2008

To: US Green Building Council- LEED-EB Program
Re: Sustainable Sites Credit 1.1 & 1.2 Green Site & Bldg. Ext. Mgmt.

The Engineering 2 Building is a 6-story, 152,077 gross square foot facility located in the Science Hill section of the UCSC campus. Built in 2003, Engineering 2 is home to more than fifteen different departments, focusing mainly on Economics and Engineering.
Engineering 2 includes facilities for two California Institutes for Science and Innovation programs: the Institute for Quantitative Biomedical Research (QB3) and the Center for Information Technology Research in the Interest of Society (CITRIS).
Engineering 2 is comprised of 4% classroom space, 22% research lab space and 74% office space.
The building exterior grounds consists of a large courtyard, natural drought resistant plantings and natural redwood forests.

Maintenance Equipment:
There is one groundskeeper / gardener whose area includes the E2 Site. All tools used at the E2 site are no- powered hand tools except for one low noise back pack blower, an Echo Pro Lite PB261L. This mid-priced backpack blower is appropriate for most homeowners, according to reviews. Rated at 65 decibels, this is the quietest backpack blower in this price range, and it only weighs 14.5 pounds."The use of the blower is scheduled early during the work shift, so that noise does not disturb building occupants.

Plantings:
There is no turf in the E2 Landscape.
The E2 landscape plant list includes California native plants or those of other regions well adapted to Mediterranean climate, low water use, and minimal susceptibility to pests and disease.

Plant List - UCSC E2 Landscape

Trees

Botanical Name	Common Name	Origin
Acer griseum	Paper bark maple	China
Cornus 'Eddies White Wonder'	Eddies White Wonder dogwood	Hybrid between CA and Eastern US native

		species
Sequoia sempervirens 'Aptos Blue'	Aptos Blue coast redwood	CA native
Quercus agrifolia	Coast live oak	CA native

Shrubs

Botanical Name	Common Name	Origin
Arctostaphylos uva ursi	Bearberry	CA native
Berberis thunbergii 'Crimson Pymy'	Crimson Pygmy barberry	Japan. Low maintenance requirement.
Calamagrostis acutifolia 'Carl Forester'	Carl Forester feather grass	Europe. Drought tolerant.
Calycanthus occidentalis	California spice bush	CA native
Carex pansa	California meadow sedge	CA native
Carex tumicola (Carex divulsa)	Berkeley sedge	Europe. Drought tolerant.
Ceanothus thyrsiflorus	Blue blossom	CA native
Erica carnea 'Springwood'	Springwood heath	Europe. Drought tolerant.
Gaultheria shallon	Salal	CA native
Iris douglasiana 'Canyon Snow'	Douglas iris	CA native
Mahonia aquifolium	Oregon grape	CA native
Polystichum munitum	Western sword fern	CA native
Rhamnus californica 'Eve Case'	Coffeeberry	CA native
Ribes sanguineum	Red flowering currant	CA native
Ribes speciosum	Fuschia flowering gooseberry	CA native
Ribes viburnifolium	Evergreen currant	CA native
Salvia spathacea	Hummingbird sage	CA native
Symphorocarpus mollis	Creeping snowberry	CA native
Vacouveria hexandra	NCN	CA native

Landscape Greencycling

Two types of material may be periodically removed from the landscape during routing maintenance operations : Woody material, such as tree branches and shrub trunks, and green material, such as weeds or herbaceous cuttings. Each type of material is greencycled .

Woody material generated by trimming trees or cleaning up fallen limbs is chipped into a landscape grade wood chip mulch by the UCSC Tree Crew. This material is stockpiled at a grounds yard, and then delivered to various sites on campus as requested.

Soft green material is typically generated by the area gardener and put into a local greencycling bin or pile, and then collected and stored at the grounds yard. From there it is

delivered to the City of Santa Cruz greencycling facility to be composted and be used in gardens.

Animal & Vegetation Pest Control:

UCSC is committed to IPM, (Integrated Pest Management). IPM is a method of pest control that draws on several different disciplines in order to effectively solve pest problems in a socially acceptable, and environmentally aware manner.

The UCSC Grounds Pest Management Coordinator provides an integrated pest management of landscape and structural pests, including education and consultation services.

Pesticide Use
(Policy EHS0003)

I. Purpose of the Policy

The University of California is concerned with maintaining a safe environment on its premises and abiding by state, local and federal regulations relating to health and safety. Pest control, as accomplished through an Integrated Pest Management Program, seeks to regulate the numbers and activities of pests, flora or fauna, where such pests threaten a safe and sanitary environment or threaten to destroy or
damage university property. As a matter of policy, control methods used will be those with minimum negative impact upon environmental quality and may include physical, mechanical, cultural, biological and educational tactics. This policy defines responsibilities and provides guidelines for selecting and applying pest control measures and pest control materials (pesticides).

II. Detailed Policy Statement

A. Responsibilities

1. Physical Plant's Pest Management Office:
All pesticide use on campus will be coordinated by Physical Plant's Pest Management Office, including such operations performed by pest control companies. Physical Plant is responsible for inspections, recommendations, identifying control methods, and maintaining campus inventory data.
a. When pests are or threaten to become a problem on university property, Physical Plant's Pest Management Office will be notified, allowing as much time as possible for pest control operations to be undertaken.
b. Physical Plant will inspect the area and assess the problems related to pest infestation, then formulate an integrated pest management remedial approach, which may include activities such as preventive maintenance, custodial practices, landscaping, and occupant education.
c. Proposed pest control measures and materials shall be submitted on a Pesticide Use *Request* form to EH&S for approval. EH&S will evaluate each request, ascertaining that safety requirements and applicable guidelines have been provided for, and will approve proposed operations based upon independent investigation and applicable regulations.
d. Using only EH&S approved pest control measures and materials, Physical Plant will coordinate pest control treatments with campus personnel assigned responsibility for the building(s) or area(s) involved. These individuals (or Physical Plant) will activate the required

notification procedures. The Physical Plant's Pest Management Office must be notified prior to the application of any pest control material.
e. Depending upon the type of pest control operations, Physical Plant, or personnel approved by them, will inspect treated areas to determine the timing of re-occupancy and the effectiveness of the control methods.
f. Physical Plant shall perform periodic pest risk evaluations of UCSC properties. Inspections for particular species will coincide with biological factors such as seasonal population growths and reproduction cycles.
g. Physical Plant or EH&S may perform inspections of adjunct campus pesticide activities or storage areas in order to assess compliance with applicable regulations and Campus Policy.

2. Environmental Health & Safety:
EH&S's responsibilities include evaluating and approving allpesticide use in accordance with applicable regulations, information pertinent to
individual species and conditions, and good health and safety practices.

B. Restrictions

1. Training
Adequate training, as determined by Physical Plant and EH&S, must be completed prior to pesticide use. Training required may vary depending upon the degree of employee responsibility and the hazard potential of anticipated operations. Pesticides will be used only under the direction of
a licensed operator, and the applicator shall be familiar with all pertinent governmental and campus regulations.
2. Pesticide Materials
Whenever possible, pest control materials will be limited to those that are least toxic. More toxic pesticides will be authorized only under special conditions based upon amounts required, hazard potential, the absence of a less toxic effective material, degradation rates, and consideration of the hazard of the pests versus the hazard of the pest control material.
3. Pesticide Storage and Disposal
All pesticide containers and service containers will be stored and labeled in accordance with state and federal pesticide regulations. Outdated or unusable materials and all pesticide waste shall be property contained and disposed in accordance with applicable state and federal regulations.
4. Equipment Care
All equipment used to apply pesticides (e.g. foggers, sprayers), other pest control equipment (e.g. traps, cages), and pesticide safety equipment (e.g. warning signs, protective clothing, eye protection, respirators) shall be thoroughly checked by the applicator for proper selection and operation before each use. After each use, they shall be thoroughly cleaned and checked for proper operation.

5. Purchase of Pesticides
Campus units will refer all pesticide sales representatives to Physical Plant. Units will not accept pesticide samples from these companies or enter into any sales agreements or direct contracts with them. Only EH&S approved pesticides may be purchased. Pesticide purchases,

including those on blanket purchases, may be coordinated by the Physical Plant Pest Management Office. Units not wishing to obtain materials
through Physical Plant may, with prior approval from the Physical Plant Pest Management Office, purchase EH&S-approved pesticides independently, providing they report pesticide purchases quarterly to that office. Quantities of pesticides purchased shall be proportional to the anticipated need to ensure all materials will be used.
6. Medical
Medical examinations for campus personnel assigned to pest control operations using pesticides will be made at the discretion of the Chief Campus Physician and/or as required by applicable regulations. Any suspected overexposure or adverse physical effects sustained by anyone using or exposed to pest control agents will be promptly reported to the Campus Health Center, Risk Management and EH&S.

III. Definitions
Pesticide**:** Any substance (or mixture) intended for preventing, destroying, repelling or mitigating any pest or intended for use as a plant regulator, defoliant, or desiccant.
Animal control (interior rodents, etc) is managed primarily through cultural practices such as food area sanitation, adjusting door thresholds to exclude rodents, keeping doors to the exterior shut, and entry exclusion by sealing or screening utility penetrations, vents, and other gaps.

Irrigation Management:
The E2 Landscape is irrigated using rotor head, spray head, and bubbler stations as appropriate. The system is controlled by a RainMaster Evolution Central Control satellite that communicates by radio with the campus base station. The base station accesses weather data from UCSC's dedicated irrigation weather station that records daily evapotranspiration, precipitation, and windspeed. The base station calculates irrigation and uploads schedules daily for the E2 Evolution satellite controller using weather station data and individual station data including relative microclimate, plant crop coefficient, station precipitation rate, distribution uniformity, soil type, slope of the station area, depth of root system, stress factor, and other factors. Irrigation does not take place until soil moisture loss calculations reach adjustable set points. At that point, run times are calculated by the station factors an account for infiltration rate, runoff likelihood due to slope and infiltration rate, soil moisture holding capacity, and plant needs. In addition, normal flow rates are established for individual stations. When flow rates exceed the base norm, the controller recognizes abnormal flow, shuts off the station, and alerts the base station computer. If a flow takes place when no stations are scheduled to be running, the controller interprets this as a mainline break and shuts off the master valve at the point of connection. In this way we save water and time by stopping overflow conditions as they occur and indicating the location of the problem to the base computer and the irrigation manager.
When precipitation set points are reached at the weather station, the base station automatically puts the Evolution controller into "rain shutdown" mode until the irrigation manager releases it. In a similar way, if windspeed set points are exceeded, irrigation will be stopped until windspeeds reach acceptable levels to avoid overspray and water waste.

There is a learning period required to adjust station factors so appropriate irrigation takes place. We found our initial factor assumptions applied excess irrigation and have reduced them significantly several times to correctly adjust the application.

Fertilizer Use.
There is minimal or no fertilizer use in this landscape.

Cleaning of Building Exterior.
Campus maintenance standards, exterior cleaning of Buildings:
Clean and remove mold, mildew, dirt and debris from concrete walls by using hot high-pressure water cleaning equipment. No chemicals, cleaning solutions or additives are to be used in the process.

Paints & Sealants Used on Building Exterior.
UCSC construction and maintenance standards, Section 09900 Painting, state exterior paints shall be low VOC and lead free.

James Dunne
Project Manager- E2 LEED-EB Submittal
Associate Director-UCSC Physical Plant

4. Prepare wood samples on type and quality of wood specified for use on Project.

5. Label and identify each sample as to location and application.

D. Wall Sample: To extent requested by University's Representative, paint designated wall areas approximately 3-foot square with paint systems corresponding to approved dry color samples and wall sample procedure until approved by University's Representative.

E. Sample Record: Maintain an accurate record of color of each sample and of materials used in preparation of approved samples.

1.03 QUALITY ASSURANCE

A. Include on label of containers:

1. Manufacturer's name.

2. Type of paint.

3. Manufacturer's stock number.

4. Color.

5. Instructions for reducing, where applicable.

B. Field Quality Control:

1. Request review by the University's Representative of first finished room, space, or item of each color scheme required for color, texture, and workmanship.

2. Use first acceptable room, space, or item as the Project standard for each color scheme.

C. Regulatory Requirements:

1. Comply with the regulations of the local Air Quality Management District for Volatile Organic Contents (VOC's).

2. Paint shall be certified by the manufacturer as "non-lead" (less than 0.06 percent lead by weight in the dried film) as defined in Part 1303 of the Consumer Product Safety Act.

3. Work to be painted may contain excessive levels of lead-based paint. Contractor shall retain and pay for the services of a Testing Agency to perform and report on tests for such suspected material. If excessive levels exist, the University will provide for subsequent testing and abatement under separate contract.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver sealed containers with labels legible and intact.

SUSTAINABLE SITES CREDIT 3.1:
ALTERNATIVE TRANSPORTATION, PUBLIC TRANS. ACCESS

1. LEED-EB Template
2. Area drawing of E2 that highlights building location and distance to closest bus stops which includes a scale bar
3. Schedule and route map of Santa Cruz Metro buses that serve the two bus stops located near E2

(Responsible Party)

I, Jim Dunne , declare to USGBC that the project building(s) meets at least one of the following options:

☐ Option A: The building is located within 1/2 mile of a commuter rail, light rail or subway station.

☒ Option B: The building is located within 1/4 mile of two or more public or campus bus lines usable by building occupants.

☐ Option C: Building occupants are provided with a conveyance (shuttle link) that supplies transportation between the building and public transportation meeting the criteria in Option A or Option B above.

I have provided all the following supplementary documentation to support the declaration:

☒ An area drawing or transit map

☒ The building location is highlighted

☒ Fixed rail stations are highlighted and distances between stations and building are indicated

☒ Bus lines are highlighted and distance between bus stops and building are indicated

☒ The map includes a scale bar for distance

☐ Records and results of quarterly contacts over the performance period with transit services to verify that service continues to be provided within specified distances from the building (dated, printed schedule from transit web site is sufficient).

The distances between the building or conveyance (shuttle link) pick up point and the public transit points are as shown in the following table. (Distances are measured as walking distance from a regular building exit or shuttle link pick up point to the bus stop location or rail station entrance).

* Distance from the building is measured in: ◉ Feet ○ Yards ○ Miles

Public Transit Stops - Locations	Distance from the Building
Commuter Rail, Light Rail or Subway Station	
Public or Campus Bus Line Stops	
McLaughlin Westbound Bus Stop	500
McLaughlin Eastbound Bus stop	500
Kresge Bus Stop Southbound Heller Dr.	1,000
Kresge Bus Stop Northbound Heller Dr.	1,000

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(Continued on page 2)

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
(•) 3-5 months	Quarter 1
( ) 6-8 months	Quarter 1 - Quarter 2
( ) 9-11 months	Quarter 1 - Quarter 3
( ) 12+ months	Quarter 1 - Quarter 4

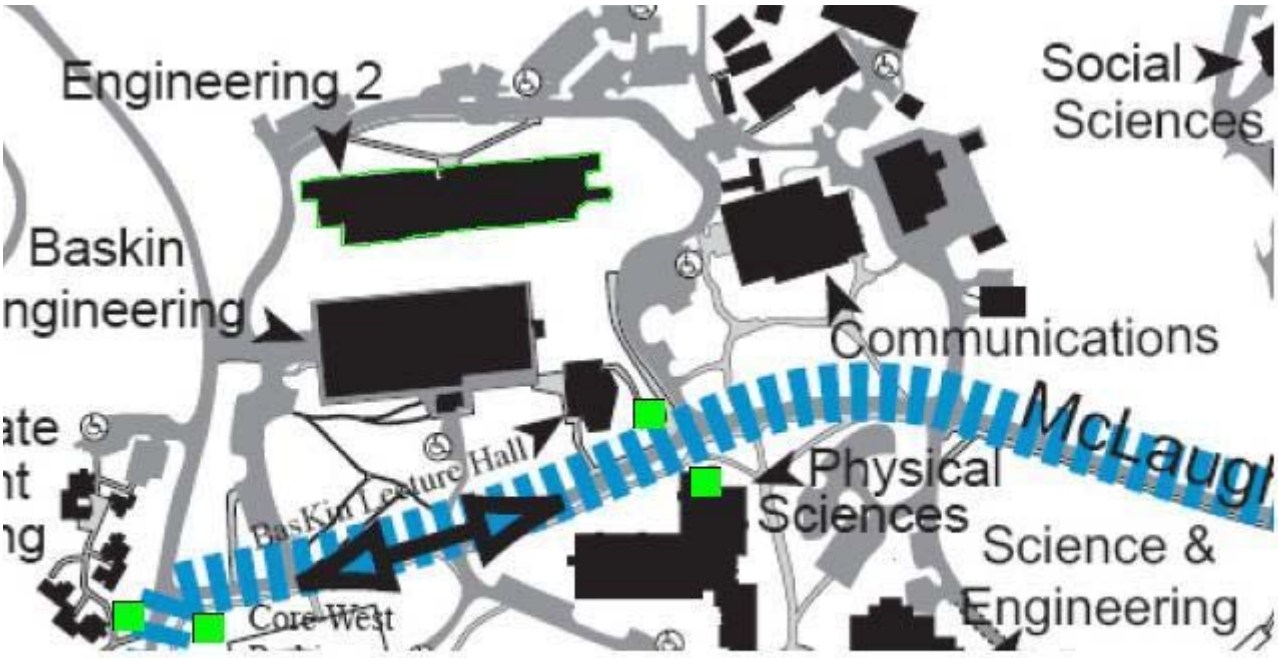
Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Project Complies with Option A	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Project Complies with Option B	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Project Complies with Option C	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Person responsible for making sure that access to public transportation measures continue to work well	Jim Dunne							
Date responsible person provided quarterly report information listed below	10-29-07							
Questions that the responsible person must answer each quarter:								
Has the delivery of the selected type of public transportation access continued over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Has the selected transportation program continued to work well for building occupants over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Are there any problems with the program that need to be remedied? (Insert a numbered list of problems or insert "None")	none							
If any problems with the program were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	none							
Are there any opportunities for improving the service or increasing the use of the service? (Insert a numbered list of remedies or insert "None")	none							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	none							

(Continued on page 3)

Project Name:	Engineering 2 LEED EB Submittal		
Credit:	SS Credit 3.1 (1 point possible): Alternative Transportation, Public Transportation Access	Points Documented:	0

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	10-29-07	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password



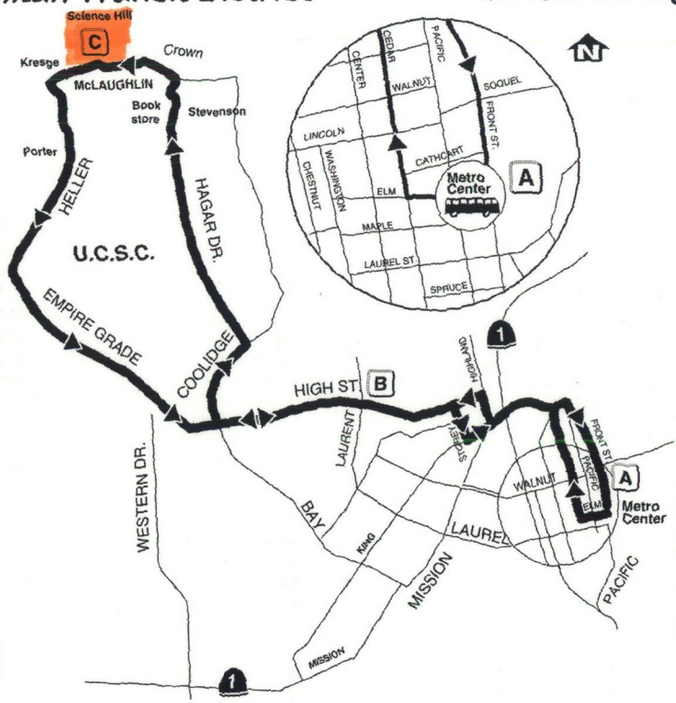
UCSC Bus and Shuttle map Northwest Section 1"= 250' Green Squares = Campus Shuttle and City of Santa Cruz Bus Stops

Santa Cruz Metropolitan Transit District — Effective / Vigente 9/18/2008

10 University Via High

Bus Leaves from Santa Cruz Metro Lane 1 (A)	Bus Leaves from High & Laurent (B)	Bus Leaves from Science Hill (C)	Bus Leaves from High & Laurent (B)	Bus Arrives at Santa Cruz Metro Center (A)
MON-FRI				
6:55 am	7:02	7:13	7:20	7:35
7:25	7:32	7:43	7:50	8:05
7:55	8:02	8:13	8:20	8:35
8:25	8:32	8:43	8:50	9:05
8:55	9:02	9:13	9:20	9:35
9:25	9:32	9:43	9:50	10:10
9:55	10:02	10:13	10:20	10:40
10:25	10:32	10:43	10:50	11:10
10:55	11:02	11:13	11:20	11:40
11:25	11:32	11:43	11:50	12:10
11:55	12:02	12:13	12:20	12:40
12:25 pm	12:32	12:43	12:50	1:10
12:55	1:02	1:13	1:20	1:40
1:25	1:32	1:43	1:50	2:10
1:55	2:02	2:13	2:20	2:40
2:25	2:32	2:43	2:50	3:10
2:55	3:02	3:13	3:20	3:40
3:25	3:32	3:43	3:50	4:10
3:55	4:02	4:13	4:20	4:40
4:25	4:32	4:43	4:50	5:10
4:55	5:02	5:13	5:20	5:40
5:25	5:32	5:43	5:50	6:10
5:35	5:42	5:53	6:00	6:20
5:55	6:02	6:13	6:20	6:40
6:25	6:32	6:43	6:50	7:05

All Metro buses are wheelchair accessible, while some stops on this route may not be.



10 University Via High

Bus Leaves from Santa Cruz Metro Lane 1 (A)	Bus Leaves from High & Laurent (B)	Bus Leaves from Science Hill (C)	Bus Leaves from High & Laurent (B)	Bus Arrives at Santa Cruz Metro Center (A)
SAT-SUN				
8:25 am	8:32	8:43	8:50	9:05
9:25	9:32	9:43	9:50	10:05
10:25	10:32	10:43	10:50	11:05
11:25	11:32	11:43	11:50	12:05
12:25 pm	12:32	12:43	12:50	1:05
1:25	1:32	1:43	1:50	2:10
2:25	2:32	2:43	2:50	3:10
3:25	3:32	3:43	3:50	4:10
4:25	4:32	4:43	4:50	5:10
5:25	5:32	5:43	5:50	6:10

All Metro buses are wheelchair accessible, while some stops on this route may not be.

For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):

All UCSC - http://scmtd.com/routes/rtuc.html

All Routes - http://scmtd.com/routes.html

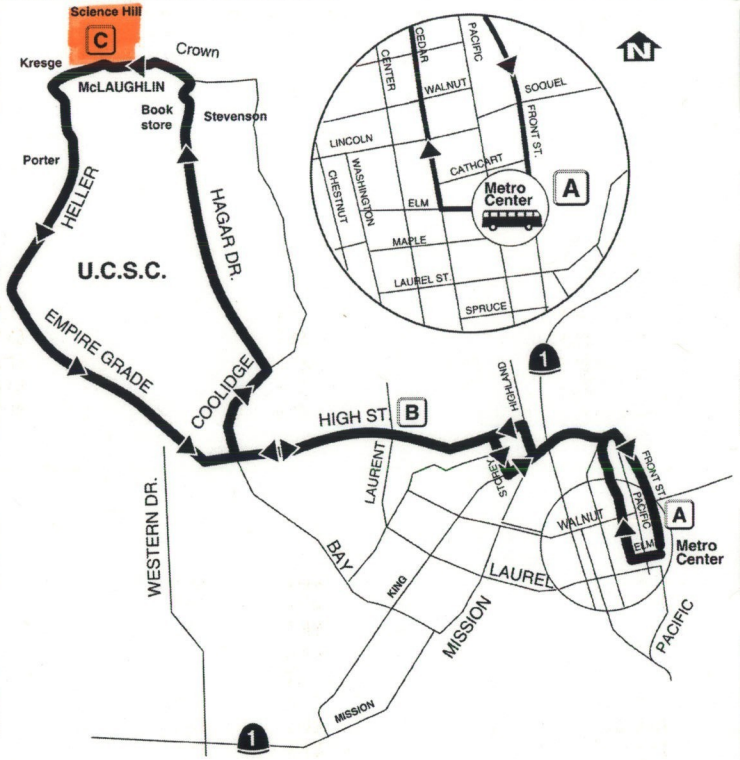
• The Engineering 2 building is located near the "Science Hill" bus stops on campus. See attached picture.

Santa Cruz Metropolitan Transit District — Effective / Vigente 9/18/2008

10 University Via High

Bus Leaves from Santa Cruz Metro Lane 1 (A)	Bus Leaves from High & Laurent (B)	Bus Leaves from Science Hill (C)	Bus Leaves from High & Laurent (B)	Bus Arrives at Santa Cruz Metro Center (A)
MON-FRI				
6:55 am	7:02	7:13	7:20	7:35
7:25	7:32	7:43	7:50	8:05
7:55	8:02	8:13	8:20	8:35
8:25	8:32	8:43	8:50	9:05
8:55	9:02	9:13	9:20	9:35
9:25	9:32	9:43	9:50	10:10
9:55	10:02	10:13	10:20	10:40
10:25	10:32	10:43	10:50	11:10
10:55	11:02	11:13	11:20	11:40
11:25	11:32	11:43	11:50	12:10
11:55	12:02	12:13	12:20	12:40
12:25 pm	12:32	12:43	12:50	1:10
12:55	1:02	1:13	1:20	1:40
1:25	1:32	1:43	1:50	2:10
1:55	2:02	2:13	2:20	2:40
2:25	2:32	2:43	2:50	3:10
2:55	3:02	3:13	3:20	3:40
3:25	3:32	3:43	3:50	4:10
3:55	4:02	4:13	4:20	4:40
4:25	4:32	4:43	4:50	5:10
4:55	5:02	5:13	5:20	5:40
5:25	5:32	5:43	5:50	6:10
5:35	5:42	5:53	6:00	6:20
5:55	6:02	6:13	6:20	6:40
6:25	6:32	6:43	6:50	7:05

All Metro buses are wheelchair accessible, while some stops on this route may not be.



10 University Via High

10 University Via High

Bus Leaves from Santa Cruz Metro Lane 1 (A)	Bus Leaves from High & Laurent (B)	Bus Leaves from Science Hill (C)	Bus Leaves from High & Laurent (B)	Bus Arrives at Santa Cruz Metro Center (A)
SAT-SUN				
8:25 am	8:32	8:43	8:50	9:05
9:25	9:32	9:43	9:50	10:05
10:25	10:32	10:43	10:50	11:05
11:25	11:32	11:43	11:50	12:05
12:25 pm	12:32	12:43	12:50	1:05
1:25	1:32	1:43	1:50	2:10
2:25	2:32	2:43	2:50	3:10
3:25	3:32	3:43	3:50	4:10
4:25	4:32	4:43	4:50	5:10
5:25	5:32	5:43	5:50	6:10

All Metro buses are wheelchair accessible, while some stops on this route may not be.

For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):

All UCSC - http://scmtd.com/routes/rtuc.html

All Routes - http://scmtd.com/routes.html

- The Engineering 2 building is located near the "Science Hill" bus stops on campus. See attached picture.

Santa Cruz Metropolitan Transit District

Effective / Vigente 9/18/2008

12 SCHOOL TERM ONLY University/East Side Direct

Bus Leaves from 41st Ave. & Kings Plaza	Bus Leaves from 7th Ave. & Bonnie	Bus Leaves from Laurel & Pacific	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Arrives at Santa Cruz Metro Center
F	E	D	B	C	B	A
MON-FRI						
7:10 am	7:18	7:26	7:32	7:44	7:54	8:07

All Metro buses are wheelchair accessible, while some stops on this route may not be.

UCSC School Term (ST) Service:
Routes: 12, 13, 15, (16,19,20 - only trips labeled "ST")

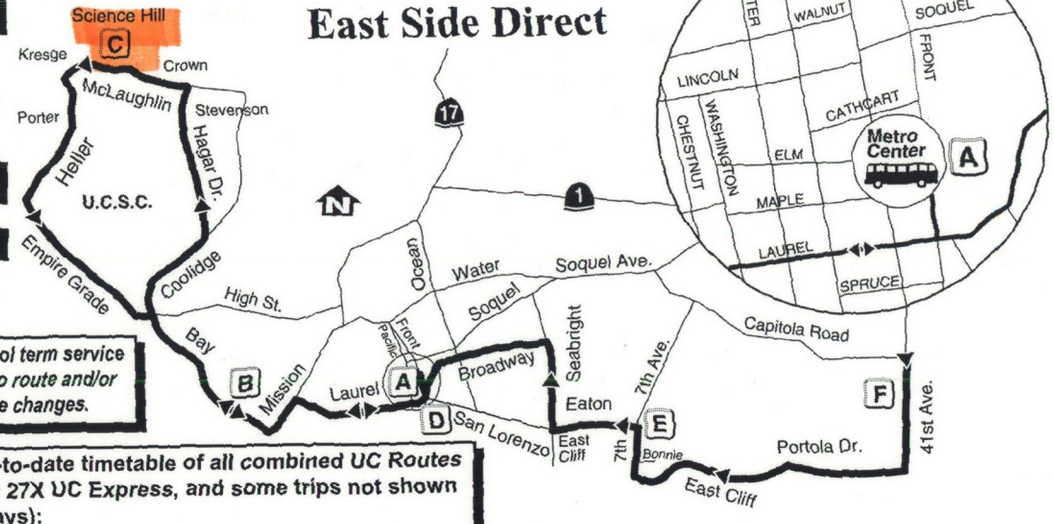
Service Operates Weekdays:	Except On:
Sep-22-2008 - Dec-11-2008	Nov 11, Nov 27, Nov 28
Jan-06-2009 - Mar-20-2009	Jan 19, Feb 16
Mar-30-2009 - Jun-11-2009	May 25

For Night Owl Dial-A-Ride Information, see Headways page 63

NOTE: School term service is subject to route and/or schedule changes.

For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):
http://scmtd.com/routes/rtuc.html

12 University/ East Side Direct



13 SCHOOL TERM ONLY University via Walnut

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Arrives at Santa Cruz Metro Center
A	B	C	B	A
MON-FRI				
7:20 am	7:27	7:39	7:49	8:07
8:20	8:27	8:39	8:49	9:07
9:20	9:27	9:39	9:49	10:07
10:20	10:27	10:39	10:49	11:07
11:20	11:27	11:39	11:49	12:07
12:20 pm	12:27	12:39	12:49	1:07
1:20	1:27	1:39	1:49	2:07
2:20	2:27	2:39	2:49	3:07
3:20	3:27	3:39	3:49	4:07
4:20	4:27	4:39	4:49	5:07
5:20	5:27	5:39	5:49	6:07
6:20	6:27	6:39	6:49	7:07

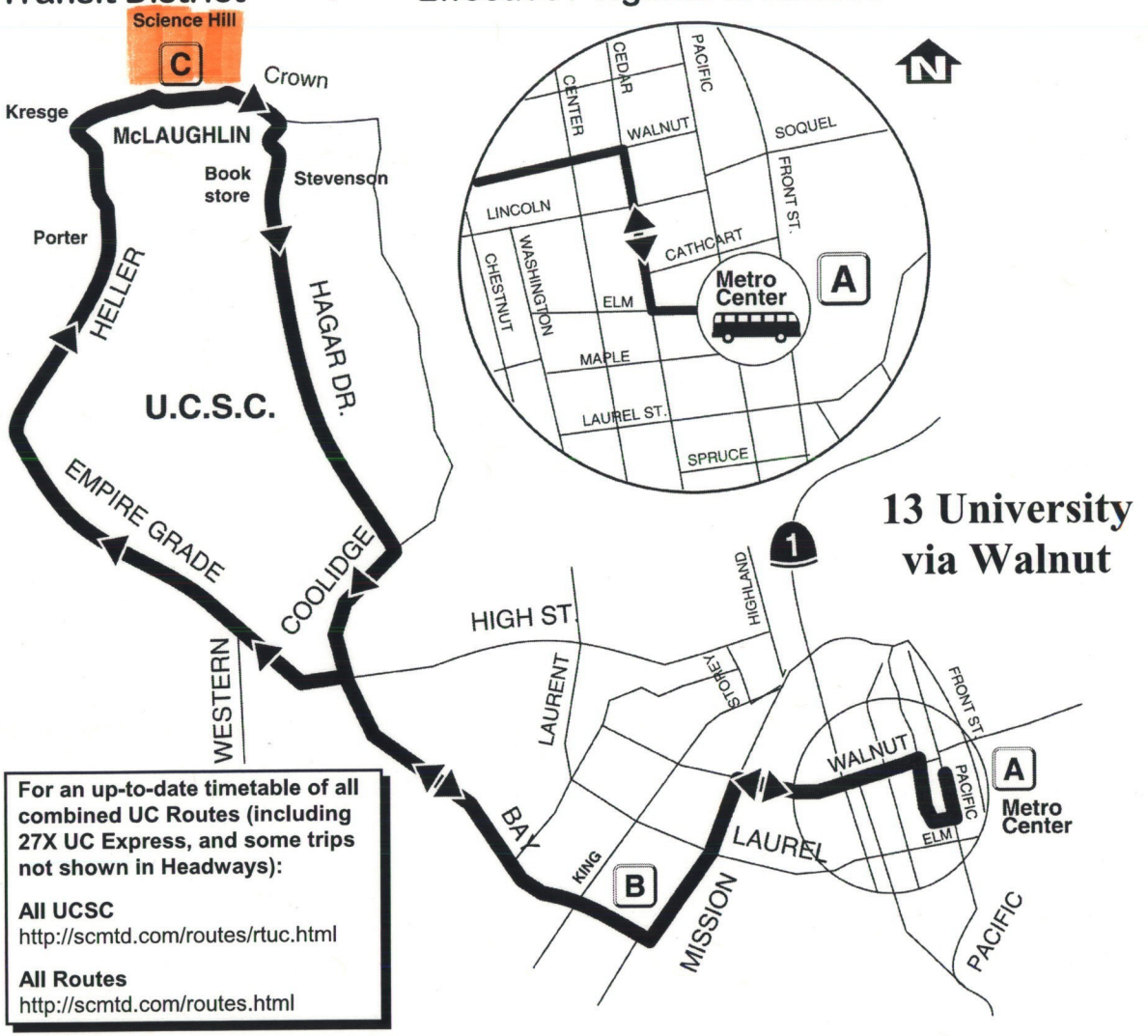
All Metro buses are wheelchair accessible, while some stops on this route may not be.

UCSC School Term (ST) Service:
Routes: 12, 13, 15, (16,19,20 - only trips labeled "ST")

Service Operates Weekdays:	Except On:
Sep-22-2008 - Dec-11-2008	Nov 11, Nov 27, Nov 28
Jan-06-2009 - Mar-20-2009	Jan 19, Feb 16
Mar-30-2009 - Jun-11-2009	May 25

For Night Owl Dial-A-Ride Information, see Headways page 63

NOTE: School term service is subject to route and/or schedule changes.



For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):

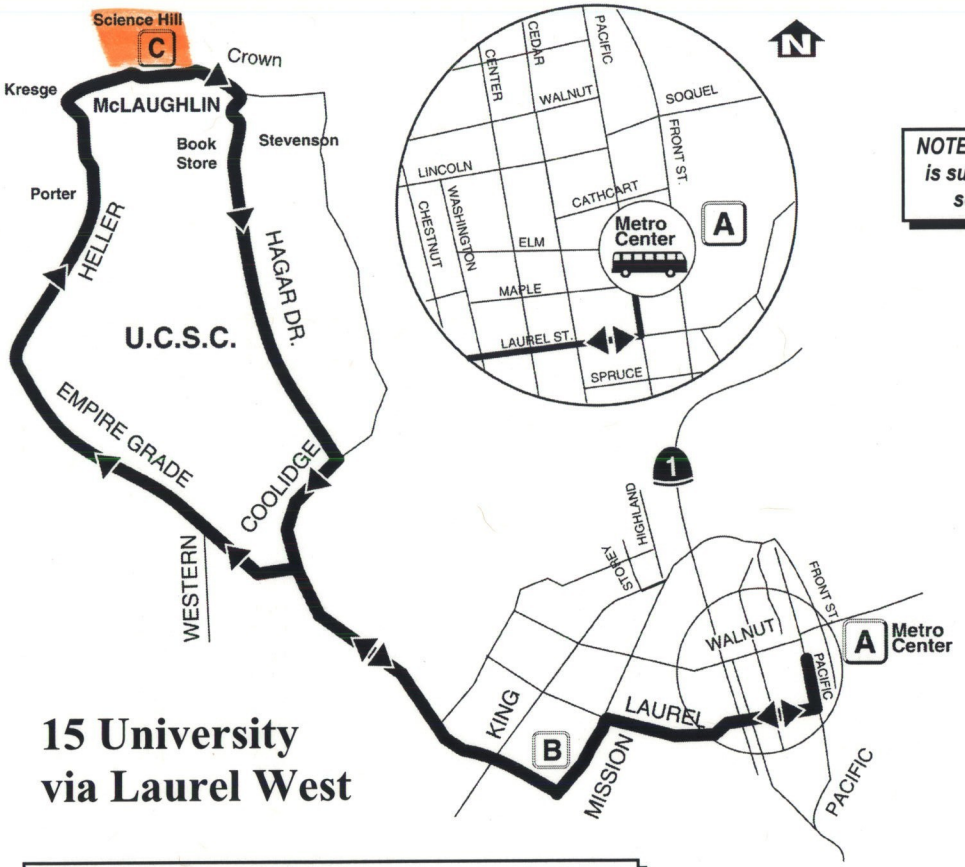
All UCSC
http://scmtd.com/routes/rtuc.html

All Routes
http://scmtd.com/routes.html

15 SCHOOL TERM ONLY University via Laurel West

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Arrives at Santa Cruz Metro Center
A	B	C	B	A
MON-FRI				
7:38 am	7:44	7:56	8:06	8:23
8:08	8:14	8:26	8:36	8:53
8:35	8:41	8:53	9:03	9:20
9:53	9:59	10:11	10:21	10:38
10:07	10:13	10:25	10:35	10:52
10:45	10:51	11:03	11:13	11:30
10:57	11:03	11:15	11:25	11:42
11:05	11:11	11:23	11:33	11:50
11:25	11:31	11:43	11:53	12:10
11:38	11:44	11:56	12:06	12:23
11:47	11:53	12:05	12:15	12:32
12:06 pm	12:12	12:24	12:34	12:51
12:15	12:21	12:33	12:43	1:00
12:48	12:54	1:06	1:16	1:33
1:05	1:11	1:23	1:33	1:50
1:15	1:21	1:33	1:43	2:00
1:32	1:38	1:50	2:00	2:17
1:38	1:44	1:56	2:06	2:23
1:50	1:56	2:08	2:18	2:35
1:58	2:04	2:16	2:26	2:43
2:17	2:23	2:35	2:45	3:02
2:30	2:36	2:48	2:58	3:15
2:38	2:44	2:56	3:06	3:23
2:48	2:54	3:06	3:16	3:33
3:00	3:06	3:18	3:28	3:45
3:08	3:14	3:26	3:36	3:53
3:38	3:44	3:56	4:06	4:23
3:58	4:04	4:16	4:26	4:43
4:08	4:14	4:26	4:36	4:53
4:22	4:28	4:40	4:50	5:07
4:35	4:41	4:53	5:03	5:20
4:47	4:53	5:05	5:15	5:32
5:13	5:19	5:31	5:41	5:58
6:03	6:09	6:21	6:31	6:48
6:25	6:31	6:43	6:53	7:10
6:58	7:04	7:16	7:26	7:43
7:20	7:26	7:38	7:48	8:05
7:50	7:56	8:08	8:18	8:35

All Metro buses are wheelchair accessible, while some stops on this route may not be.



15 University via Laurel West

UCSC School Term (ST) Service:
Routes: 12, 13, 15, (16,19,20 - only trips labeled "ST")

Service Operates Weekdays:	Except On:
Sep-22-2008 - Dec-11-2008	Nov 11, Nov 27, Nov 28
Jan-06-2009 - Mar-20-2009	Jan 19, Feb 16
Mar-30-2009 - Jun-11-2009	May 25

For Night Owl Dial-A-Ride Information, see Headways page 63

NOTE: School term service is subject to route and/or schedule changes.

For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):

All UCSC - http://scmtd.com/routes/rtuc.html

All Routes - http://scmtd.com/routes.html

16 University via Laurel East

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Arrives at Santa Cruz Metro Center
A	B	C	B	A
MON-FRI				
6:25 am	6:31	6:43	6:53	7:05
7:10	7:16	7:28	7:38	7:50
7:40	7:46	7:58	8:08	8:20
8:10	8:16	8:28	8:38	8:50
8:40	8:46	8:58	9:08	9:25
ST 8:55	9:01	9:13	9:23	9:40
9:10	9:16	9:28	9:38	9:55
ST 9:22	9:28	9:40	9:50	10:07
9:40	9:46	9:58	10:08	10:25
ST 9:50	9:56	10:08	10:18	10:35
10:10	10:16	10:28	10:38	10:55
ST 10:22	10:28	10:40	10:50	11:07
10:40	10:46	10:58	11:08	11:25
11:10	11:16	11:28	11:38	11:55
ST 11:22	11:28	11:40	11:50	12:07
11:40	11:46	11:58	12:08	12:25
ST 11:52	11:58	12:10	12:20	12:37
12:10 pm	12:16	12:28	12:38	12:55
ST 12:25	12:31	12:43	12:53	1:10

All Metro buses are wheelchair accessible, while some stops on this route may not be.

more pm times continued on right

UCSC School Term (ST) Service:
Routes: 12, 13, 15, (16,19,20 - only trips labeled "ST")

Service Operates Weekdays:	Except On:
Sep-22-2008 - Dec-11-2008	Nov 11, Nov 27, Nov 28
Jan-06-2009 - Mar-20-2009	Jan 19, Feb 16
Mar-30-2009 - Jun-11-2009	May 25

For Night Owl Dial-A-Ride Information, see Headways page 63

NOTE: School term service is subject to route and/or schedule changes.

16 University via Laurel East

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Arrives at Santa Cruz Metro Center
A	B	C	B	A
MON-FRI				
12:40 pm	12:46	12:58	1:08	1:25
ST 1:00	1:06	1:18	1:28	1:45
1:10	1:16	1:28	1:38	1:55
ST 1:22	1:28	1:40	1:50	2:07
1:40	1:46	1:58	2:08	2:25
ST 1:45	1:51	2:03	2:13	2:30
2:10	2:16	2:28	2:38	2:55
ST 2:25	2:31	2:43	2:53	3:10
ST 2:35	2:41	2:53	3:03	3:20
2:40	2:46	2:58	3:08	3:25
ST 2:52	2:58	3:10	3:20	3:37
ST 3:07	3:13	3:25	3:35	3:52
3:10	3:16	3:28	3:38	3:55
ST 3:15	3:21	3:33	3:43	4:00
ST 3:22	3:28	3:40	3:50	4:07
3:40	3:46	3:58	4:08	4:25
ST 3:45	3:51	4:03	4:13	4:30
ST 3:52	3:58	4:10	4:20	4:37
4:10	4:16	4:28	4:38	4:55
ST 4:30	4:36	4:48	4:58	5:15
4:40	4:46	4:58	5:08	5:25
ST 4:50	4:56	5:08	5:18	5:35
5:10	5:16	5:28	5:38	5:55
ST 5:35	5:41	5:53	6:03	6:20
5:40	5:46	5:58	6:08	6:25
ST 6:00	6:06	6:18	6:28	6:45
6:10	6:16	6:28	6:38	6:50
6:40	6:46	6:58	7:08	7:20
7:00	7:06	7:18	7:28	7:40
7:15	7:21	7:33	7:43	7:55
7:45	7:51	8:03	8:13	8:25
8:00	8:06	8:18	8:28	8:40
8:15	8:21	8:33	8:43	8:55
8:45	8:51	9:03	9:13	9:25
9:00	9:06	9:18	9:28	9:40
9:15	9:21	9:33	9:43	9:55
9:45	9:51	10:03	10:13	10:25
10:15	10:21	10:33	10:43	10:55
10:45	10:51	11:03	11:13	11:25
11:15	11:21	11:33	11:43	11:55
11:45	11:51	12:03	12:13	12:25

All Metro buses are wheelchair accessible, while some stops on this route may not be.

16 University via Laurel Night Owl Service

SCHOOL TERM ONLY

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Arrives at Santa Cruz Metro Center
A	B	C	B	A
SUN-THU				
12:00 am	12:05	12:14	12:23	12:35
12:20	12:25	12:34	12:43	12:55
12:40	12:45	12:54	1:03	1:15
1:20	1:25	1:34	1:43	1:55
2:00	2:05	2:14 ❶	—	—

All Metro buses are wheelchair accessible, while some stops on this route may not be.

❶ Trip ends at Bay & High 5 min. later
Viaje termina en Bay & High 5 minutos despues

UCSC Night Owl School Term (ST) Service:
Routes: 16 & 19 (starting at 11:45pm)

Service Operates:	Except On:
Sep-22-2008 - Dec-10-2008	(Nov 26 - Nov 30)
Jan-06-2009 - Mar-19-2009	Jan 18, Feb 15
Mar-30-2009 - Jun-10-2009	May 24

For Night Owl Dial-A-Ride Information, see Headways page 63

For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):

All UCSC - http://scmtd.com/routes/rtuc.html

All Routes - http://scmtd.com/routes.html

19 University via Lower Bay

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Leaves from Cliff & Beach	Bus Arrives at Santa Cruz Metro Center
A	B	C	B	D	A
MON-FRI					
7:30 am	7:37	7:49	7:59	8:05	8:22
8:30	8:37	8:49	8:59	—	9:17
ST 9:00	9:07	9:19	9:29	—	9:47
9:30	9:37	9:49	9:59	—	10:17
10:30	10:37	10:49	10:59	—	11:17
11:30	11:37	11:49	11:59	—	12:17
ST 12:00 pm	12:07	12:19	12:29	—	12:47
12:30	12:37	12:49	12:59	—	1:17
1:30	1:37	1:49	1:59	—	2:17
2:30	2:37	2:49	2:59	—	3:17
ST 3:00	3:07	3:19	3:29	—	3:47
3:30	3:37	3:49	3:59	—	4:17
ST 4:00	4:07	4:19	4:29	—	4:47
4:30	4:37	4:49	4:59	—	5:17
ST 5:00	5:07	5:19	5:29	—	5:47
5:30	5:37	5:49	5:59	—	6:17
6:30	6:37	6:49	6:59	7:05	7:11
7:30	7:37	7:49	7:59	8:05	8:11
8:30	8:37	8:49	8:59	9:05	9:11
ST 9:30	9:37	9:49	9:59	—	10:11
ST 10:30	10:37	10:49	10:59	—	11:11
ST 11:30	11:37	11:49	11:59	—	12:11
SAT-SUN					
9:50 am	9:57	10:09	10:19	10:25	10:42
10:50	10:57	11:09	11:19	11:25	11:42
11:50	11:57	12:09	12:19	12:25	12:42
12:50 pm	12:57	1:09	1:19	1:25	1:42
1:50	1:57	2:09	2:19	2:25	2:42
2:50	2:57	3:09	3:19	3:25	3:42
3:50	3:57	4:09	4:19	4:25	4:42
4:50	4:57	5:09	5:19	5:25	5:42
5:50	5:57	6:09	6:19	6:25	6:42
6:50	6:57	7:09	7:19	7:25	7:42

All Metro buses are wheelchair accessible, while some stops on this route may not be.

For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):

All UCSC
http://scmtd.com/routes/rtuc.html

All Routes
http://scmtd.com/routes.html

NOTE: School term service is subject to route and/or schedule changes.

UCSC School Term (ST) Service:
Routes: 12, 13, 15, (16,19,20 - only trips labeled "ST")

Service Operates Weekdays:	Except On:
Sep-22-2008 - Dec-11-2008	Nov 11, Nov 27, Nov 28
Jan-06-2009 - Mar-20-2009	Jan 19, Feb 16
Mar-30-2009 - Jun-11-2009	May 25

For Night Owl Dial-A-Ride Information, see Headways page 63

19 University via Lower Bay Night Owl Service

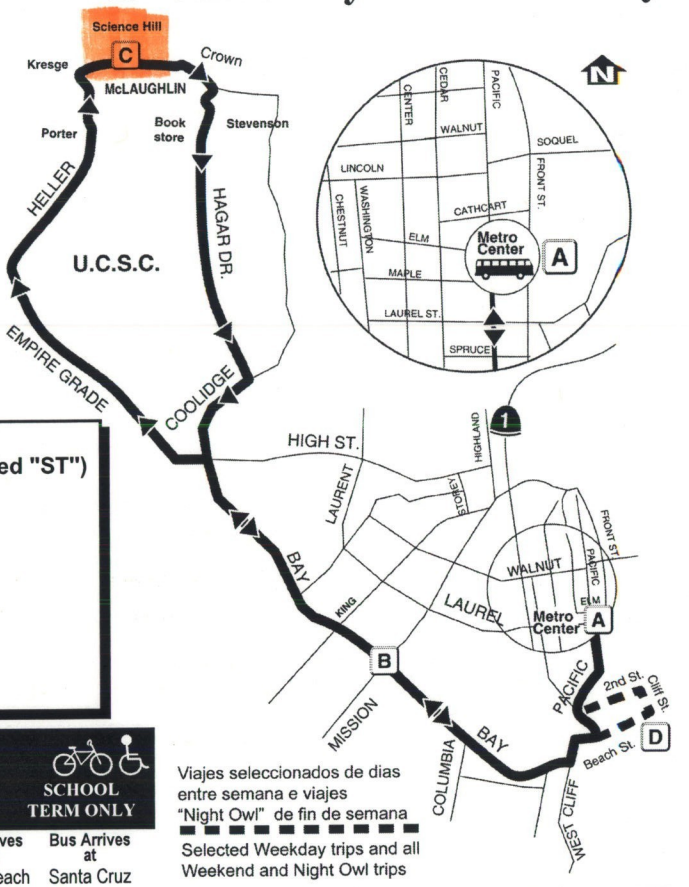
SCHOOL TERM ONLY

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Bay & Mission	Bus Leaves from Science Hill	Bus Leaves from Bay & Mission	Bus Leaves from Cliff & Beach	Bus Arrives at Santa Cruz Metro Center
A	B	C	B	D	A
FRI-SAT					
—	—	11:45 ❶	11:54	11:56	12:06
12:20 am	12:25	12:34	12:43	12:45	12:55
1:00	1:05	1:14	1:23	1:25	1:35
1:40	1:45	1:54	2:03	2:05	2:15
2:20	2:25	2:34	2:43	2:45	2:55
3:00	3:05	3:14 ❷	—	—	—

All Metro buses are wheelchair accessible, while some stops on this route may not be.

❶ Trip starts at High & Bay 5 min. earlier — Viaje comienza en Bay & High 5 min. temprano
❷ Trip ends at Bay & High 5 min. later — Viaje termina en Bay & High 5 min. despues

19 University via Lower Bay



Viajes seleccionados de dias entre semana e viajes "Night Owl" de fin de semana

Selected Weekday trips and all Weekend and Night Owl trips

UCSC Night Owl School Term (ST) Service:
Routes: 16 & 19 (starting at 11:45pm)

Service Operates:	Except On:
Sep-22-2008 - Dec-10-2008	(Nov 26 - Nov 30)
Jan-06-2009 - Mar-19-2009	Jan 18, Feb 15
Mar-30-2009 - Jun-10-2009	May 24

For Night Owl Dial-A-Ride Information, see Headways page 63

Santa Cruz Metropolitan Transit District

Effective / Vigente 9/18/2008

20 University via Westside

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Delaware & Swift	Bus Leaves from Pacific Shores	Bus Leaves from Bay & High	Bus Leaves from Science Hill	Bus Leaves from Pacific Shores	Bus Leaves from Delaware & Swift	Bus Leaves from Santa Cruz Metro Center	Bus Arrives at Bay & High
A	B	C	D	E	C	B	A	D
MON-FRI								
7:20 am	7:30	—	7:40	7:50	7:57	8:03	8:18	—
8:20	8:30	8:33	8:43	8:53	9:00	9:08	9:20	—
ST 8:50	9:00	—	9:10	9:20	—	—	—	9:27
9:20	9:30	—	9:40	9:50	—	10:03	10:15	—
10:20	10:30	—	10:40	10:50	—	11:03	11:15	—
11:20	11:30	—	11:40	11:50	—	12:03	12:15	—
12:20 pm	12:30	—	12:40	12:50	—	1:03	1:15	—
1:20	1:30	1:33	1:43	1:53	2:00	2:08	2:20	—
2:20	2:30	—	2:40	2:50	—	3:03	3:15	—
3:20	3:30	—	3:40	3:50	—	4:03	4:15	—
4:20	4:30	4:33	4:43	4:53	5:00	5:08	5:20	—
ST —	—	—	5:05	5:15	—	5:28	5:40	—
5:20	5:30	5:33	5:43	5:53	6:00	6:08	6:20	—
6:20	6:30	—	6:40	6:50	—	7:03	7:15	—
7:20	7:30	—	7:40	7:50	—	8:03	8:15	—
8:20	8:30	—	8:40	8:50	—	9:03	9:15	—

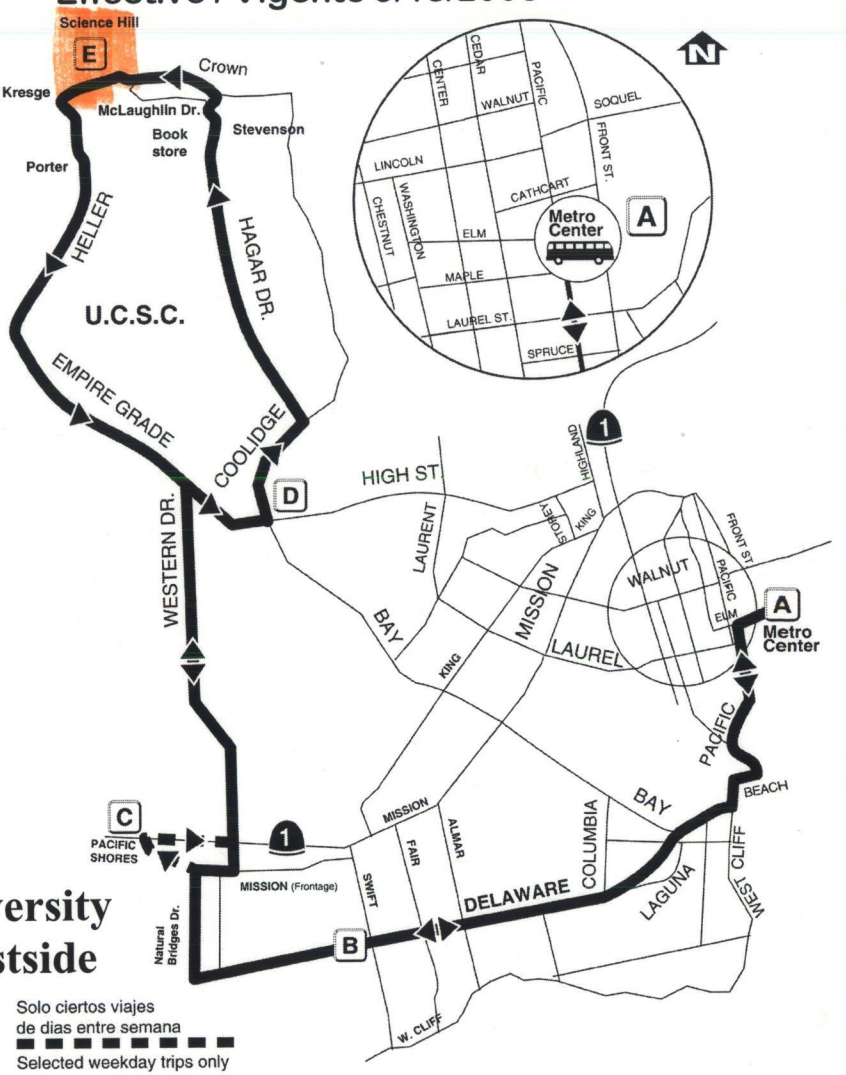
All Metro buses are wheelchair accessible, while some stops on this route may not be.

20 University via Westside

Bus Leaves from Santa Cruz Metro Lane 1	Bus Leaves from Delaware & Swift	Bus Leaves from Bay & High	Bus Leaves from Science Hill	Bus Leaves from Delaware & Swift	Bus Arrives at Santa Cruz Metro Center
A	B	D	E	B	A
SAT-SUN					
8:20 am	8:30	8:40	8:50	9:03	9:15
9:20	9:30	9:40	9:50	10:03	10:15
10:20	10:30	10:40	10:50	11:03	11:15
11:20	11:30	11:40	11:50	12:03	12:15
12:20 pm	12:30	12:40	12:50	1:03	1:15
1:20	1:30	1:40	1:50	2:03	2:15
2:20	2:30	2:40	2:50	3:03	3:15
3:20	3:30	3:40	3:50	4:03	4:15
4:20	4:30	4:40	4:50	5:03	5:15
5:20	5:30	5:40	5:50	6:03	6:15
6:20	6:30	6:40	6:50	7:03	7:15
7:20	7:30	7:40	7:50	8:03	8:15
8:20	8:30	8:40	8:50	9:03	9:15

All Metro buses are wheelchair accessible, while some stops on this route may not be.

NOTE: School term service is subject to route and/or schedule changes.



20 University via Westside

Solo ciertos viajes de dias entre semana

Selected weekday trips only

UCSC School Term (ST) Service:
Routes: 12, 13, 15, (16,19,20 - only trips labeled "ST")

Service Operates Weekdays:	Except On:
Sep-22-2008 - Dec-11-2008	Nov 11, Nov 27, Nov 28
Jan-06-2009 - Mar-20-2009	Jan 19, Feb 16
Mar-30-2009 - Jun-11-2009	May 25

For Night Owl Dial-A-Ride Information, see Headways page 63

For an up-to-date timetable of all combined UC Routes (including 27X UC Express, and some trips not shown in Headways):

All UCSC - http://scmtd.com/routes/rtuc.html

All Routes - http://scmtd.com/routes.html

SUSTAINABLE SITES CREDIT 3.2: ALTERNATIVE TRANSPORTATION, BICYCLE STORAGE AND CHANGING

1. LEED-EB template
2. E2 bike rack usage tracking sheet used during the performance period.
3. Narrative of calculations and documentation that includes FTE occupancy, peak demand, required shower facilities and also photos of the bike racks and showers.
4. Location map of the bike racks relative to building entrances.
5. E2 floor plan highlighting shower facilities.

EITHER (For Commercial or Institutional Buildings)

(Responsible Party)

I, Louise Huttinger , declare to USGBC that secure bicycle storage, with convenient changing/shower facilities (within 200 yards of the building) will be provided for the greater of: 1 percent of either the full-time equivalent building occupants or 125% of peak demand for bicycle storage and convenient changing/shower facilities as follows:

Number of Full-Time Equivalent (FTE) building occupants assumed:	468
Surveyed Average Daily Peak Demand for bicycle storage slots provided within 200 yards of building during the performance period	11
Number of secure bicycle storage slots provided within 200 yards of building:	22
Number of shower and changing facilities within 200 yards of building:	2
Number of bicycle storage slots required based on 125% of peak demand:	**13.75**
Number of bicycle storage slots required based on FTE occupancy:	**4.68**
Adequate bicycle storage provided based on 125% of peak demand for bicycle storage slots?	**YES**
Adequate bicycle storage provided?	**YES**
Adequate showers and changing facilities provided?	**YES**

OR (For Residential Projects)

(Responsible Party)

I, , declare to USGBC that covered storage facilities for securing bicycles will be provided for 15% of building occupants in lieu of changing/shower facilities as follows:

Number of Full-Time Equivalent (FTE) building occupants assumed:	
Number of covered bicycle storage slots provided within 200 yards of building:	
Percent of the building occupants provided with adequate bicycle storage	**0**
Adequate bicycle storage provided?	**NO**

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(Continued on page 2)

I have also provided the following supplementary information to support the declaration:

☒ Site drawings (Drawings showing where the showers and bike storage are located do not need to be the original building architectural drawings of the building), product cut sheets and/or photographs highlighting bicycle securing apparatus and changing/shower facilities. (In campus settings, the maximum distance from individual buildings to showers requirement can be replaced with a requirement that 2 lines at 90 degrees to each other be drawn through the center of the campus on a campus map and it be documented that the bicycle racks and showers requirements are met for all buildings occupants within each quadrant).

☒ Records and results of quarterly inspections over the performance period to verify that the initially identified number of bicycle securing apparatus and shower/changing facilities continue to be available and that bicycle storage peak usage is being tracked on a quarterly basis.

☒ Documentation that secure bicycle storage with convenient changing/shower facilities (within 200 yards of the building) are provided for at least 5% of all building users for LEED-NC certified buildings that are less than 2 years old.

☒ Records of quarterly assessments of the number to building occupants and associated calculations to verify that these facilities continue to meet the credit requirements.

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
◉ 3-5 months	Quarter 1
○ 6-8 months	Quarter 1 - Quarter 2
○ 9-11 months	Quarter 1 - Quarter 3
○ 12+ months	Quarter 1 - Quarter 4

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(Continued on page 3)

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Bicycle Facilities Meet Requirements?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Shower Facilities Meet Requirements?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Person responsible for making sure that the bicycle facilities provided continue to work well	Robert Vitale							
Date responsible person provided quarterly report information listed below	2008-07-30							
Questions that the responsible person must answer each quarter:								
Have the required bicycle facilities remained available over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Have the bicycle facilities continued to work well for building occupants over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Are there any problems with the bicycle facilities that need to be remedied? (Insert a numbered list of problems or insert "None")	None							
If any problems were identified with the bicycle facilities, how have these been remedied? (Insert a numbered list of remedies or insert "None")	None							
Are there any opportunities for improving the bicycle facilities or increasing the use of these facilities? (insert a numbered list of opportunities or insert "None")	None							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	None							

Project Name: Engineering 2 LEED EB Submittal

Credit: SS Credit 3.2 (1 point possible): Alternative Transportation, Bicycle Storage & Changing Rooms

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-03	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

E2- SS CREDIT 3.2
BICYCLE RACK USE

Date	Description	# racks in use	# available
5/12/08	12pm Good Condition	7	22
5/14/08	8am - Good conditi	1	22
5/16/08	10am - GC good cond.	3	22
5/28/08	3pm - ~~8 bikes~~	9	22
5/31/08	12 pm GC	5	22
6/2/08	2pm - Good Conditi	11	22
6/4/08	10:30 am - GC	10	22
6/10/08	9am - GC	8	22
6/18/08	11:15 am GC	2	22
6/19/08	9am - GC	0	22
6/25/08	10:45 am - GC	9	22
6/27/08	1:30 pm GC	2	22
6/30/08	10:30 am GC	9	22
7/7/08	9am GC	5	22
7/14/08	11am - Good Conditio	3	22
7/16/08	10:00 am - GC	4	22
7/18/08	8:30 am - GC	2	22
7/21/08	**1:00 pm GC**	**4**	**22**
7/23/08	8:00 am GC	1	22

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SANTA CRUZ, CALIFORNIA 95064

LEED-EB: SS Credit 3.2 Bicycle Storage & Changing Rooms Calculations and Documentation

CALCULATING FULL TIME EQUIVALENCY (FTE) OCCUPANCY:

The Engineering 2 building has a FTE of 468. This number was calculated by using the UCSC Facilities Link that describes in detail the allotted space for each department in the Engineering 2 building. From this information, it was found that there were 160 staff/academic persons in the building and 356 grad and research students. In addition there are two classrooms on the 1st floor of E2 that hold 52 occupants each. It is estimated that classes are held for a total of 5 hours per day in each room, so approximately 520 students travel through E2 per day. In terms of weighting Full Time Equivalency, the calculations below weight staff and academic positions as full time, grad and research students as half shifts (.5) and students as a quarter shift (.25).

Staff/Academic: 160 persons x FTE 1 = 160
Grad/Research: 356 persons x FTE .5 = 178
Classroom/Students: 520 persons x FTE .25 = 130

TOTAL BUILDING FTE: 468

CALCULATING PEAK DEMAND:

The peak demand for bicycle parking was determined by counting the number of bicycles parked at the racks. Rack counts were conducted throughout the performance period, on different days of the week and times of day to account for variation in bicycle commuting (see attached documentation). The peak demand was found to be 11 bicycles.

DETERMINING THE MINIMUM NUMBER OF BICYCLE RACKS REQUIRED:

The minimum number of bicycles required is the greater of:

a) 1% of FTE building occupants
   468 FTE x .01 = 4.68 racks

OR

b) 125% of peak demand for bike racks
   1.25 x 11 = 13.75, or 14 racks

Minimum number of racks required: 14
Racks current available: 22

DETERMINING NUMBER OF CHANGING/SHOWER FACILITIES:

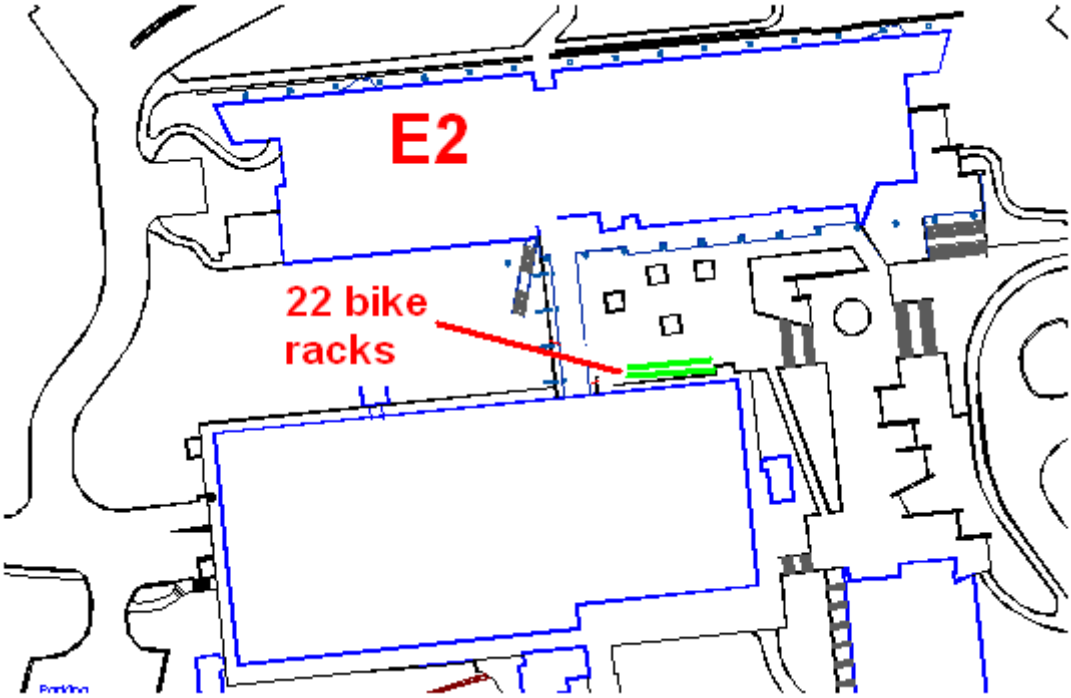
A minimum number of 1 shower for every 8 required bicycle racks is needed to satisfy this credit. Since there are 14 required racks, and thus at least one shower required, E2 satisfies this requirement with two shower/changing rooms located on the first floor. A floor plan identifying the location of this facility is attached.

PHOTOS OF BICYCLE RACKS AND SHOWER FACILITIES:

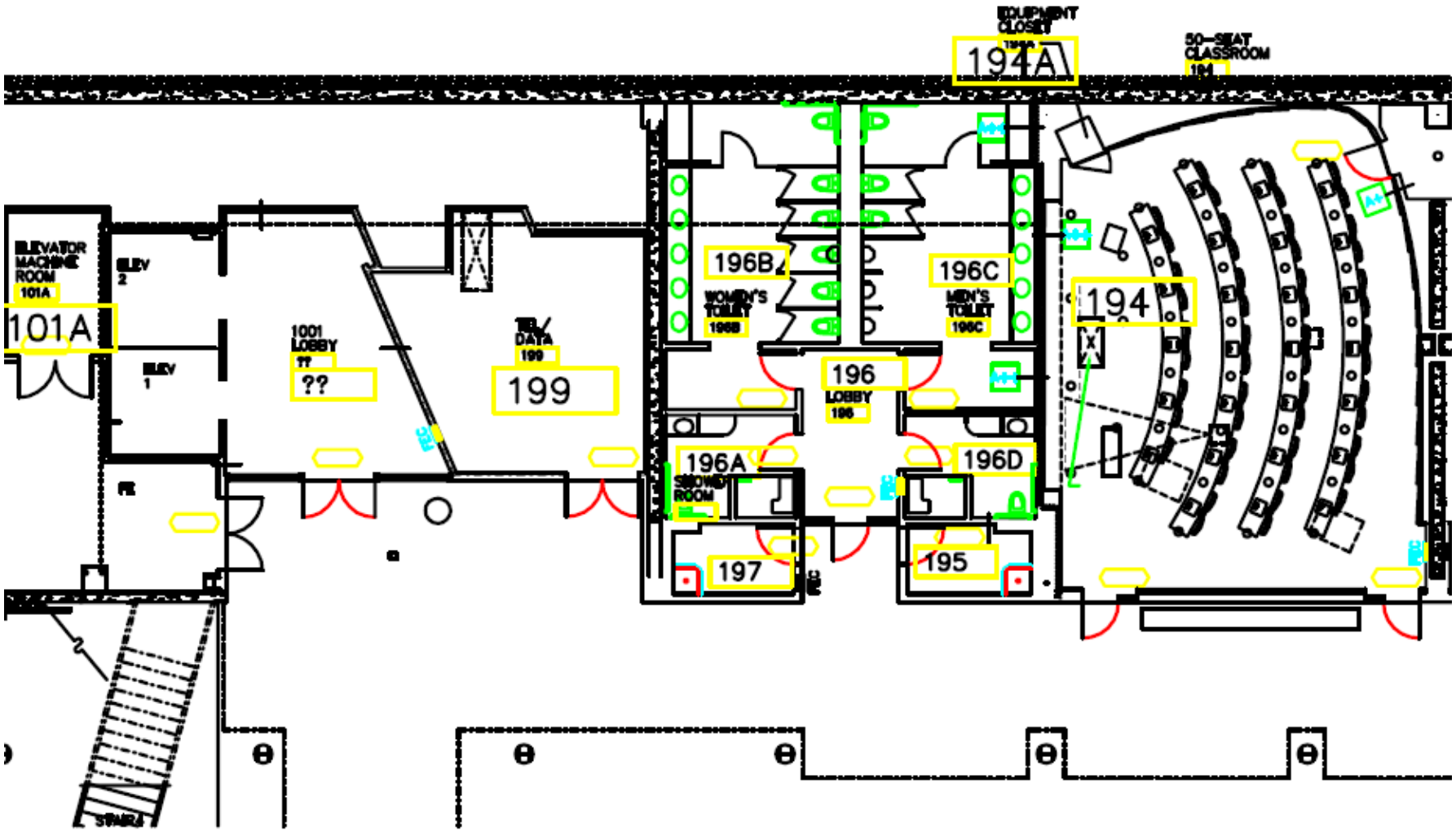

Engineering

PHOTOS OF SHOWER FACILITIES:

2 shower/changing rooms are located on the 1st floor of the E2 building about 100 feet from the bicycle racks. Each room has one shower, and is identical to one another.


E2
22 bike
racks

Engineering 2 building: 1st floor
Shower Rooms: 196A & 196D



SUSTAINABLE SITES CREDIT 3.4: ALTERNATIVE TRANSPORTATION, CARPOOLING & TELECOMMUTING

1. LEED-EB template
2. 2. E2 vanpool program description including calculations and parking plan.
3. Letter from UCSC Transportation and Parking Services (TAPS) describing carpool and vanpool programs and usage.
4. E2 vanpool usage reports from performance period.
5. Signed letter from director of TAPS confirming no new parking was added during the performance period.

EITHER: Option A

(Responsible Party)

I, Louise Huttinger , declare to USGBC that no new parking capacity has been added to the site and preferred parking has been provided for car pools or van pools capable of serving 5% of the building occupants.

I have provided all of the following supplementary documentation to support the declaration:

☒ A description, calculations, parking plan, and company literature describing car pool and van pool programs.

☒ Documentation of car pooling program including an underlying daily or weekly report on car pool and van pool usage.

Total number of Full-Time Equivalent (FTE) building occupants:	468
Number of car pool or van pool spaces:	16
Percentage of building occupants provided with car pool or van pool preferred parking:	**6.84**
Adequate percent of building occupants provided with car pool or van pool preferred parking?	**YES**

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(Continued on page 2)

OR: Option B

(Responsible Party)

I, _____ , declare that an occupant telecommuting program has been implemented that reduces commuting frequency by 20% for 20% or more of the building occupants and provides the necessary communications infrastructure in the building to accommodate telecommuting.

I have provided all of the following supplementary documentation to support the declaration:

☐ A detailed description of telecommuting program and communications infrastructure in the building to accommodate telecommuting

☐ Specific information on telecommuting baselines, assumptions and calculation methodology

☐ A summary for the performance period and an excerpt from underlying daily or weekly reports on telecommuting participation over the performance period

Total number of Full-Time Equivalent (FTE) building occupants:	
Number of occupants in telecommuting program:	
Percentage of building occupants participating in telecommuting program:	0
Baseline Commuting Frequency (vehicle miles) for telecommuting program participants, assuming five roundtrips per participant per work week:	
Actual Commuting Frequency (vehicle miles) for telecommuting program participants, based on actual number of roundtrips made per participant per work week:	
Calculation of Percent Reduction in Community Frequency (vehicles miles traveled):	0
Adequate percentage of building occupants participating in telecommuting program?	NO
Adequate percent reduction in commuting frequency resulting from telecommuting program?	NO

Project Name: Engineering 2 LEED EB Submittal

Credit: SS Credit 3.4 (1 point possible): Alternative Transportation, Car Pooling and Telecommuting

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-10	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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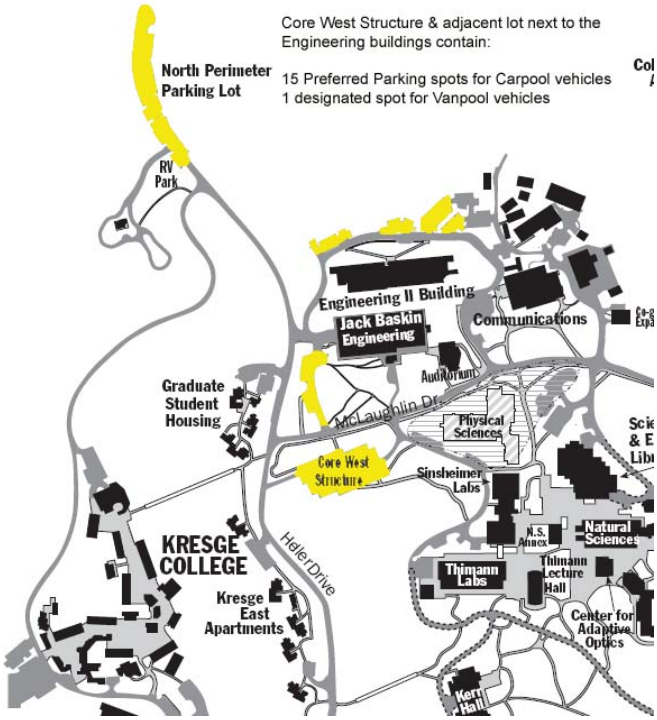
SANTA CRUZ, CALIFORNIA 95064

E2 Carpool/Vanpool Preferred Parking Narrative

The Engineering 2 building has no designated parking lot. Faculty, staff, and students may park in near by lots or structures by purchasing parking permits from the UCSC Transportation and Parking Services (TAPS). The Engineering 2 building is located nearest to four main parking areas on campus (areas highlighted on map).



Combined, these four lots that serve the Engineering 2 building contain 15 preferred parking spots for carpool vehicles and 1 designated parking spot for a UCSC Vanpool vehicle.
On average at least 2 people ride in carpool vehicles and 8 ride in the vanpool.

15 carpools = serves greater than 30 people
1 vanpool = serves 8 people

Total: Capable of serving 38 people

There are a total of 468 FTE occupants in the Engineering building. The calculations above prove that the current Vanpool/Carpool program is capable of serving greater than 5% of the building occupants (24 people).

In addition to this material, attached is a letter from the Director of TAPS highlighting the campus wide Carpool /Vanpool services offered at UCSC.

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TRANSPORTATION AND PARKING SERVICES

SANTA CRUZ, CALIFORNIA 95064

September 10, 2008

To: US Green Building Council
Re: LEED for Existing Building Program (SS Credit 7)

UC Santa Cruz has an aggressive Transportation Demand Management (TDM) program to reduce the overall number of vehicle trips made to campus via the single-occupant automobile. These TDM programs include parking management, carpool and vanpool programs and incentives, a bike shuttle and other bicycling programs, a campus transit shuttle program and regional transit program, as well as car sharing. Overall, more than 58% of all passenger-trips made to campus travel via a mode other than a single-occupant vehicle.

Registered carpools pay greatly-reduced parking permit fees and can also benefit from preferred carpool parking spaces located throughout the main campus. TAPS also offers an extensive, subsidized commuter vanpool program offering services from Palo Alto, San Jose, Los Gatos, Monterey, Watsonville, the San Lorenzo Valley, and Live Oak/Soquel/Capitola/Aptos. Vanpool drivers pay no fee for participation while other riders are charged based on distance traveled from campus. Some vanpools are also CNG-fueled or are dual-fueled vehicles as well. Vanpool drivers may also request a reserved parking space as needed.

During Fall, 2007, the campus has 527 staff/faculty registered carpool participants and 494 registered student carpool participants totaling 1,021 overall. Only registered carpools can use the preferred carpool parking spaces by permit. Many other UC affiliates carpool on an informal basis that TAPS can only monitor through occasional mode split studies, where multi-occupant vehicles accommodate 22% of all passenger-trips.

In addition, we operate 22 commuter vanpool routes accommodating 254 participants.

Sincerely,

Larry Pageler
Director,
Transportation & Parking Services

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TRANSPORTATION & PARKKING SERVICES SANTA CRUZ, CALIFORNIA 95064

To: USGBC LEED-EB Application Review Committee
Re: Technical Advice for SS Credit 3.4 Vanpool/Carpool

Per your request to provide underlying daily or weekly reports such as weekly demand tracking logs on car pool and vanpool usage of the preferred parking spots in Lots 112, 138, 139, 150 located near the Engineering 2 building (highlighted in attached map), I have reviewed the latest utilization survey results and the monthly reports for the vanpool program.

Please note below the carpool utilization results for Lots 112, 138. These results are based on a survey completed in Spring of 2008. Lots 139 and 150 do not have designated carpool spaces.

Lot 112 Overall Usage of parking lot: 78.5% (489 spaces)
Usage of Carpool Space: 82.8% (16 spaces)
Lot 138 Overall Usage of parking lot: 72.6% (26 spaces)
Usage of Carpool Space: 100% (2 spaces)

The carpool spaces throughout the day and academic year are always in high demand as observed by our parking lot maintenance staff.

The vanpool space located in Lot 112 is designated to the Monterey Vanpool. The Monterey Vanpool is a full 12 passenger van and was in operation during the months of May, June, July, August and September. Based on monthly reports provided by the drivers, the daily usage is as follows:
5/08--20 days
6/08--15 days
7/08--18 days
8/08--19 days
9/08--17 days

Please let me know if you have any questions or need additional information.

Regards,

Cathy Crowe
Transportation and Parking Services
UC Santa Cruz
1101 Pacific Avenue, Suite G
Santa Cruz, CA 95060
wk: 831-469-1942
fx: 831-469-1943
cacrowe@ucsc.edu

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TRANSPORTATION & PARKING SERVICES

SANTA CRUZ, CALIFORNIA 95064
February 1, 2009

TO: U.S. Green Building Council LEED for Existing Buildings Program
RE: Sustainable Site Credit 3.4 Application Review Comments

The UCSC Transportation and Parking Services has added no new parking over the performance period (May through September 2008) to the campus lots serving the Engineering 2 building.

Sincerely,

Larry Pageler
Director,
Transportation & Parking Services

SUSTAINABLE SITES CREDIT 4.1-4.2: REDUCED SITE DISTURBANCE: PROTECT/RESTORE OPEN SPACE

1. LEED-EB template
2. Site drawing with area calculations of maintained open space.
3. Construction bid planting notes
4. Plant list

(Responsible Party)

I, Roger Edberg , declare to USGBC that I have maintained and/or restored the site area that does not fall within the building footprint by replacing impervious surfaces with native planting, adaptive vegetation or other ecologically appropriate features by the following percentage:

- (●) Option A: At least 50% of the site area excluding the building footprint. (SS Credit 4.1: 1 point)
- ( ) Option B: At least 75% of the site area excluding the building footprint. (SS Credit 4.2: 1 additional point)

Other ecologically appropriate features are natural site elements beyond vegetation that maintain or restore the ecological integrity of the site, and may include water bodies, exposed rock, un-vegetated ground, or other features that are part of the historic natural landscape within the region and provide habitat value.

I have provided the following supplementary documentation to support the declaration:

- [x] site drawings with area calculations demonstrating that the declared percentage of the site area that does not fall within the building footprint has been maintained and/or restored.
- [x] records and results of quarterly inspections for performance period to show that the declared percentage of the site area excluding the build footprint remains vegetated.
- [ ] for offsite areas, a contract with the offsite area owner that specifies the required improvement and maintenance of the offsite area. (Every two offsite square feet will be counted as one onsite square foot.)

I have provided a list of the "native" or adapted plants used to earn this credit in the space below:

Plant List - UCSC E2 Landscape

Trees

Botanical Name	Common Name	Origin

I have provided the following calculations to prove the declaration:

Total Site Area [ft^2]:	122,076
Building Footprint [ft^2]:	34,882
Open Site Area [ft^2]:	**87,194**
Onsite Natural Area [ft^2]:	57,225
Onsite Natural Area [%]:	**65.63**
Offsite Natural Area [ft^2]:	0
Weighted Offsite Natural Area [%]:	**0**
Total Weighted Natural Area [%]:	**65.63**

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(Continued on page 2)

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
(•) 3-5 months	Quarter 1
( ) 6-8 months	Quarter 1 - Quarter 2
( ) 9-11 months	Quarter 1 - Quarter 3
( ) 12+ months	Quarter 1 - Quarter 4

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Project Complies with Option A	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Project Complies with Option B	( ) Yes	(•) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Person responsible for making sure that the native vegetation areas / roof gardens continue to work well.	Roger Edberg							
Date responsible person provided quarterly report information listed below	2007-11-08							
Questions that the responsible person must answer each quarter:								
Have the required native vegetation areas / roof gardens been maintained over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Have the native vegetation area / roof gardens continued to work well over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Are there any problems with the native vegetation areas / roof gardens that need to be remedied? (Insert a numbered list of problems or insert "None")	1. Initial Central irrigation control station factors too high							
If any problems with these programs were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	1. Central Irrigation Control Station factors adjusted							
Are there any opportunities for improving the native vegetation areas / roof gardens? (insert a numbered list of opportunities or insert "None")	None							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	None							

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(Continued on page 3)

SS Credit 4.1 (1 point):
Protect or Restore Open Spaces => 50%

Points Documented: 0

SS Credit 4.2 (1 additional point):
Protect or Restore Open Spaces => 75%

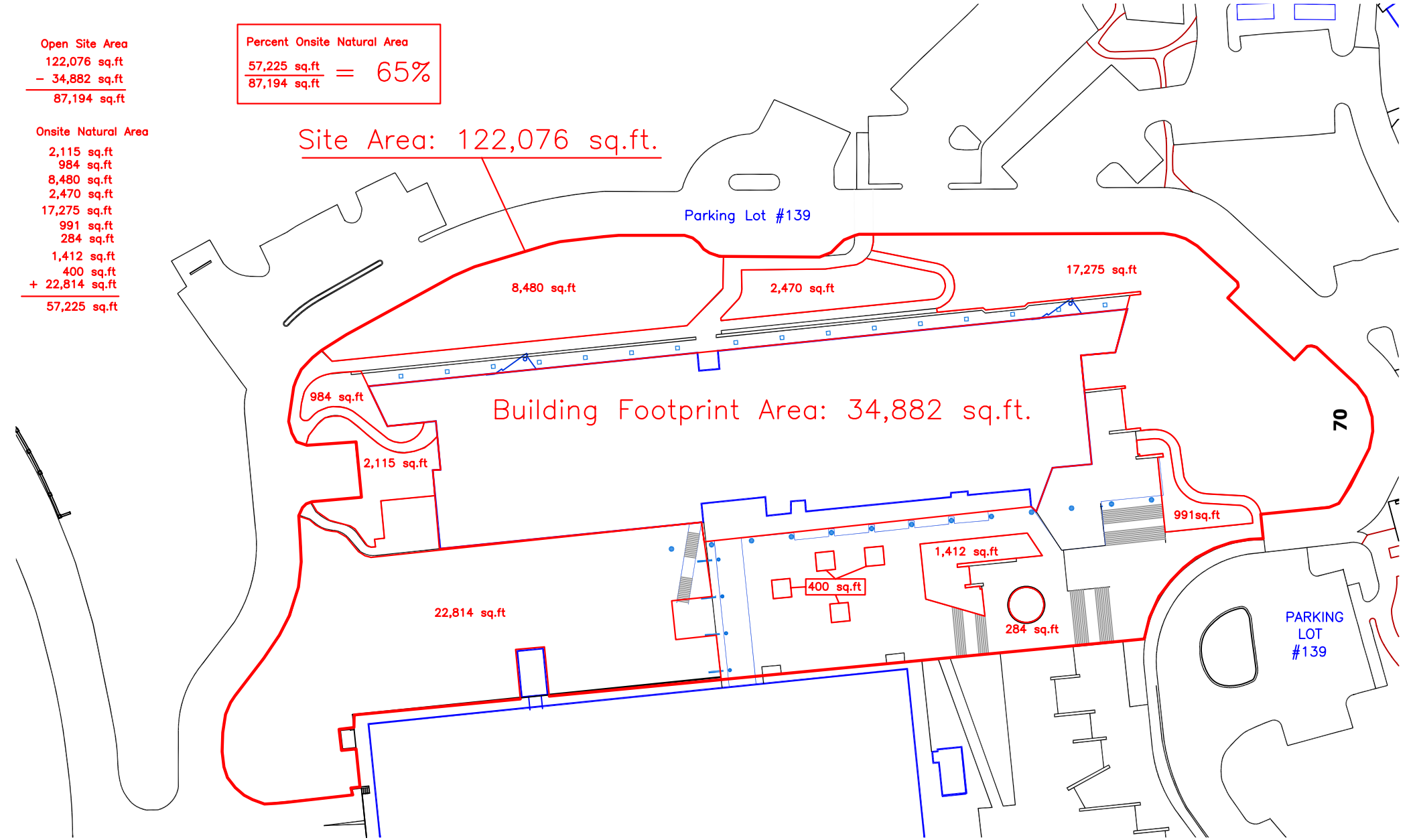
Points Documented: 0

Project Name:	Engineering 2 LEED EB Submittal
Credit:	SS Credit 4.1 - 4.2 (2 points possible): Reduced Site Disturbance, Protect or Restore Open Space

Points Documented: 0

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Roger	Edberg	2007-11-08	RJEDBERG@UCSC.EDU	
First Name	Last Name	Date	Username (Email Address)	Password


Open Site Area
122,076 sq.ft
– 34,882 sq.ft
87,194 sq.ft
Onsite Natural Area
2,115 sq.ft
984 sq.ft
8,480 sq.ft
2,470 sq.ft
17,275 sq.ft
991 sq.ft
284 sq.ft
1,412 sq.ft
400 sq.ft
+ 22,814 sq.ft
57,225 sq.ft
Percent Onsite Natural Area
57,225 sq.ft / 87,194 sq.ft = 65%
Site Area: 122,076 sq.ft.
Parking Lot #139
8,480 sq.ft
2,470 sq.ft
17,275 sq.ft
984 sq.ft
Building Footprint Area: 34,882 sq.ft.
2,115 sq.ft
991sq.ft
1,412 sq.ft
400 sq.ft
22,814 sq.ft
284 sq.ft
PARKING LOT #139
70

PLANTING NOTES

1. CONTRACTOR SHALL PROCURE PLANT SPECIES WITHIN THIRTY (30) DAYS OF AWARD OF THE CONTRACT. CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING REQUIRED DEPOSITS TO ENSURE TIMELY PROCUREMENT OF THE SPECIFIED PLANTS.

2. THE FOLLOWING GROWERS ARE PROVIDED FOR CONTRACTOR'S REFERENCE ONLY.

   A. SPRING VALLEY NURSERY
   (831) 761-6377
   170 SPRING VIEW ROAD
   LA SELVA BEACH, CA 95076

   B. SUNCREST NURSERY
   (831) 728-2595
   400 CASSERLY ROAD
   WATSONVILLE, CALIFORNIA 95076

   C. ELKHORN NATIVE PLANT NURSERY
   (831) 763-1207
   PO BOX 270
   MOSS LANDING, CALIFORNIA 95039

   D. WESTERN TREE NURSERY
   (408) 842-4842
   3873 HECKER PASS
   GILROY, CALIFORNIA 95020

   E. VALLEY CREST NURSERY
   (925) 862-2485
   8501 CALAVERAS ROAD
   SUNOL, CALIFORNIA 94586

   F. SPECIALTY OAKS *
   (707) 995-2275
   12552 HIGHWAY 29
   LOWER LAKE, CALIFORNIA 95457

   * PREFERRED SUPPLIER FOR OAK TREES IS SPECIALTY OAKS

3. ALL EXISTING TREES SHALL BE PROTECTED IN PLACE UNLESS NOTED OTHERWISE. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE OF ANY KIND TO EXISTING TREES DURING THE COURSE OF CONSTRUCTION. REFER TO SPECIFICATIONS FOR TREE PROTECTION.

4. LOCATIONS OF ALL TREES SHALL BE APPROVED BY UNIVERSITY REPRESENTATIVE PRIOR TO FINAL INSTALLATION.

5. IN ADDITION TO QUANTITIES OF TREES GIVEN, SUPPLY 2 PERCENT OF THE TOTAL NUMBER OF TREES OR A MINIMUM OF 1 TREE IN EACH SPECIES FOR INSPECTION. THE TREES TO BE SO INSPECTED WILL BE RANDOMLY SELECTED BY THE UNIVERSITY REPRESENTATIVE UPON DELIVERY AT THE SITE, AND PRIOR TO ACCEPTANCE OF PLANTS.

6. HOLD FINISHED GRADES FOR SHRUB AREAS 1 1/2 INCHES BELOW TOP OF ADJACENT PAVEMENT OR WALLS, UNLESS OTHERWISE NOTED ON THE DRAWINGS.

7. GRADUALLY ROUND OFF TOPS AND TOES OF ALL PLANTED SLOPES TO PRODUCE A SMOOTH AND NATURAL TRANSITION BETWEEN EXISTING PLANTINGS, FINISH GRADES AND NEW PLANTINGS.

8. EXACT PLACEMENT OF HEADERS WILL BE REVIEWED BY UNIVERSITY REPRESENTATIVE PRIOR TO FINAL INSTALLATION.

9. PROVIDE AN ALLOWANCE OF 5 PERCENT OF THE TOTAL LINEAL FOOTAGE OF HEADER TO BE FURNISHED AND INSTALLED DURING PROGRESS OF WORK AS MAY BE DIRECTED BY THE UNIVERSITY REPRESENTATIVE, IN ADDITION TO ALL HEADERS INDICATED ON DRAWINGS.

10. THE CONTRACTOR SHALL NOTIFY THE UNIVERSITY REPRESENTATIVE TWO (2) WEEKS IN ADVANCE TO SCHEDULE PLANT DELIVERY DATES. THE UNIVERSITY REPRESENTATIVE SHALL INSPECT PLANTS UPON ARRIVAL, AND RESERVES THE RIGHT TO REJECT PLANTS.

11. THE CONTRACTOR SHALL PLACE PLANTS AS SHOWN ON PLAN AND VERIFY LOCATION WITH UNIVERSITY REPRESENTATIVE. UNIVERSITY REPRESENTATIVE MAY REQUEST THAT CONTRACTOR ADJUST OR RELOCATE PLANTS ON-SITE AS NEEDED TO PROPERLY COMPLETE DESIGN.

12. PROVIDE A MINIMUM OF 3 INCHES OF MULCH TO SOIL SURFACE AFTER PLANTING. MULCH SHALL NOT BE PLACED WITHIN A 12" DIAMETER OF TREE TRUNKS AND SHOULD BE KEPT FREE FROM THE CROWN OF ALL SHRUBS, GRASSES AND PERENNIALS.

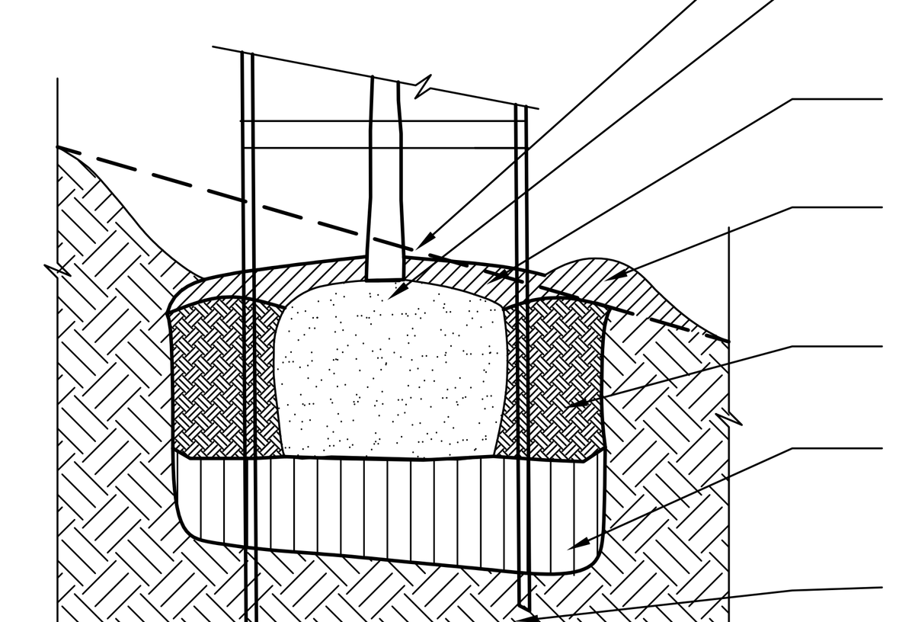
13. ALL DISTURBED AREAS NOT PLANTED ARE TO RECEIVE A 4" LAYER OF MULCH.

14. CONTRACTOR SHALL PROVIDE WIRE MESH FENCING WITH METAL OR WOOD STAKES AS NEEDED TO PROTECT NEW PLANTINGS FROM DEER BROWSING. SUBMIT FENCING PLAN AND MATERIALS TO UNIVERSITY REPRESENTATIVE FOR APPROVAL. NOTE- PLANT SELECTIONS ARE BASED ON RECENT REPORTS FROM CAMPUS GROUNDS OF THOSE SPECIES LESS PRONE TO DEER BROWSING.

PLANT LIST (NOTE: CONTRACTOR TO MODIFY PLANT LIST AND QUANTITIES AS NECESSARY TO MEET BID ALTERNATES)

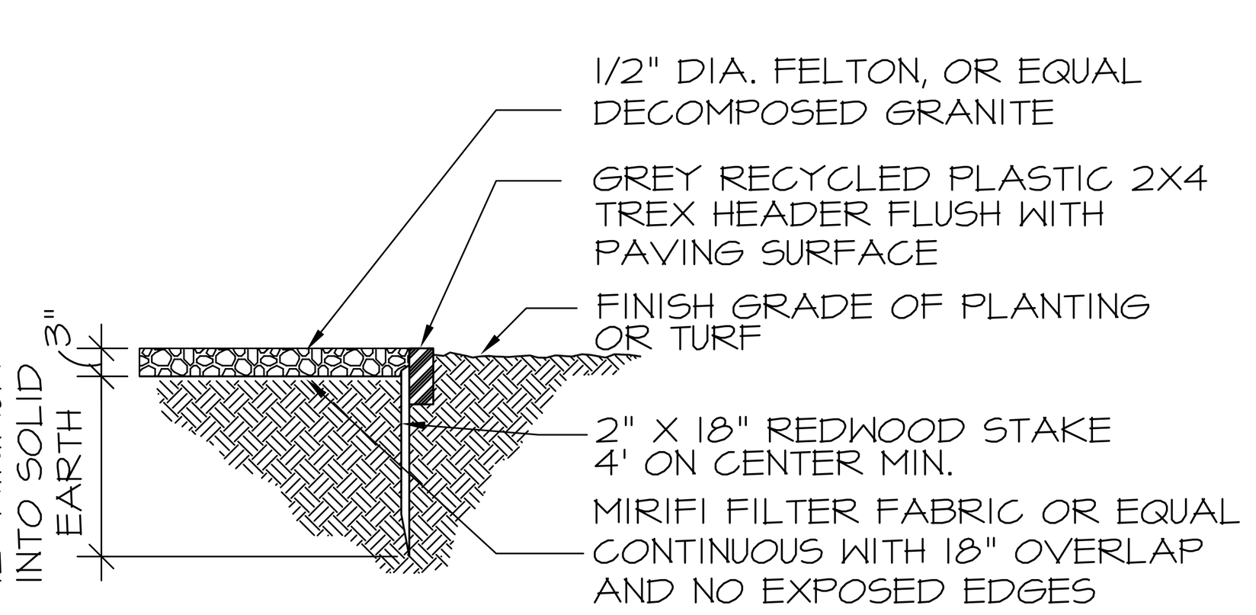
ABBREVIATION	QUANTITY	SPECIFICATIONS				BOTANICAL NAME	COMMON NAME	REMARKS
		HEIGHT	WIDTH	SIZE	CALIPER			
TREES								SEE NOTE 14, THIS SHEET
ACE GRI	16	10-12'	4-5'	24" BOX	1.75-2"	ACER GRISEUM	PAPER BARK MAPLE	
COR COR	37	5-6'	3'	24" BOX	1.75-2"	CORNUS 'EDDIE'S WHITE WONDER'	EDDIE'S WHITE WONDER DOGWOOD	
SEQ SEM	11	5-6'	3'	15 GAL	1.75-2"	SEQUOIA SEMPERVIRENS 'APTOS BLUE'	REDWOOD	
SEQ SEM	43	12'	4-5'	24" BOX	1.75-2"	SEQUOIA SEMPERVIRENS 'APTOS BLUE'	REDWOOD	
QUE AGR	12	5-6'	3'	24" BOX	3"	QUERCUS AGRIFOLIA	COAST LIVE OAK	PREFER PURCHASE FROM SPECIALTY OAKS
SHRUBS								
ARC UVA	159	6"	6"	1 GAL	--	ARCTOSTAPHYLOS UVA URSI	BEARBERRY	
BER THU	70	12"	10"	1 GAL	--	BERBERIS THUNBERGII 'CRIMSON PYGMY'	BARBERRY	
CAL ACU	841	FULL	FULL	1 GAL	--	CALAMAGROSTIS ACUTIFOLIA 'CARL FORESTER'	CARL FORESTER FEATHER GRASS	
CAR PAN	6,349	FULL	FULL	4" POTS	--	CAREX PANSA	CALIFORNIA MEADOW SEDGE	
CAR TUM	6411	FULL	FULL	1 GAL	--	CAREX TUMULACOLA	BERKELEY SEDGE	
CEA JUL	33	18"	12"	5 GAL	--	CEANOTHUS 'JULIA PHELPS'	JULIA PHELP'S BLUE BLOSSOM	
CEA THR	2	18"	12"	5 GAL	--	CEANOTHUS THYRSIFLORUS	BLUE BLOSSOM	
ERI CAR	137	6"	6"	1 GAL	--	ERICA CARNEA 'SPRINGWOOD'	HEATH	
FIC PUM	4	2'-6"	2'-6"	5 GAL	--	FICUS PUMILA	CREEPING FIG	FASTEN TO WALL
GAU SHA	234	9"	6"	1 GAL	--	GAULTHERIA SHALLON	SALAL	
IRI DOU	218	6"	6"	1 GAL	--	IRIS DOUGLASIANA 'CANYON SNOW'	DOUGLAS IRIS	
MAH AQU	533	12"	9"	1 GAL	--	MAHONIA AQUIFOLIUM	OREGON GRAPE	
OXA ORE	50	12"	9"	1 GAL	--	OXALIS OREGANA	REDWOOD SORREL	
POL MUN	911	6"	6"	1 GAL	--	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	
RHA CAL	77	12"	9"	1 GAL	--	RHAMNUS CALIFORNICA 'EVE CASE'	COFFEE BERRY	
RIB SAN	33	12"	9"	1 GAL	--	RIBES SANGUINEUM	RED FLOWERING CURRANT	
RIB SPE	187	12"	9"	1 GAL	--	RIBES SPECIOSUM	FUSCHIA-FLOWERING GOOSEBERRY	
RIB VIB	184	12"	9"	1 GAL	--	RIBES VIBURNIFOLIUM	EVERGREEN CURRANT	
SAL SPA	38	8"	6"	1 GAL	--	SALVIA SPATHACEA	HUMMINGBIRD SAGE	
SYM MOL	603	12"	9"	1 GAL	--	SYMPHORICARPOS MOLLIS	CREEPING SNOWBERRY	
VAN HEX	753	6"	6"	1 GAL		VANCOUVERIA HEXANDRA	NCN	

* PLANT LIST IS FOR CONTRACTOR'S REFERENCE ONLY. EXACT QUANTITIES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.

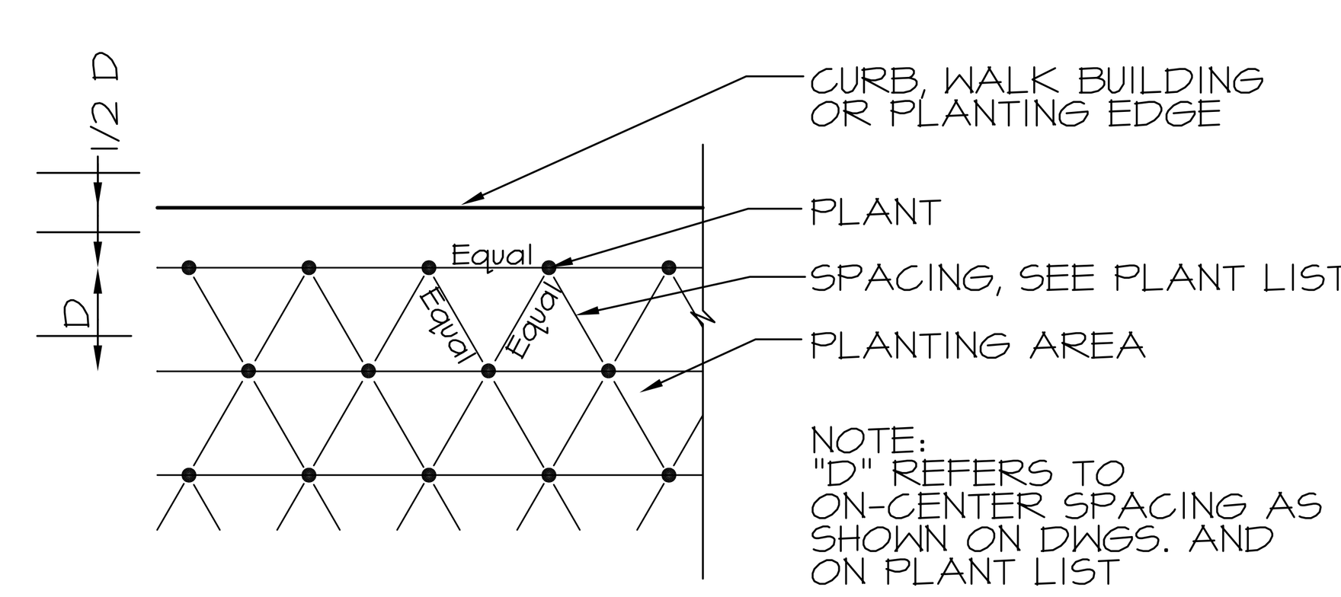


2 TREE PLANTING ON SLOPE
NOT TO SCALE

NOTE:
ALL JOINTS SHALL BE BACKED WITH 1 x 4 BRACES 18" LONG.
DOUBLE NAILED TO EACH 2 X 4.

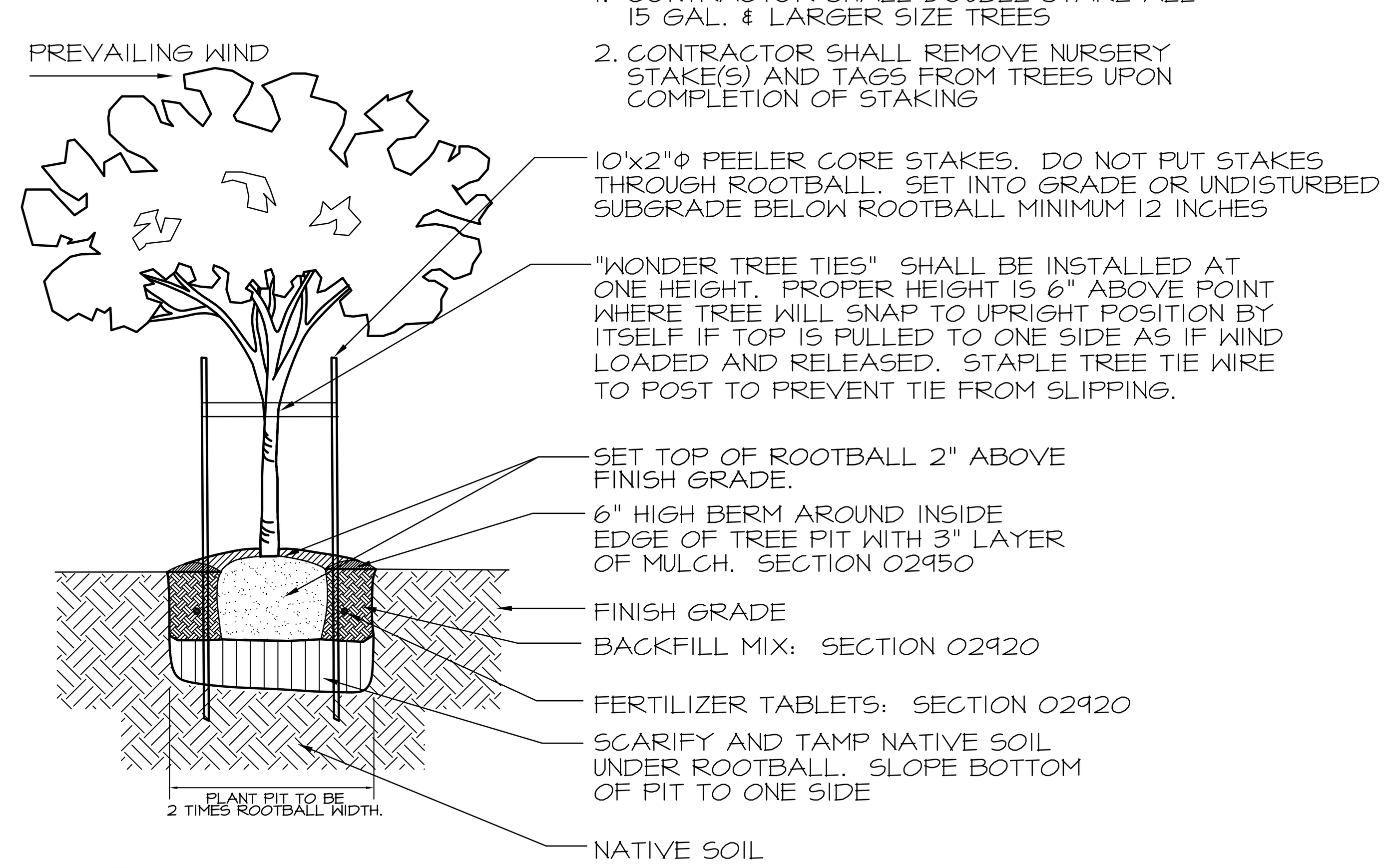


6 TREX HEADER BOARD
NOT TO SCALE

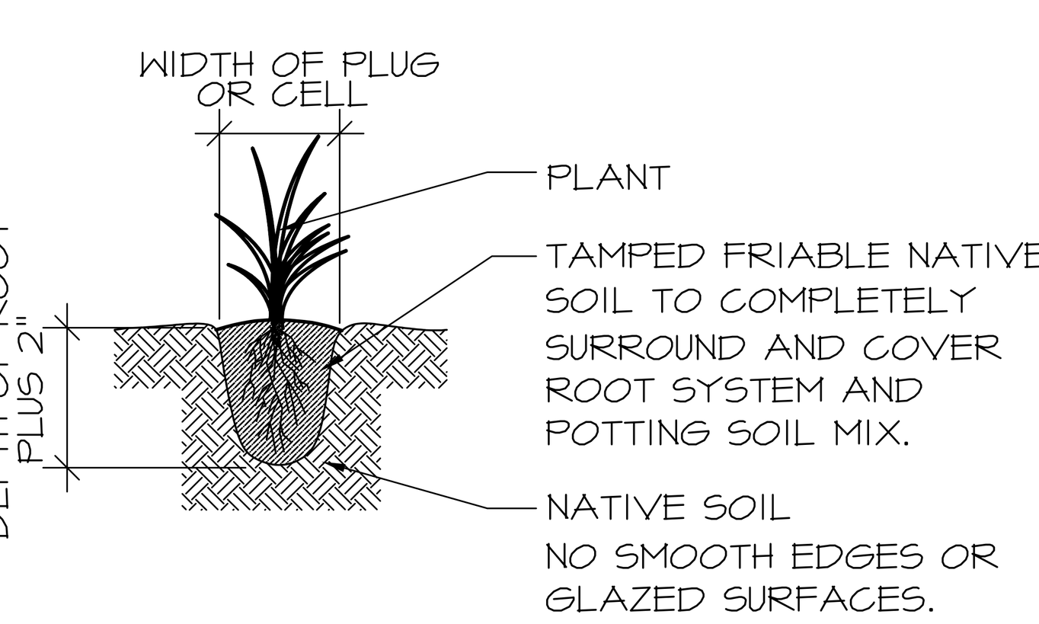


4 TYP. PLANT SPACING DETAIL
NOT TO SCALE

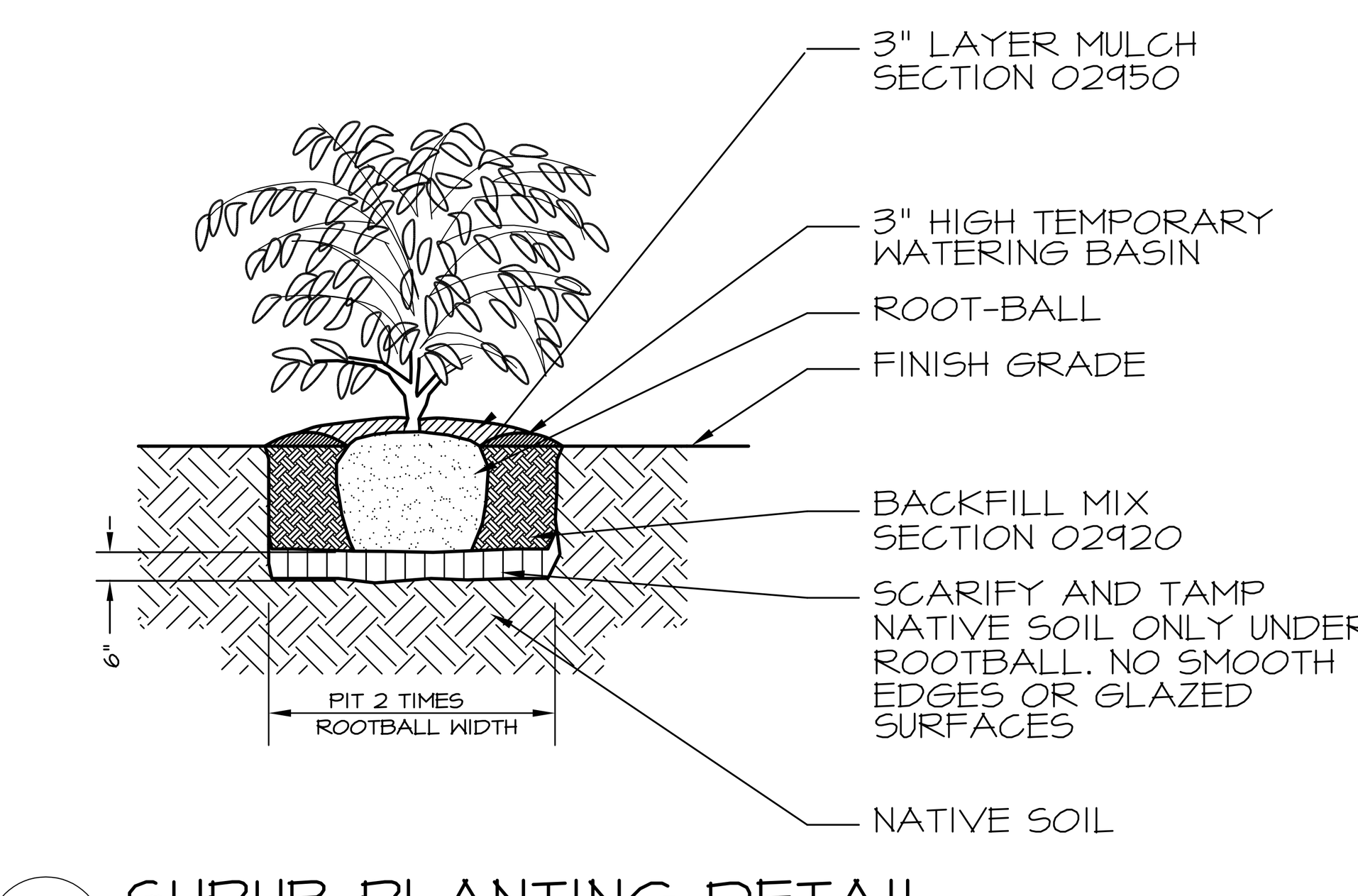
NOTES:
1. CONTRACTOR SHALL DOUBLE STAKE ALL 15 GAL. & LARGER SIZE TREES
2. CONTRACTOR SHALL REMOVE NURSERY STAKE(S) AND TAGS FROM TREES UPON COMPLETION OF STAKING



1 TREE PLANTING & STAKING DETAIL
NOT TO SCALE



5 PLUG PLANTING DETAIL
NOT TO SCALE



3 SHRUB PLANTING DETAIL
NOT TO SCALE

A+A·LA

ANSHEN+ALLEN·LA

323.525.0500 tel
323.525.0955 fax
5055 Wilshire Boulevard
Los Angeles, California 90036

LANDSCAPE ARCHITECT
REGISTERED
J. L. JANECKI
No. 3163
Exp. 9/24/04
STATE OF CALIFORNIA

JONI L. JANECKI
& ASSOCIATES, INC.
303 POTRERO STREET, SUITE 16
SANTA CRUZ, CALIFORNIA 95060
(831) 423-6040
(831) 423-6054 FAX

71

REVISIONS

8	07.22.03	ADDENDUM #8
9	05.24.04	ADDENDUM #9

UNIVERSITY OF CALIFORNIA, SANTA CRUZ
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 5

KEY PLAN

LANDSCAPE DETAILS

SCALE: AS SHOWN
DATE: 05.28.03
FILE:
SCRIPT:

PROJECT NO: 21008.00

L2.5

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Plant List - UCSC E2 Landscape

Trees

Botanical Name	Common Name	Origin
Acer griseum	Paper bark maple	China
Cornus 'Eddies White Wonder'	Eddies White Wonder dogwood	Hybrid between CA and Eastern US native species
Sequoia sempervirens 'Aptos Blue'	Aptos Blue coast redwood	CA native
Quercus agrifolia	Coast live oak	CA native

Shrubs

Botanical Name	Common Name	Origin
Arctostaphylos uva ursi	Bearberry	CA native
Berberis thunbergii 'Crimson Pymy'	Crimson Pygmy barberry	Japan. Low maintenance requirement.
Calamagrostis acutifolia 'Carl Forester'	Carl Forester feather grass	Europe. Drought tolerant.
Calycanthus occidentalis	California spice bush	CA native
Carex pansa	California meadow sedge	CA native
Carex tumicola (Carex divulsa)	Berkeley sedge	Europe. Drought tolerant.
Ceanothus thyrsiflorus	Blue blossom	CA native
Erica carnea 'Springwood'	Springwood heath	Europe. Drought tolerant.
Gaultheria shallon	Salal	CA native
Iris douglasiana 'Canyon Snow'	Douglas iris	CA native
Mahonia aquifolium	Oregon grape	CA native
Polystichum munitum	Western sword fern	CA native
Rhamnus californica 'Eve Case'	Coffeeberry	CA native
Ribes sanguineum	Red flowering currant	CA native
Ribes speciosum	Fuschia flowering gooseberry	CA native
Ribes viburnifolium	Evergreen currant	CA native
Salvia spathacea	Hummingbird sage	CA native
Symphorocarpus mollis	Creeping snowberry	CA native
Vacouveria hexandra	NCN	CA native

SUSTAINABLE SITES CREDIT 5.1-5.2: STORM WATER MANAGEMENT: RATE & QUANTITY REDUCTION

1. LEED-EB template
2. Letter from campus engineer describing storm water drainage system including drawings of the underground utilities.
3. UCSC Storm Water Pollution Prevention plan from campus standards.

(Responsible Party)

I, Roger Edberg , declare to USGBC that a stormwater management plan has been implemented that is designed to mitigate run off from the site through a variety of measures including: perviousness of site, stormwater management practices (structural and non structural), capture of rainwater for reuse or other measures over the performance period that results in:

○ Mitigation of at least 25% of the annual stormwater falling on the site. (SS Credit 5.1: 1 point)

◉ Mitigation of at least 50% of the annual stormwater falling on the site. (SS Credit 5.2: 1 additional point)

I have provided the following documentation to support the declaration:

☒ Calculations found in the table below that certify that existing site imperviousness level changes affirm the selected mitigation statements above.

☐ A design narrative for the stormwater management technology/plan implemented and pre/post development stormwater rate and quantity calculations to support this claim.

I have provided the following calculations to support the declaration:

Average Building Site Annual Precipitation [inches]:	30
Total Site Area [acres]:	2.80248
On-Site Annual Precipitation [gal]:	**2,283,029.6**
On-Site Annual Precipitation [gal per ft^2]:	**18.7**

Infiltration Based on Permeability of Site Surfaces

Table 1: Imperviousness By Surface Type Table

Suface Type	Runoff Coefficient	Suface Type	Runoff Coefficient
Pavement, Asphalt	0.95	Turf, Average (1 - 3% slope)	0.35
Pavement, Concrete	0.95	Turf, Hilly (3 - 10% slope)	0.40
Pavement, Brick	0.85	Turf, Steep (> 10% slope)	0.45
Pavement, Gravel	0.75	Vegetation, Flat (0 - 1% slope)	0.10
Roof, Conventional	0.95	Vegetation, Average (1 - 3% slope)	0.20
Roof, Garden Roof (< 4 in)	0.50	Vegetation, Hilly (3 - 10% slope)	0.25
Roof, Garden Roof (4 - 8 in)	0.30	Vegetation, Steep (> 10% slope)	0.30
Roof, Garden Roof (9 - 20 in)	0.20	User Defined 1	
Roof, Garden Roof (> 20 in)	0.10	User Defined 2	
Turf, Flat (0 - 1% slope)	0.25	User Defined 2	

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(Continued on page 2)

Table 2: Imperviousness of Site Calculation Table

Suface Type	Runoff Coefficient	Area [SF]	Impervious Area [SF]
Vegetation, Flat (0 - 1% slope)	0.1	684	68.4
Vegetation, Average (1 - 3% slope)	0.2	18,159	3,631.8
Vegetation, Hilly (3 - 10% slope)	0.25	14,922	3,730.5
Vegetation, Steep (> 10% slope)	0.3	24,389	7,316.7
Roof, Conventional	0.95	34,186	32,476.7
Pavement, Concrete	0.95	29,736.03	28,249.23
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0

*Total Area of All Surface Types in Table 2 [SF]	122,076.03
*Total Reported Site Area (converted data from Total Site Area on Page 1) [SF]	122,076.03
Total Impervious Area [SF]	75,473.33
Area Average Runoff Coefficient	0.62

***Note: Total Area of All Surface Types and Total Reported Site Area must be equal to earn credit.**

Rainwater Capture and Reuse

Metered data that measures all water used from the holding tank [gal]:

OR

Area of Impervious Surfaces the Feed into Collection System [ft^2]:

Annual Storage Tank Overflow [gal]

Annual Precipitation Mitigated by Rainwater Collection System [gal]: 0

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(Continued on page 3)

Table 3: Annual Precipitation Mitigated by Structural Detention Facilities

Collection Area Surface Type	Runoff Coefficient	Area [SF]	Impervious Area [SF]
Roof, Conventional	0.95	34,186	32,476.7
Pavement, Concrete	0.95	29,628	28,146.6
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0
----	0		0

Collection and Detention System Total Area [SF]	63,814
Total Collection Area Impervious Area[SF]	60,623.3
Area Average Collection Area Runoff Coefficient	0.95
Annual Detention Facility Overflow [gal]	
On-Site Average Annual Precipitation [gal/SF]	18.7
Annual Precipitation Mitigated by Structural Detention Facilities [gal]	1,133,655.71

(Continued on page 4)

Table 4: Total Mitigation of Annual Stormwater Falling on the Site

Mitigation Measure Type	Mitigation [gal]
Annual Precipitation Mitigated by Infiltration (Perviousness of site)	867,551.25
Rainwater Capture and Reuse (metered)	
Rainwater Capture and Reuse (calculated)	0
Stormwater management practices (structural detention facilities)	1,133,655.71
Other measures	

Total Mitigation [gal]	2,001,206.96
On-Site Annual Precipitation [gal]	2,283,029.6
Total Mitigation Percentage	87.66

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(Continued on page 5)

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
(•) 3-5 months	Quarter 1
( ) 6-8 months	Quarter 1 - Quarter 2
( ) 9-11 months	Quarter 1 - Quarter 3
( ) 12+ months	Quarter 1 - Quarter 4

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Person responsible for making sure that the stormwater runoff reduction measures continue to work well.	Roger Edberg							
Date responsible person provided quarterly report information listed below	2008-01-28							
Questions that the responsible person must answer each quarter:								
Have the required stormwater runoff reduction measures been maintained over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Has the stormwater runoff reduction measures continued to work well over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Are there any problems with the stormwater runoff reduction measures that need to be remedied? (Insert a numbered list of problems or insert "None")	None							
If any problems with these measures were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	None							
Are there any opportunities for improving the stormwater runoff reduction measures? (insert a numbered list of opportunities or insert "None")	None							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	None							

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(Continued on page 6)

**SS Credit 5.1 (1 point): Stormwater Management,
25% Rate/Quantity Mitigation of the annual stormwater falling on the site**

Points Documented: 0

**SS Credit 5.2 (1 additional point): Stormwater Management,
50% Rate/Quantity Mitigation of the annual stormwater falling on the site**

Points Documented: 0

Project Name: Engineering 2 LEED EB Submittal

Credit: SS Credit 5 (2 points possible): Stormwater Management, Rate/Quantity

Points Documented: 0

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Roger	Edberg	Jan 28, 2008	RJEDBERG@UCSC.EDU	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

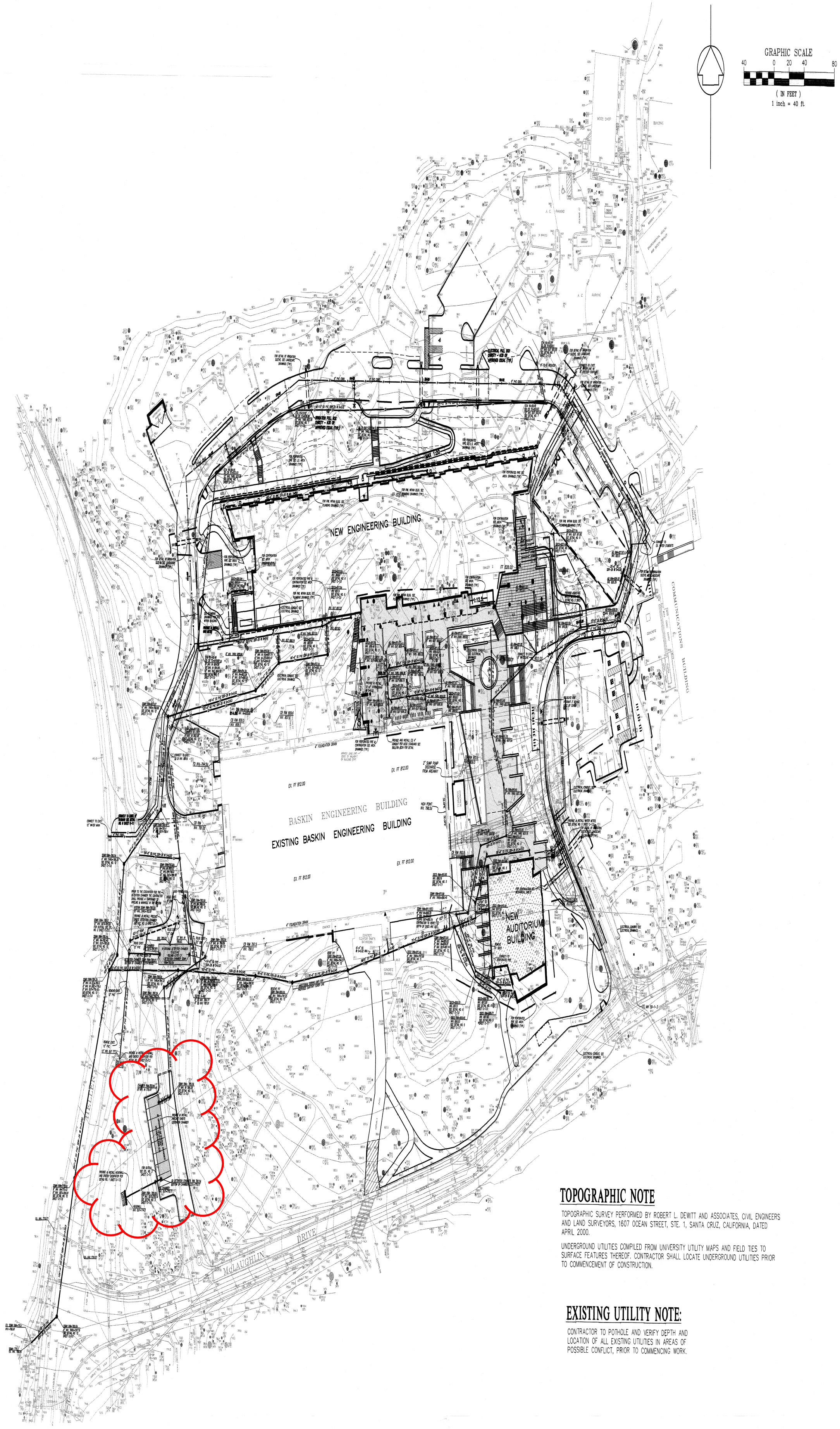
PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

Regarding Engineering Building LEED EB Project
Sustainable Sites Credit: 5.1 & 5.2

100% of the storm water that falls on this facility and surrounding sight is either infiltrated or directed to the facility's storm water drainage system via roof rain water leaders, foundation drains, area drains in the plaza areas and in the planted areas around the facilities in to the storm water system. This system channels all of the storm water through a series of pipes to a storm water detention vault at the south west corner of the site. From the detention vault the water is released at pre-development rates into a natural drainage channel. The storm water flows in the channel, through a forested area, for approximately ¼ mile then discharges into a sink hole.
See attached:
TIF drawings of the underground utilities.
Language on SWPP plans from University of Caif. Santa Cruz campus standards doc.

Jim Sherman
University Of California
Santa Cruz
1156 High St
Facilities Commissioner
Central Heat Plant
Santa Cruz Ca. 95064
Office (831) 459-4128
Cell (831) 212-0494



TOPOGRAPHIC NOTE

TOPOGRAPHIC SURVEY PERFORMED BY ROBERT L. DEWITT AND ASSOCIATES, CIVIL ENGINEERS AND LAND SURVEYORS, 1607 OCEAN STREET, STE. 1, SANTA CRUZ, CALIFORNIA, DATED APRIL 2000.

UNDERGROUND UTILITIES COMPILED FROM UNIVERSITY UTILITY MAPS AND FIELD TIES TO SURFACE FEATURES THEREOF. CONTRACTOR SHALL LOCATE UNDERGROUND UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

EXISTING UTILITY NOTE:

CONTRACTOR TO POTHOLE AND VERIFY DEPTH AND LOCATION OF ALL EXISTING UTILITIES IN AREAS OF POSSIBLE CONFLICT, PRIOR TO COMMENCING WORK.

A+A·LA

ANSHEN+ALLEN·LA

323.525.0500 tel | 5055 Wilshire Boulevard
323.525.0955 fax | Los Angeles, California 90036

SANDIS HUMBER JONES
CIVIL ENGINEERS SURVEYORS PLANNERS
605 Castro Street
Mountain View CA 94041-0640
Tel (650) 969-6900 Fax (650) 969-6472

DATE ________ 2002

KENNETH N. OLCOTT
R.C.E. NO. 51079, EXPIRES 9-30-05

UNIVERSITY OF CALIFORNIA, SANTA CRUZ
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95060

KEY PLAN

DPR Construction, Inc.
MAY 01 2003
File Ref.
AS-BUILT

OVERALL
UTILITY PLAN
UCSC FILE #
7401

SCALE: 1"=20'
DATE: 03.21.03
FILE:
SCRIPT:

C-6.4

PROJECT NO. 21008.00 (AA), 201210 (SHJ)

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Language on SWPP plans from University of Caif. Santa Cruz campus standards doc.

1.06 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

The Contractor will be required to submit a Storm Water Pollution Prevention Plan (SWPPP) to the University for review and approval prior to any soil disturbance, if the cumulative size of the Construction project exceeds 5 acres. See Specification Section 01060 and 01560, Regulatory Requirements and Erosion Control, for additional information related to the SWPPP.

E. Inclusion of Storm Water Pollution Prevention Permit Requirements into Erosion and Sediment Control Plan.

1. A Storm Water Pollution Prevention Plan (SWPPP) will need to be completed and approved by the University prior to commencement of any soil disturbance. The SWPPP report shall be inclusive of both the requirements in the Specification Section 1560 and the requirements set by the State Water Resources Control Board. The SWPPP report shall be completed by a registered civil engineer or qualified environmental protection company. The SWPPP shall follow the requirement outlined in the current version of the Waste Discharge Requirements For Discharges of Storm Water Runoff Associated with Construction Activities, as provided by the State Water Resources Control Board per attached General Construction Storm Water Permit Check list. See attached SWPPP checklist, included in Specification Section 01560, for University and Contractor’s responsibilities required for General Construction Storm Water Permit. The SWPPP shall also include items identified in Section 1.03 (C) above. Note that attached checklist has been reduced for inclusion in specification format. Spreadsheet blank file is available from University’s Representative.

Use of Permanent Drainage Facilities:

1. Any drainage structures, or detention devices, which appear in the contract documents may be utilized in the Erosion and Sediment Control plan on the condition that they are temporarily modified to serve the Contractor's purposes, and cleaned before Project completion.
2. Such facilities have been designed for The University's use in drainage control upon completion of the Project, and shall not be considered as adequate for control during construction except by the independent determination of the Contractor.

SUSTAINABLE SITES CREDIT 6.2:
HEAT ISLAND REDUCTION, ROOF SURFACES

1. LEED-EB template
2. Letter confirming that E2 has installed and maintained a highly emissive roof
3. Product information on roofing material
4. MSDS sheet of roofing material
5. E2 roof image
6. Reports of quarterly report- roof inspection

Option A

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building has installed and maintained ENERGY STAR®–compliant, high-reflectance and high emissivity roofing material in place over the performance period that constitutes at least 75% of the total roof area and also meets the following specifications:

☒ roofing materials comply with the ENERGY STAR® label requirements and have emissivity of at least 0.9 when tested in accordance with ASTM 408.

Total Roof Area [SF]:	34,186
High Albedo Roof Area [SF]:	32,350
Percentage Covered by High Albedo Materials [%]	**94.63**

I have provided the following documentation to support the specific declaration above:

☒ a roof plan, photographs and measurements of reflectance and emissivity. Manufacturer measurements are acceptable if the materials have been in place less than 5 years. If the materials have been in place more that 5 years, current measurements must be provided.

☒ records and results of quarterly inspections over the performance period

Option B

(Responsible Party)

I, , declare to USGBC that the building has installed and maintained a "green" (vegetated) roof area over the performance period that constitutes at least 50% of the total roof area.

Total Roof Area [SF]:	
Green Roof Area [SF]:	
Percentage of Roof Vegetated [%]	**0**

I have provided the following documentation to support the specific declaration above:

☐ photographs and a roof plan documenting the installation/ maintenance of a green vegetated roof system

☐ a description of the green roof system being used and the types of vegetation being grown in the green roof

☐ records and results of quarterly inspections over the performance period

(Continued on page 2)

Option C: Combinations of Option A and B

(Responsible Party)

I, _____ , declare to USGBC that the building uses a combination approach of options A and B above.

To Comply with Option C, you must fill out all the information in Options A & B.

Combinations of roofing area that meets the requirements of Option A and Option B can be used by calculating the Weighted Square Footage of the Compliant Roofing Material Types. Declarations, calculations and submittals must be completed for both Options A and B above to meet the requirements of the combined approach. If the Weighted Square Footage value above is greater than or equal to the actual roof area entered in Options A and B, this credit is earned through the combined approach.

Weighted Square Footage of Option A and Option B Roofing Material Types [SF]:	43,133.33
Adequate weighted combined roof area weighted [SF]	NO

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
(•) 3-5 months	Quarter 1
( ) 6-8 months	Quarter 1 - Quarter 2
( ) 9-11 months	Quarter 1 - Quarter 3
( ) 12+ months	Quarter 1 - Quarter 4

(Continued on page 3)

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Project Complies with Option A	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Project Complies with Option B	( ) Yes	(•) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Project Complies with Option C	( ) Yes	(•) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Person responsible for making sure that the roof measures for reducing the heat island effect continue to work well.	Jeff Clothier							
Date responsible person provided quarterly report information listed below	2008-05-19							
Questions that the responsible person must answer each quarter:								
Have the required roof measures for reducing the heat island effect been maintained over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Have the roof measures for reducing the heat island effect continued to work well over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Are there any problems with the program that need to be remedied? (Insert numbered list or "None")	None							
If any problems with these programs were identified, how have these been remedied? (Insert numbered list or "None")	None							
Are there any opportunities for improving the program? (insert numbered list or insert "None")	None							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	None							

Project Name: Engineering 2 LEED EB Submittal

Credit: SS Credit 6.2 (1 point possible): Heat Island Effect, Roof Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-06-04	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

BERKELEY · DAVIS · IRVINE · LOS ANGELES · MERCED · RIVERSIDE · SAN DIEGO · SAN FRANCISCO

SANTA BARBARA · SANTA CRUZ

PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

Regarding Engineering Building LEED EB Project
Sustainable Sites Credit 6.2 Heat Island Reduction – Roof

The total square foot area of roof on this building is 34,186 sq. ft.
Air handler units on the roof of the building of witch there are four occupy 1,836 sq. ft.

The roofing material used on this building is a product called Carlisle's Sure-Weld, color is white see attached roofing material documentation. This product has a solar reflectance of .75 min, .87 typ white. This test was conducted by the manufacture using solar spectrum reflectometer to ASTM E 408 standard. This product meets or exceeds the Energy Star rating requirements, and guarantees to maintain it's reflective properties for the life of the product warranty.

Jim Sherman
University Of California
Santa Cruz
1156 High St
Facilities Commissioner
Central Heat Plant
Santa Cruz Ca. 95064
Office (831) 459-4128
Cell (831) 212-0494

ROOFING AMERICA FOR OVER 40 YEARS

CARLISLE'S

SURE-WELD™

IS TURNING UP THE HEAT

SW

carlisle-syntec • com

CARLISLE SYNTEC'S STRONG COMMITMENT

Carlisle SynTec Incorporated — Sure-Weld Production Facility, Senatobia, Mississippi

The Carlisle Experience — four decades of being your strongest ally.

The Carlisle company emerged as a manufacturer of automobile inner tubes in 1917. Constant innovations, product changes and company evolution provided the opportunity, in 1950, to develop elastomeric membrane sheeting, utilized for liquid containment systems.

Expanding the possibilities, a small construction materials department was created and began to experiment with membrane roofing systems. During its infancy (1951-1961), no one could have predicted the success elastomeric sheeting would have in the commercial and industrial roofing market segment. Forty years later and known industry-wide as the pioneer of EPDM membrane roofing systems, Carlisle SynTec Incorporated has a track record like no other supplier — eight billion square feet of membrane sold and more than 200,000 warranted projects.

In independent surveys of building owners and managers, Carlisle ranks highest in such key areas as product quality, technology implementation, and relationships with customers and suppliers. While it is gratifying to receive such positive feedback, the emphasis remains on our commitment to constantly monitor and improve upon our existing roofing systems, develop innovative roof products, and continually focus on improving customer services. This commitment has included product line extensions in both our EPDM- and TPO-based systems, the implementation of an Enterprise Resource Planning software package (ERP) to fully integrate all facets of our organization, and the development of an industry-leading interactive website (carlisle-syntec.com) to name just a few.

A major investment by Carlisle in recent years has been the construction of a dedicated TPO heat weldable membrane manufacturing facility located in Senatobia, Mississippi.

Carlisle's TPO Sure-Weld membrane has experienced extraordinary acceptance in the marketplace and resulting strong sales. While Carlisle's established single-ply technical infrastructure has supported this growth, there are three primary physical attributes of Sure-Weld TPO that have fueled its phenomenal market share gains:

- Width
- Thickness
- Environmentally Sensitive

These three product design attributes, available now with Carlisle's Sure-Weld TPO, exemplify our investment in the future for our owners and contractors. As it has done for 40 years in the single-ply industry, Carlisle SynTec is setting new standards within the thermoplastic, heat-welded market, both for today and tomorrow.

SW WITH CARLISLE'S SURE-WELD
WIDER IS BETTER

Carlisle's 8'-, 10'- and 12'-wide sheets reduce seaming costs.

While competitors continue to manufacture heat-weldable membrane sheets 6'-wide or less, Carlisle's wider TPO sheets mean fewer seams to weld and less material required for installations. Sure-Weld membranes, in 8'-, 10'- and 12'-widths decrease installation time and result in less membrane loss under welded seams. Applicators save labor and time, and owners realize cost savings. Wider is Better.

Sure-Weld's wider sheets offer other advantages to applicators and owners.

- Carlisle's Sure-Weld wider sheets minimize labor costs since fewer components are required to install the roof. Wider sheets mean fewer fasteners, less seams, less roll handling, and fewer potential problems. Saving building owners money and conserving applicators time and materials is another reason why Wider is Better.

The Patriot News, Harrisburg, Pennsylvania

Lift To Remove

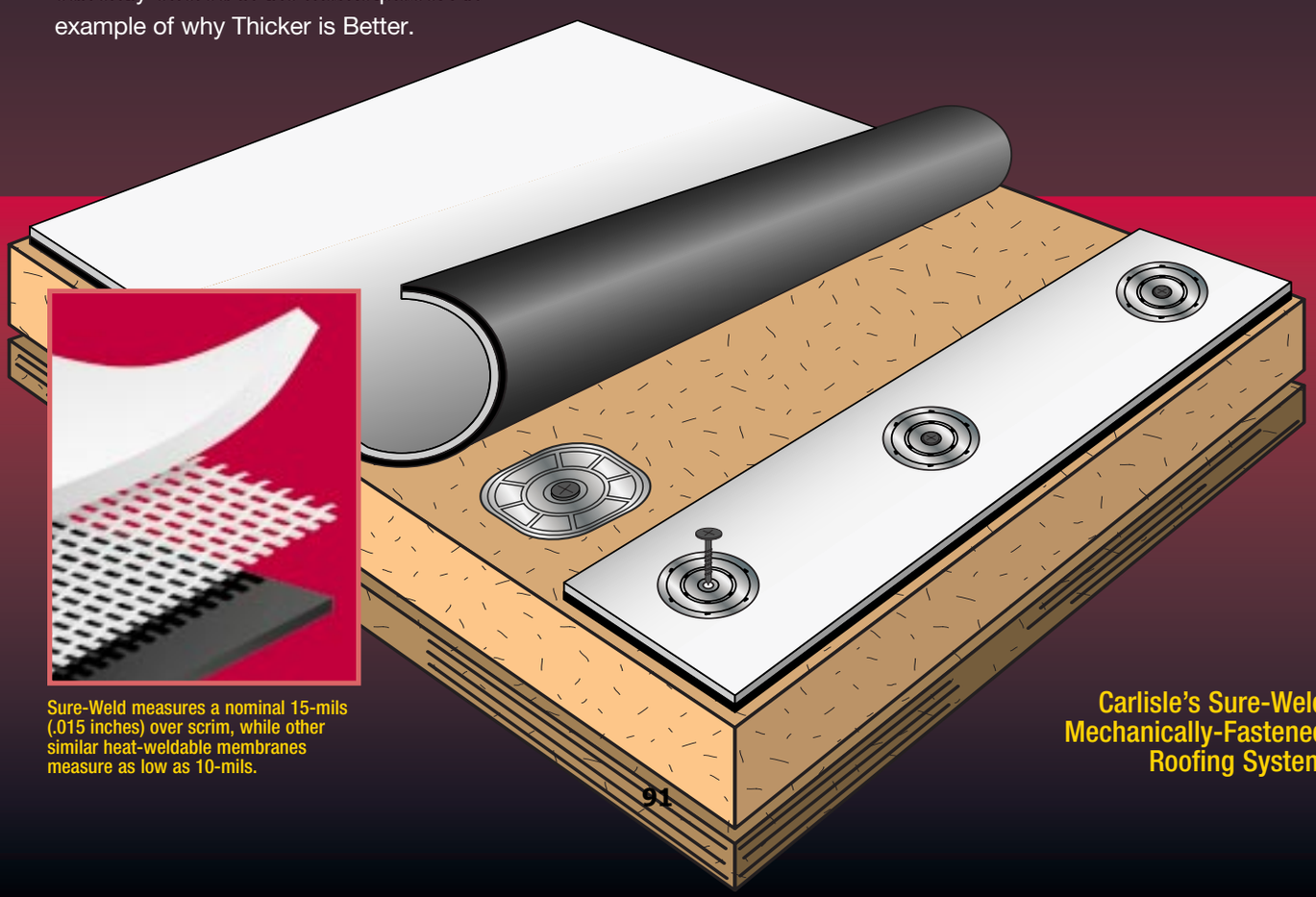
SW WITH CARLISLE'S SURE-WELD THICKER IS BETTER

Carlisle's Sure-Weld membrane has the thickest top ply over scrim in the industry.
Sure-Weld 45- and 60-mil standard membrane consists of three layers: a TPO polymer base; a strong, polyester reinforced fabric center (scrim); and a tough thermoplastic polyolefin (TPO) compounded top ply. Recognizing the top ply as the most vital membrane component for long-term weathering characteristics, Sure-Weld measures a nominal 15-mils (.015 inches) over scrim, while other heat-weldable membranes can measure as low as 10-mils. Thicker translates into Better.

Sure-Weld's thicker membrane is superior for these reasons:

- With Sure-Weld, the extra thickness over scrim offers additional protection against rooftop traffic and migratory debris. The top ply, in combination with Sure-Weld's strong scrim and tough bottom ply, creates a sheet that out-performs other membranes in the market. When physical properties were tested, including the all-important "puncture" test, Sure-Weld surpassed other heat-weldable membranes currently offered in the marketplace. An example of why Thicker is Better.
- By providing a nominal 15-mils top ply thickness over scrim, Sure-Weld offers a smooth surface that resists dirt and debris pick-up and microbial attack. As a result, the membrane maintains a clean appearance and high reflectivity values throughout its life cycle. The added thickness over scrim again proves to be one of the most vital components of the product. Thicker is Better.
- Carlisle's manufacturing specifications, mandating a 15-mil (nominal) top ply coating thickness, equates to application ease — affording smooth, uninterrupted welding for roofing contractors. Total surface fusion welds create monolithic roof assemblies in which the seams themselves are actually stronger than the field membrane.
- Sure-Weld's thicker top ply provides outstanding long term ultraviolet and ozone resistance, particularly in the Sunbelt and western markets.

Sure-Weld measures a nominal 15-mils (.015 inches) over scrim, while other similar heat-weldable membranes measure as low as 10-mils.



Carlisle's Sure-Weld Mechanically-Fastened Roofing System

SW WITH CARLISLE'S SURE-WELD COOLER IS BETTER

Carlisle's Sure-Weld membrane is an ENERGY STAR partner.

Sure-Weld carries the EPA/DOE ENERGY STAR rating and label meeting and/or exceeding the program's energy efficiency guidelines. Because maintaining this high reflectivity is so vital to our long term sheet performance, Sure-Weld contains no ingredients that promote the growth of mildew, bacteria or algae that may cause defacement. Further, being produced without plasticizers or chlorinated ingredients addresses the environmental issues that are a concern today. The membrane remains reflective, clean and cool. Cooler is Better.

Everyone can benefit from cooler, reflective Sure-Weld membrane:

- Available in white, tan or gray, Sure-Weld's clean surface reflects the sun's heat conserving energy required to operate HVAC cooling units for buildings. Air conditioning equipment may even be able to be downsized, since the roof itself will not contribute to the heat gain of the building. Cooler means Better.
- Because ENERGY STAR-labeled Sure-Weld membrane helps lower surrounding air temperatures by reflecting the sun's heat off roofs, it directly contributes to reducing the "urban heat island effect." This reduction in surrounding air temperature will help lower the demands placed on HVAC systems thus reducing energy consumption; supporting a cleaner, cooler surrounding environment; and lowering cost. Cooler is Better for everyone.

Carlisle's reflectivity ratings are so good, and our confidence in their long term benefits so complete, that Carlisle is the only heat-weldable membrane manufacturer in the market today offering a Reflectivity Warranty. We guarantee that our Sure-Weld membrane will continue to meet the ENERGY STAR program reflectivity requirements for the specified length of the warranty.

Fleet Bank Headquarters, Lincoln, Rhode Island

Showplace, High Point, North Carolina

Spencer Theater, Alto, New Mexico

SURE-WELD EXTRA 72- & 80-MIL

The Air Canada Center, Toronto, Canada

Mattel Distribution Center, Fort Worth, Texas

Because we all know that thicker is better and because so many roofers and specifiers have been looking for an alternative to PVC, Carlisle SynTec has developed new, thicker Sure-Weld EXTRA TPO membranes. Not only can Sure-Weld EXTRA membranes be used in traditional PVC project arenas, they can also be utilized on projects that demand extra protection from weathering elements or potential rooftop abuse. Schools, manufacturing facilities, retail operations and institutions can benefit from the securities of heavier gauge, heat weldable membranes. And, Carlisle is the first manufacturer to offer a TPO product with TPO inherrent benefits in both 72- and 80-mil thicknesses.

Sure-Weld EXTRA:

- 8-, 10- and 12'-widths increase rooftop installation productivity.
- 72- and 80-mil thicknesses improve puncture resistance and enhance weatherability and durability.
- produced without the use of any chlorinated ingredients or plasticizers to address environmental issues and concerns.
- manufactured in white, gray and tan, membranes are highly reflective and help to reduce energy consumption costs and carry the EPA/DOE ENERGY STAR® rating and label.
- Carlisle's membranes are up to twice as wide as competitor's 6' PVC sheets, therefore labor- and material-savings are immediately realized.
- Roofing Systems can be warranted up to 20-years with Carlisle's Golden Seal Total System Warranty AND Carlisle offers an exclusive Sure-Weld EXTRA Puncture and Reflectivity Warranty.

Carlisle SynTec Incorporated offers you a complete TPO single-ply roofing systems package, from insulation and accessories to inspections and warranties. And because we are constantly researching and developing innovations to ensure our systems and products meet your every expectation, we are regarded as the industry leader. Partnering with Carlisle assures system performance, longevity and product durability. Only Carlisle can offer 40-years of experience, credibility and reliability in the single-ply market.

For complete specifications, details, promotional materials and case studies, log on to: www.carlisle-syntec.com

ROOFING AMERICA FOR OVER 40 YEARS™

800-4-SYNTEC
www.carlisle-syntec.com

Carlisle SynTec Incorporated
P.O. Box 7000 • Carlisle, PA 17013
Phone (toll free): 1-800-4-SYNTEC
International: 717-245-7083
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CARLISLE
Carlisle SynTec Incorporated

SURE-WELD™ .045 & .060 THICK REINFORCED TPO SHEET

TYPICAL PROPERTIES AND CHARACTERISTICS (Standard, GSD and HS)

Physical Property	Test Method	Property Of Unaged Sheet	Property After Aging[1] 28 days @ 240 °F
Tolerance on nominal thickness, %	ASTM D 751	± 10	
Thickness over scrim, in. (mm)	ASTM D 4637 Optical Method	0.015 (0.381) ± 10%	
Solar reflectance (albedo X 100), % (Min. for ENERGY STAR approval is 65%)	Solar Spectrum Reflectometer	75 min, 87 typical (white) 65 min, 70 typical (tan)	
Emittance, infrared	ASTM E 408	0.92 typical	
Breaking strength, lbf (kN)	ASTM D 751 Grab Method	225 (1.0) min. 340 (1.5) typical	225 (1.0) min. 340 (1.5) typical
Elongation at break of fabric, %	ASTM D 751	25 typical	25 typical
Tearing strength, lbf (N) 8 by 8 in. specimen	ASTM D 751 B Tongue Tear	55 (245) min. 130 (578) typical	55 (245) min. 130 (578) typical
Brittleness point, °F (°C)	ASTM D 2137	- 40 (- 40) max. - 50 (- 46) typical	
Linear Dimensional Change (shrinkage), %	ASTM D 1204		+/- 1.0 max. - 0.5 typical
Ozone resistance, 100 pphm, 168 hours	ASTM D 1149	No cracks	No cracks
Resistance to water absorption After 7 days immersion 158 °F (70 °C) Change in mass, %	ASTM D 471	4.0 max. 2.0 typical	
Resistance to microbial surface growth, rating (1 is very poor, 10 is no growth)	ASTM D 3274 2 yr S. Florida	9-10 typical	
Field seam strength, lbf/in. (kN/m) Seam tested in peel	ASTM D 1876	40 (7.0) min. 60 (10.5) typical	
Water vapor permeance, Perms	ASTM E 96	0.10 max. 0.05 typical	
Puncture resistance, lbf (N)	FTM 101C Method 2031	250 (1110) min. 300 (1330) typical - .045 350 (1560) typical - .060	250 (1110) min. 300 (1330) typical - .045 350 (1560) typical - .060
Resistance to xenon-arc weathering [2] Xenon-Arc, 10,080 kJ/m^2 total radiant exposure, visual condition at 10X	ASTM G 26 0.70 W/m^2 80 °C B.P.T.	No cracks No loss of breaking or tearing strength	

[1] Aging conditions are 28 days at 240 °F (116 °C) equivalent to 400 days at 176 °F (80 °C) for breaking strength, elongation, tearing strength, linear dimensional change, ozone and puncture resistance

[2] Approximately equivalent to 8,000 hours exposure at 0.35 W/m^2 irradiance 11/02

WO Number: WO00325320 WORK ORDER TICKET

Description: RCH: ENG 2, ROOF INSPECTION WEEK OF 5/19/08

Enter User:	SMITHJS	Schedule Date:	16-MAY-2008
Type:	SCCPROOF	Due Date:	20-MAY-2008
Status:	ASSIGNED	Modify Date:	19-MAY-2008
Priority:	2	Start Date:	16-MAY-2008
Method:		Nonavailable Time:	
Crew:	CARPENTERS	Req Type:	Service
Craft:	CARPENTERS	Req Number:	SR00023391
Assigned To:	CARNIGLIDS CARNIGLIA, DON S	Requestor:	DUNNE, JIM
Est Hours:	4	Telephone:	9-3411
Site:	UCSC	Mail Code:	
Building:	ENGINEER 2	Department:	PP PP
Bldg Desc:	940 ENGINEERING BUILDING 2	CP Number:	82105
Floor:		Equipment:	
Room:		Nomenclature:	

Task List

PLEASE WRITE WORK ORDER OFF OF CFR # 82105- CARPENTER SHOP- CONDUCT ROOF INSPECTION OF E2 ROOF, AS PER PM REPORT FORMAT FROM PM MANAGER-JEFF CLOTHIER, INSPECTION TO BE DONE WEEK OF 5-19-08. SEE J.DUNE FOR QUESTIONS. THANKS.

JS

5-19 1
5-20 1L

COMPLETED

PM ID# 266

Area	Engineering 2
Week#	48
Date	5/24/2008
Crew	Carpenter

Roof / Eng. 2 & A[redacted]& G / Annual

11 Hrs Rev 5/19/2008

W.O. SCE2PCR (11 HRS)

Comunication Procedure:

1 Check in with building coordinator:

2 Keep maint supervisor informed of any problems found.

3 Upon completion, let maint supervisor know it is done and of any follow-up work .

PM Procedure:

1 Clean HVAC equipment as necessary.

2 Empty trash in mechanical rooms

Supervisor Craig Russo, x93045. Email: crusso@ucsc.edu

Name:	Date:	Hours:	Name:	Date:	Hours:	Name:	Date:	Hours:
CC.	5-19	1						
	5-20	1½						

Notes:

W.O. SCE2PCR (11 HRS)

ENG2 **Asset # 940**

ROOF-940 ROOF SCE2PCR FL RM

Check all valleys & flat spots ☐

Clean roof drains ☐

Clean all debris from gutter and remove all debris from roof ☐

Check gutter fasteners ☐

Flush gutters with water or blow out ☐

Check that downspouts are intact ☐

Check downspouts are clear of all debris ☐

Flush downspouts with water or blow out ☐

Equip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☐ ok

H20 TIGHTNESS- Leaks on underside ___ Weath/Mech dmg ____
Fasten/Flash failure ____ Stand H20 ___ Faulty material ____ ☐ ok
Plaster ... Faults

SURFACE:Adhesion ____ Cracks, holes __ Bare areas ___ Fish mouths ___
Blist/wrink ✗ Ballast ___ Alligator ___ ☐ Some wrinkles above Penthouse

PENETRATIONS- Weather tightness ____ Operable? ____ ☐ ok

FLASHING- Deterioration ___ Open joints ___ Holes/damage ____ Anchoring
____ Protect. coating_____ ☐ ok

DRAINAGE- Clamping rings secure ____ Corrosion ___ Screens ____ ☐ ok

List all deficiencies found: None ☐

this PM was for Auditorium

E-2 Bldg P.V.C. roof good shape some wrinkles on Penthouse roof.

All else looked good

- most of the Mech roof are standing seam metal. ok shape.

Felt under ballast walk way starting to deteriorate

the 2 ... lumber redwood North side of bldg.

WATER EFFICIENCY PREREQUISITE 1: MINIMUM WATER EFFICIENCY

1. LEED-EB template
2. Credit narrative including meter data, fixture type with flow rate, and photos.

(Civil Engineer or Responsible Party)

I, Louise Huttinger , declare to USGBC that the project uses at least or less water than a baseline calculated as 120% of 100% implementation of the performance requirements of the Energy Policy Act of 1992.

1. Enter any building fixture types not listed in the table below and their corresponding water use data under "Other (user defined)"
2. Use metered fixture water use data if the building has sufficient metering capability, otherwise calculate fixture water use with the Total Calculated Annual Fixture Water Use table below.

Flow Fixture Chart

Flow Fixture Type	Water Use [GPM]	Duration [sec]
EPACT Equivalent Lavatory	2.20	15
Low-Flow Lavatory	1.80	15
Ultra Low-Flow Lavatory	0.50	15
EPACT Equivalent Kitchen Sink	2.20	15
Low-Flow Kitchen Sink	1.80	15
EPACT Equivalent Shower	2.50	300
Low-Flow Shower	1.80	300
EPACT Equivalent Janitor Sink	2.20	15
Hand Wash Fountain	0.50	15
Conventional Low-Flow Self-Closing Faucet	0.25	60
High Efficiency Self-Closing Faucet	0.20	60
User Defined 1		
User Defined 2		
User Defined 3		

Flush Fixture Chart

Flush Fixture Type	Water Use [GPF]
EPACT Equivalent Water Closet	1.60
Low-Flow Water Closet	1.10
Ultra Low-Flow Water Closet	0.80
Dual-Flush Toilet (average flush)	1.20
Composting Toilet	0.00
EPACT Equivalent Urinal	1.00
High-Efficiency Urinal	0.50
Non-water Urinal	0.00
User Defined 1	
User Defined 2	
User Defined 3	

Guidance for developing the baseline and calculated or metered fixture water use cases below:
1. Daily Uses per Occupant = the number of times per day that a male or female occupant uses the selected fixture. (On average female building occupants use water closets three times daily and male occupants use water closets once and urinals twice daily.
2. Occupant Users per Fixture = the number of building occupants that utilize each selected fixture type.
3. The total numbers of Fixture Uses by All Occupants must be the same in the Baseline and Fixture Water Use. (This is equal to the sum of the Daily Uses per Occupant multiplied by the Occupant Users of Fixtures columns)
4. If there are showers in the building, 10 percent of building occupants use shower facilities for 5 minutes per day.
5. All occupants use faucets for 15 seconds three times daily.
6. An average savings of 10 percent on sensor-operated, auto-controlled faucets is assumed.
7. Note: When urinals are selected as a fixture type, please enter zeros for female occupants in the 'Daily Uses per Occupant' and 'Occupant users per Fixture' columns.

Method of determining the fixture water use during the performance period:

- [x] Water Meter Data
- [ ] Calculations

Total Metered Fixture Water Use Annual Volume (Annual Fixture Water Use, meter data option) [kgal] **338.563**

OR

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(Continued on page 2)

Total Calculated Annual Fixture Water Use (Annual Fixture Water Use, calculation option)

Flush Fixture	Daily Uses per Occupant	Flow Rate [GPF]	Duration [Flush]	Auto Conrols [Yes or No]	Occupant Users per Fixture Type	Daily Water Use per Gender [gal]

Male		0	1	N/A		0
Female		0	1	N/A		0

Male		0	1	N/A		0
Female		0	1	N/A		0

Male		0	1	N/A		0
Female		0	1	N/A		0

Male		0	1	N/A		0
Female		0	1	N/A		0

Male		0	1	N/A		0
Female		0	1	N/A		0
Flow Fixture	**Daily Uses per Occupant**	**Flow Rate [GPM]**	**Duration [sec]**	**Auto Conrols [Yes or No]**	**Occupant Users per Fixture Type**	**Daily Water Use per Occupant [gal]**
----		0	0			0
----		0	0			0
----		0	0			0
----		0	0			0
----		0	0			0
----		0	0			0
----		0	0			0
----		0	0			0

Total Daily Uses by All Occupants	
Total Daily Volume [kgal]	0
Annual Work Days	260
Total Annual Volume Demanded [kgal]	0
Graywater or Stormwater Reuse Volume [kgal]	
Potable Annual Volume [kgal]	

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(Continued on page 3)

Calculated Baseline

Flush Fixture	Daily Uses per Occupant	Flow Rate [GPF]	Duration [Flush]	Occupant Users per Fixture Type	Daily Water Use per Gender [gal]
EPACT Equivalent Water Closet					
Male	1	1.6	1	234	**374.4**
Female	3	1.6	1	234	**1,123.2**
EPACT Equivalent Urinal					
Male	2	1	**1**	234	**468**
Female	0	**1**	**1**	234	**0**

Male		**0**	**1**		**0**
Female		**0**	**1**		**0**

Male		**0**	**1**		**0**
Female		**0**	**1**		**0**

Male		**0**	**1**		**0**
Female		**0**	**1**		**0**

Flow Fixture	Daily Uses per Occupant	Flow Rate [GPM]	Duration [sec]	Occupant Users per Fixture Type	Daily Water Use per Occupant [gal]
EPACT Equivalent Lavatory	3	**2.2**	**15**	468	**772.2**
EPACT Equivalent Kitchen Sink	1	**2.2**	**15**	468	**257.4**
EPACT Equivalent Shower	0.1	**2.5**	**300**	468	**585**
----		**0**	**0**		**0**
----		**0**	**0**		**0**
----		**0**	**0**		**0**
----		**0**	**0**		**0**
----		**0**	**0**		**0**

Total Daily Uses by All Occupants	**3,322.8**
Total Daily Volume [kgal]	**3.58**
Annual Work Days	**260**
EPAct Baseline Annual Volume [kgal]	**930.8**

(Continued on page 4)

LEED-EB Baseline Annual Volume [kgal] (120% of EPAct Baseline)	1,116.96
Total Metered or Calculated Fixture Water Use Annual Volume [kgal]	338.56
Total Fixture Water Use Annual Volume [kgal] less than 120% of Baseline Case	Yes
Number of Building Occupants	468
Fixture Water Annual Use [kgal] per Building Occupant	0.72
Building Square Footage [SF]	152,077
Fixture Water Annual Use [gal] per Building Square Foot	2.23

I have provided the following to support the declaration:

☒ Annual water meter data for the performance period for potable water use inside the building showing that the annual fixture potable water use is equal to or less than the calculated baseline OR by providing calculations, fixture cut sheets, and photographs.

Project Name: Engineering 2 LEED EB Submittal

Credit: WE Prerequisite 1: Minimum Water Efficiency Prerequisite Documented: **No**

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	Sep 10, 2008	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

E2 LEED-EB SUBMITTAL: NARRATIVE AND DOCUMENTATION
W.E Pre Requisite 1: Minimum Water Efficiency
W.E Credit 3:Water Use Reduction

The UCSC Engineering 2 building was built in 2004 and therefore all of its fixtures are new, low-flow and meet the Energy Policy Act of 1992 fixture performance requirements. Each restroom has low-flow aerators on the faucets and low flow toilets (see attached specifications). In addition, the men's restrooms have water-free urinals. These water saving technologies have significantly reduced the building's burden on potable water supply. The Engineering 2 buildings water use is measured and tracked by the UCSC Physical Plant. Below is the water meter data collected from the past year.

Engineering Building 2					
			W94201		
	Start Date	End Date	Cubic Feet	Gallons	Kgal
Aug-07	7/25/2007	8/30/2007	3,000.00	22441	22.441
Sep-07	8/30/2007	9/28/2007	2,250.00	16831	16.831
Oct-07	9/28/2007	10/26/2007	3,890.00	29099	29.099
Nov-07	10/26/2007	11/29/2007	3,510.00	26256	26.256
Dec-07	11/29/2007	12/20/2007	2,100.00	15709	15.709
Jan-08	12/20/2007	1/31/2008	3,460.00	25882	25.882
Feb-08	1/31/2008	2/28/2008	3,300.00	24685	24.685
Mar-08	2/28/2008	3/31/2008	7,590.00	56777	56.777
Apr-08	3/31/2008	4/24/2008	3,100.00	23189	23.189
May-08	4/24/2008	5/21/2008	4,100.00	30670	30.67
Jun-08	5/21/2008	6/30/2008	3,980.00	29772	29.772
Jul-08	6/30/2008	7/28/2008	2,380.00	17803	17.803
Aug-08	7/28/2008	8/26/2008	2,600.00	19449	19.449
ANNUAL USE				338563	338.563

The annual metered water use of E2 is 338.563 kgal, which is significantly lower than the LEED-EB baseline annual volume (120% of EPACT Equivalent) that was calculated to be 1116.96 kgal.

Fixture Type	Fixture GMF/G rating
1) WC-1-(flush-valve type toilet)	1.6 gpf (gallons per flush)
2) UR- 1-(waterless type urinal)	0
3) Lavatory Faucet	0.5 gpm (gallons per minute)
4) SK-1- Kitchen Sinks	2.2 gpm
5) SH-1- Handi-capped Shower	2.5 gpm

Delta faucet with 0.5 gpm vandal resistant outlet aerator attachment

American Standard Low-Flow Toilet – 1.6 gpf

Falcon Technologies Water-free Urinals

Aquatrol Shower Head- 2.5 gpm flow rate

Symmetrix Single Hand Kitchen Faucet- 2.2 gpm flow rate
Located in break rooms/kitchens on each floor of E2

WATER EFFICIENCY PREREQUISITE 2: DISCHARGE WATER COMPLIANCE

1. LEED-EB template
2. Letter confirming that UCSC is not regulated by the EPA NPDES Clean Water Act requirements.

(Responsible Party)

I, Jim Dunne , declare to USGBC that the building complies with the following requirements:

Option A: If regulated by the EPA National Pollution Discharge Elimination System (NPDES) Clean Water Act requirements.

○ I have provided documentation demonstrating ongoing NPDES permit compliance and ongoing discharge monitoring reporting (DMR) over the performance period.

Option B: If not regulated by the EPA NPDES Clean Water Act requirements.

◉ I have provided a letter of confirmation that the facility is not regulated by the EPA NPDES Clean Water Act requirements.

Project Name: Engineering 2 LEED EB Submittal

Credit: WE Prerequisite 2: Discharge Water Compliance Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	5-27-08	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

5-21-08

RECEIVED

MAY 2 2 2008

ENVIRONMENTAL HEALTH & SAFETY

Dan,
For signature and return to me.

Thanks JD
Any questions, 459-3411..

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT
95064

SANTA CRUZ, CALIFORNIA

May 21, 2008

To: US Green Building Council- LEED-EB Program
Re: Documentation for MR Pre-Req 2, Discharge Water Compliance for E2-UCSC

This letter is to confirm that Engineering 2 building on the UCSC campus is not regulated by the EPA NPDES Clean Water Act requirements. If you have any questions, feel free to contact me.

Dan Blunk
Environmental Health & Safety
Environmental Programs Manager
831-459-93541

WATER EFFICIENCY CREDIT 1.1-1.2:
WATER EFFICIENT LANDSCAPING

1. LEED-EB template
2. Meter reads and description demonstrating how much potable water use for irrigation is reduced in comparison to conventional uses.

(Responsible Party)

I, Jim Dunne , declare to USGBC that potable water consumption for site irrigation has been reduced through high-efficiency irrigation technology, captured rain/recycled site water, or landscaping and other techniques, or by reducing potable water for watering any roof/courtyard garden space or outdoor planters in urban settings, where there is no lawn by at least the following amount:

- (●) WE Cr 1.1: Reduce potable water consumption for site irrigation by 50% (1 point)
- ( ) WE Cr 1.2: Reduce potable water consumption for site irrigation by 95% (1 additional point)

I have provided the following to support the declaration(s):

- [X] A brief narrative description, system schematics, photographs and calculations or meter readings demonstrating how much potable water use for irrigation is reduced in comparison to conventional means of irrigation. The head of facility management for the facility is required to sign off below on the calculation of reduction in the amount of potable water used for irrigation.
- [X] A description of the type of irrigation system that is "conventional" in the area and the extent that the "conventional" type of irrigation system is used in the area.
- [X] Quarterly reports over the performance period that document the maintenance activities implemented to ensure proper operation of the irrigation system.

Equation 1
Annual Irrigation Baseline =
Landscape Area [acres] x Average Annual Conventional System Irrigation Rate [gallons/acres/year]

Equation 2
Total Annual Potable Irrigation Water Use [gallons/year] =
Irrigated Area [acres] x Best Estimate of Actual Irrigation Water Use [gallons/acre/year]

Equation 3
Percent Reduction =
((Baseline Irrigation Water Use - Actual Potable Water Use for Irrigation) / Baseline Irrigation Water Use) x 100

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(Continued on page 2)

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
(•) 3-5 months	Quarter 1
( ) 6-8 months	Quarter 1 - Quarter 2
( ) 9-11 months	Quarter 1 - Quarter 3
( ) 12+ months	Quarter 1 - Quarter 4

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
50% Reduction	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
95% Reduction	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Name of person currently responsible for making sure that the water efficient landscaping measures continue to work well	Roger Edburg							
Date responsible person provided quarterly report information listed below	8-26-08							
Questions that the responsible person must answer each quarter:								
Have the water efficient landscaping measures been maintained over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Have the water efficient landscaping measures continued to work well over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
What are the best available irrigation water use quantities for the last quarter and the year to date?	173,178 gallons							
Is the fixture water use for the last quarter and the year to date on track for achieving the annual fixture water use reduction goals for the building?	yes							
Are there any problems with the water efficient landscaping measures that need to be remedied? (Insert a numbered list of problems or insert "None")	none							
If any problems with these programs were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	none							
Are there any opportunities for improving the water efficient landscaping measures? (insert a numbered list of opportunities or insert "None")	none							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	none							

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(Continued on page 3)

WE Credit 1.1 (1 point):
Water Efficient Landscaping, Reduce by 50%

Points Documented: 0

WE Credit 5.2 (1 additional point):
Water Efficient Landscaping, Reduce by 95%

Points Documented: 0

Project Name: Engineering 2 LEED EB Submittal

Credit: WE Credit 1 (2 point possible): Water Efficient Landscaping - Reduce Water Use

Points Documented: 0

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	8-27-08	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

Generation Date: 08/26/08 7:25 AM

WATER USAGE REPORT

PERIOD: 97 Days REPORT BY: Period DAY END: 12:00 AM AVERAGES-No
FROM:04/24/08 SORT BY:Satellite WEEK END: Sun MEASURED-Yes
TO: 07/29/08 UNITS: Gallons MONTH END:30 WARNINGS-No
Stations

ADDR: 009-00 NAME: Engineering Scienc LOC: South East Corner Path
04/24/08 TO 07/29/08

STATION	RUNTIME	GAL(COMPUTED)	GAL(MEASURED)
1	258 MIN	4128	4272
2	597 MIN	7164	7568
3	642 MIN	10914	9289
4	257 MIN	3855	4216
5	258 MIN	10578	10572
6	232 MIN	7424	11068
7	87 MIN	2088	2452
8	258 MIN	15738	15151
9	257 MIN	10794	10684
10	595 MIN	10710	10958
11	596 MIN	10728	10672
12	257 MIN	10537	11383
13	260 MIN	11440	11402
14	263 MIN	7364	9465
15	257 MIN	8995	9455
16	597 MIN	12537	12860
17	257 MIN	8738	9026
18	260 MIN	9100	9143
19	258 MIN	13674	13988
20	257 MIN	4883	5088
21	257 MIN	771	936
22	460 MIN	20240	21675
23	541 MIN	7574	14391
24	259 MIN	8288	9936
25	259 MIN	7770	8208
26	258 MIN	3354	3582
27	258 MIN	6966	7419

28	170 MIN	2040	2677
29	263 MIN	4734	5490
30	259 MIN	5957	7613
31	261 MIN	5742	6602
32	261 MIN	11745	12149
33	257 MIN	8224	8473
34	177 MIN	1770	2312
35	180 MIN	2880	3824
36	721 MIN	3605	4985
37	178 MIN	1958	2497
38	179 MIN	358	724
39	178 MIN	2136	2999
40	179 MIN	1969	2952
41	0 MIN	0	0
42	38995 MIN	0	1014
43	0 MIN	0	0
44	0 MIN	0	0
45	0 MIN	0	0
46	0 MIN	0	0
47	0 MIN	0	0
48	0 MIN	0	0
TOTAL	854.2 HOURS	289470	319170

TOTAL USAGE

RUNTIME	GAL(COMPUTED)	GAL(MEASURED)
854.2 HOURS	289470	319170

Evaluation of Relative Irrigation Performance - Engineering 2 LEED-EB WE Credit 1.1

College 8 Residential Water Use per Area data: 04-25-08 through 07-29-08

Zone	Irrigation Meter	Zone Water Use 04-25-08 07-29-08 (Cubic feet)	Zone Water Use 04-25-08 07-29-08 (Gallons)	Station / Bed	Landscape type	Bed Area (sq.ft.)	Performance Period Relative Zone Water Use (gallons per square foot)
College 8 Upper Apartments	I75004	18,910	141,447	A		4,012	6.7
				B		4,150	
				C		1,098	
				D		610	
				E		1,220	
				F		64	
				G		1,360	
				H		1,479	
				I		6,990	
College 8 Dorms	I75003	67,280	503,254	1D	Shrub	429	15.0
				2D	Shrub	1,466	
				3D	Not used		
				4D, 5D	Shrub	5,145	
				6D,7D	Shrub	1,423	
				8d, 9D, 10D, 11D	Mixed	3,300	
				12D	Not used		
				13D	Not used		
				14D	Shrub	1,480	
				15D	Shrub	218	
				16D	Shrub	535	
				17D	Shrub	420	
				18D, 19D, 20D, 21D	Mixed	4,385	
				1C	Shrub	1,041	
				2C	Shrub	475	
				4C	Shrub	420	
				3C,7C,8C	Mixed	1,690	
				5C,6C	Mixed	1,715	
				9C,10C,11C	Turf	2,000	
				12C,13C, 14C	Turf	1,539	
				15C	Shrub	420	
				16C,19C	Mixed	1,400	
				17C,18C	Shrub	2,000	
				20C,21C, 22C	Not used		
				24C	Turf	2,133	

Evaluation of Relative Irrigation Performance - Engineering 2 LEED-EB WE Credit 1.1

College 8 Residential Water Use per Area data: 04-25-08 through 07-29-08

Zone	Irrigation Meter	Zone Water Use 04-25-08 07-29-08 (Cubic feet)	Zone Water Use 04-25-08 07-29-08 (Gallons)	Station / Bed	Landscape type	Bed Area (sq.ft.)	Performance Period Relative Zone Water Use (gallons per square foot)
College 8 Lower Apartments	I75002	22,812	170,634	1F	Shrub	563	9.6
				2F	Shrub	4,200	
				3F	Shrub	2,282	
				4F	Not used		
				5F	Shrub	1,333	
				6F	Turf	1,223	
				7F	Shrub	267	
				8F	Shrub	1,081	
				9F	Shrub	1,295	
				10F	Shrub	1,027	
				11F	Shrub	4,440	

Performance Period: 04-25-08 through 07-29-08

Relative Water Use at College 8 Landscape: **11.3** Gallons per square foot.

Evaluation of Relative Irrigation Performance - Engineering 2 LEED-EB WE Credit 1.1

E2 Water Use per Area data: Performance Period 04-25-08 through 07-29-08

Calibration: E2 / Rainmaster flow sensor data * .85 = Water Meter Reading

Zone	Area (sq.ft.)	Station	RainMaster Flow Sensor data 04-24-08 07-29-08 (gallons)	RainMaster Flow data * .85 to calibrate to utility meter	Total Zone water Use	Period Relative Zone Water Use (gallons per square foot)
A	8480	7	2,452	2,084	44,979	5.3
		8	15,151	12,878		
		9	10,684	9,081		
		10	10,958	9,314		
		11	10,672	9,071		
		39	2,999	2,549		
B	2470	12	11,383	9,676	21,490	8.7
		13	11,402	9,692		
		37	2,497	2,122		
C	17275	16	12,860	10,931	38,264	2.2
		17	9,026	7,672		
		18	9,143	7,772		
		19	13,988	11,890		
D	991	20	5,088	4,325	4,325	4.4
E	2205	22	21,675	18,424	18,424	8.4
F	400	35	3,824	3,250	3,250	8.1
G	22814	1	4,272	3,631	24,052	1.1
		2	7,568	6,433		
		3	9,289	7,896		
		4	4,216	3,584		
		40	2,952	2,509		
H	2115	5	10,572	8,986	8,986	4.2
I	984	6	11,068	9,408	9,408	9.6
Overall	**57,734**		**203,739**			**3.5**

E2 Relative Water use Compared to College 8 Baseline 3.5 / 11.3 = 31%


Visual Arts
Research Center
Parking
Lot #146
Irrigation Meter
I75004
Apt 1
Apt 2
Controller
College 8
Kitchen
College 8
Academic
College 8
Dine
Eightn
Cafe
West Field House
Irrigation Meter
I75002
Apt 3
Apt 4
Apt 5
Apt 6
Student Commons
Dorm AG
Dorm AL
Dorm BL
Dorm BG
Dorm CG
Dorm CL
Dorm DL
Dorm CG
Irrigation Meter
I75003
Parking
Lot #160
Parking
Lot #14
121

College Eight Irrigation Meter Reads
Performance Period 04-25-08 through 07-29-08

		I75002 College 8 Apt Bldg 3-6	I75003 College 8 Irrigation	I75004 College 8 Apts Bldg 1-2	I75601 College 8 Dining
May-08	Usage (CF)	8,003.00	18,290.00	1,900.00	23,580.00
	Start Date	4/29/2008	4/25/2008	4/25/2008	4/25/2008
	End Date	5/30/2008	5/22/2008	5/22/2008	5/22/2008
Jun-08	Usage (CF)	7,476.00	26,040.00	7,890.00	29,670.00
	Start Date	5/30/2008	5/22/2008	5/22/2008	5/22/2008
	End Date	6/30/2008	6/30/2008	6/30/2008	6/30/2008
Jul-08	Usage (CF)	7,333.00	22,950.00	9,120.00	26,380.00
	Start Date	6/30/2008	6/30/2008	6/30/2008	6/30/2008
	End Date	7/30/2008	7/29/2008	7/29/2008	7/29/2008

WATER EFFICIENCY CREDIT 3.1-3.2: WATER USE REDUCTION

1. LEED-EB template
2. E2 water narrative and calculations
3. Fixture cut sheets with flow rates

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the project uses at least 10% less water than baseline fixture performance requirements of the Energy Policy Act of 1992 established in WE Prerequisite 1.

WE 3.1: 10 % reduction in fixture water use from the baseline (At least one meter for the overall building water use is required and metering for cooling towers and other process water use encouraged but not required).

WE 3.2: 20 % reduction in fixture water use from the baseline (measured fixture water use demonstrating required level of efficiency must be provided).

Note: Complete WE p1 before attempting this credit. Fill in the results from WE p1 below.

Calculated Fixture Water Use Total Annual Volume [gal]	

OR (either fill in calculated or metered - do not fill in both)

Metered Fixture Water Use Total Annual Volume [gal]	338,563

LEED-EB baseline annual volume (120% of EPAct baseline) [gal]	1,116,960
Water Use Reduction [%]	69.69

I have provided the following to support the declaration:

☒ Documentation (calculations, fixture cut sheets, results of direct measurement and photographs) that the existing building fixture potable water use over the performance period is less than the baseline established in WE Prerequisite 1.

☒ Annual water meter data for total water use in the building supporting the documentation of the annual fixture potable water use. Include measured fixture water use demonstrating required level of efficiency for WE Credit 3.2.

WE Credit 3.1 (1 point):
Water Use Reduction, 10% Reduction

Points Documented: 1

WE Credit 3.2 (1 additional point):
Water Use Reduction, 20% Reduction

Points Documented: 1

Project Name: Engineering 2 LEED EB Submittal

Credit: WE Credit 3 (2 points possible): Water Use Reduction

Points Documented: 2

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-10	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

E2 LEED-EB SUBMITTAL: NARRATIVE AND DOCUMENTATION
W.E Pre Requisite 1: Minimum Water Efficiency
W.E Credit 3:Water Use Reduction

The UCSC Engineering 2 building was built in 2004 and therefore all of its fixtures are new, low-flow and meet the Energy Policy Act of 1992 fixture performance requirements. Each restroom has low-flow aerators on the faucets and low flow toilets (see attached specifications). In addition, the men's restrooms have water-free urinals. These water saving technologies have significantly reduced the building's burden on potable water supply. The Engineering 2 buildings water use is measured and tracked by the UCSC Physical Plant. Below is the water meter data collected from the past year.

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2) UR- 1-(waterless type urinal)	0
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4) SK-1- Kitchen Sinks	2.2 gpm
5) SH-1- Handi-capped Shower	2.5 gpm

Delta faucet with 0.5 gpm vandal resistant outlet aerator attachment

American Standard Low-Flow Toilet – 1.6 gpf

Falcon Technologies Water-free Urinals

Aquatrol Shower Head- 2.5 gpm flow rate

Symmetrix Single Hand Kitchen Faucet- 2.2 gpm flow rate
Located in break rooms/kitchens on each floor of E2

WC-1 15440 2.02

American Standard

BARRIER FREE

AFWALL™ ELONGATED FLUSH VALVE TOILET

VITREOUS CHINA

AFWALL™ ELONGATED TOILET

- Vitreous china
- Low-consumption (6.0 Lpf/1.6 gpf)
- Wall-mounted elongated bowl
- Fully glazed trapway
- Condensation channel
- Direct-fed siphon jet action
- 1-1/2" inlet spud
- 2" ballpass trapway
- 10" x 12" water surface area
- 100% factory flush tested

- ☑ **2257.103** Top spud
- ☐ **2256.194** Top spud with slotted rim for bedpan holding (White only)
- ☐ **2258.125** Back spud
- ☐ **2254.127** Back spud with slotted rim for bedpan holding (White only)

Recommended working pressure--between 30 psi at valve when flushing and 80 psi static

Nominal Dimensions:
635 x 375 x 381mm (25" x 14-3/4" x 15")

Fixture only, less seat and bolt caps

Compliance Certifications -
Meets or Exceeds the Following Specifications:
- ASME A112.19.2M (and 19.6M) for Vitreous China Fixtures - includes Flush Performance, Ball Pass Diameter, Trap Seal Depth and all Dimensions

NOTE: Roughing-in information shown on reverse side of page

To Be Specified

- ☐ Color: ☐ White ☐ Bone ☐ Silver ☐ Shell ☐ Black
- ☐ Seat: Olsonite #95 open front seat less cover
- ☐ Seat: Church #9500C open front seat less cover
- ☐ Alternate Seat:
- ☐ Flush Valve: Sloan Royal #111 (Top Spud) Sloan Royal #144-1.5 (Back Spud)
- ☐ Alternate Flush Valve:
- ☐ Carrier Fitting (by others):

● When installed so top of seat is 432 to 483mm (17" to 19") from the finished floor.
MEETS THE AMERICAN DISABILITIES ACT GUIDELINES AND ANSI A117.1 REQUIREMENTS FOR ACCESSIBLE AND USEABLE BUILDING FACILITIES-CHECK LOCAL CODES.

© 1998 American Standard Inc.

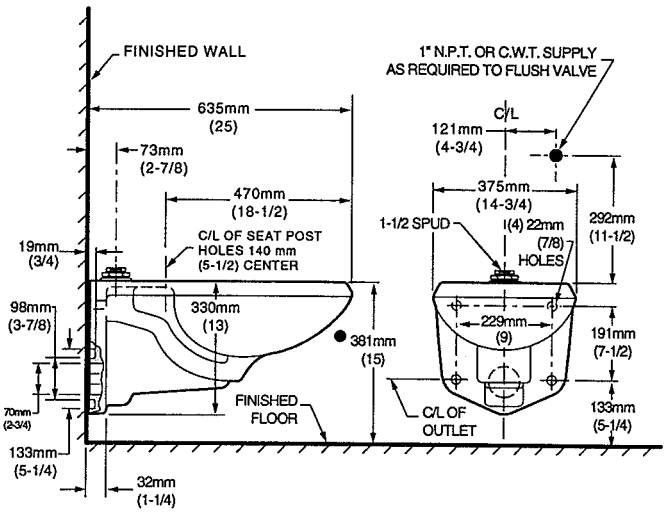
WC-1 15440 2.02

American Standard

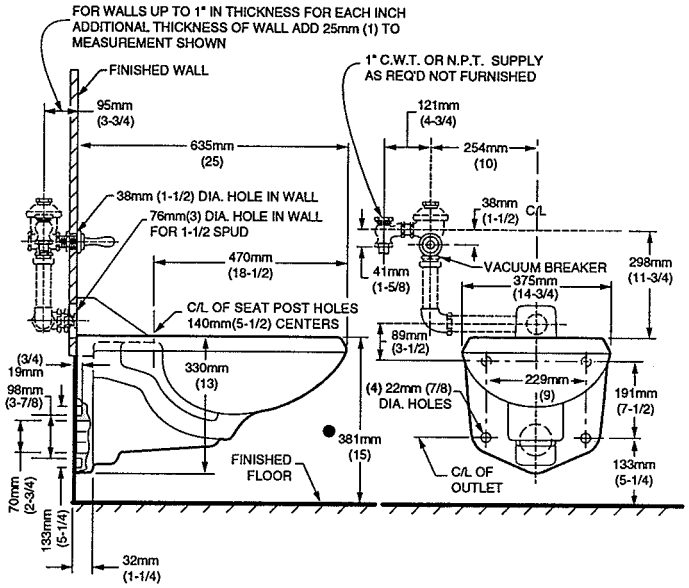
AFWALL™ ELONGATED FLUSH VALVE TOILET

VITREOUS CHINA

2256./2257.



2254./2258.



NOTES:

● Toilet designed to meet ADA handicapped standards with seat\ height set at 432 to 483mm (17" to 19") from finished floor.

PRODUCT 2257.103 SHOWN, 2256.194 SAME AS EXCEPT WITH SLOTTED RIM FOR BED PAN HOLDING.

PRODUCT 2258.125 SHOWN, 2254.127 SAME AS EXCEPT WITH SLOTTED RIM FOR BED PAN HOLDING.

WASTE OUTLET SEAL RING MUST BE NEOPRENE OR GRAPHITE-FELT (WAX RING NOT RECOMMENDED).

SUGGESTED 2mm (1/16) CLEARANCE BETWEEN FACE OF WALL AND BACK OF BOWL.

TO COMPLY WITH AREA CODE GOVERNING THE HEIGHT OF VACUUM BREAKER ON THE FLUSH VALVE, THE PLUMBER MUST VERIFY DIMENSIONS SHOWN FOR SUPPLY ROUGHING.

FLUSH VALVE NOT INCLUDED WITH FIXTURE AND MUST BE ORDERED SEPARATELY.

CARRIER FITTING AS REQUIRED TO BE FURNISHED BY OTHERS.

PROVIDE SUITABLE REINFORCEMENT FOR ALL WALL SUPPORT.

IMPORTANT: Dimensions of fixtures are nominal and may vary within the range of tolerance established by ANSI Standard A112.19.2

These measurements are subject to change or cancellation. No responsibility is assumed for use of superseded or voided pages.

© 1998 American Standard Inc.

Model F-1000 Specifications

FALCON WATERFREE TECHNOLOGIES

Waterfree Urinal Vitreous China

Sealed Cartridge

Description

The Falcon model F-1000 vitreous china wall hung, wall outlet waterfree urinal. The urinal complies with ANSI/ASME A112.19.2M-1998 and A117.1 (Section 605.2) for vitreous china fixtures and with IAPMO IGC 161-2000 and CSA.

Specifications

- Vitreous china fixture
- Housing (H-1, Mod. 3)
- Cartridge kit*
- One piece wall bracket with anchors
- Uni-coupler
- Drain line test cap
- Instruction sheet

*Additional cartridges sold separately

Colors

Standard white; available in other colors

Nominal Dimensions (W x H x D)

19.25 x 26.25 x 14.375 inches [488 x 666 x 366 mm]

Approximate Weight

54 lbs. [24.5 kg]

Compliance Certifications

Meets ANSI/ASME A112.19.2.M-1998 and A117.1 (section 605.2) for vitreous china fixtures. In compliance with IAPMO 1GC 161-2000 and ANSI Z124.9-94. Meets the American Disabilities Act guidelines and ANSI A117.1 for accessible and usable buildings and facilities. Check local codes.

H1 Housing (H-1, mod. 3)

The factory installed housing is comprised of a bowl with a tailpiece and a mounting flange of 316 Stainless Steel. It is sealed into the bowl drain opening by a profile gasket made of a synthetic rubber. The housing and gasket are compressed into the drain opening by the installation of a retaining nut, and a friction washer.

Cartridge kit

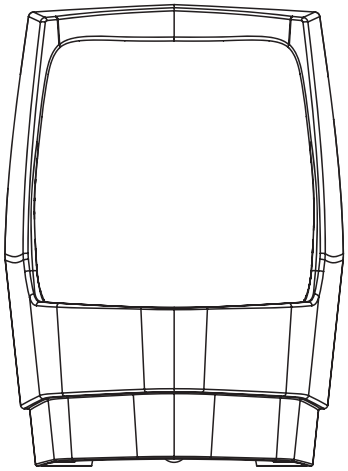
The patented cartridge is engineered to last an average of three to four months in typical installations and to receive urine through drain holes. Urine passes through an immiscible layer of biodgradable sealant, continues through a siphon trap system, and flows out through a baffle to prevent the loss of sealant. A discharge tube in the housing directs the flow of urine into the building drain system. The cartridge is designed as a replaceable component when its function has been exhausted.

Uni-coupler

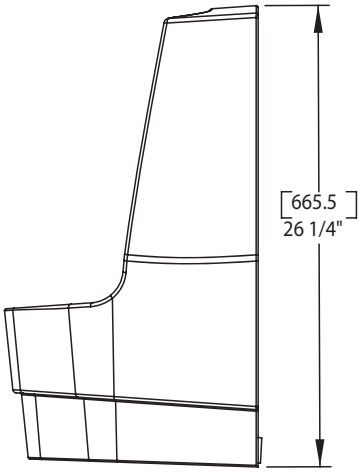
The housing is connected to the building drain system by means of the Falcon Uni-coupler. The coupler conforms to NSF 14 for plastic pipes and fittings. It is designed to be used in both retrofit and new installations. It offers a variety of configurations which allow it to couple to most existing drain openings.

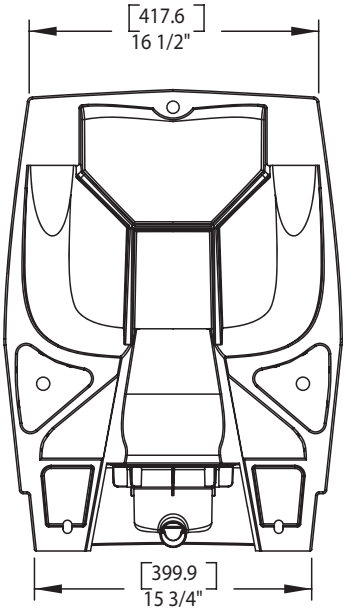
The information in this document is subject to change without notice.

Model F-1000 Specifications

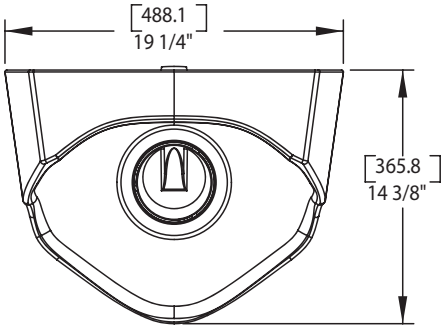


FRONT VIEW

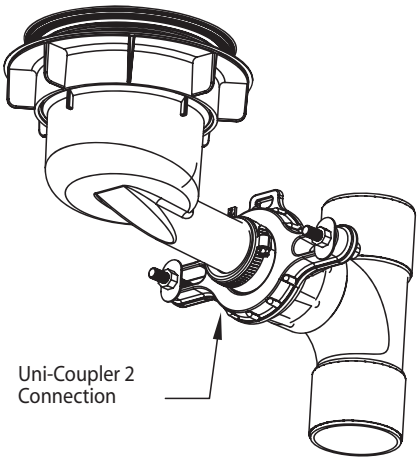


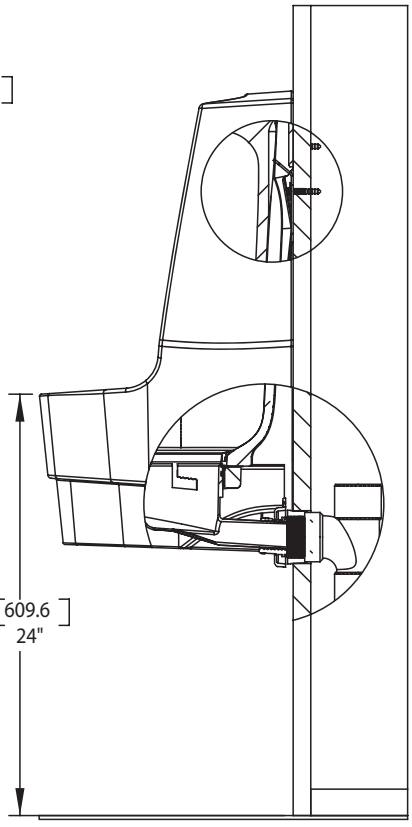


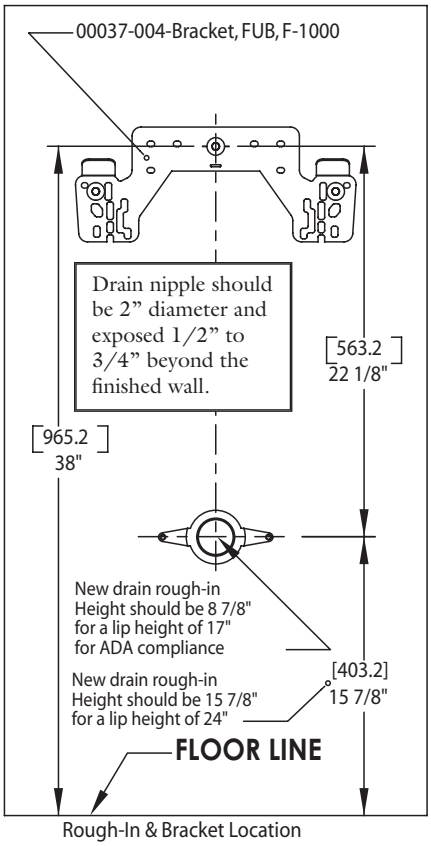
BACK VIEW



TOP VIEW







Rough-In & Bracket Location

Rev. 5/26/2006

The information in this document is subject to change without notice.

FALCON WATERFREE TECHNOLOGIES

Falcon Waterfree Technologies, LLC
Tel: 866.275.3718 (toll-free) • Fax: 616.954.3579 • info@falconwaterfree.com

www.falconwaterfree.com

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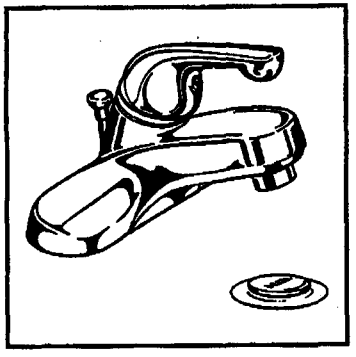
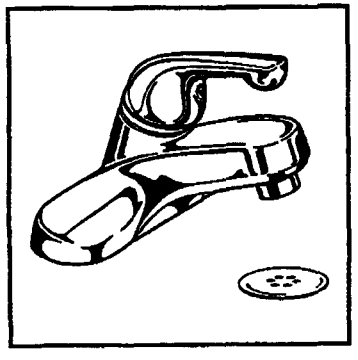
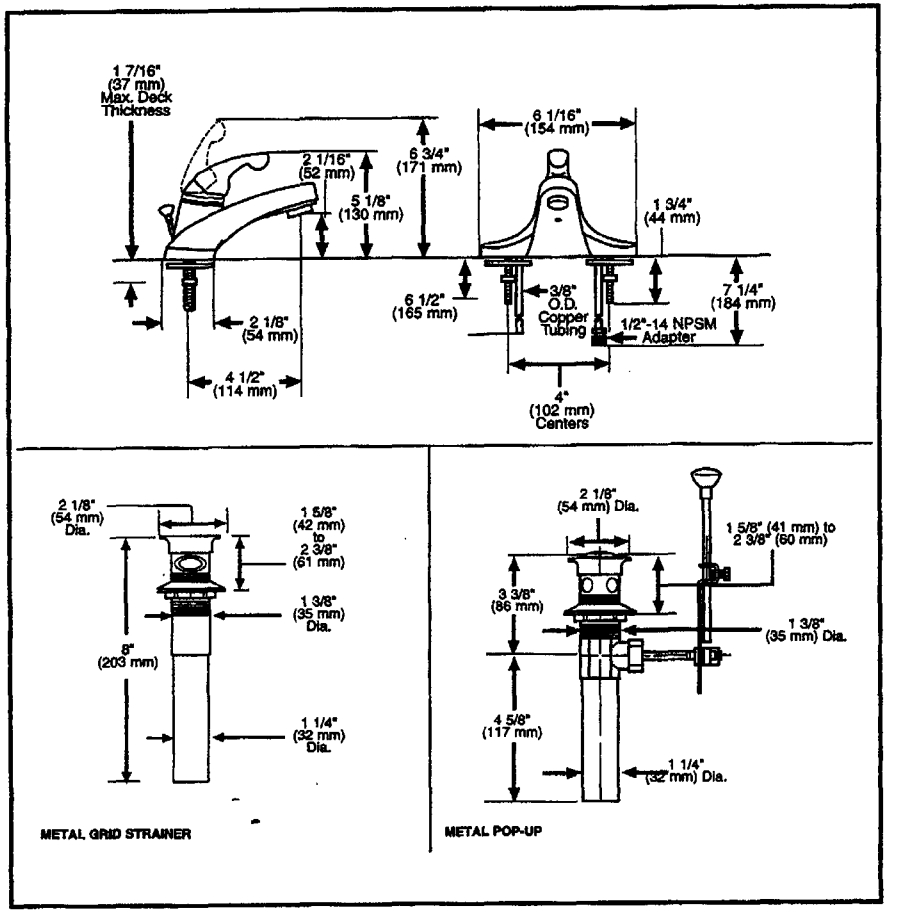
Tract-Pack™ Bath Faucets – Product Specifications

DELTA COMMERCIAL

- Single Handle
- Deck Mount
- 2 & 3 Hole Sink Applications
- 4" (102 mm) Centerset







- **STANDARD SPECIFICATIONS**
- Single handle lavatory deck faucets for mounting on two and three hole sinks.
- 4" (102 mm) centerset.
- Solid brass fabricated body.
- 4 1/2" (114 mm) long spout.
- Vandal resistant aerator or spray outlet.
- Metal grid strainer (523).
- Metal pop-up drain (520).
- Lift Rod Hole (520).
- Vandal resistant lever handle. Red/blue colored graphics indicate hot/cold temperature.
- Control mechanism shall be of the rotating stainless steel ball type with replaceable non-metallic seats operating in stainless steel lined sockets.
- Control handle shall return to the neutral position when valve is turned off.
- Models have 3/8" O.D. copper supply tubes.
- Models with suffix "WF" supplied with 1/2"-14 NPSM adapters.

- **COMPLIES WITH:**
- ASME A112.18.1/CSA B125.1
- ICC/ANSI A117.1/ADA
- IAPMO Listed
- CSA Certified

Inserts

PART NUMBER	DESCRIPTION		SUGG. LIST
060686A	1.9 L/min. (0.5 USGPM) Insert (pkg. of 12)	Spray	31.20
060687A	3.8 L/min. (1.0 USGPM) Insert (pkg. of 12)	Spray	38.45
060688A	5.7 L/min. (1.5 USGPM) Antimicrobial Laminar Flow Insert (pkg. of 12)	Laminar	81.45
060689A	5.7 L/min. (1.5 USGPM) Insert (pkg. of 12)	Aerated	21.50

Outlets

PART NUMBER	DESCRIPTION		SUGG. LIST
060726A	1.9 L/min. (0.5 USGPM) Vandal Resistant Outlet (Female)	Spray	22.65
060666A	1.9 L/min. (0.5 USGPM) Outlet (Female)	Spray	10.55
060667A	1.9 L/min. (0.5 USGPM) Outlet (Male)	Spray	10.55
060667SS	1.9 L/min. (0.5 USGPM) Stainless Outlet (Male)	Spray	38.65
RP31704	1.9 L/min. (0.5 USGPM) Vandal Resistant Outlet (Male)	Spray	20.20
RP31704SS	1.9 L/min. (0.5 USGPM) Vandal Resistant Stainless Outlet (Male)	Spray	47.40
RP31704PB	1.9 L/min. (0.5 USGPM) Vandal Resistant Polished Brass Outlet (Male)	Spray	47.40
060663A	3.8 L/min. (1.0 USGPM) Vandal Resistant Outlet (Female)	Spray	20.70
060566A	3.8 L/min. (1.0 USGPM) Vandal Resistant Outlet (Male)	Spray	20.70
060566SS	3.8 L/min. (1.0 USGPM) Vandal Resistant Stainless Outlet (Male)	Spray	47.40
060566APB	3.8 L/min. (1.0 USGPM) Vandal Resistant Polished Brass Outlet (Male)	Spray	47.40
060664A	3.8 L/min. (1.0 USGPM) Outlet (Female)	Spray	10.55
060665A	3.8 L/min. (1.0 USGPM) Outlet (Male)	Spray	10.55
060941A	3.8 L/min. (1.0 USGPM) Outlet (Female)	Aerated	10.55
060940A	3.8 L/min. (1.0 USGPM) Outlet (Male)	Aerated	10.55
060940SS	3.8 L/min. (1.0 USGPM) Stainless Outlet (Male)	Aerated	36.75
060637A	5.7 L/min. (1.5 USGPM) Antimicrobial Laminar Flow Vandal Resistant Outlet (Female)	Laminar	22.65
060638A	5.7 L/min. (1.5 USGPM) Antimicrobial Laminar Flow Vandal Resistant Outlet (Male)	Laminar	22.65
060638SS	5.7 L/min. (1.5 USGPM) Antimicrobial Laminar Flow Stainless Vandal Resistant Outlet (Male)	Laminar	35.60
060639A	5.7 L/min. (1.5 USGPM) Vandal Resistant Outlet (Female)	Aerated	13.85
060640A	5.7 L/min. (1.5 USGPM) Vandal Resistant Outlet (Male)	Aerated	13.85
060640SS	5.7 L/min. (1.5 USGPM) Vandal Resistant Stainless Outlet (Male)	Aerated	29.15
060641A	5.7 L/min. (1.5 USGPM) Outlet (Female)	Aerated	10.55
060642A	5.7 L/min. (1.5 USGPM) Outlet (Male)	Aerated	10.55
060642SS	5.7 L/min. (1.5 USGPM) Stainless Outlet (Male)	Aerated	36.75

SK-1

15440 2.02

SYMMETRIX®
Single Handle Kitchen Faucet

- ☐ **S-23-3:** With hose and spray mounted on escutcheon
- ☐ **S-23-2:** With hose and spray
- ☐ **S-23-1:** With swivel spray aerator in place of hose and spray
- ☐ **S-23:** Faucet only

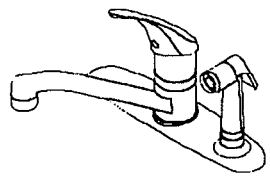
Symmetrix Single Lever Kitchen Faucet with ceramic control components, handle limit stop, and red/blue indicators on handle. 8 3/4" swing spout with aerator, 3/8" supplies, 8" centers, metal construction, polished chrome finish.

Modifications:

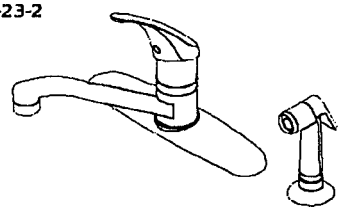
Add:

- ☐ **Suffix LP:** Loop handle
- ☐ **Suffix W:** 6" lever handle
- ☐ **Suffix 10:** 10 7/8" swing spout with aerator
- ☐ **Suffix VP:** Vandal resistant aerator
- ☐ **Suffix IPS:** 1/2" IPS connections
- ☐ **Suffix LST:** 18" copper supply tubes
- ☐ **Suffix BRS:** Radiance® polished brass finish
- ☐ **Suffix AWT:** White finish
- ☐ **Suffix PCB:** Polished chrome and Radiance® polished brass finish

S-23-3

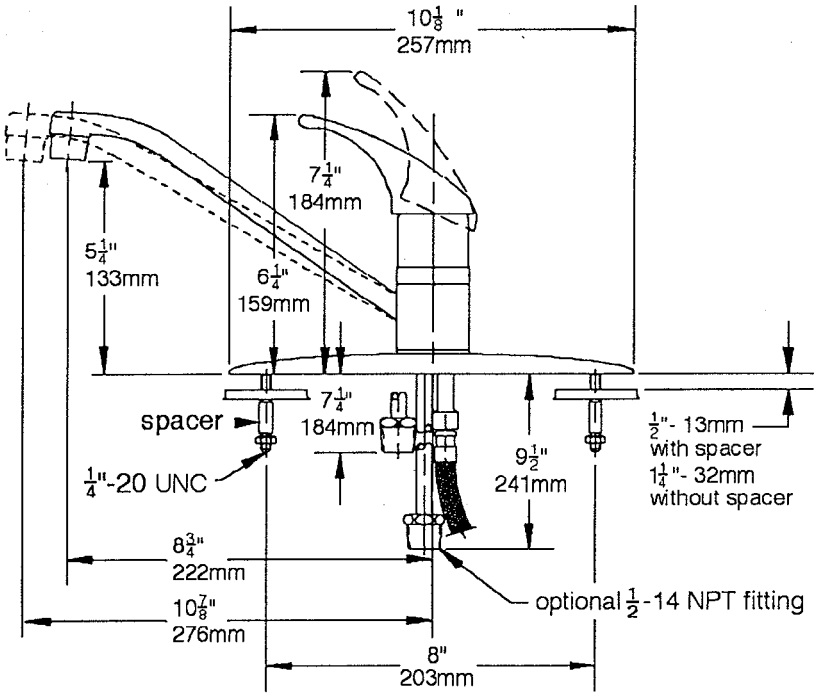


S-23-2



ADA

SYMMONS PRODUCTS MEET ANSI A112.18.1M, EPA '92 AND ALL KNOWN FLOW RATE REQUIREMENTS.
Kitchen and Lavatory Faucets
2.2 GPM (8.3 L/min)



Job/Location

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Engineer

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Contractor

. . . . . .

. . . . . .

For ADA compliance (Americans with Disabilities Act) consult ADAAG or your state regulations for proper product choice and mounting locations.

SYMMONS INDUSTRIES, INC.
31 Brooks Drive, Braintree, MA 02184-3804
TEL: 1-800-SYMMONS, (781) 848-2250 FAX: 1-800-961-9621, (781) 843-3849
Web site: www.symmons.com

Symmons®

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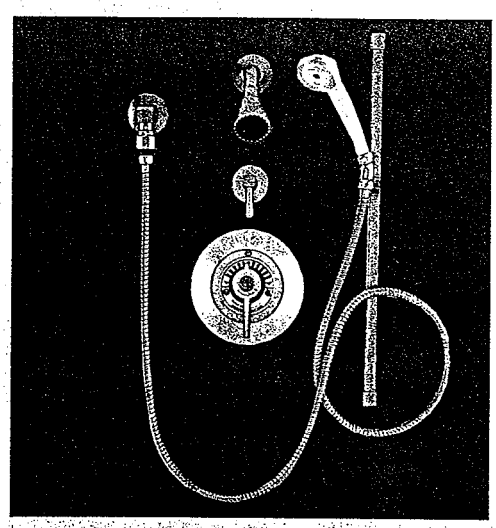
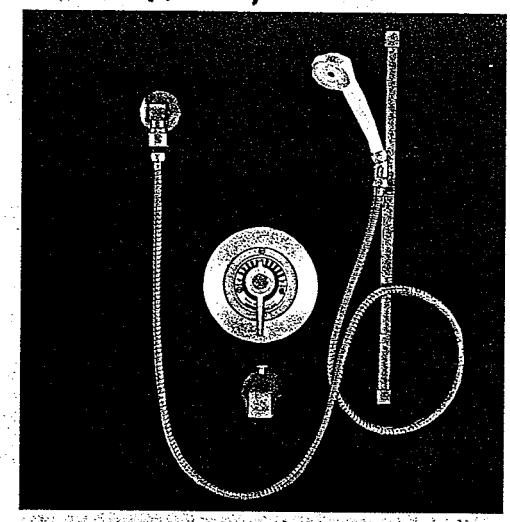
15440
2.02

AQUATROL® 4500 COMBINATIONS

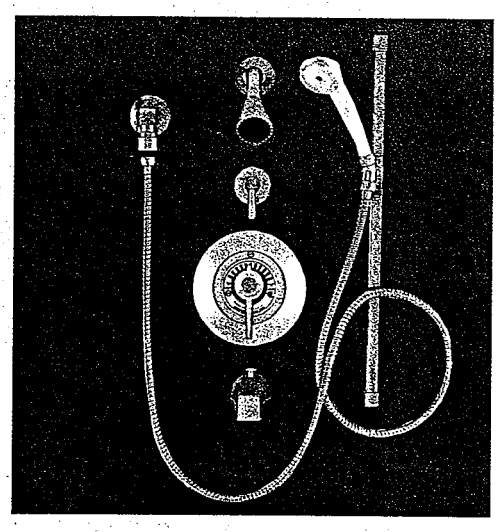
SH-1A



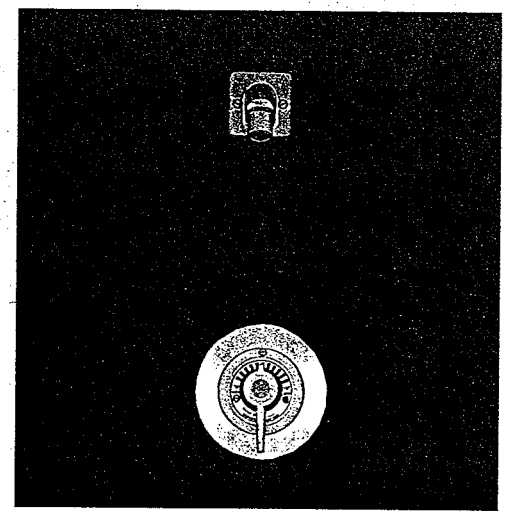
4505: 4500 valve, D-2L inline diverter with lever handle, H-05 head, arm and flange, 501P(G) hand shower, 24" glide bar, inline vacuum breaker, supply elbow
4506: 4500-S, D-2L, H-05, 501P(G)



4507: 4500 valve, D diverter tub spout, 501P(G) hand shower, 24" glide bar, inline vacuum breaker, supply elbow
4508: 4500-S, D, 501P(G)



4509: 4500 valve, D diverter spout, D-2L inline diverter with lever handle, H-05 shower head, arm and flange, 501P(G) hand shower, 24" glide bar, inline vacuum breaker, supply elbow
4510: 4500-S, D, D-2L, H-05, 501P(G)



4511: 4500 valve, H-06 institutional shower head
4512: 4500-S, H-06

OPTIONS

SUFFIX H-03: Brass shower head ball joint, adjustable spray (in place of H-05)
SUFFIX H-06: Institutional shower head (in place of H-05)
SUFFIX AP: Anchor plate with screws for H-06
SUFFIX 501P(G)-30: Hand shower with 30" glide bar in place of wall hooks
SUFFIX 500P: Hand shower with 2 wall hooks in place of glide bar
SUFFIX LessInvb: Less inline vacuum breaker
SUFFIX EVB: Elevated vacuum breaker unit
SUFFIX RV: Reinforced vinyl hose on hand shower
SUFFIX QD: Quick disconnect on hand shower

SH-1A 15440 2.02

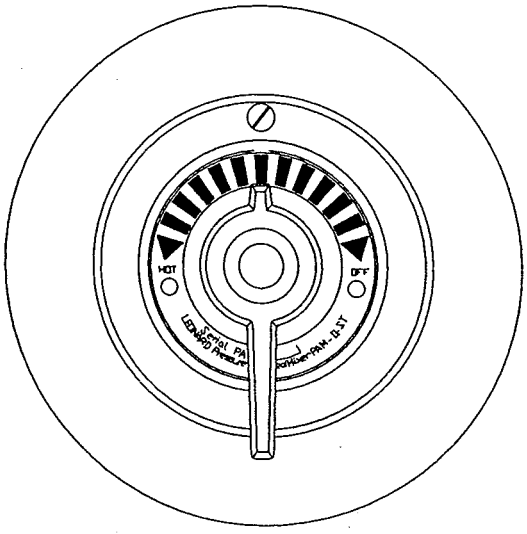
PRESSURE ACTUATED SHOWER VALVES

Submittal Data Sheet S-1051
July, 2000

AQUATROL® 4500

½" inlets, and outlet

SHOWER OR TUB/SHOWER



4500 AQUATROL® Pressure Actuated mixer

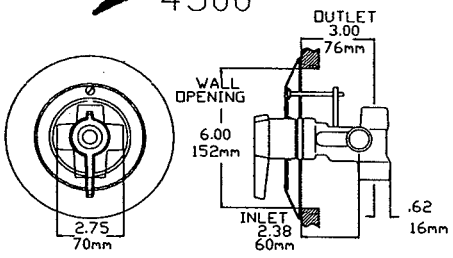
- Durable stainless steel balancing piston to equalize hot and cold supply pressures.
- Built-in shutoff for single handle operation
- Removable one piece upper and lower valve seat
- Internal parts of bronze and stainless steel
- Cast wall flange and lever handle, polished chrome plated
- Maximum operating pressure: 125 PSIG (860KPA)
- Adjustable high temperature limit stop set for 110°F* (43°C)
- Color coded dial, Off through Hot, with directional indicators

ASSE · 1016 Certified
CSA · B125-93 Certified

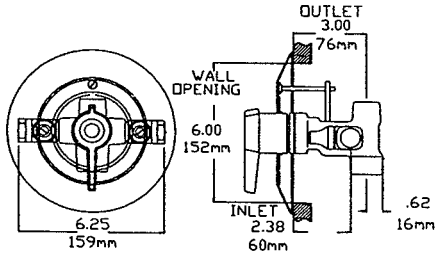
OPTIONS:

__4500-S- Straight stops, IPS connection
__4500-F- Angle checkstops, copper tube connection

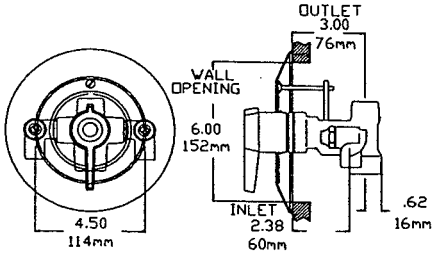
4500



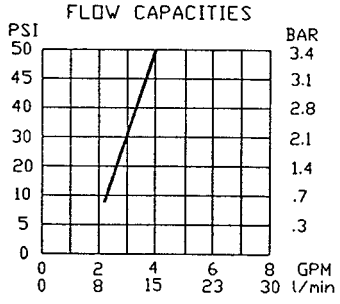
4500-S



4500-F



4500
FLOW CAPACITIES



Job # _____

Arch/Eng. _____

Contractor _____

Engineer's Approval

*NOTE: A limit stop, set for 110°F (43°C), is simply a mechanical setting to prevent excessive handle rotation. If incoming water is hotter than 135°F (57°C), the temperature of the factory test, the valve when turned to full HOT may deliver water in excess of 110°F and the limit stop MUST BE RESET BY THE INSTALLER

LEONARD®
WATER TEMPERATURE CONTROLS
1360 Elmwood Avenue, Cranston, RI 02910 USA
Phone: 401.461.1200 Fax: 401.941.5310
Email: info@leonardvalve.com
WEB SITE: http//www.leonardvalve.com

SH-1A

LEONARD WATER TEMPERATURE CONTROLS

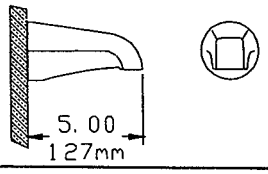
15440 2.02

ACCESSORIES

DIVERTER/TUB SPOUTS

TS

- Tub spout
- 1/2" IPS



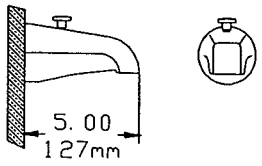
TS

D

- Diverter spout
- 1/2" or 3/4" IPS

D(BR)

- Diverter spout
- 1/2" or 3/4" IPS
- Brass construction



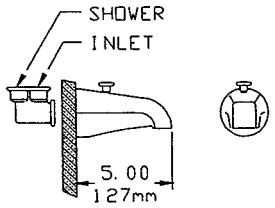
D

D-1

- Diverter spout, 3/4" IPS
- Twin Elbow

D-1(BR)

- Diverter spout, 3/4" IPS
- Brass construction
- Twin Elbow

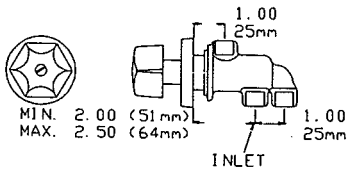


D1

DIVERTER VALVES

D-2

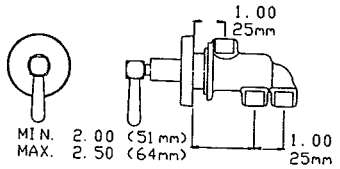
- Inline diverter valve
- Exposed parts, polished chrome plated
- 1/2" copper tube connections



D-2

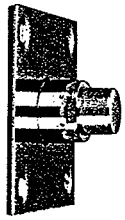
D-2L

- As above with lever handle



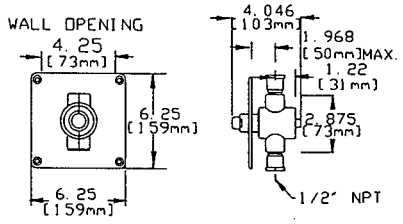
D-2L

METERING VALVES



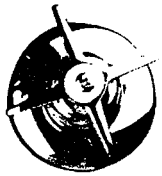
LV-477B

- Concealed metering valve
- Pushbutton activation
- Fixed cycle, 30 seconds
- Exposed parts, chrome plated
- 1/2" MIPS connections



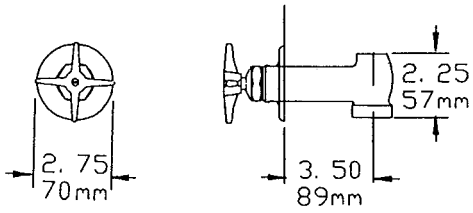
LV-477B

CONCEALED ON/OFF VALVES



770

- Concealed compression type volume control on/off valve
- Four arm handle
- Exposed parts, chrome plated
- 1/2" IPS connections



770

Printed in U.S.A.

SH-1A

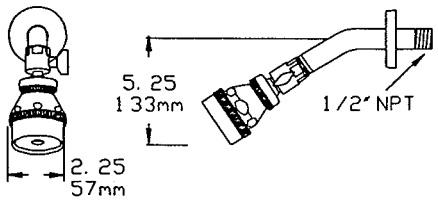
SUBMITTAL SHEET S-1110
October 1995

ACCESSORIES

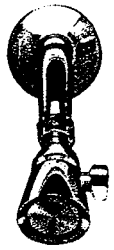
15490 2.02
SHOWER HEADS

H-01(AC-11)

- Brass shower head
- Volume control
- Ball joint
- Arm & flange
- 2.5 GPM (9.5 L/min) max. flow rate

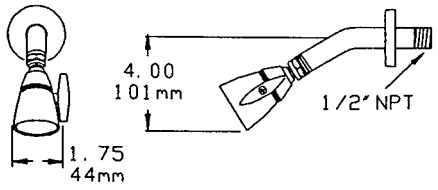


H-01



H-02

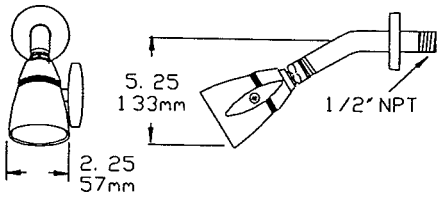
- Brass shower head
- Adjustable spray
- Ball joint
- Arm & flange
- 2.5 GPM (9.5 L/min) max. flow rate



H-02

H-03

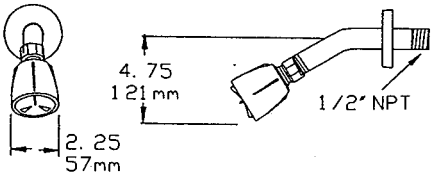
- Brass shower head
- Adjustable spray
- Ball joint
- Arm & flange
- 2.5 GPM (9.5 L/min) max. flow rate



H-03

H-05

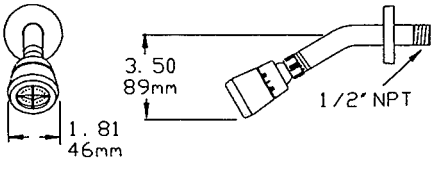
- ABS shower head
- Brass ball joint
- Adjustable spray
- Arm & flange
- 2.5 GPM (9.5 L/min) max. flow rate



H-05

H-16

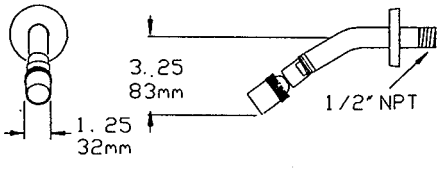
- ABS shower head
- Ball joint
- Arm & flange
- 2.5 GPM (9.5 L/min) max. flow rate



H-16

C-10-2S

- Brass shower head
- Ball joint
- Arm & flange
- 2.0 GPM (7.6 L/min) max. flow rate



C-10-2S

OPTIONS

☐ SUFFIX V - Separate volume control, lever adjustment

☐ SUFFIX CFL - Cast flange with set screw

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WATER TEMPERATURE CONTROLS
1360 Elmwood Avenue, Cranston, RI 02910 USA
Phone: 401.461.1200 Fax: 401.941.5310

ENERGY & ATMOSPHERE: PREREQUISITE 1
EXISITING BUILDING COMMISSIONING

1. LEED-EB template
2. Letter confirming MBCx of E2
3. Enovity Commissioning Proposal
4. MBCx Task Schedule

(Responsible Party)

I, Jim Dunne , declare to USGBC that the following best practice commissioning procedures outlined below have been implemented, calibrated, and are operating as intended or a contract is in place to implement them.

Option A

☐ Comprehensive existing building commissioning has been carried out that includes the following procedures:

Completed	Under Contract	
☐		A comprehensive building operation plan has been developed that meets the requirements of current building usage, and addresses the heating system, cooling system, humidity control system, lighting system, safety systems and the building automation controls.
☐		A commissioning plan has been prepared for carrying out the testing of all building systems to verify that they are working according to the specifications of the building operation plan.
☐		The commissioning plan has been implemented and all results have been documented.
○	○	All systems components that are found to not be working according to the specifications of the building operation plan have been repaired or upgraded.
○	○	All building components that required repairs or upgrades have been re-tested to verify that they are working according to the specifications of the building operation plan

I have provided the following documentation to support the declaration under Option A:

☐ A narrative summary of the current building operation plan that highlights major building systems and assemblies.

☐ Documentation that all actions in the requirements above have been completed

Option B

☒ A 1-5 year plan has been submitted for continuous improvement of the aspects of commissioning requirements above until all aspects in Option 1 above have been completed.

I have provided the following documentation to support the declaration under Option B:

☒ A 5-Year Plan that includes a schedule of annual actions that will be implemented in order to complete all actions in the requirements above within 5 years including implementation of all low cost and no cost measures in the first 2 years of the program.

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Prerequisite 1: Existing Building Commissioning Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	5-21-08	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

May 6th, 2008

To: US Green Building Council- LEED-EB Program
Re: Documentation for EA PreReq1: Existing Building Commissioning for E2-UCSC

This letter is to confirm that UCSC Physical Plant has authorized Enovity, San Francisco, CA, to conduct Monitoring Based Commissioning Program (MBCx) on Engineering 2 building.
Please see attached Enovity proposal, scope of work, and methodology. This project is underway, also attached is 3-31-08 Task Schedule.

I'm available for any questions,

James Dunne
Project Manager- E2 LEED-EB Submittal
Associate Director-UCSC Physical Plant

Proposal

FOR
MONITORING BASED BUILDING COMMISSIONING (MBCX)
FOR
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
SOCIAL SCIENCES II
&
ENGINEERING II

Prepared for:

Patrick Testoni
Energy Analyst
University of California, Santa Cruz
Physical Plant
1156 High Street
Santa Cruz, CA 95064

Prepared by:

Jonathan Soper, P.E., Principal

The Hearst Building, Suite 320
5 Third Street
San Francisco, CA 94103-3299
(415) 974-0390 (v)
(415) 974-0399 (f)

September 26, 2007

TABLE OF CONTENTS

1.0 INTRODUCTION

Enovity, Inc. is pleased to present this Proposal to perform Monitoring-Based Building Commissioning (MBCx) for the University of California, Santa Cruz (UCSC).

MBCx is a long-term process to identify and implement low-cost operational and maintenance improvements for campus buildings and plant energy systems. MBCx utilizes remote metering/monitoring capabilities and diagnostic protocols to achieve and continuously maintain a high level of system performance. If successfully executed and with properly-trained campus personnel, this MBCx project should result in initial and sustainable energy and operational savings at UCSC. The benefits include:

- new information about campus building and central systems' performance
- the application of diagnostic protocols
- correct potential inefficiencies in building and plant system operations
- realize energy and operational savings from resulting operational improvements
- develop a program for re-commissioning of systems to ensure persistence of savings

1.1 Summary of Enovity Strengths

Enovity is an industry leader in commissioning, re-commissioning and retro-commissioning in California, with a history of successfully completed projects for public sector, private sector and utility clients. Experienced also in retro energy design consulting, Enovity is unique as a licensed General Engineering and Electrical Contractor and as a provider of facility operations, maintenance and repair (OM&R) services to the Federal government at the largest Federal courthouse and office building in the Western U.S as well as at the innovative New San Francisco Federal Building.

Enovity offers a unique blend of capable professionals, experienced in building HVAC systems equipment performance, systems troubleshooting and diagnostics, equipment maintenance and repair, construction management, measurement and verification of energy savings, and evaluations of building retrofit opportunities leading to energy and operational savings. The Enovity personnel available for this work bring requisite experience and complementary skills to ensure the success of the MBCx Program activities at UCSC.

Enovity, Inc. is fully licensed and insured and we stand ready to execute a contract for this work.

Here are a few of the reasons why we believe Enovity is uniquely qualified for this work:

1. Leader in commissioning and retro-commissioning of buildings;
2. Successful completion of the Fackler Condensing Plant Commissioning Project for UC Santa Cruz in 2005/06; this project established our excellent working relationship with UC Santa Cruz;
3. Experienced with end-use metering and measurement and verification (M&V) for building energy retrofits;
4. Experienced with UC Campus buildings and relevant HVAC system types;
5. Experienced in energy evaluations of building improvements;
6. Experienced in design, specification, installation, commissioning, maintenance and trouble-shooting of building automation systems (BAS), including BACnet™ and enterprise level automated control solutions;
7. Industry provider of energy planning; construction management; and facility operations, maintenance, troubleshooting and repair (OM&R) services;
8. Licensed, bonded and insured as a General Engineering Contractor & Electrical Contractor;

3.0 SCOPE OF WORK

3.1 Description of Project

There will be two monitoring based commissioning projects:

1. Social Sciences II
2. Engineering II

.

3.2 Project Goals

The UC/CSU/IOU Energy Efficiency Partnership Program for Monitoring-Based Commissioning has established goals and milestones for the 2007/08 activities for the MBCx program. They are:

1. Execute and complete the MBCx Plan and Monitoring Plan prior to December 31, 2008
2. Identify MBCx energy savings at campus facilities and demonstrate that they are achievable and cost effective
3. Significantly increase campus energy metering/monitoring capability
4. Improve level of MBCx expertise on campus
5. Significantly improve campus's ability to apply best practices to MBCx initiatives, and where possible, advance MBCx industry best practices

3.3 Summary of Tasks and Deliverables

This section lists the major project milestone tasks, shown in relative chronological sequence, that will be completed for each phase of the project.

Phase 1: Planning Phase

Task	Description
1.1	Convene Kickoff Meeting
1.2	Develop MBCx Findings Log Template
1.3	Conduct Initial Site Assessment
1.4	Define Operational Requirements
1.5	Catalog Known Issues and Improvement Opportunities
1.6	Identify Available and Missing Documentation
1.7	Define Monitoring Objectives and Requirements
1.8	Develop MBCx Plan (Planning Phase)
1.9	Develop Measurement and Verification Plan
1.10	Present Plans to the MBCx Project Team
1.11	Update MBCx Findings Log
1.12	Prepare and Submit Draft MBCx Report (Planning Phase)

Phase 2: Pre-Investigation Phase

Task	Description
2.1	Conduct Preventative Maintenance Activities
2.2	Evaluate Existing Monitoring Systems
2.3	Calibrate Sensors (Support Only)
2.4	Upgrade EMCS or Install Monitoring Equipment (Support Only)
2.5	Setup Trends and Data Collection Routines (Setup Trends: Support Only)
2.6	Collect Sample Data (Support Only)

2.7 Assess Data Quality (Fix Data Problems: Support Only)
2.8 Prepare for Data Analysis
2.9 Update MBCx Findings Log
2.10 Update and Submit Draft MBCx Report (Pre-Investigation Phase)

Phase 3: Investigation Phase

Task	Description
3.1	Update and Submit MBCx Plan (Investigation Phase)
3.2	Collect Baseline Data
3.3	Analyze Data
3.4	Establish a Baseline
3.5	Functional Performance Testing: (Perform/Witness: Support Only)
3.6	Evaluate Improvement Opportunities and Provide Recommendations
3.7	Update and Submit Draft MBCx Report (Investigation Phase)
3.8	Present Draft MBCx Report

Phase 4: Implementation Phase

Task	Description
4.1	Update and Submit MBCx Plan
4.2	Implement Selected Improvements (Support Only)
4.3	Verify EMCS Updates (Support Only)
4.4	Verify Improved Operation (Support Only)
4.5	Document Remaining Improvement Opportunities
4.6	Update MBCx Findings Log
4.7	Update and Submit Draft MBCx Report (Implementation Phase)

Phase 5: Handoff Phase

Task	Description
5.1	Update and Submit MBCs Plan (Support Only)
5.2	Develop Ongoing Diagnostic Tests
5.3	Provide Training
5.4	Develop O&M Plan (Support Only)
5.5	Verify Benefits at Conclusion of Commissioning and Estimate Operating Savings
5.6	Establish a New Baseline
5.7	Update MBCX Findings Log
5.8	Update Draft and Submit Final MBCx Report
5.9	Develop MBCx Systems Manual

Phase 6: Project Oversight

Task	Description
6.1	Facilitate MBCx Meetings
6.2	Submit Progress Reports

3.4 Detailed Scope of Work

This section provides a detailed description of the tasks for each phase of the project.

3.4.1 Phase 1: Planning Phase

In the initial Planning Phase, Enovity will perform the background activities required to prepare the initial MBCx Plan and Measurement and Verification (M&V) Plan that are the critical elements of the project. Background activities will include a kickoff meeting and an initial site walkthrough assessment to observe condition of equipment, operational issues (comfort complaints, IAQ issues, maintenance and noise problems), BAS trending capability, and general operating criteria. We will review operations logs, point lists and all other relevant data as part of the initial site assessment. As-built drawings and specifications will be reviewed and cataloged and O&M Manuals, TAB reports, design intent document(s) and documented energy operating strategy information will be collected. Complete records of historical electricity and natural gas usage (monthly, annual utility bill data), together with electric interval data (15-minute demand data), will be collected and processed for the site. The team will develop a complete site-verified HVAC equipment list, with nameplate data, equipment condition, and equipment status. Enovity will catalogue this information for later report deliverables.

Enovity staff will interview O&M personnel regarding potential energy measures and operational improvements and will discuss technologies and strategies appropriate for the work. During this phase an MBCx Findings Log Template will be developed for use during subsequent phases.

An initial MBCx Plan will be developed that includes a detailed outline of the tasks, schedule and project deliverables. In preparing the Plan, Enovity will identify the monitoring objectives and constraints that include the required points to be monitored, data accuracy and frequency, and data analysis methodology. The MBCx Plan will focus on the current BAS point list and trend capabilities, to be supplemented with additional points that may be installed to facilitate the continuous commissioning required of the contract. The full complement of points will be employed to diagnose operational problems, identify opportunities for HVAC system improvements, and validate the results of Functional Performance Tests.

Enovity will develop an M&V Plan that will be based on the *International Performance Measurement & Verification Protocol (IPMVP), October, 2002, Option B.* The Plan will identify equipment to be monitored, monitoring devices, duration of monitoring, schedule, format of results, and correlation parameters of measured results. Types of savings to be measured include energy savings and those associated with equipment maintenance.

3.4.2 Phase 2: Pre-Investigation Phase

The Pre-investigation Phase includes evaluation and testing of existing BAS and monitored points, sensor calibration, specification, installation and commissioning of additional monitoring equipment, sample data collection methods, evaluation of data quality, and establishment of commissioning protocols.

As part of this work, Enovity will perform a survey of all systems to determine if there are maintenance procedures that must be completed prior to the Investigation Phase. A Deficiency List will be developed for actionable items that may include additional sensors required for the MBCx program, sensor calibration, disabled or non-functioning equipment, and additional equipment and devices that can be repaired in a timely fashion. Enovity will develop a specification for the additional control points and/or metering devices that will be installed as part of this work. We will provide technical support to the campus for procuring, installing, and commissioning these items, but their cost and installation will be the responsibility of the campus.

Enovity will set up BAS trends and will perform short-term monitoring to confirm sampling and downloading of equipment and data transfer protocols, likely on a weekly basis. It is anticipated

that this activity will be performed remotely so that subsequent monitoring activity can be sustained without costly site visits. Once tested and data integrity has been confirmed, we will collect and process at a minimum one day's worth of data. Data processing will include confirmation of usability of the data for energy benchmarking and verification activities.

Once the trending and monitoring procedures have been established and the data integrity confirmed, Enovity will prepare the commissioning protocols and calculation methodology that is consistent with the M&V Plan. Sample charts and datasets will be assembled for use during the Investigation Phase.

3.4.3 Phase 3: Investigation Phase

Establishment of the performance baseline, functional performance testing, and evaluation of improvements will be performed in the Investigation Phase.

Enovity will prepare the baseline utilizing data collected from the site. A customized energy model will be developed for the baseline. Model routines will be based on ASHRAE calculation procedures and may be facilitated by building simulation (DOE-2). Models will be calibrated against historical electricity and natural gas usage (monthly, annual utility bill data), electric interval data (15-minute demand data), and trend data.

Functional test protocols will be developed specifically for this project. These will be prepared in electronic format, allowing the user to input site data and generate compliance and acceptance lists in the field. Test procedures will be developed using protocols previously by Enovity, and additionally may be based on the Model Commissioning Plan and Guide Specifications (PECI), FEMP Continuous Commissioning Guidebook, and the Retro-Commissioning Handbook for Facility Manager, Oregon Office of Energy (PECI).

Enovity will witness the functional testing activity and will provide technical support to the University's project team. Enovity will collect data during the testing phase and will analyze the results for potential systems improvements. Improvement strategies, measures, and sequences will be analyzed for potential energy and maintenance cost savings, while implementation costs will be estimated and constructability issues addressed. The implementation list will be completed and organized, prioritized by cost, and will be based on estimated sustainable savings. The draft MBCx Report will be updated for review and discussion by the UCSC.

3.4.4 Phase 4: Implementation Phase

Recommended and approved improvements will be implemented during this phase. Enovity will not be responsible for the labor or materials cost of these changes but will provide assistance and technical support in overseeing and verifying the completion of this work. It is anticipated that no extensive repairs will be completed but that there will be improvements to control programming, sequences, and other operational performance criteria.

Once the improvements are implemented, Enovity will perform a review of the revised points list, sequences and control graphics, will inspect equipment, and will verify that the systems are ready for re-verification of functional tests.

Enovity will witness and oversee the final functional verification tests and trend data to document improved performance and will provide technical support to the University's project team.

Enovity will provide a list of remaining improvements that have not been implemented, along with probable costs to complete these measures.

3.4.5 Phase 5: Handoff Phase

Enovity will work closely with campus staff throughout the project to provide training on all aspects of the continuous commissioning process, with an emphasis on tracking on-going operational performance, assess on-going opportunities, and documenting persistence of savings. At the conclusion of the project, Enovity personnel will facilitate formal training on operation and maintenance procedures related to the commissioning effort, monitored points, systems diagnostics in place, and collection and analysis of trend data.

Enovity will work with the campus staff to update the O&M Manual that will include ongoing trending and future re-commissioning efforts. A MBCx Systems Manual will be completed by Enovity.

Enovity will use the M&V Plan developed for this project to verify and document the operating savings achieved by the implemented measures. The energy performance baseline will be updated and the MBCx Report will be finalized.

3.4.6 Phase 6: Project Oversight

Enovity will be onsite monthly for regular meetings with the campus MBCx team. Other project administrative activities will be performed by the Enovity project manager; these may include meeting minutes, project schedule updates, email correspondence, and other project deliverables.

4.0 APPROACH

4.1 Methodology, Tools and Processes

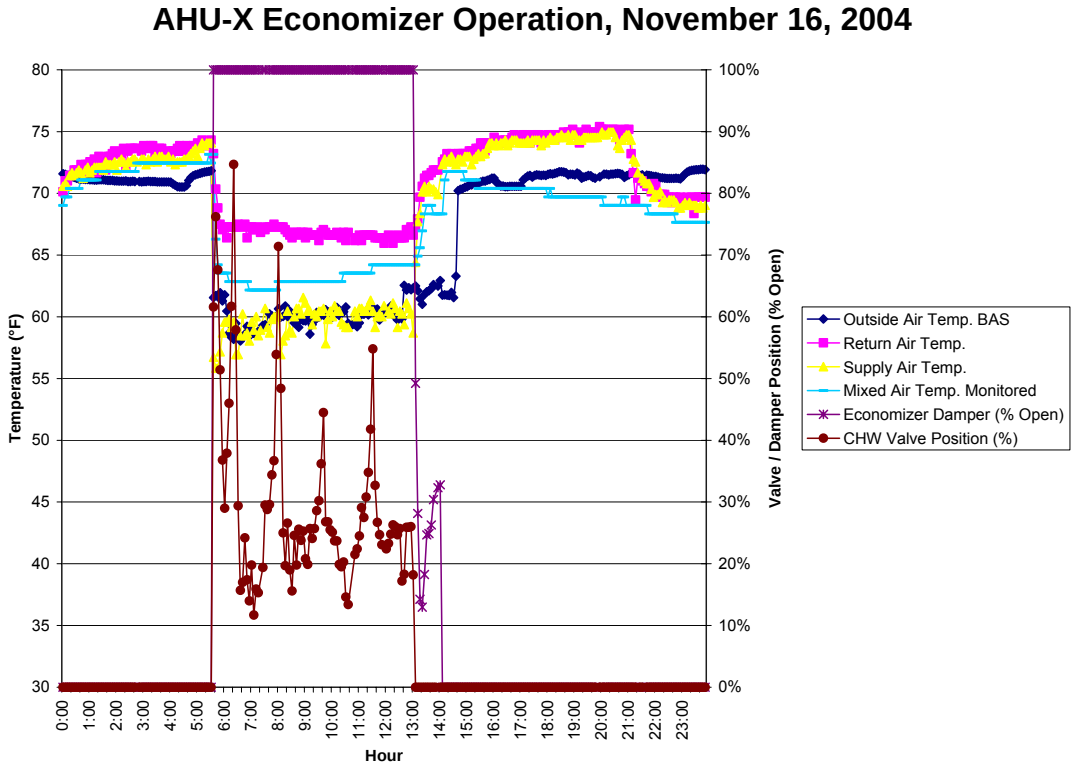
Enovity will largely use BAS trend datasets to diagnose system faults, to verify corrective measures, and to collect systems data that can be used in the energy savings calculations. Our understanding is that the Engineering II Building has a virtually new Honeywell system so trending should be straightforward. The trending capabilities of the Honeywell system serving Social Sciences II is uncertain at this time, but will be determined during the Planning Phase.

For the past ten years, Enovity principals have been using graphical tools as the basis of BAS trend datasets so that plots can be developed for visualization of systems performance. Typically a graph will show from 4 to 10 separate but interrelated points on a single chart plotted against time. Enovity has developed a variety of typical plot types based on system types that can be used directly for this project. Enovity staff has the capability and experience to interpret this data, recommend corrective action, and re-populate the dataset with information from the site following measure implementation for the verification activity.

There are two steps involved in this process. The first step includes setting up the BAS trends, confirming that points are being collected and stored properly, and organizing the datasets into a clean and usable format once all the data has been collected. The second step is to plot the information, interpret the data, find the faults, devise the corrective action, and re-populate the dataset with site data reflecting the altered building.

Once all faults have been corrected and their performance verified, Enovity can set up a semi-automated tool that will assist in verifying the system performance over a longer period of time. This tool will allow UCSC O&M staff to access and visualize data over a longer period of time for continuous commissioning of systems. The tool would be a spreadsheet tool that would allow facilities staff to take trend data from the BAS and drop the data into a spreadsheet that will have automated graphs set up for specific points so that system performance can be checked.

Examples of this methodology from recent Enovity projects are shown below:

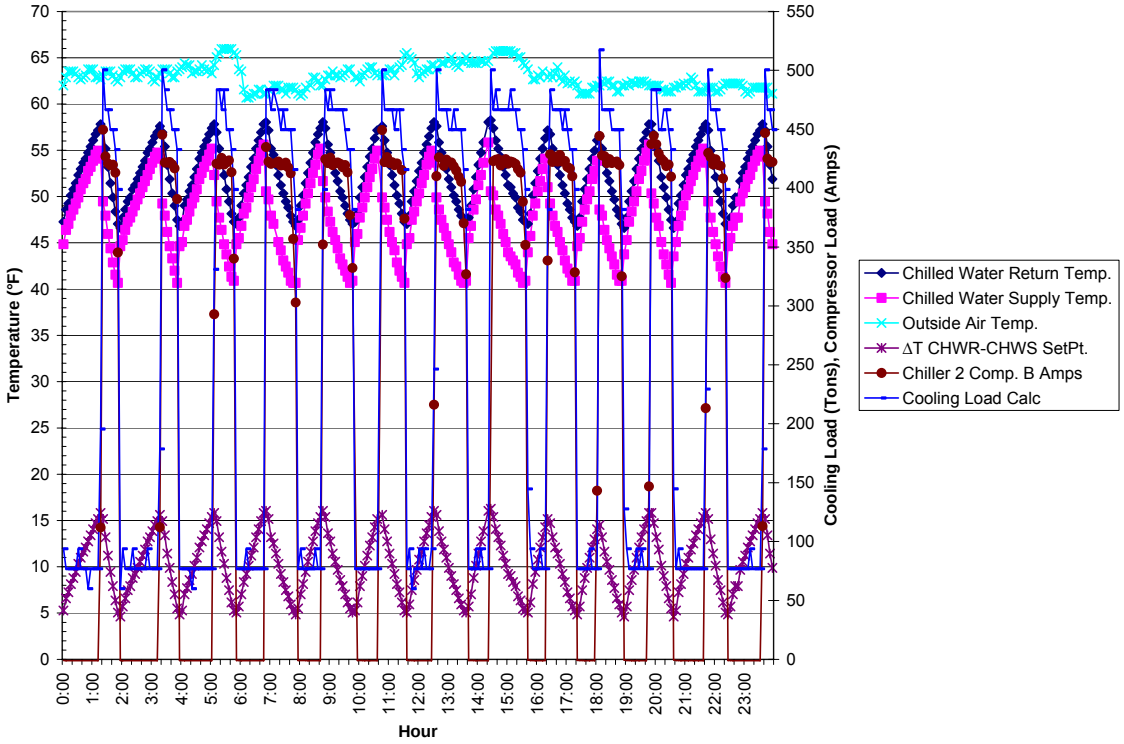


The example above shows damper positions for AHU-X when the unit was supposed to be operating in full economizer mode. The pneumatic actuators are not stroking the return damper fully closed and the return damper fully open. During the survey it was verified that the damper position is following the signal generated by the building automation system (BAS) indicating a mechanical problem. It was found the pneumatic actuator linkages are out of calibration and do not stroke through the full 90° range of damper motion.

Corrective Action
Calibrate OAT sensor in the mechanical room housing the air handling units.

Another example is shown below.

Chiller 2 Operation, November 14, 2004



The figure above shows the operation of chiller #2 during a 24 hour period on 11/11/04, a typical mild day. The figure shows one compressor cycling On/Off to bring the chilled water supply temperature down to 42°F. This cycle repeats 13 times throughout the day. The lead chiller enable signal is the temperature difference (ΔT) between the chilled water return (CHWR) and the chilled water supply setpoint (CHWS) of 42°F. The chiller was enabled at a ΔT > 15°F and disabled at a ΔT < 6°F. The lead enable signal is manually adjusted upwards to a max of 20°F by building engineers to keep the chillers off longer when ballroom and meeting room occupancy is low.

Spot readings of the CHWS temperature showed the BAS trended value is reading above the correct CHWS temperature by 1.2°F. The chiller is set to make 42°F water and the BAS reads 40.8°F water.

Corrective Action

It is recommended that the each chiller compressor be demand limited to 60% to operate at the best efficiency point and allowed to operate for a longer period of time. Analysis assumed an efficiency profile for the chiller compressor based on similar older 19D series R-11 Carrier chillers. The assumed efficiency for one compressor at 100% is 0.700 kW/ton and 0.545 kW/ton at 60% load. Energy savings result from operating at a lower kW/ton and comfort savings result from operating at reduced chilled water temperatures on average. There are also fan energy savings on the air handler; the VFDs on the supply fans will ramp down with the lower supply air temperature that can be achieved with consistently available CHW at 42-45°F.

Stand Alone Monitoring Equipment

Enovity has a large amount of experience with the use of data loggers (flow, electrical demand, temperature, pressure, humidity) to collect system performance data where a BAS cannot provide all the required data. As part as the initial evaluation process Enovity will determine the need for permanently installed monitoring equipment and will be able to recommend the appropriate type of instrumentation.

Add Alternate for Long Term Diagnostics

Enovity can also offer a more formalized tool for long term diagnostics called Performance and Continuous Re-commissioning Analysis Tool (PACRAT), but there would be an additional cost associated with this. This is presented as Add Alternate 2 in Section 7.

PACRAT works by mining trend data from the BAS and processing that data through pre-programmed routines. A separate PACRAT model is established for each major piece of mechanical equipment: air handlers, chillers, chilled water distribution loops. Each PACRAT model is set up to receive trend data from selected points. For example, an air handler PACRAT model may be set up to receive outside air, return air, mixed air, supply air, chilled water valve position, static pressure, VFD speed, and supply air CFM. There are standard routines for typical HVAC equipment such as air handlers, chillers and boilers. Examples of standard routines include recognition of sensors that are out of calibration, hunting control loops, non-functioning economizer dampers. Customized routines can also be programmed into each PACRAT setup to identify specific faults; examples may include monitoring of a specific supply air reset sequence or optimum start sequence. PACRAT has in-built calculators that determine the energy cost penalty associated with a given fault or deficiency. PACRAT analyzes the trend data over time and will generate deficiency reports automatically at regular intervals.

4.2 Energy Savings Calculations

Calculation of energy measure savings will be facilitated using computer modeling, spreadsheet analysis (weather bin datasets), or both. UCSC project evaluations will rely on site-specific HVAC equipment survey data, building operational data, BAS trend data, and stand-alone monitoring to demonstrate benchmark (baseline) HVAC systems operating efficiency and energy end use profiling. Field data will be used directly in the calculations for estimates of HVAC equipment energy contributions to the utility bill. Computer models if employed will be 'calibrated' (adjusted) to all available data, including weather; BAS trend and/or monitored data will be used to refine the modeling parameters to re-confirm the baseline condition. Energy savings for individual HVAC measures will be calculated so that accurate payback calculations can be developed. These calculations will also aid the energy benchmarking activity, providing the level of energy reporting detail required by the program.

4.3 Training

Enovity staff will provide in depth training to the UCSC operations and maintenance (O&M) personnel on all aspects of the changes and improvements that are recommended for the facility. Enovity staff will also discuss all recommended changes to systems operations with the O&M staff, and ask for feedback; O&M staff will likely have valuable input into the process.

5.0 QUALIFICATIONS AND EXPERIENCE

5.1 Relevant Project Profiles

This section provides detailed project descriptions that are relevant to the scope of work.

1. **2006-2008 Enovity CPUC-funded 3rd Party Persistence-Based Commissioning Program for Existing Buildings – PG&E Territory**
   Enovity designed and is currently implementing a Monitoring-Based Persistence Retro-commissioning (MBPCx) Program in the PG&E service territory. This CPUC-funded $1.5 million state-of-the-art program focuses on the use of a building's Building Automation System (BAS) to track the ongoing performance of HVAC systems and facilitates the reporting and correction of deviations from optimal performance in a timely manner. The advantage of MBPCx over traditional Utility-sponsored retro-commissioning programs is that it provides a mechanism for ensuring that energy efficiency measures are sustained and that new or recurring equipment problems are identified continuously. The Program goals are 4 million square feet of commercial (office, retail, hotel, hospital, college/university, high tech office/lab/manufacturing) facilities with the ultimate goal of achieving 4.38 million kWh and 61,300 therms of annual energy savings. Projects include:
   - Department of Health Services Richmond Laboratory
   - Peckham Federal Building, San Jose
   - Shea GSA Federal Office Building, Santa Rosa
   - US Geological Survey Laboratory and Office Campus, Menlo Park
   - National Archives, South San Francisco
   - State Office Building, San Francisco
   - Four Marriott Hotels

2. **Monitoring-Based Commissioning Program (MBCx) for U.C.**
   Enovity completed Monitoring-Based Commissioning at U.C. Santa Cruz in early 2006. The UCSC project involved MBCx protocols for continuous commissioning of the 3,375-ton Fackler Condenser Water Plant that provides condenser water to six separate buildings through a complex distributed pumping array. Enovity utilized remote metering/monitoring and diagnostic protocols. The monitoring plan called for control data trending and stand-alone dataloggers to monitor temperatures of the secondary loop and the open and closed loop for each cooling tower, outside air temperature and relative humidity, and flow rates of the open and closed loop from each tower and the secondary loop. Power monitoring was taken from the Honeywell Excel Plus EMCS.

   Contact: Patrick Testoni, Project Manager
   Physical Plant/Energy Management, Heat Plant, UC Santa Cruz
   1156 High Street, Santa Cruz, CA 95064
   (831) 459-2243 voice (831) 459-3186 fax testonip@ucsc.edu

3. **Monitoring-Based Commissioning for Federal GSA**
   Enovity is currently providing Monitoring-Based Commissioning at the Phillip Burton Federal Courthouse and Office Building in San Francisco. Enovity is using PACRAT (Performance and Continuous Re-commissioning Analysis Tool) to provide continuous commissioning of building HVAC systems at this 1.4 million square foot building. Enovity is also contracted to provide complete OM&R services at this facility, with scope of services that include maintenance of building structure, HVAC, electrical, lighting, controls, plumbing, fire/LS, elevators, and special systems.

   Contact: Mark Levi, GSA Federal Region 9 Energy Manager
   450 Golden Gate Ave., 4th Floor East, San Francisco, CA 94102
   (415) 522-3374 voice, (415) 522-3311 fax, mark.levi@gsa.gov

4. **2007-2008 Retro-commissioning State of California Facilities, DGS State of CA**
   Enovity is currently committed to retro-commission three facilities totaling 910,000 square feet of

State of California facilities in California for the Department of General Services. The objectives are to verify and document that the building equipment and systems are working according to the desired sequences of operation; improve space comfort, indoor air quality and increase tenant satisfaction; and reduce energy usage through tune-up activities, control system adjustments, sequence optimization and fixing system deficiencies. The following are being retro-commissioned:

- Attorney General's Building, Sacramento
- Department of Justice Building, Sacramento
- Energy Commissioning Building, Sacramento

5. **Retro-commissioning of the State of California DGS Office Building (Ziggurat)**
Enovity is currently retro-commissioning the State of California's DGS Headquarters building (the Ziggurat), and will provide incentives for up to $100,000 of energy saving implementation projects at the facility. Funding for the project is Enovity's own PG&E-sponsored, CPUC rate-payer funded Innovative Energy Efficiency Partnership Program for State Leased Facilities, which targets state of California leased facilities for energy efficiency improvements and retro-commissioning measures that are cost effective and help to meet the intent of EO S-20-04. Incentives include $0.105/kWh saved and $0.527/therm, with audit and detailed investigation services provided at no cost by Enovity. This retro-commissioning work will also help the facility with its goal of achieving a LEED Existing Building (EB) certification.

6. **Retro-commissioning Sierra College, Grass Valley Campus**
Enovity is retro-commissioning the 70,000 square foot nine-building Sierra College Grass Valley Campus. The objectives are to verify and document that the building equipment and systems are working according to the desired sequences of operation; improve space comfort, indoor air quality and increase tenant satisfaction; and reduce energy usage through tune-up activities, control system adjustments, sequence optimization and fixing system deficiencies. Enovity has already completed a campus-wide controls assessment report for Sierra College.

7. **2006-2007 Retro-commissioning State of California Facilities, DGS State of CA**
Enovity retro-commissioned 1.16 million square feet of State of California facilities in California. The objectives were to verify and document that the building equipment and systems are working according to the desired sequences of operation; improve space comfort, indoor air quality and increase tenant satisfaction; and reduce energy usage through tune-up activities, control system adjustments, sequence optimization and fixing system deficiencies. The retro-commissioned projects include:
   - CDCR Medical Facility, Vacaville
   - California Highway Patrol Academy, West Sacramento
   - CDCR Medical Clinic, San Quentin Prison
   - Department of Health Services Richmond Laboratory

   Contact: Howard Sacks, Program Manager, Department of General Services
   707 3rd St., Suite 4-330, West Sacramento, CA 95605
   (916) 376-1794 voice (916) 375-4909 fax howard.sacks@dgs.ca.gov

8. **Turnkey Implementation of Retro-commissioning Measures at Marriott Hotels**
Enovity is contracted directly with the Marriott to provide turn-key implementation of retro-commissioning implementation projects at various facilities. The projects were originally identified as part of the CPUC Statewide Building Tune-up Program and Enovity's Monitoring-Based Persistence Commissioning Incentive Program (MBPCx). Projects included supply air temperature reset for corridor air handlers, demand limit chiller, enabling both sets of cooling towers to run together, lighting controls integration, correcting air side economizer settings on air handlers to enable additional free cooling, schedule non-guestroom fan coil units serving meeting rooms to be off when space is not occupied, optimize domestic hot water control sequence, implement heating hot water supply temperature reset, install variable frequency drives (VFDs) on garage supply and exhaust fans and carbon monoxide sensors to control amount of ventilation based on exhaust levels, install VFDs on DHW booster pumps.

9. **2004-2005 CPUC Statewide Building Tune-up Program**
Enovity provided extensive building retro-commissioning for this $7.2 Million program. Enovity was responsible for retro-commissioning thirteen large non-residential buildings. This program was developed to help building owners and operators assess and optimize their energy systems while providing incentives for the installation of measures that improve building operations, comfort and energy efficiency. Projects included:

- Phillip Burton Federal Courthouse and Office Building, San Francisco
- Appraiser's Federal Office Building, San Francisco
- US Geological Survey Laboratory and Office Campus, Menlo Park
- 50 United Nations Plaza Courthouse and Office Building, San Francisco
- National Archives, South San Francisco
- Court of Appeals, San Francisco
- Federal Office Building, Santa Rosa
- Three (3) Marriott Hotels in the San Francisco Bay Area

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450 Golden Gate Ave., 4th Floor East, San Francisco, CA 94102
(415) 522-3374 voice, (415) 522-3311 fax, mark.levi@gsa.gov

Contact: Edward Hilts, Regional Energy Manager, Marriott Hotels
1301 Dove Street, Suite 500, Newport Beach, CA 92660
(702) 215-3883 voice, (702) 995-0395 fax, edward.hilts@marriott.com

10. **SMUD Retro-commissioning of Large Commercial Buildings Program**
Co-principals Cunningham and Soper helped launch the SMUD Retro-Commissioning Pilot Program in 1999 while with a former company. Over the next four years they managed and/or executed retro-commissioning projects for nine Sacramento buildings, including State agency buildings, under the Program. A published testament to our RCx technical abilities, approach, close interaction with facility operations staff, and measure sustainability can be found in Lawrence Berkeley's National Laboratory's (LBNL's) recent paper entitled Evaluation of Retro-commissioning Persistence in Large Commercial Buildings, which surveyed six of the following nine Sacramento buildings that Cunningham and Soper managed and executed:

- Sacramento Corporate Office Center, 501 J Street
- Franchise Tax Board State Offices, Phase I and II
- State of CA PERS Office Building, Lincoln Plaza
- Corporate Office Building, 300 Capitol Mall
- GSA Region 9 Regional Office, 2800 Cottage Way
- State of CA Office Building, 1300 I Street
- Vision Service Plan Headquarters, Office and Laboratory Facility
- Corporate Office Building, 1325 J Street
- U.S. Bank Plaza Corporate Office Building

Contact: Jim Parks, Program Manager, Sacramento Municipal Utility District
6301 S Street, PO Box 15830, Sacramento, CA 95852-15830
(916) 732-5252 voice (916) 32-6831 fax jparks@smud.org

11. **BAS Retro-commissioning of Five (6) Federal Facilities**
Enovity provided re-commissioning of building automation systems (BAS) at six (6) Federal Facilities throughout GSA's Region 9, including facilities in Phoenix, Tuscon, Las Vegas and California. This effort included troubleshooting and BAS re-programming at recently constructed or existing facilities employing Alerton BACtalk and Automated Logic BACnet™ BAS. Facilities include:

- New Sandra Day O'Connor Federal Courthouse Office Building (Phoenix, AZ)
- New Lloyd George Federal Office Building (Las Vegas, NV)
- Hagel Federal Office Building (Richmond, CA)
- Appraiser's Federal Office Building (San Francisco, CA)

- Santa Rosa Federal Office Building (Santa Rosa, CA)

Contact: Mark Levi, GSA Federal Region 9 Energy Manager
450 Golden Gate Ave., 4th Floor East, San Francisco, CA 94102
(415) 522-3374 voice, (415) 522-3311 fax, mark.levi@gsa.gov

12. SMUD Customer Services Center

Enovity recently completed the retro-commissioning of the Sacramento Municipal Utility District's (SMUD) Customer Service Center (CSC) building. The CSC is a 167,000 square foot office building located in Sacramento, California. Thirteen (13) no-cost, low cost energy-efficiency measures were recommended, resulting in an annual energy savings of 206,290 kWh and 3,500 therms and an approximate utility cost savings of $21,070 per year, approximately 9.4% of total. The estimated cost for implementing these measures is $8,400 or less, for parts, materials or external contractor costs, resulting in an overall simple payback of 0.4 years. Three higher cost energy efficiency measures and 14 recommended measures aimed at improving the operations and maintenance and/or the environmental and aesthetic conditions of the building were identified.

Contact: Doug Norwood, Senior Mechanical Engineer, Facilities Management, Sacramento Municipal Utility District
6301 S Street, PO Box 15830, Sacramento, CA 95852-15830
(916) 732-6623 voice, (916) 32-6831 fax, dnorwoo@smud.org

6.0 PROJECT SCHEDULE

Tables 6.1 and 6.2 provides the project schedule for Social Sciences II and Engineering II respectively.

Table 6.1 Project Schedule for Social Sciences II

***Milestone* or Deliverable**	**Deliverable due from CxP?**	**Approximate Date**
Contract Signed	X	10/01/07
Planning		
Kickoff Meeting (Beginning of Planning Stage)	X	10/15/07
Deliverable: MBCx Plan Submitted	____	
M&V Plan Submitted	X	10/31/07
MBCx and M&V Review Meeting	NA	
Deliverable: Draft MBCx Report (Planning Phase Sections) Due	NA	
Pre-Investigation		
Monitoring System Installation, Trends and Data Collection Routine Setup and Testing Complete		
Deliverable: Draft MBCx Report (Pre-Investigation Phase) Due	NA	
Investigation		
Deliverable: Updated MBCx Plan (Investigation Phase Sections) Due	X	11/30/07
Deliverable: Functional Performance Test Protocol	X	12/15/07
Deliverable: Draft MBCx Report (Investigation Phase Sections) Due	X	03/31/08
Present Draft MBCx Report and Select Improvements to Implement	NA	
Implementation		
Deliverable: Updated MBCx Plan (Implementation Phase Sections) Due	NA	
Deliverable: Draft MBCx Report (Implementation Phase Sections) Due	NA	
Handoff		
Deliverable: Updated MBCx Plan Due (Handoff Phase Sections)	NA	
Deliverable: Draft MBCx Report (Handoff Phase Sections) Due	NA	
Deliverable: Draft MBCx Final Report Due		
Deliverable: MBCx Final Report Due	X	May 31, 2008
Deliverable: Systems Manual Due	X	May 31, 2008
Ongoing		
Monthly MBCx Meeting (conference call)	X	____regular date each month

Table 6.2 Project Schedule for Engineering II

Milestone or Deliverable	Deliverable due from CxP?	Approximate Date
Contract Signed	X	10/01/07
Planning		
Kickoff Meeting (Beginning of Planning Stage)	X	10/15/07
Deliverable: MBCx Plan Submitted	____	
M&V Plan Submitted	X	10/31/07
MBCx and M&V Review Meeting	NA	
Deliverable: Draft MBCx Report (Planning Phase Sections) Due	NA	
Pre-Investigation		
Monitoring System Installation, Trends and Data Collection Routine Setup and Testing Complete		
Deliverable: Draft MBCx Report (Pre-Investigation Phase) Due	NA	
Investigation		
Deliverable: Updated MBCx Plan (Investigation Phase Sections) Due	X	11/30/07
Deliverable: Functional Performance Test Protocol	X	12/31/07
Deliverable: Draft MBCx Report (Investigation Phase Sections) Due	X	06/30/08
Present Draft MBCx Report and Select Improvements to Implement	NA	
Implementation		
Deliverable: Updated MBCx Plan (Implementation Phase Sections) Due	NA	
Deliverable: Draft MBCx Report (Implementation Phase Sections) Due	NA	
Handoff		
Deliverable: Updated MBCx Plan Due (Handoff Phase Sections)	NA	
Deliverable: Draft MBCx Report (Handoff Phase Sections) Due	NA	
Deliverable: Draft MBCx Final Report Due		
Deliverable: MBCx Final Report Due	X	09/30/08
Deliverable: Systems Manual Due	X	09/30/08
Ongoing		
Monthly MBCx Meeting (conference call)	X	____regular date each month
Deliverable: Monthly Progress Reports	_X__	_7th calendar day of month

7.0 PROPOSED COST

7.1 Cost Summary

Table 7.1 provides a cost summary. The university requested two separate cost proposals, one for each project. If Enovity was awarded both projects there would be a cost reduction of $4,000 giving a combined price for both projects of **$99,570**.

Table 7.1 Cost Summary

	Phase	Engineering II	Social Sciences II
1	Planning	$11,880	$6,630
2	Pre-Investigation	$6,010	$3,730
3	Investigation	$17,210	$9,275
4	Implementation	$8,450	$3,985
5	Handoff	$13,740	$8,505
6	Oversight	$7,030	$3,955
	Subtotal Labor	**$64,320**	**$36,080**
	Expenses	**$1,800**	**$1,370**
	Total	**$66,120**	**$37,450**

7.2 Detailed Tasks and Fees

Tables 7.1 and 7.2 provide the detailed cost breakdown showing the breakdown of effort for individuals who will be working on the project.

Table 6.2 Cost Breakdown for Engineering II Building

Cost Proposal: MBCx Project for U.C. Santa Cruz					
	Category:	**Principal**	**Senior Engineer/ Project Manager**	**Engineer**	
	Hourly Rate:	**$210**	**$145**	**$125**	**Cost**
		Jonathan Soper, P.E.	**Rick Unvarsky**	**David Chan**	
			Henry Summers		
			David Guthrie		
			Tim Fackler		
Phase 1: Planning Phase					
Task					
1.1	Convene Kickoff Meeting	6	6		$2,130
1.2	Develop MBCx Findings Log Template	1		1	$335
1.3	Conduct Initial Site Assessment	2	4		$1,000
1.4	Define Operational Requirements	1	1		$355
1.5	Catalog Known Issues and Improvement Opportunities		1		$145
1.6	Identify Available and Missing Documentation (Support Only)		1		$145
1.7	Define Monitoring Objectives and Requirements (Support Only)	1	4		$790
1.8	Develop MBCx Plan (Planning Phase)	2	16	4	$3,240
1.9	Develop Measurement and Verification Plan	1	16		$2,530
1.10	Present Plans to the MBCx Project Team (N/R)	2			$420
1.11	Update MBCx Findings Log		1		$145
1.12	Prepare and Submit Draft MBCx Report (Planning Phase) (N/R)	1	3		$645
	Estimated Reimbursable Expenses:	*Travel and Lodging*			300
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**17**	**53**	**5**	**$12,230**
Phase 2: Pre-Investigation Phase					
Task					
2.1	Conduct Preventative Maintenance Activities (Support Only)		2		$290
2.2	Evaluate Existing Monitoring Systems	1	5		$935
2.3	Calibrate Sensors (Support Only)	1	4		$790
2.4	Upgrade EMCS or Install Monitoring Equipment (Support Only)	1	4		$790
2.5	Setup Trends and Data Collection Routines (Setup Trends: Support Only)	1	4	1	$915
2.6	Collect Sample Data (Support Only)			1	$125
2.7	Assess Data Quality (Fix Data Problems: Support Only)		3	3	$810
2.8	Prepare for Data Analysis	1	1	4	$855
2.9	Update MBCx Findings Log		1		$145
2.10	Update and Submit Draft MBCx Report (Pre-Investigation Phase) (N/A)	1	1		$355
	Estimated Reimbursable Expenses:	*Travel and Lodging*			200
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**6**	**25**	**9**	**$6,260**
Phase 3: Investigation Phase					
Task					
3.1	Update and Submit MBCx Plan (Investigation Phase)		1		$145
3.2	Collect Baseline Data			3	$375
3.3	Analyze Data	2	12	24	$5,160
3.4	Establish a Baseline	1	6	4	$1,580
3.5	Functional Performance Testing: (Perform/Witness: Support Only)	2	24		$3,900
3.6	Evaluate Improvement Opportunities and Provide Recommendations	1	16	12	$4,030
3.7	Update and Submit Draft MBCx Report (Investigation Phase)	1	7	3	$1,600
3.8	Present Draft MBCx Report	2			$420
	Estimated Reimbursable Expenses:	*Travel and Lodging*			300
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**9**	**66**	**46**	**$17,560**

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Phase 4: Implementation Phase					
Task					
4.1	Update and Submit MBCx Plan (N/A)		3		$435
4.2	Implement Selected Improvements (Support Only)	2	24		$3,900
4.3	Verify EMCS Updates	1	3		$645
4.4	Verify Improved Operation (Support Only)	1	7	3	$1,600
4.5	Document Remaining Improvement Opportunities	1	6		$1,080
4.6	Update MBCx Findings Log		1		$145
4.7	Update and Submit Draft MBCx Report (Implementation Phase) (N/A)	1	3		$645
	Estimated Reimbursable Expenses:	*Travel and Lodging*			200
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**6**	**47**	**3**	**$8,700**
Phase 5: Handoff Phase					
Task					
5.1	Update and Submit MBCs Plan (Support Only) (N/A)		1		$145
5.2	Develop Ongoing Diagnostic Tests	1	10		$1,660
5.3	Provide Training	4	8		$2,000
5.4	Develop O&M Plan	1	8		$1,370
5.5	Verify Benefits at Conclusion of Commissioning and Estimate Operating Savings	1	6	7	$1,955
5.6	Establish a New Baseline	1	1	4	$855
5.7	Update MBCX Findings Log	1	1		$355
5.8	Update Draft and Submit Final MBCx Report	1	8	4	$1,870
5.9	Develop MBCx Systems Manual	1	16	8	$3,530
	Estimated Reimbursable Expenses:	*Travel and Lodging*			200
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**11**	**59**	**23**	**$13,990**
Phase 6: Oversight					
Task					
6.1	Facilitate MBCx Meetings	8	24		$5,160
6.2	Submit Progress Reports	2	10		$1,870
	Estimated Reimbursable Expenses:	*Travel and Lodging*			300
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**10**	**34**	**0**	**$7,380**
Summary					
	Labor:	**59**	**284**	**86**	**$64,320**
	Direct Expenses:				**$1,800**
	TOTAL				**$66,120**

Table 6.2 Cost Breakdown for Social Sciences II Building

Cost Proposal: MBCx Project for U.C. Santa Cruz					
	Category:	**Principal**	**Senior Engineer/ Project Manager**	**Engineer**	
	Hourly Rate:	**$165**	**$140**	**$125**	**Cost**
		Jonathan Soper, P.E.	**Jeff Dunnavant**	**David Chan**	
			David Guthrie		
			Tim Fackler		
			Henry Summers		
Phase 1: Planning Phase					
Task					
1.1	Convene Kickoff Meeting	6	6		$1,830
1.2	Develop MBCx Findings Log Template	1		1	$290
1.3	Conduct Initial Site Assessment	2	2		$610
1.4	Define Operational Requirements	1	1		$305
1.5	Catalog Known Issues and Improvement Opportunities		1		$140
1.6	Identify Available and Missing Documentation (Support Only)		1		$140
1.7	Define Monitoring Objectives and Requirements (Support Only)	1	3		$585
1.8	Develop MBCx Plan (Planning Phase)	1	6	2	$1,255
1.9	Develop Measurement and Verification Plan	1	4		$725
1.10	Present Plans to the MBCx Project Team (N/R)	1			$165
1.11	Update MBCx Findings Log		1		$140
1.12	Prepare and Submit Draft MBCx Report (Planning Phase) (N/R)	1	2		$445
	Estimated Reimbursable Expenses:	*Travel and Lodging*			200
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**15**	**27**	**3**	**$6,880**
Phase 2: Pre-Investigation Phase					
Task					
2.1	Conduct Preventative Maintenance Activities (Support Only)		1		$140
2.2	Evaluate Existing Monitoring Systems	1	2		$445
2.3	Calibrate Sensors (Support Only)	1	2		$445
2.4	Upgrade EMCS or Install Monitoring Equipment (Support Only)	1	3		$585
2.5	Setup Trends and Data Collection Routines (Setup Trends: Support Only)	1	3		$585
2.6	Collect Sample Data (Support Only)			1	$125
2.7	Assess Data Quality (Fix Data Problems: Support Only)		2	1	$405
2.8	Prepare for Data Analysis	1	1	2	$555
2.9	Update MBCx Findings Log		1		$140
2.10	Update and Submit Draft MBCx Report (Pre-Investigation Phase) (N/A)	1	1		$305
	Estimated Reimbursable Expenses:	*Travel and Lodging*			100
		Telephone, Delivery, Copy and Document Preparation			25
	Task Subtotal:	**6**	**16**	**4**	**$3,855**
Phase 3: Investigation Phase					
Task					
3.1	Update and Submit MBCx Plan (Investigation Phase)		1		$140
3.2	Collect Baseline Data			1	$125
3.3	Analyze Data	1	6	8	$2,005
3.4	Establish a Baseline	1	2	1	$570
3.5	Functional Performance Testing: (Perform/Witness: Support Only)	2	20		$3,130
3.6	Evaluate Improvement Opportunities and Provide Recommendations	1	2	16	$2,445
3.7	Update and Submit Draft MBCx Report (Investigation Phase)	1	2	2	$695
3.8	Present Draft MBCx Report	1			$165
	Estimated Reimbursable Expenses:	*Travel and Lodging*			150
		Telephone, Delivery, Copy and Document Preparation			125
	Task Subtotal:	**7**	**33**	**28**	**$9,550**

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Phase 4: Implementation Phase					
Task					
4.1 Update and Submit MBCx Plan (N/A)					$0
4.2 Implement Selected Improvements (Support Only)		1	8		$1,285
4.3 Verify EMCS Updates		1	1		$305
4.4 Verify Improved Operation (Support Only)		1	3	4	$1,085
4.5 Document Remaining Improvement Opportunities		1	3		$585
4.6 Update MBCx Findings Log			3		$420
4.7 Update and Submit Draft MBCx Report (Implementation Phase) (N/A)		1	1		$305
	Estimated Reimbursable Expenses:	*Travel and Lodging*			200
		Telephone, Delivery, Copy and Document Preparation			20
	Task Subtotal:	**5**	**19**	**4**	**$4,205**
Phase 5: Handoff Phase					
Task					
5.1 Update and Submit MBCs Plan (Support Only) (N/A)			1		$140
5.2 Develop Ongoing Diagnostic Tests		1	4		$725
5.3 Provide Training		4	6		$1,500
5.4 Develop O&M Plan		1	4		$725
5.5 Verify Benefits at Conclusion of Commissioning and Estimate Operating Savings		1	3	2	$835
5.6 Establish a New Baseline		1	1	3	$680
5.7 Update MBCX Findings Log		1	1		$305
5.8 Update Draft and Submit Final MBCx Report		1	3	2	$835
5.9 Develop MBCx Systems Manual		2	12	6	$2,760
	Estimated Reimbursable Expenses:	*Travel and Lodging*			100
		Telephone, Delivery, Copy and Document Preparation			50
	Task Subtotal:	**12**	**35**	**13**	**$8,655**
Phase 6: Oversight					
Task					
6.1 Facilitate MBCx Meetings		6	16		$3,230
6.2 Submit Progress Reports		1	4		$725
	Estimated Reimbursable Expenses:	*Travel and Lodging*			200
		Telephone, Delivery, Copy and Document Preparation			150
	Task Subtotal:	**7**	**20**	**0**	**$4,305**
Summary					
	Labor:	**52**	**150**	**52**	**$36,080**
	Direct Expenses:				**$1,370**
	TOTAL				**$37,450**

7.3 Add Alternate I

Opportunities for lighting energy savings were observed during the walk through of the two buildings. These opportunities included more effective lighting controls and better use of daylight in perimeter zones. Enovity could complete a full lighting energy audit in Engineering II for **$7,000** and in Social Sciences II for **$4,500**.

7.4 Add Alternate 2

Enovity is a Value Added Reseller (VAR) for the diagnostic tool, PACRAT, which is described in Section 4.1. PACRAT is an ideal tool for long term monitoring of HVAC system performance. Enovity could implement PACRAT on the air handlers and chilled water plant in Engineering II for **$27,000** and an additional annual license fee of **$1,800**. Enovity could implement PACRAT on the air handlers and chilled water plant in Social Sciences II for **$20,000** and an additional annual license fee of **$990.**

Task No	Description	Enovity Lead	Enovity Support	Enovity N/A	Target Completion Date Soc. Sci. II	Target Completion Date Eng. II
1	**Planning Phase**					
1.1	Hold kick-off meeting				complete	complete
	Organize and facilitate a meeting to introduce the MBCx Project Team, outline the MBCx process, and review work scope and goals. Logistical work protocols will be discussed including: Building access and availability of keys; Restrictions on special building areas; Sign-in and sign-out requirements; Parking permits; Safety and emergency requirements and contacts; Building escorts; Availability of building operating personnel to participate in site investigations and Functional Tests; Acceptable work times	X				
1.2	Develop MBCx Findings Log Templete				complete	complete
	Develop a template document to record and track issues identified during the Planning, Pre-Investigation, Investigation, and Handoff Phases. This document will be continually updated, and the latest version shall be submitted to the MBCx Project Team at the end of each phase of development. A summary report shall also be defined to allow for quick "at-a-glance" review of the status of outstanding issues. See Table 1 in Section 1.3. for a listing of the fields that should be included in the template document. (note that not all fields will be relevant in all cases.)	X				
1.3	Conduct initial site assessment				Complete	complete
	Walk through the facility and observe the condition of the subject equipment, noting obvious indicators of potential savings, and equipment or operational problems. This site survey will include: A survey of the chilled and hot water hydronic systems; A survey of the air handlers; Interviews with facility staff; Verification of programmed sequences of operation on a sample of systems; Reviewing a sample of trend data (as available)	X				
1.4	Define Operation Requirements				complete	complete
	Meet with owner's representatives and determine the intended operation of the facility such as hours of operation, required space temperatures, required humidity levels, etc.	X				
1.5	Catalog Known Issues and Improvements				complete	complete
	Review facility operating logs or conduct interviews in order to identify the improvement opportunities. This might include items such as addressing EMCS/controls problems, maintenance concerns, repeated comfort complaints, indoor air quality concerns, or equipment noise problems.	X				
1.6	Identify Available Missing Documentation				complete	complete
	Identify the existence of key equipment or system documentation, determine its location, and assess its accuracy and completeness. Identify any missing documentation. The identified documentation may include items such as as-built drawings, construction drawings, energy bills, equipment manuals, specifications, warranties and cut sheets, test and balance reports, control points list, and operating schedules.	X				
1.7	Define Monitoring Objectives and Requirements				complete	complete
	Determine and document the objectives for monitoring within the MBCx project, and the associated requirements. This should include items such as points to be monitored, required accuracy of data, frequency of measurement and downloads, communications capabilities, storage requirements, and pre-processing and analysis of data.		X			
1.8	Develop MBCx Plan				complete	complete
	Create an MBCx Plan document, to include the items specified in Table 2.	X				
1.9	Develop Measurement and Verification Plan				complete	complete
	Create a Measurement and Verification plan, to identify how the savings from the project will be estimated upon completion of the project. The plan should also address ongoing savings past this date. Savings shall include both energy savings and maintenance savings. This shall include the topics specified in Table 3.	X				
1.10	Present Plans to the MBCx Project Team				na	na
	Submit MBCx and M&V Plans to the owner, and present the plan at a meeting with the MBCx Project Team. Revise the plan as needed to implement Project Team recommendations.			X		
1.11	Update MBCx Findings Log				complete	complete
	Review MBCx Findings Log to ensure that it is complete and that the status of issues is up-to-date.	X				
1.12	Prepare and Submit Draft MBCx Report				na	na
	Prepare a Draft MBCx Report, including the sections specified in Table 4.			X		
2	**Pre-Investigation Phase**					
2.1	Conduct Preventative Maintenance Activities				complete	complete
	Identify preventative maintenance activities that must be accomplished before a meaningful investigation can be conducted. This may include items such as maintaining sensors and actuators that are known to require maintenance, or adding refrigerant charge to rooftop units.		X			
2.2	Evaluate Existing Monitoring System				complete	complete

Task No	Description	Enovity Lead	Enovity Support	Enovity N/A	Target Completion Date Soc. Sci. II	Target Completion Date Eng. II
	Look at building plans and walk-through the building to determine the capabilities of the existing monitoring systems, in comparison with the MBCx program requirements. Identify system deficiencies that will have to be addressed before monitoring can commence.	X				
2.3	Calibrate Sensors				ongoing	ongoing
	Calibrate any of the sensors that are required for commissioning and in need of calibration. Document calibration activities.		X			
2.4	Upgrade EMCS or Install Monitoring Equipement		X		complete	complete
	Determine a plan for supplementing the existing monitoring capabilities, which might include upgrading the existing capabilities or installing monitoring equipment.		X			
	Develop specifications for system instrumentation to be procured and installed and identify suitable providers.			X		
	Procure instrumentation.			X		
	Install instrumentation.			X		
	Commission instrumentation.		X			
2.5	Set Up Trends and Data Collection Routines				2/22/08	complete
	Identify the points that are to be monitored and the sampling and download frequencies. A sampling rate of five minutes or less is recommended for most points. The download frequency will depend on the analysis and diagnostics planned, but should probably be at least weekly.	X				
	Setup trends in the EMCS software to begin collecting these data. Setup and test any necessary mechanisms to transfer data to a central platform for analysis.		X			
	If data loggers are installed, program them to collect the necessary information and subsequently transfer the information to a central platform for analysis. Test the communications mechanisms to ensure that data are transferred reliably.	X				
2.6	Collect Sample Data				2/29/08	complete
	Collect at least one day of data from the EMCS or data loggers.		X			
2.7	Assess Data Quality				3/7/08	complete
	Review tables or charts of collected data to assess reasonableness. If any data seem to be providing unreasonable results, investigate any possible problems with the data.	X				
	Fix any data problems that are found from reviewing the data.		X			
2.8	Prepare For Data Analysis				complete	complete
	Setup routines to calculate factors and metrics required for commissioning of systems. Create template charts and tables of collected and calculated data.	X				
2.9	Update MBCx Findings Log				complete	complete
	Review and update the Findings Log to ensure that it is complete and that the status of issues is up-to-date.	X				
2.10	Update and Submit MBCx Report				na	na
	Update the Draft MBCx Report, by adding the sections specified in Table 4.			X		
3	**Investigation Phase**					
3.1	Update and Submit MBCx Plan				complete	complete
	Update MBCx Plan as needed to reflect the findings or changes as a result of the Pre-Investigation Phase and submit to the MBCx Project team for review and approval.	X				
3.2	Collect Base Line Data				3/28/08	complete
	Collect sufficient data to establish baseline performance, and to identify operating characteristics of the building, system, or equipment.	X				
3.3	Analyze Data				4/4/08	4/11/08
	Analyze data to identify issues and Improvement Opportunities, and record these in the MBCx Findings Log.	X				
	Define Functional Performance Testing needed to identify further Improvement Opportunities.	X				
3.4	Establish Base Line				4/4/08	4/11/08
	Analyze utility and collected data to establish building, system, or equipment baseline performance.	X				
3.5	Conduct Functional Performance Testing				4/11/08	4/25/08
	Determine the objectives and scope of Functional Performance Testing.	X				
	Draft and submit a Functional Performance Test protocol. See, for example, the Functional Test Guide and the Commissioning Functional Test Protocol Library at http://building.lbl.gov/hpcbs/ftg.	X				

Task No	Description	Enovity Lead	Enovity Support	Enovity N/A	Target Completion Date Soc. Sci. II	Target Completion Date Eng. II
	Perform Pre-functional Performance Testing. The purpose of the Pre-functional Tests is to assess the condition of the building mechanical and control systems, determine the programmed sequences of operation and to verify functionality of points controlled and monitored by the building energy management and control system (EMCS). Such tests will include: Acquiring and verifying equipment and system component data; Performing point-to-point tests of the EMCS. Pre-functional Tests will be performed by University operations personnel and witnessed by Cx Agent. University personnel should be available to make simple repairs and adjustments to correct deficiencies discovered during the testing process. Any deficiencies observed during the Pre-functional Tests will be added to the MBCx Findings Log, which will be maintained and updated by Cx Agent for the duration of the MBCx process. ***Perform Functional tests.*** The purpose of the Functional Tests is to confirm that the sequences of operation are proper, and that they are operating in their intended fashion. Such tests will include: Review and analysis of EMCS trend data (as available); Review and analysis of data from interim data loggers, if required; Perform customized field tests. University personnel should be on hand to participate in any field tests and be available to make any repairs to deficiencies that may be discovered during the testing process and to fine tune system operation. Any deficiencies discovered or corrective actions taken during the Functional Tests will be added to the MBCx Findings Log. Energy efficiency retrofits that are more capital intensive than the low-cost measures may be identified and added to the MBCx Findings Log accordingly.		X			
	Witness Functional Performance Testing.		X			
	Collect and analyze trend data and other data generated from Functional Performance Tests to identify Improvement Opportunities. Update MBCx Findings Log accordingly.	X				
3.6	Evaluate Improvement Opportunities and Provide Recommendations				4/18/08	5/9/08
	Evaluate Improvements in the MBCx Findings Log and recommend which improvements should be implemented during the course of this project, and which should be addressed through future work. Provide prioritization. Provide supporting information, including: any calculations, trend and portable logger data, functional test results, building simulation parameters and results, site visit reports, or photographs that were used to identify the problem or opportunity.	X				
3.7	Update and Submit Draft MBCx Report (Investigation Phase)				4/25/08	5/16/08
	Update the Draft MBCx Report, by adding the sections specified in Table 4.	X				
3.8	Present Draft MBCx Report				4/25/08	5/16/08
	Present Draft MBCx Report to the MBCx Project Team, and work with the Team to select Improvements to implement.	X				
4	**Implementation Phase**					
4.1	Update and Submit MBCx Plan				na	na
	Update MBCx Plan as needed to reflect the findings of the Investigation Phase. Submit.			X		
4.2	Implement Selection Impovements				5/9/08	6/20/08
	Implement selected improvements. It is expected that this may involve activities such as implementing changes in the control programming, tuning control loops, performing maintenance tasks, and implementing simple repairs of system components. The Contractor will not provide materials, and no extensive repairs will be included.		X			
	Oversee implementation of selected improvements that are implemented by campus staff or outside contractors.		X			
4.3	Verify EMCS Updates				5/9/08	7/3/08
	Review any updated graphics, points list, and new or revised sequences of operation.	X				
4.4	Verify Improved Operation				5/16/08	7/18/08
	Inspect any improvements to equipment or systems, and repeat Functional Performance Tests and collect and review trend data as needed in order to witness and document improved performance.		X			
4.5	Document Remaining Improvement Opportunities				5/16/07	7/18/08
	For the Improvement Opportunities that were not initially selected for implementation, including the more extensive or capital-intensive improvements; provide evidence of the potential benefits, and a rough estimate of the scope of effort required.	X				
	Assist the owner with obtaining hard costs for implementing the remaining Improvement Opportunities.			X		
4.6	Update MBCx Findings Log				5/16/07	8/8/08
	Review Findings Log to ensure that it is complete and that the status of findings is up-to-date.	X				
4.7	Update and Submit Draft MBCx Report (Implementation Phase)				na	na
	Update the Draft MBCx Report, by adding the sections specified in Table 4.			X		
5	**Handoff Phase**					
5.1	Update and Submit MBCx Plan				na	na
	Update MBCx Plan as needed to reflect the findings of the Implementation Phase and submit to the MBCx Project team for review.			X		
5.2	Develop Ongoing Diagnostic Tests				5/30/08	8/30/08

Task No	Description	Enovity Lead	Enovity Support	Enovity N/A	Target Completion Date	Target Completion Date
	Based upon the findings of the investigation phase and the new instrumentation installed, work with the campus staff to develop specifications for, and implement data trending routines and control programming for ongoing diagnostic tests to be conducted by the building operations staff or regular service contractors.	X				
5.3	Provide Training				5/30/08	8/30/08
	In the course of delivering pre-investigation and investigation phase tasks, work with campus staff with a goal of training them on the procedures. This may include topics such as identification and installation of additional monitoring points and additional ongoing diagnostic tests. , To ensure the persistence of savings from the MBCx activities, campus staff should have a clear understanding of the points being monitored, the collected trends and the diagnostic routines.	X				
	At project conclusion, train campus staff on the operation of the optimized facility and equipment, discuss maintenance procedures and review the use of documentation including the systems manual. Also discuss energy saving projections and recommended corrective actions	X				
5.4	Develop O&M Plan				5/30/08	8/30/08
	Work with campus staff to incorporate the findings of the project into ongoing O&M activities. Place a particular emphasis on ongoing trending and re-commissioning of systems to ensure persistence of savings.	X				
5.5	Verify Benefits at Conclusion of Commissioning and Estimate Operating Savings				5/30/08	8/30/08
	Follow the agreed-upon M&V procedures for verifying the expected benefits at the conclusion of commissioning, and estimate the operating savings achieved through the improvements implemented.	X				
5.6	Establish a New Base Line				5/30/08	8/30/08
	Review trended data and establish a new baseline for energy performance.	X				
5.7	Update MBCx Findings Log				5/30/08	8/30/08
	Review Findings Log to ensure that it is complete and that the status of findings is up-to-date.	X				
5.8	Update Draft and Submit Final MBCx Report				5/30/08	8/30/08
	Update the Draft MBCx Report, by adding the sections specified in Table 4.	X				
	Compile a complete MBCx Report and submit for review.	X				
	Revise MBCx Report based upon comments received and submit final report.	X				
	Present final MBCx Report to MBCx Project Team.	X				
5.9	Develop MBCx Systems Manual				5/30/08	8/30/08
	Draft and submit a MBCx Systems Manual, to include the sections specified in Table 5.	X				
6	**Oversight**					
6.1	Facilitate MBCx Meetings				monthly	monthly
	During the course of the project; conduct periodic (at least monthly) meetings of the MBCx Project Team. Develop and circulate meeting agendas, facilitate meetings, compile and circulate minutes.	X				
6.2	Submit Progress Reports				7th ea. Mo.	7th ea. Mo.
	Submit monthly progress reports to the project manager. This shall include accomplishments, plans, milestones, issues, and financial aspects.	X				

ENERGY & ATMOSPHERE: PREREQUISITE 2
MINIMUM ENERGY PERFORMANCE

1. LEED-EB Template
2. E2 Energy Star Report
3. E2 electricity and heating meter data
4. E2 utility billing report

(Responsible Party)

I, Patrick Testoni , declare to USGBC that the building meets the following energy performance standard:

Option A: Energy Star Option

◉ An EPA–Energy Performance Rating (ENERGY STAR® Rating) of at least 60, utilizing the EPA's Portfolio Manager tool for building types addressed by ENERGY STAR, website: www.energystar.gov.

I have provided the following to support the declaration for Option A:

☒ A Statement of Energy Performance generated from Portfolio Manager stating that the building energy has achieved an ENERGY STAR Rating of at least 60.

☒ A summary of the annual bills including cost and usage amounts (kilowatt-hours, therms, gallons, etc.) for each type of energy used by the building. (This information can be printed from Portfolio Manager).

☒ Copies of all monthly building energy bills for the performance period (at least 3 months).

Option B: Equivalent Energy Star Option

○ ENERGY STAR Rating equivalent for building types not addressed by Portfolio Manager on the ENERGY STAR website

I have provided the following to support the declaration for Option B:

☐ Calculations showing the building energy efficiency and performance meets the equivalent of an ENERGY STAR Rating of at least 60 using the alternate calculation method described in the LEED-EB Reference Guide

☐ A summary of the annual bills including cost and usage amounts (kilowatt-hours, therms, gallons, etc.) for each type of energy used by the building annually over the performance period.

☐ Copies of all monthly building energy bills for the performance period (at least 3 months).

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Prerequisite 2: Minimum Energy Performance Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Patrick	Testoni	2008-09-03	TESTONIP@UCSC.EDU	
First Name	Last Name	Date	Username (Email Address)	Password

OMB No. 2060-0347

STATEMENT OF ENERGY PERFORMANCE
Engineering 2

Building ID: 1328908
For 12-month Period Ending: July 31, 2008[1]
Date SEP becomes ineligible: N/A
Date SEP Generated: February 20, 2009

Facility
Engineering 2
1156 High Street
Santa Cruz, CA 95064

Facility Owner
Regents of the University of California
1156 High Street
Santa Cruz, CA 95064

Primary Contact for this Facility
Patrick Testoni
UCSC Physical Plant 1156 High Street
Santa Cruz, CA 95064

Year Built: 2003
Gross Floor Area (ft²): 151,550

Energy Performance Rating[2] (1-100) 71

Site Energy Use Summary[3]

Electricity (kBtu)	9,537,582
Natural Gas (kBtu)[4]	6,969,861
Total Energy (kBtu)	16,507,443

Energy Intensity[5]

Site (kBtu/ft²/yr)	109
Source (kBtu/ft²/yr)	258

Emissions (based on site energy use)

Greenhouse Gas Emissions ($MtCO_2e$/year)	371

Electric Distribution Utility
Pacific Gas & Electric Co

National Average Comparison

National Average Site EUI	141
National Average Source EUI	334
% Difference from National Average Source EUI	-23%
Building Type	Office

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Certifying Professional
Patrick Testoni
UCSC Physical Plant 1156 High Street
Santa Cruz, CA 95064

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Natural Gas values in units of volume (e.g. cubic feet) are converted to kBtu with adjustments made for elevation based on Facility zip code.
5. Values represent energy intensity, annualized to a 12-month period.
6. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

The government estimates the average time needed to fill out this form is 6 hours (includes the time entering energy data, PE facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Engineering 2	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Office	Is this an accurate description of the space in question?		☐
Location	1156 High Street, Santa Cruz, CA 95064	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐

Engineering 2 Main (Office)

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Gross Floor Area	151,550 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Weekly operating hours	112 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		☐
Workers on Main Shift	468	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 10 workers per 1000 square feet (92.8 square meters)		☐
Number of PCs	836	Is this the number of personal computers in the Office?		☐
Percent Cooled	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	50% or more	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐

Energy Consumption

Power Generation Plant or Distribution Utility: Pacific Gas & Electric Co

Fuel Type: Electricity		
Meter: Engineering 2 480V/277V Service (kWh) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh)**
06/01/2008	06/30/2008	179,484.00
05/01/2008	05/31/2008	181,856.00
04/01/2008	04/30/2008	167,558.50
03/01/2008	03/31/2008	175,270.00
02/01/2008	02/29/2008	148,081.00
01/01/2008	01/31/2008	146,575.00
12/01/2007	12/31/2007	152,819.00
11/01/2007	11/30/2007	167,559.00
10/01/2007	10/31/2007	183,756.00
09/01/2007	09/30/2007	172,416.00
07/31/2007	08/31/2007	180,490.00
Engineering 2 480V/277V Service Consumption (kWh)		**1,855,864.50**
Engineering 2 480V/277V Service Consumption (kBtu)		**6,332,209.67**
Meter: Engineering 2 208V Service (kWh) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (kWh)**
06/01/2008	06/30/2008	63,677.00
05/01/2008	05/31/2008	68,296.00
04/01/2008	04/30/2008	65,059.00
03/01/2008	03/31/2008	66,808.00
02/01/2008	02/29/2008	61,927.25
01/01/2008	01/31/2008	56,794.00
12/01/2007	12/31/2007	60,706.00
11/01/2007	11/30/2007	64,605.00
10/01/2007	10/31/2007	70,427.00
09/01/2007	09/30/2007	65,060.00
07/31/2007	08/31/2007	66,929.00
Engineering 2 208V Service Consumption (kWh)		**710,288.25**
Engineering 2 208V Service Consumption (kBtu)		**2,423,503.51**
Total Electricity Consumption (kBtu)		**8,755,713.18**

Is this the total Electricity consumption at this building including all Electricity meters?	☐

Fuel Type: Natural Gas		
Meter: Engineering 2 Heating Therms (therms) **Space(s):** Entire Facility		
Start Date	**End Date**	**Energy Use (therms)**
05/21/2008	06/30/2008	6,355.00
04/24/2008	05/21/2008	5,063.00
03/31/2008	04/24/2008	4,542.00
02/28/2008	03/31/2008	7,683.00
01/31/2008	02/28/2008	5,132.00
01/01/2008	01/31/2008	8,621.00
12/01/2007	12/31/2007	8,210.00
11/01/2007	11/30/2007	6,291.00
10/01/2007	10/31/2007	5,500.00
09/01/2007	09/30/2007	4,564.00
08/01/2007	08/31/2007	4,077.00
Engineering 2 Heating Therms Consumption (therms)		**66,038.00**
Engineering 2 Heating Therms Consumption (kBtu)		**6,603,800.00**
Total Natural Gas Consumption (kBtu)		**6,603,800.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

Certifying Professional

(When applying for the ENERGY STAR, this must be the same PE that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Engineering 2
1156 High Street
Santa Cruz, CA 95064

Facility Owner
Regents of the University of California
1156 High Street
Santa Cruz, CA 95064

Primary Contact for this Facility
Patrick Testoni
UCSC Physical Plant 1156 High Street
Santa Cruz, CA 95064

General Information

Engineering 2	
Gross Floor Area Excluding Parking: (ft^2)	151,550
Year Built	2003
For 12-month Evaluation Period Ending Date:	July 31, 2008

Facility Space Use Summary

Engineering 2 Main	
Space Type	Office
Gross Floor Area(ft^2)	151,550
Weekly operating hours	112
Workers on Main Shift	468
Number of PCs	836
Percent Cooled	50% or more
Percent Heated	50% or more

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 07/31/2008)	**Baseline** (Ending Date 08/31/2006)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	71	82	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	109	65	104	N/A	141
Source (kBtu/ft^2)	258	217	247	N/A	334
Energy Cost					
$/year	$ 314,992.09	$ 365,204.90	$ 301,023.93	N/A	$ 407,014.20
$/$ft^2$/year	$ 2.08	$ 2.41	$ 1.99	N/A	$ 2.69
Greenhouse Gas Emissions					
$MtCO_2e$/year	371	0	355	N/A	479
$kgCO_2e/ft^2$/year	2	0	2	N/A	3

More than 50% of your building is defined as Office. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

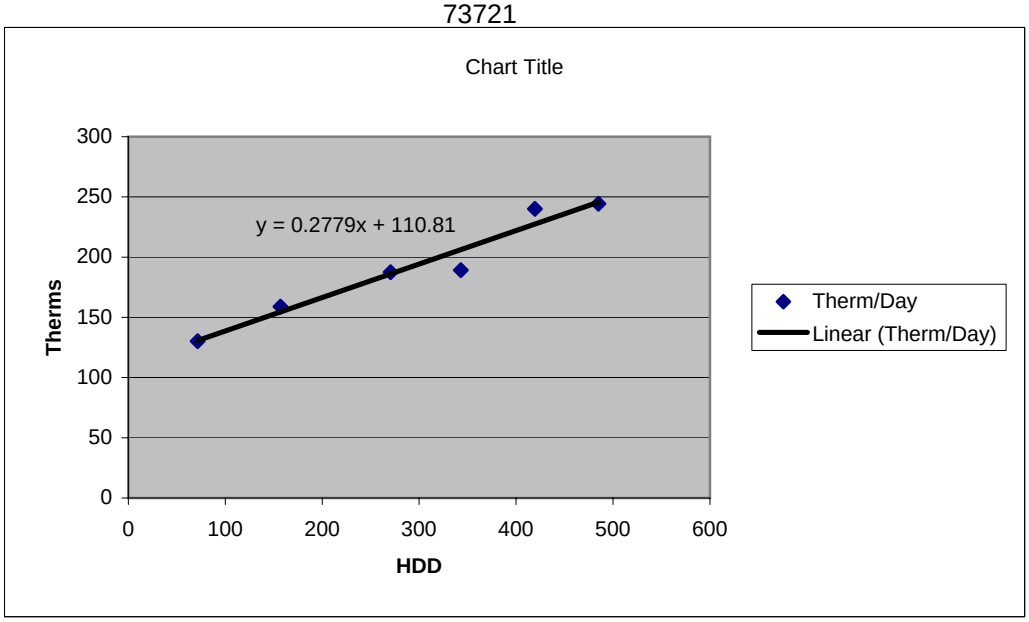
Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.

Meter Name	Fuel	Units	Start Date	End Date	Energy Use	Energy Cost
Engineering 2 208V Service	Electri	kWh	6/30/2008	8/1/2008	62,222	
Engineering 2 208V Service	Electri	kWh	6/1/2008	6/30/2008	63,677	$7,904.55
Engineering 2 208V Service	Electri	kWh	5/1/2008	5/31/2008	68,296	$8,325.82
Engineering 2 208V Service	Electri	kWh	4/1/2008	4/30/2008	65,059	$5,405.26
Engineering 2 208V Service	Electri	kWh	3/1/2008	3/31/2008	66,808	$5,524.81
Engineering 2 208V Service	Electri	kWh	2/1/2008	2/29/2008	61,927	$0.00
Engineering 2 208V Service	Electri	kWh	1/1/2008	1/31/2008	56,794	$5,074.81
Engineering 2 208V Service	Electri	kWh	12/1/2007	12/31/2007	60,706	$5,707.21
Engineering 2 208V Service	Electri	kWh	11/1/2007	11/30/2007	64,605	$6,117.66
Engineering 2 208V Service	Electri	kWh	10/1/2007	10/31/2007	70,427	$8,584.07
Engineering 2 208V Service	Electri	kWh	9/1/2007	9/30/2007	65,060	$7,882.39
Engineering 2 208V Service	Electri	kWh	7/31/2007	8/31/2007	66,929	$8,186.00
Engineering 2 208V Service	Electri	kWh	6/30/2007	7/31/2007	66,064	$8,063.00
Engineering 2 208V Service	Electri	kWh	5/31/2007	6/30/2007	65,194	$8,081.00
Engineering 2 208V Service	Electri	kWh	5/1/2007	5/31/2007	67,431	$9,688.00
Engineering 2 208V Service	Electri	kWh	4/1/2007	5/1/2007	66,688	$6,307.00
Engineering 2 208V Service	Electri	kWh	2/28/2007	4/1/2007	68,954	$6,816.00
Engineering 2 208V Service	Electri	kWh	1/31/2007	2/28/2007	61,848	$6,110.00
Engineering 2 208V Service	Electri	kWh	12/31/2006	1/31/2007	65,748	$6,107.00
Engineering 2 208V Service	Electri	kWh	12/1/2006	12/31/2006	62,293	$5,965.00
Engineering 2 208V Service	Electri	kWh	11/1/2006	11/30/2006	64,612	$5,886.00
Engineering 2 208V Service	Electri	kWh	10/1/2006	10/31/2006	67,813	$7,601.00
Engineering 2 208V Service	Electri	kWh	8/31/2006	10/1/2006	63,947	$7,282.00
Engineering 2 208V Service	Electri	kWh	8/1/2006	8/31/2006	63,947	$8,469.00
Engineering 2 208V Service	Electri	kWh	7/2/2006	8/1/2006	64,140	$8,459.00
Engineering 2 208V Service	Electri	kWh	6/1/2006	7/2/2006	61,515	$8,082.00
Engineering 2 208V Service	Electri	kWh	5/1/2006	6/1/2006	66,137	$8,634.00
Engineering 2 208V Service	Electri	kWh	4/1/2006	5/1/2006	66,107	$8,630.00
Engineering 2 208V Service	Electri	kWh	3/1/2006	4/1/2006	67,628	$8,743.00
Engineering 2 208V Service	Electri	kWh	2/2/2006	3/1/2006	60,175	$7,834.00
Engineering 2 208V Service	Electri	kWh	1/1/2006	2/2/2006	65,980	$9,008.00
Engineering 2 208V Service	Electri	kWh	11/30/2005	1/1/2006	67,002	$7,245.00
Engineering 2 208V Service	Electri	kWh	11/1/2005	11/30/2005	63,703	$6,876.00
Engineering 2 208V Service	Electri	kWh	10/3/2005	10/31/2005	61,547	$7,881.00
Engineering 2 208V Service	Electri	kWh	9/1/2005	10/3/2005	67,949	$8,941.00
Engineering 2 480V/277V	Electri	kWh	6/30/2008	8/1/2008	182,065	
Engineering 2 480V/277V	Electri	kWh	6/1/2008	6/30/2008	179,484	$22,280.13
Engineering 2 480V/277V	Electri	kWh	5/1/2008	5/31/2008	181,856	$22,169.73
Engineering 2 480V/277V	Electri	kWh	4/1/2008	4/30/2008	167,559	$13,921.17
Engineering 2 480V/277V	Electri	kWh	3/1/2008	3/31/2008	175,270	$14,494.17
Engineering 2 480V/277V	Electri	kWh	2/1/2008	2/29/2008	148,081	$0.00
Engineering 2 480V/277V	Electri	kWh	1/1/2008	1/31/2008	146,575	$13,097.10
Engineering 2 480V/277V	Electri	kWh	12/1/2007	12/31/2007	152,819	$14,367.12
Engineering 2 480V/277V	Electri	kWh	11/1/2007	11/30/2007	167,559	$15,866.60
Engineering 2 480V/277V	Electri	kWh	10/1/2007	10/31/2007	183,756	$22,397.01
Engineering 2 480V/277V	Electri	kWh	9/1/2007	9/30/2007	172,416	$20,889.19
Engineering 2 480V/277V	Electri	kWh	7/31/2007	8/31/2007	180,490	$22,075.00
Engineering 2 480V/277V	Electri	kWh	6/30/2007	7/31/2007	182,975	$22,332.00
Engineering 2 480V/277V	Electri	kWh	5/31/2007	6/30/2007	174,772	$20,843.00
Engineering 2 480V/277V	Electri	kWh	5/1/2007	5/31/2007	176,775	$21,081.00
Engineering 2 480V/277V	Electri	kWh	4/1/2007	5/1/2007	166,619	$15,758.00

Engineering 2 480V/277V	Electri	kWh	2/28/2007	4/1/2007	186,828	$18,467.00
Engineering 2 480V/277V	Electri	kWh	2/1/2007	2/28/2007	153,172	$15,131.00
Engineering 2 480V/277V	Electri	kWh	1/1/2007	1/31/2007	212,455	$65,748.00
Engineering 2 480V/277V	Electri	kWh	12/1/2006	12/31/2006	203,977	$19,533.00
Engineering 2 480V/277V	Electri	kWh	11/1/2006	11/30/2006	198,216	$18,058.00
Engineering 2 480V/277V	Electri	kWh	10/1/2006	10/31/2006	208,936	$23,419.00
Engineering 2 480V/277V	Electri	kWh	9/1/2006	10/1/2006	183,480	$20,890.00
Engineering 2 480V/277V	Electri	kWh	8/1/2006	8/31/2006	183,480	$20,890.00
Engineering 2 480V/277V	Electri	kWh	7/1/2006	8/1/2006	228,255	$30,103.00
Engineering 2 480V/277V	Electri	kWh	6/1/2006	7/1/2006	216,292	$28,418.00
Engineering 2 480V/277V	Electri	kWh	5/1/2006	6/1/2006	196,009	$25,589.00
Engineering 2 480V/277V	Electri	kWh	4/1/2006	5/1/2006	163,828	$21,388.00
Engineering 2 480V/277V	Electri	kWh	3/1/2006	4/1/2006	156,249	$20,200.00
Engineering 2 480V/277V	Electri	kWh	2/2/2006	3/1/2006	145,618	$18,957.00
Engineering 2 480V/277V	Electri	kWh	1/1/2006	2/2/2006	160,844	$21,961.00
Engineering 2 480V/277V	Electri	kWh	11/30/2005	1/1/2006	157,631	$17,044.00
Engineering 2 480V/277V	Electri	kWh	10/31/2005	11/30/2005	159,991	$17,270.00
Engineering 2 480V/277V	Electri	kWh	10/3/2005	10/31/2005	158,872	$20,344.00
Engineering 2 480V/277V	Electri	kWh	9/1/2005	10/3/2005	182,405	$24,004.00
Engineering 2 Heating	Natura	therm	6/30/2008	8/1/2008	3,775	
Engineering 2 Heating	Natura	therm	5/21/2008	6/30/2008	6,355	
Engineering 2 Heating	Natura	therm	4/24/2008	5/21/2008	5,063	
Engineering 2 Heating	Natura	therm	3/31/2008	4/24/2008	4,542	
Engineering 2 Heating	Natura	therm	2/28/2008	3/31/2008	7,683	
Engineering 2 Heating	Natura	therm	1/31/2008	2/28/2008	5,132	
Engineering 2 Heating	Natura	therm	1/1/2008	1/31/2008	8,621	
Engineering 2 Heating	Natura	therm	12/1/2007	12/31/2007	8,210	
Engineering 2 Heating	Natura	therm	11/1/2007	11/30/2007	6,291	
Engineering 2 Heating	Natura	therm	10/1/2007	10/31/2007	5,500	
Engineering 2 Heating	Natura	therm	9/1/2007	9/30/2007	4,564	
Engineering 2 Heating	Natura	therm	8/1/2007	8/31/2007	4,077	
Engineering 2 Heating	Natura	therm	7/1/2007	7/31/2007	3,908	

	HDD	Therm/Day	Therms
Apr-07	352		
May-07	243	178.3397	5350
Jun-07	96	137.4884	4262
Jul-07	70	130.263	3908
Aug-07	74.5	131.51355	4077
Sep-07	131	147.2149	4564
Oct-07	261	183.3419	5500
Nov-07	331.5	202.93385	6291
Dec-07	586	273.6594	8210
Jan-08	602	278.1058	8621
Feb-08	485	244.38	5132
Mar-08	419.5	240.09	7683
Apr-08	343	189.25	4542
May-08	270.5	187.52	5063
Jun-08	157	158.88	6355
Jul-08	71.5	130.17	3775
			73721

x	B
0.3098	97.725
0.2571	119.14
0.2759	111.61
0.2779	**110.81**



	B94004	E94201	E94202
	HOT_WATER	ELECTRIC	ELECTRIC
	Engineering 2 Heat Water Therms	Engineering 2 480/277V Service	Engineering 2 208V Service
	therms	kWh	kWh
Mar-08	7,683 $7,413.00	175,270 $14,494.17	66,809 $5,524.81
Apr-08	4,542 $4,760.06	167,559 $13,921.17	65,059 $5,405.26
May-08	5,063 $5,972.42	181,857 $22,169.73	68,296 $8,325.82
Jun-08	6,355 $7,737.41	179,484 $22,280.13	63,677 $7,904.55

ENERGY & ATMOSPHERE: PREREQUISITE 3
OZONE PROTECTION

1. LEED-EB Template
2. Letter from HVAC supervisor stating type and amount of refrigerant used in E2 chillers
3. Photo of boiler plate

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project meets the following ozone protection levels:

Option A

◉ Zero use of CFC-based refrigerants in the HVAC&R base building systems

Option B

○ A third party audit showing that system replacement or conversion is not economically feasible because of a simple payback of greater than 10 years.

I have provided the following to support the declaration for Option B:

☐ Documentation that base building HVAC&R systems do not use CFCs

Option C

○ Results of third-party audit demonstrating that replacement is not economically feasible.

I have provided the following to support the declaration for Option C:

☐ Documentation showing compliance with EPA Clean Air Act, Title VI, Rule 608 governing refrigerant management and reporting.

☐ Documentation showing that the annual refrigerant leakage rate is below 5% and the leakage over the remainder of unit life is being maintained below 30%.

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Prerequisite 3: Ozone Protection Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-24	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT
Office of Building & Utility Services
Darren Hintsala
HVAC Supervisor

SANTA CRUZ, CALIFORNIA 95064

April 16, 2008

To Whom It May Concern,

In order to achieve **EA Prerequisite 3**: Ozone Protection for the Engineering 2 building, we have attached an equipment information sheets showing the type of refrigerants, amount of refrigerants, models, and serial numbers of the two McQuay chillers. Both chillers are charged with 853 lbs of R-134a refrigerant, which is a HFC refrigerant, thus meeting this prerequisite.

The fire suppression in the Engineering 2 building contains HFC-227ea (FM-200), thus meeting the requirements for **EA Credit 4**.

If you have any questions please contact me at 831-459-5035.

Sincerely,

Darren Hintsala
HVAC Supervisor
University of California, Santa Cruz
(831) 459-5035
dwhintsa@ucsc.edu

EQ Equipment | Main | Equipment | Readings | Tasks | History | Warranty | PM Files | Refrige

EquipID: CH-01-940 | EquipDesc: CHILLER | Delta Point: | Dept: HVAC | RCH: | Supply Type: | Si

Mnf	MCQUAY	location	Mech. Rm. Level 1
Model	WSC063-0AAAM	Building	ENG2
Serial#	STNU031000057	Floor	1
Keyword	CHILLER	Room	1013A
Refrig. Type	R-134A	Duty	50 + Lbs
Chrg 1-Lbs/Oz	853	Chrg 2	
BldAsset#	940	Block	
Status	OPERATING	Zone	
Permit Required		Key#	
Equip. Condition	Excellent	Construction#	

Route: | Rou

Sort Order:

Notes: System fill pressure set - 12psi.
200 Ton Rated

Print List

Procedure by equip#: (Up to 30 lines will print out, don't wrap text).

1 On VFD

DrawingsEquip

EQ Equipment | Main | Equipment | Readings | Tasks | History | Warranty | PM Files | Refrige

EquipID: CH-02-940 | EquipDesc: CHILLER | Delta Point: | Dept: HVAC | RCH: | Supply Type: | Si

Mnf	MCQUAY	location	Basement Mech.
Model	WSC063-0AAAM	Building	ENG2
Serial#	STNU031000073	Floor	1
Keyword	CHILLER	Room	107
Refrig. Type	R-134A	Duty	50 + Lbs
Chrg 1-Lbs/Oz	853	Chrg 2	
BldAsset#	940	Zone	
Status	OPERATING	Key#	
Permit Required		Equip. Condition	Excellent
		Construction#	

Notes: System fill pressure set - 12psi. Chill water temp. setpoint 44F. 200 Ton Rated

Route: | Rou

Sort Order:

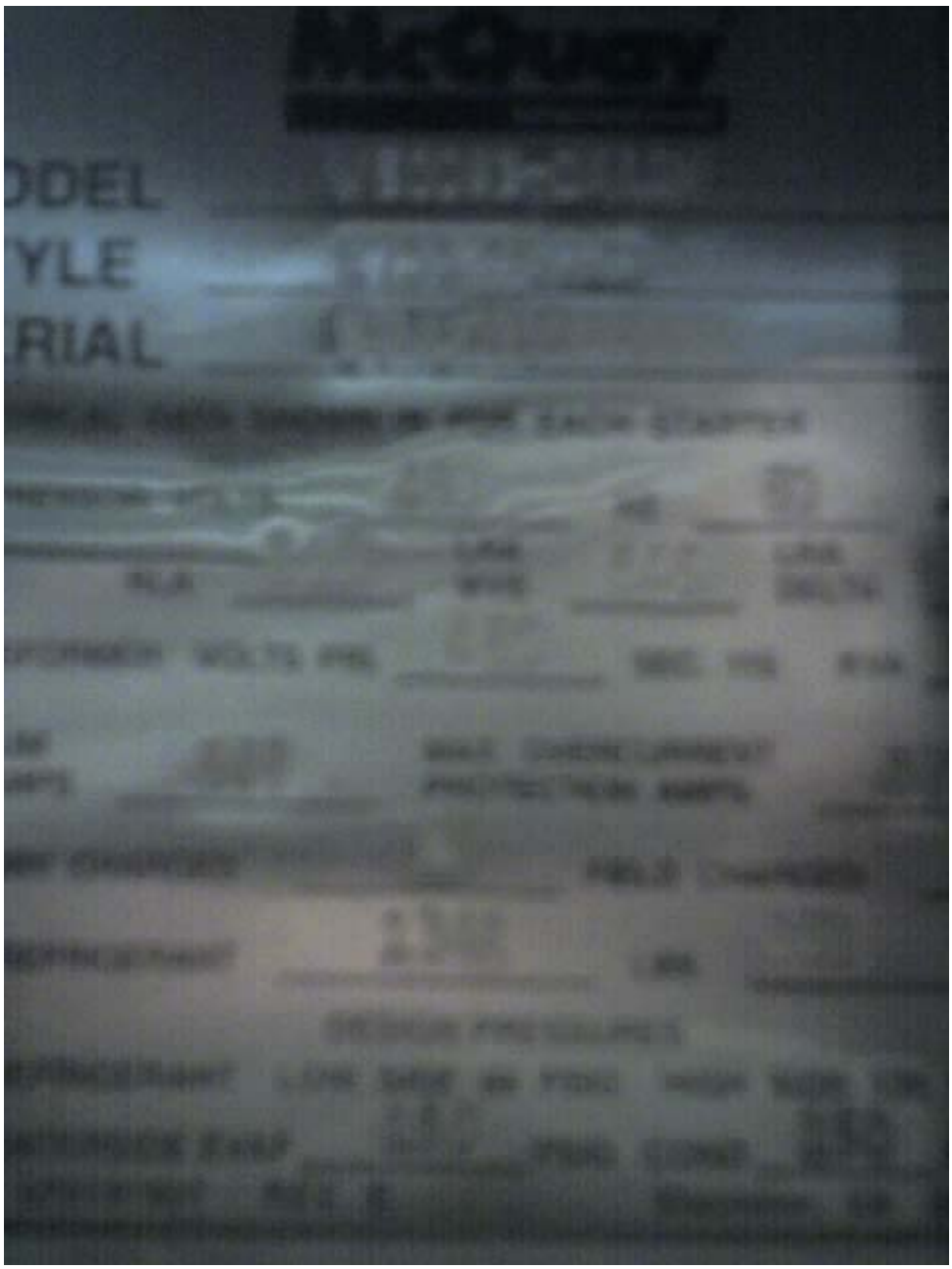
Print List

Procedure by equip#:

(Up to 30 lines will print out, don't wrap text).

1 On VFD

DrawingsEquip



ENERGY & ATMOSPHERE: CREDIT 1.1-1.10
OPTIMIZE ENERGY PERFORMANCE

1. LEED-EB Template
2. See EA Pre Requisite 2: Minimum Energy Performance for all other required documentation for this credit.

(Responsible Party)

I, Patrick Testoni , declare to USGBC that the following EPA–Energy Performance Rating (ENERGY STAR® Rating) has been achieved utilizing the Portfolio Manager tool on the ENERGY STAR website: www.energystar.gov., or for building types not addressed by ENERGY STAR Rating, the ENERGY STAR Rating equivalent for the building energy use has been demonstrated using the alternate method described in the LEED-EB Reference Guide.

ENERGY STAR Rating

○ 63	◉ 71	○ 79	○ 87	○ 95
○ 67	○ 75	○ 83	○ 91	○ 99

I have provided the following supplementary information to support the declaration:

Option A

☒ A Statement of Energy Performance generated from Portfolio Manager stating that the building energy has achieved the declared building ENERGY STAR Rating over the performance period.

☒ A summary of the annual bills including cost and usage amounts (kilowatt-hours, therms, gallons, etc.) for each type of energy used by the building annually over the performance period (This information can be printed from Portfolio Manager).

☒ Copies of the most recent 12 months of building utility bills including both energy use and peak demand if it is available. (An exception is made that buildings seeking initial LEED-EB certification may provide the most recent three months of building operating performance data augmented to approximate one full year of data to document compliance with this prerequisite.)

☒ If previously certified under LEED-NC, baseline (budget) building and design building projected energy consumption, projected peak demand and the energy points earned under LEED NC.

Option B

☐ Calculations showing the equivalent ENERGY STAR Rating for the building calculated using the alternate calculation method described in the LEED-EB Reference Guide.

☐ A summary of the annual bills including cost and usage amounts (kilowatt-hours, therms, gallons, etc.) for each type of energy used by the building annually over the performance period.

☐ Copies of the most recent 12 months of building utility bills including both energy use and peak demand if it is available.

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Credit 1.1 - 1.10 (10 points possible): Optimize Energy Performance Points Documented: 3

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Patrick	Testoni	2008-09-03	TESTONIP@UCSC.EDU	
First Name	Last Name	Date	Username (Email Address)	Password

ENERGY & ATMOSPHERE: CREDIT 2.1-2.4
ONSITE AND OFFSITE RENEWABLE ENERGY

1. LEED-EB Template
2. Narrative letter from UCSC Energy Manager highlighting program and contract to continue to purchase renewable energy credits over the next performance period.
3. Purchase order for renewable energy credits and invoices from Sterling Planet Inc.

Please complete for Option A and/or Option B

Note: Number entered must agree with the value from the EAp2 template

Building total energy use during the performance period [kBTU]:	2,516,694

Option A: On-Site Renewable Energy

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building's total energy use is provided by at least 3% of on-site renewable energy supply and that the associated environmental attributes have been retained or retired and not sold.

I have provided the following documentation to support the declaration for Option A:

- ☐ Narrative with system schematic diagrams highlighting on-site renewable energy systems installed in the building.
- ☐ Metered energy output of on-site renewable energy system over the performance period.
- ☐ Calculations below demonstrating that the declared percentage of total energy use are supplied by the on-site renewable energy systems.

Table 1: On-Site Renewable Energy

Energy Type	Annual Use [kBtu]	Annual Cost [$]	Energy Supplied [%]
			0
			0
			0
			0
			0
Total On-Site Renewable			0
Total Energy Use	2,516,694		0

Equation: 1 kWh = 3.412 kBTU

(Continued on Page 2)

Option B: Off-Site Renewable Energy

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building's total energy use is offset by at least 15% with off-site renewable energy supply or certificates and that at least 25% of any off-site green power or Green Certificates used to earn this credit are from new sources (sources constructed after 1997).

I have provided the following supplementary documentation to support the declaration for Option B:

☒ Demonstration that the supplied renewable power or certificates over the performance period met the referenced Green-e or equivalent requirements.

☒ Letter stating a commitment to continue purchases of renewable power or certificates at the same or higher level over the next performance period.

☒ Calculations below demonstrating that the declared percentage of total energy use are supplied by the off-site renewable energy systems or certificates.

Table 2: Off-Site Renewable Energy

Offsite Green Power Provider	Annual Use [kWh]	Annual Use [kBtu]	Annual Cost [$]	Energy Supplied [%]
Sterling Planet	57,000,000	194,484,000	94,620	98.72
				0
				0
				0
				0
Total Off-Site Renewable		194,484,000	94,620	98.72
Total Energy Use		197,000,694	94,620	0

Note: only 4 points are possible for EA credit 2. Points can be documented for each sub-credit by meeting the requirements for On-site or Off-site renewable energy or both, but any points beyond 4 are ignored in the total.

EA Cr 2.1: On-site and Off-site Renewable Energy >= 3% On-site or 15% Off-site Points Documented: 1

EA Cr 2.2: On-site and Off-site Renewable Energy >= 6% On-site or 30% Off-site Points Documented: 1

EA Cr 2.3: On-site and Off-site Renewable Energy >= 9% On-site or 45% Off-site Points Documented: 1

EA Cr 2.4: On-site and Off-site Renewable Energy >= 12% On-site or 60% Off-site Points Documented: 1

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Credit 2 (4 Points Possible): Renewable Energy Points Documented: 4

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password Associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-09	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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SANTA BARBARA · SANTA CRUZ

PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

To: US Green Building Council
LEED for Existing Building Program

The University of California Santa Cruz purchases Green-e Certified Renewable Energy Credits from Sterling Planet Inc. for 100% of its energy needs. Beginning in the fall of 2006, UCSC purchased 50,000 MWh of Green-e energy with sources in wind, solar, geothermal, hydropower, biomass and landfill gas. At a rate of $1.66 per MWh, the total price of the 2006 contract was $83,000. In 2007, UCSC purchased 57,000 MWh, totaling in $94,620 spent to off-sets.

UC Santa Cruz students passed a referendum in 2006 to pay $3 more in tuition each quarter to purchase clean, sustainable energy. These additional funds, on top of UC Santa Cruz's already existing electrical contract for 5 million kilowatt hours of renewable power, allows the campus to off set 100% of its energy.

The current Green Certificate Master Purchase Agreement with Sterling Planet Inc is effective from November 13, 2006 though November 12th, 2010. This contract ensures that UCSC will continue to purchase renewable energy certificates at the same or higher level over the next performance period.

Sincerely,

Patrick Testoni
Energy Manager
University of California, Santa Cruz

ATTACHMENT B

PURCHASE ORDER FORM

TASK One - UCSC

Purchase For:

Unique Purchase Order Number: PO269474

Purchase Order Effective Date: 11/13/2006

PURCHASE AMOUNT AND PURCHASE PRICE

Quantity to be Purchased (MWh): 50,000,000

REC Type (A, B or C) C

Choose from one of the following:

A) 100% wind
B) 99% wind/ 1% CA Solar PV
C) Green E Certified w/sources in wind, solar, geothermal, hydropower, biomass and landfill gas

Rate per MWh: $.00166 per MWh

Total Purchase Price: $83,000.00

PAYMENT SCHEDULE

Below is the agreed to payment schedule for the Green Certificates purchased under this Agreement.

Payment shall be made within 30 days of receipt of a proper invoice.

IN WITNESS WHEREOF, the Parties have caused this Purchase Order to be effective as of the day and year first set above set forth.

STERLING PLANET, INC.	**PURCHASER**
Signed: _____	Signed: _____
Name: Mel Jones	Name: William B. Hale
Title: President and Chief Executive Officer	Title: Business Contracts Administrator

For Green Certificate Master Purchase Agreement effective November 13, 2006 thru November 12, 2010.

Choosing To Make a Difference

University of Calif - Santa Cruz
Physical Plant Service Center
1156 High Street Barn G
Santa Cruz, CA 95064

Date	Invoice #	Due Date
11/1/2006	07-447	11/1/2006

Description	Period Ending	MWH	Rate Per REC	Amount Due
Green-e Certified Renewable Energy Credits REF PO: P0269474	11/15/2006	50,000	1.66	83,000.00

DOC: I1344656
PHYSICAL PLANT
AMT: 83,000 —
DUE: 11/15/06
APPROVAL: [illegible] O.K. TO PAY
DATE: 11.8.06

20 273. 642900-008020 - PHELCY

Per terms and conditions or our agreement.	**Total Amount Due** $83,000.00

Please detach and return bottom portion with your payment. If you have questions, please contact Ron Mitchell at 678-325-3172.

AP REVIEW
approved SB 11/14/06

Sterling Planet, Inc.
3295 River Exchange Drive
Suite 300
Norcross, Georgia 30092

Invoice No.
07-447

Payment Due	$83,000.00

Summary - PO P0269474

PO/Reference No. P0269474
Supplier Sterling Planet Inc

General Information

PO/Reference No.	**P0269474**
Revision No.	0
Purchase Order Date	11/3/2006
Supplier Name	Sterling Planet Inc
Address	3295 River Exchange Drive Suite 300 Norcross, GA 30092 US
Phone	+1 (678) 325-3172
Supplier Fax No.	+1 (678) 325-3174
Total	83,000.00 USD
Requisition Number	3050471
Hold PO	*no value*

Contact Information

Requestor Name	Patrick Testoni
Requestor Email	testonip@ucsc.edu
Requestor Phone	+1 (831) 459-2243

Shipping Information

Ship To

Department Physical Plant
Phone +1 (831) 459-2243
Email testonip@ucsc.edu
Attention Patrick Testoni
Univ. of Calif. Santa Cruz
1156 High Street
Shop Store
Santa Cruz, CA 95064
United States

Ship To Address Code

ShipTo Address Code	PLANT1

Delivery Options

Ship Via	Best Carrier-Best Way
Need Item By	11/16/2006

Billing/Payment

Bill To

Phone: 831-459-4972
Email: camaler@ucsc.edu
UC Santa Cruz
Physical Plant Service Center
1156 High Street Barn G
Santa Cruz, CA 95064
United States

Billing Options

F.O.B.

Information for Supplier

Purchasing Info

Purchasing Contact	*no value*
Purchasing Email	*no value*
Purchasing Phone	*no value*

Supplier Information

Note to Supplier	*no note*
Attachments for supplier	

Distribution Information

Distribution Methods

The system will distribute purchase orders using the method(s) indicated below:

Fax +1 (678) 325-3174

Distribution Options

Order acceptance instructions	Acceptance of this order including UC standard terms and conditions and/or other attached terms and conditions which are incorporated herein by reference constitutes a contract. Clauses and Terms and Conditions can be found at: http://purchasing.ucsc.edu/suppliers

Accounting Codes

Fund	Organization	Account	Activity
20273 Renewable Energy Fee	642900 OMP/UTILITIES	008020 Electricity	PPELCY PP Electricity (Utility)

Other Codes

Chart	Commodity Code	WorkOrder (10 Char Max.)
X	30000000 Building, Maintenance & Construction Supplies	*no value*

STERLING PLANET

Choosing To Make a Difference

University of Calif - Santa Cruz
Physical Plant Service Center
1156 High Street Barn G
Santa Cruz, CA 95064

Date	Invoice #	Due Date
10/9/2007	07-908	10/9/2007

Description	Period Ending	MWh	Rate Per MWh	Amount Due
Green-e Certified Renewable Energy Credits (National) REF: PO294253 Wiring Instructions: Bank: Wachovia, Atlanta ABA: 061000227 ACCT: 2000029033881	9/14/2007	57,000	1.66	94,620.00

DOC: I1465899
PHYSICAL PLANT
AMT: 94,620.00
DUE: 10/31/07
PO 294253
APPROVAL:
DATE: 10/12/07
MKS 11/2/07

Per terms and conditions or our agreement.	**Total Amount Due**	$94,620.00

Please detach and return bottom portion with your payment. If you have questions, please contact Ron Mitchell at 678-325-3172.

STERLING PLANET

AP REVIEW

Sterling Planet, Inc.
3295 River Exchange Drive
Suite 300
Norcross, Georgia 30092

Invoice No.
07-908

Payment Due	$94,620.00

Accounting Codes - PO P0294253

PO/Reference No. P0294253

Supplier Sterling Planet Inc

Accounting Codes

These values apply to all lines unless specified by line item

Chart	Fund	Organization	Account	Activity
X	20273 Renewable Energy Fee	642900 OMP/UTILITIES	008020 Electricity	PPELCY PP Electricity (Utility)

Other Codes

Commodity Code	WorkOrder (10 Char Max.)
30000000 Building, Maintenance & Construction Supplies	*no value*

Line Item Details

	Product Description	Catalog No	Size / Packaging	Unit Price	Quantity	Ext. Price
1	**57M Green-e certified Renewable Energy Credits (RECs)Priced at $.00166/kwh of RECs**	**UNKNOWN**	**EA**	**1.00**	**94,620 EA**	**94,620.00**

Accounting Codes (same as header)

Other Codes (same as header)

Shipping, Handling, and Tax charges are calculated and charged by each supplier. The values shown here are for estimation purposes, budget checking, and workflow approvals.

Subtotal	**94,620.00**
Tax1	0.00
Tax2	0.00
Total	**94,620.00 USD**

ENERGY & ATMOSPHERE: CREDIT 3.1
BUILDING OPERATION & MAINTENANCE: STAFF EDUCATION

1. LEED-EB Template
2. Spreadsheet of staff trainings and hours
3. Expense reports of staff trainings

(Responsible Party)

I, Louise Huttinger , declare to USGBC that all building operation and maintenance staff have been provided with at least 24 hours of high quality and relevant building operation and maintenance education on building and building systems operation, maintenance, and achieving sustainable building performance each year as outlined below over the performance period.

Performance period covered for building operation & maintenance education (number or fraction of years)	**1**

Building Operation and Maintenance Education Entry Table
Note: Only use one row per employee as each row is used in equation to comply with 24 hours of education per year.

Staff Member's Name	Dates of Courses	Course Titles	Hours
Sandoval, Gabriel	12/10/074/18/2008	HVAC Specialist: Tridium. Niagara AX certification Level 2 W	154
Yahia, Emad	12/10/07 to 12-14-(	HVAC Specialist: Tridium. Niagara AX certification HVA Spec	84

Powered by
Adobe® LiveCycle™

(Continued on Page 2)

*Recorded Performance Period Hours (Sum of entered time in Hours column)	238
*Qualifying Performance Period Hours (Sum of time that annualizes to 24 hours/yr or greater)	238
Total number of staff receiving building operation and maintenance education	2
Calculated annual average training hours for all by building operation and maintenance staff	119
Adequate building operation and maintenance education received	YES

***Note: Recorded Hours and Qualifying Hours must be equal for the calculations to be complete and to earn the credit. If these fields do not equal one another, it means one of the staff entered does not have enough education during the performance period to meet the credit intent of at least 24 hours per year.**

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Credit 3.1 (1 point possible): Building Operation & Maintenance: Staff Education

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

First Name	Last Name	Date	Username (Email Address)	Password
Louise	Huttinger	2008-09-24	lhutting@ucsc.edu	

MEMBER NAME	DATE	COURSE TITLE	HOURS
Sandoval, Gabriel	11-5-2007 to 11-9-200	Analog Service Course: Technique Courses for Lab Airflow, Controls and Applications. Offered by	36 hours
	12/10/07 to 12-14-07	HVAC Specialist: Tridium. Niagara AX certification	40 hours
	6-23-08 to 6-27-08	HVA Specialist PART 2: Tridium. Niagara AX certification	40 hours
	4/17/2008	E.S.I Onsite Training: WebAxSupervisor	6 hours
	4/18/2008	Level 2 WEBS Training, Tridium Niagra Ax Part II	32 hours
Yahia, Emad	12/10/07 to 12-14-07	HVAC Specialist: Tridium. Niagara AX certification	40 hours
	6-23-08 to 6-27-08	HVA Specialist PART 2: Tridium. Niagara AX certification	40 hours
	4/17/2008	E.S.I Onsite Training: WebAxSupervisor	6 hours

POST TRAVEL EXPENSE

Traveler's Name: Ernest Gabriel Sandoval
Traveler's Email: egsandoval@gmail.com
Address: Central Heat Plant

Phone: 212-0696
Destination(s) Richmond, VA
Purpose of Travel Training - Niagara AX Certification

Departure Date: 12/8/2007 **Time: 6:00AM**
Return Date: 12/15/2007 **Time: 11:00PM**

FAST Office Use Only	AP Review: YES NO -		
Trip Number:	PP8021	Date:	12/18/2007
Document #	I1488382		
Date Due:	1/10/2008		
Prepared by:	Carol Maler	Email: camaler@ucsc.edu	Ext: 4972
Vendor#@	72112		

U.S. Citizen: Yes No
Foreign: Visa Type _____
UC Student Campus _____
UC Employee Campus _____

Payments Made To/Or On Behalf Of Traveler

Airfare	$349.60
RegFee	$2,200.00
Lodging	$822.64
Total	$3,372.24

Enter all payments made on behalf of the traveler.

http://finaff.ucsc.edu/ap/travel/travel/TravPostInstrSC.htm

Cash [ ] *Enter cash advances from UCSC*

If traveler chooses to include personal travel, record times/dates based only on the business portion of the trip. Provide explanation of personal travel.

Description of Expense	Date 12/15/2007	Date	Date	Date	Date	Date	Date	TOTAL EXPENSE	COMMENTS
Airfare *	$349.60							$349.60	To/From: SJC/Richmond, VA R/T
PC **Mileage** .485 per mile (as of Jan 1, 2007)									
Car license#: 5Y05362	$32.00							$32.00	R/T: R/T Aptos to SJC Airport
Rental Car * *(excludes insurance)*	$348.93							$348.93	to/fr:
Other Transportation									to/fr
Parking/Tolls	$120.00							$120.00	
Conference *Registration**	$2,200.00							$2,200.00	PD on Banner Doc I1481361 w/ AirFare
Lodging * (rm+tax only)									
Meals & Incidentals	$29.21							$29.21	
Foreign Per Diem									
Long Term									
Miscellaneous (explain)									
**Totals from additional pages	$157.17	$139.40	$151.52	$151.52	$151.52	$151.52	$151.52	$1,054.17	
TOTALS:	$3,236.91	$139.40	$151.52	$151.52	$151.52	$151.52	$151.52	$4,133.91	

Less Payments on behalf of Traveler	Less Cash Advance	Due to Traveler or <Due to Regents>
$3,372.24		**$761.67**

Amount to charge FOAPAL

Fund	Org	Account	Activity	Amount
19900	642202	004420	PPH8788	**$761.67**

*** Must submit original receipts. ** Use additional forms for further expenses and explanations**

Traveler's certification: I certify that the above is a true statement, that the expenses claimed were incurred by me while on official University business on the dates shown, and that I have attached original receipts for each expense of $75.00 or more, as required by University policy. I certify that I have complied with California's auto liability insurance law while operating my personal automobile on University business.

Ernest "Gabe" Sandoval
Sign and Date

Other Authorizing Signatures
Sign and Date

Susan Bright 1/10/08
Susan Bright, Business Manager

Revised 05/2006

ATTENDANCE REQUEST FOR JOB DEVELOPMENT

INSTRUCTIONS:

1). Complete & submit the following form *at least* one (1) month prior to the first day of class

2). Is space in the class limited? If so, is registration considered a **RUSH?** [ ] Yes [X] No

EMPLOYEE NAME: Ernest Gabriel Sandoval	**DATE:** 10-31-07

Class title:	HVAC Specialist
Class offered by:	Tridium
Class location:	Richmond, Virginia

Indicate subject and brief outline of the course: Niagara AX certification, To help gain the level of technical expertise necessary to effectively and efficiently design, engineer and program projects using the Niagara Ax Framework

Indicate how this training benefit(s) the University: Facilitate the operation of Frontend system for the university

Select Course Type

[ ]	Budget/Finance	[ ]	Safety
[ ]	Customer Service	[X]	Skill Development
[ ]	IT Training	[ ]	Supervisory
[ ]	Management	[ ]	Other: _____

First Class Date:	12-10-07	**Final Class Date:**	12-14-07

Days of the week	Monday	Tuesday	Wednesday	Thrusday	Friday	Sat/Sun
Daily Class Hours	8	8	8	8	8	

Totals hours from work:	40
Number of work days missed:	5
Total Hours of the Class:	40

Please Note: if the total hours from work exceeds 8 hours in any given day, your supervisor will determine your eligiblity for overtime compensation based on departmental policy.

Estimated Course costs:	**Registration:**	**Travel:**	**Lodging:**	**Other:**	**Total:**
	2200 ea				2200.00

Supervisor

How will work be covered: _____

Approvals

[signature]	10-31-07	[signature]	10.31.07
Employee	Date	Superintendent	Date
[signature]	10-31-07	Dave Kolbus	11/1/07
Supervisor	Date	Director	Date

[signature] 11-1-07

TRIDIUM

3951 Westerre Parkway, Suite 350
Richmond, VA 23233
PHONE : (804) 747-4771
FAX : (804) 747 -5204

Invoice

NUMBER	100003407
DATE	PAGE
19-NOV-07	1 of 1
PURCHASE ORDER NUMBER	VSES111407
SALES ORDER UMBER	70031546
PROJECT NUMBER	
CUSTOMER NUMBER	LOCATION
13632	B-SANTA CRUZ
WAYBILL NUMBER	

BILL TO:
UNIVERSITY CALIFORNIA SANTA CRUZ
1156 HIGH STREET
SANTA CRUZ CA 95060
United States

SHIP TO:
UNIVERSITY CALIFORNIA SANTA CRUZ
1156 HIGH STREET
SANTA CRUZ CA 95060
United States

REMIT TO:
14434 Collections Center Drive
CHICAGO IL 60693
United States

TERMS	DUE DATE	SALESPERSON	CUSTOMER CONTACT
Net 30	19-DEC-07		
SHIPPING REFERENCE		SHIP VIA	SHIP DATE
FREIGHT TERMS		REQUESTOR/DELIVERY	CONFIRM TO/TELEPHONE

ITEM NO.	PART NUMBER/DESCRIPTION	QUANTITY ORDERED	BACK ORD.	SHIPPED	UNIT PRICE	EXTENSION
1	TRN-TCP-AX TRAINING, TECHNICAL CERTIFICATION FOR AX	1		1	2,200.00	2,200.00

PAID
BY: CC 11/15/07

SPECIAL INSTRUCTIONS	SUBTOTAL	TAX	SHIPPING	TOTAL
ERNEST GABRIEL SANDOVAL 12/10/07	2,200.00			2,200.00

POST TRAVEL EXPENSE

FAST Office Use Only	AP Review: YES NO -		
Trip Number:	PP8026	Date:	1/10/2008
Document #	E1488387		
Date Due:	~~12/26/08~~ 1/11/08		
Prepared by:	Carol Maler	Email: camaler@ucsc.edu	Ext: 4972
Vendor#@	72112		

Traveler's Name: Ernest Gabriel Sandoval
Traveler's Email: egsandoval@gmail.com
Address: Central Heat Plant

Phone: 212-0696

Destination(s) Boston, MA
Purpose of Travel Phoenix Controls

Departure Date: 11/3/2007 **Time: 6:00AM**
Return Date: 11/9/2007 **Time: 11:00PM**

U.S. Citizen: Yes No
Foreign:Visa Type
UC Student Campus
UC Employee Campus

Payments Made To/Or On Behalf Of Traveler

Airfare	$338.80
RegFee	$1,720.00
Lodging	$888.60
Total	$2,947.40

Enter all payments made on behalf of the traveler.

http://finaff.ucsc.edu/ap/travel/travel/TravPostInstrSC.htm

If traveler chooses to include personal travel, record times/dates based only on the business portion of the trip. Provide explanation of personal travel.

Cash [ ] *Enter cash advances from UCSC*

Description of Expense	Date 11/3/2007	Date 11/4/2007	Date 11/5/2007	Date 11/6/2007	Date 11/7/2007	Date 11/8/2007	Date 11/9/2007	TOTAL EXPENSE	COMMENTS
Airfare *							$338.80	$338.80	To/From: SanJose/ Boston, MA R/T PD on I1481331
PC **Mileage** .485 per mile (as of Jan 1, 2007)									
Car license#: 5Y05362							$32.00	$32.00	R/T: R/T Aptos to SJC Airport
Rental Car * *(excludes insurance)*							$434.31	$434.31	to/fr:
Other Transportation									to/fr
Parking/Tolls							$113.00	$113.00	Long-Term Parking (San Jose Airport)
Conference *Registration**	$1,720.00							$1,720.00	Paid on Banner Doc I1466550
Lodging * (rm+tax only)	$148.10	$148.10	$148.10	$148.10	$148.10	$148.10		$888.60	Paid on Banner Doc I1481331
Meals & Incidentals	$54.45	$44.19	$40.86	$40.86	$33.32	$38.91	$37.14	$289.73	*Breakfast of $5.14/day added to each days dinner. Breakfasts purchased from Stop & Watch*
Foreign Per Diem									
Long Term									
Miscellaneous (explain)							$39.11	$39.11	Gasoline for rental car
**Totals from additional pages									
TOTALS:	$1,922.55	$192.29	$188.96	$188.96	$181.42	$187.01	$994.36	$3,855.55	

Less Payments on behalf of Traveler	Less Cash Advance	Due to Traveler or <Due to Regents>
$2,947.40		**$908.15**

*** Must submit original receipts. ** Use additional forms for further expenses and explanations**

Amount to charge FOAPAL

Fund	Org	Account	Activity	Amount
19900	642202	004420	PPH8788	**$908.15**

Traveler's certification: I certify that the above is a true statement, that the expenses claimed were incurred by me while on official University business on the dates shown, and that I have attached original receipts for each expense of $75.00 or more, as required by University policy. I certify that I have complied with California's auto liability insurance law while operating my personal automobile on University business.

Erneset "Gabe" Sandoval
Sign and Date

Other Authorizing Signatures
Sign and Date

Susan Bright 1/10/08
Susan Bright, Business Manager

Revised 05/2006

ATTENDANCE REQUEST FOR JOB DEVELOPMENT

INSTRUCTIONS:

1). Complete & submit the following form *at least* one (1) month prior to the first day of class

2). Is space in the class limited? If so, is registration considered a **RUSH?** [ ] Yes [X] No

9/28/16
11/5-9/07

EMPLOYEE NAME:	Gabriel Sandoval 7/31/7	**DATE:**	
Class title:	Analog Service Course		
Class offered by:	Phoenix Controls		
Class location:	Acton, Ma.		

Indicate subject and brief outline of the course: Technical course for lab airflow control applications, variable airflow valve theory and fume hood fundamentals. Hands on training with Phoenix line and develop thorough operation and trouble shooting capabilities.

Indicate how this training benefit(s) the University: Provide an understanding of the Phoenix analog product line which is being utilized in PSB and possible future buildings (Biomed)

Select Course Type

[ ]	Budget/Finance	[ ]	Safety
[ ]	Customer Service	[X]	Skill Development
[ ]	IT Training	[ ]	Supervisory
[ ]	Management	[ ]	Other: _____

First Class Date:	Nov 5th, 2007	**Final Class Date:**	Nov 9th, 2007

Days of the week	Monday	Tuesday	Wednesday	Thrusday	Friday	Sat/Sun
Daily Class Hours	8	8	8	8	4	

Totals hours from work:	
Number of work days missed:	5
Total Hours of the Class:	36

Please Note: if the total hours from work exceeds 8 hours in any given day, your supervisor will determine your eligiblity for overtime compensation based on departmental policy.

Estimated Course costs:	**Registration:**	**Travel:**	**Lodging:**	**Other:**	**Total:**
	1720 00	1,000	800	1,350	4,170

Supervisor

How will work be covered: _____

Approvals

Employee	7/16/07	Superintendent	7-18-07
Supervisor	7/17/07	Director	7/19/07

Honeywell

Phoenix Controls Corporation

Training Information

While the Phoenix system requires little maintenance, some customers have expressed a desire to educate their facilities staff on the operation of our laboratory ventilation system. To meet this need, we offer classes at our Acton training facility.

For a detailed description of each course, click on the course name below. All classes require minimum attendance and are therefore subject to change. Classes fill on a first come, first served basis. Please contact the Training Coordinator with any questions or concerns regarding this schedule.

Registration form Microsoft Word form (91 KB)

Please Note: The following schedules are subject to change without notice.

Celeris® 1 Operations and Maintenance	
October 16-18, 2007	Open
Analog Service Course	
July 9-13, 2007	Open
September 24-28, 2007	Open
November 5-9, 2007	Open
Celeris Service Course	
July 16-20, 2007	Open
October 1-5, 2007	Open
November 12-16, 2007	Open
Combined Sales and Applications Course	
October 22-26, 2007	Open

Prerequisite: Personnel registering for the training must operate and maintain an installation of Celeris 2 equipment.

Course materials: All students will receive a course-specific training manual.

Registration form Microsoft Word form (91 KB).

Combined Sales & Applications Course

This lecture and hands-on seminar gives students a working knowledge of labs, fume hoods, related HVAC and control systems, and specific Phoenix Controls products and design solutions. Students build submittals for every application covered in class. Activities include balancing zones, selecting and sizing products, setting system parameters, determining control signal flows and reviewing wiring diagrams.

Other topics discussed are budgeting, pricing, competitive analysis, project responsibilities and integrated systems (DDC vendors). The analog and Celeris 2 product lines are covered.

Students who successfully complete this course will receive Sales and Applications certification.

Objectives: To become fluent in laboratory airflow issues, and Phoenix Controls equipment and systems. Sales personnel will be capable of presenting laboratory control issues, describing products and solutions in detail, and estimating and quoting projects. Design personnel can engineer and submit a complete system.

Intended participants: Employees of Phoenix Controls representatives responsible for sales and employees responsible for submittals and project management.

Duration: Five days; 1 p.m. closure on day five

Location: Phoenix Controls, Acton, MA

Class Size: 6 to 15

Prerequisites: HVAC experience preferred. Students are required to complete a short assignment and test before class.

Course materials: All students will receive an assignment and test that they must complete before class. They will also receive the Product Selection Guide, a class workbook and all software required for preparing and submitting submittals.

Registration form Microsoft Word form (91 KB)

Phoenix Controls
Corporation

Educational Services

Training Registration Form

Please complete this form and return it to the Training Manager by fax at (978) 795-1111.

General Information

Organization: University of California, Santa Cruz Date: 10/9/07

Address: Physical Plant, 1156 High Street, Barn G

City: Santa Cruz State: CA Zip: 95064

Telephone: (831) 459-5038 (Dan MIceli) Fax: (831) 459-5121 (Carol Maler
Supervisor

Course Information (Use one form for each class.)

Course Name: Analog Service Course Course Number:

Date of Course: NOVEMBER 5 - 9, 2007 ☐ Check enclosed (Payable to Phoenix Controls Corporation)

Course Fee: $ 1720.00 ☒ Please invoice my company (PO #): PP8016

Payments are due three weeks before the course.

Participant Information

Name	Title	E-mail Address
Ernest "Gabe) Sandoval	Physical Plant Mechanic	egsand@ucsc.edu

Payments are due three weeks before the course.

Facility Director: Ilse Kolbus, Director Telephone:

In-house Training Instructions

Phoenix Controls will provide all sessions, lunch, workbooks, pre-reading materials, and transportation to and from the Westin Hotel in Waltham to the Phoenix Controls Training Center. All other costs incurred are the responsibility of the participant.

Phoenix Controls reserves the right to cancel a course 21 days in advance of the start date. If a class is cancelled, all attendees will be notified in writing. Phoenix Controls' liability will be limited to a refund of the registration fee (if applicable).

Phoenix Controls Corporation

75 Discovery Way Acton, MA 01720 USA
978 795-1285 978 795-1112 Fax
www.phoenixcontrols.com

SHIPMENT NO.	DATE SHIPPED	BILL OF LADING	PAGE
1057960	10/12/07	HAND	1

METHOD OF SHIPMENT	FREIGHT TERMS
HAND CARRIED	NOT APPLICABLE

Invoice

INVOICE NO.	INVOICE DATE	PRINTED ON	CUSTOMER PURCHASE ORDER NUMBER
1057960	10/12/07	10/12/07	PP8016

SALES ORDER NO.	PAYMENT TERMS	CONTRACT NUMBER
1669TR	CASH IN ADVANCE	TRAINING

BILL TO
UNIVERSITY OF CALIFORNIA
PHYSICAL PLANT 1156 HIGH ST.
BARN C

SANTA CRUZ, ca 95064
USA

BILL TO CUSTOMER ca1728

SHIP TO
PHOENIX CONTROLS
75 DISCOVERY WAY

ACTON, MA
USA 95064

SHIP TO CUSTOMER ca1728

E/4 C C550
10/5/07

LINE	PRODUCT NUMBER / PRODUCT DESCRIPTION	QTY. INVOICE / QTY. BACKORDERED	UOM	NET UNIT PRICE / LIST PRICE	NET EXTENSION	TAX	TOTAL DISCOUNT %
1	TRAINING TRAINING ANALOG SERVICE COURSE FOR ERNEST SANDOVAL TO BE HELD AT PHOENIX CONTROLS ON 11/5-11/9 2007.	1.000 0.000	EA	1720.0000	1720.00		

SUBTOTAL:	1720.00
TAX: 0.00 @ 6.000% CALIFORNIA SALES TAX	0.00
TOTAL: ($)	1720.00

REMIT PAYMENT TO LOCKBOX ADDRESS:
Phoenix Controls Corporation
Box 83042
Woburn, MA 01813-3042

WIRING INSTRUCTIONS FOR US DOLLAR PAYMENTS:
Bank: Silicon Valley Bank, Santa Clara, CA USA, Bank ABA#: 121 140 399
Account Name: Phoenix Controls Corp. Account Number: 700 254 870

PRODUCTS ARE SHIPPED IN ACCORDANCE WITH THE USA EXPORT ADMINISTRATION REGULATIONS. DIVERSION CONTRARY TO USA LAW IS PROHIBITED.

ATTENDANCE REQUEST FOR JOB DEVELOPMENT

INSTRUCTIONS:

1). Complete & submit the following form *at least* one (1) month prior to the first day of class

2). Is space in the class limited? If so, is registration considered a **RUSH?** [x] Yes [ ] No

EMPLOYEE NAME: Ernest Gabriel Sandoval	**DATE: 4/18/08**

Class title:	Level 2 WEBS Training, Niagara AX part 2
Class offered by:	Universal Supply Group
Class location:	New Jersey

Indicate subject and brief outline of the course: Tridium Niagara AX Advanced training class designed to teach how to intergrate Honeywell specific controllers n Niagara AX systems.

Indicate how this training benefit(s) the University: Honeywell controls are being used throughout the facility and Tridium Niagara AX is beginning to be integrated with Honeywell controls. This training will allow us to support these to controls to provide better customer service and facilitate better energy management.

Select Course Type

[ ]	Budget/Finance	[ ]	Safety
[ ]	Customer Service	[x]	Skill Development
[ ]	IT Training	[ ]	Supervisory
[ ]	Management	[ ]	Other: _____

First Class Date:	6/23/2008	**Final Class Date:**	6/26/2008

Days of the week	Monday	Tuesday	Wednesday	Thrusday	Friday	Sat/Sun
Daily Class Hours	8:00-5:00	8:00-5:00	8:00-5:00	8:00-5:00		

Totals hours from work:	40
Number of work days missed:	5
Total Hours of the Class:	32

Please Note: if the total hours from work exceeds 8 hours in any given day, your supervisor will determine your eligiblity for overtime compensation based on departmental policy.

Estimated Course costs:	**Registration:**	**Travel:**	**Lodging:**	**Other: Meals/Incidentals**	**Total:**
	$1,800.00	$700.00	$1,200.00	$500.00	$4,200.00

Supervisor

How will work be covered: Work will be absorbed by shop as best as possible while he is in training.

Approvals

EGS — Employee — Date: 4-21-08

Superintendent — Date

Supervisor — Date: 4/21/08

Director — Date

Level II WEBs Training, Real Job Programming

Niagara AX Training Part 2

This class is designed for the technician who will be:

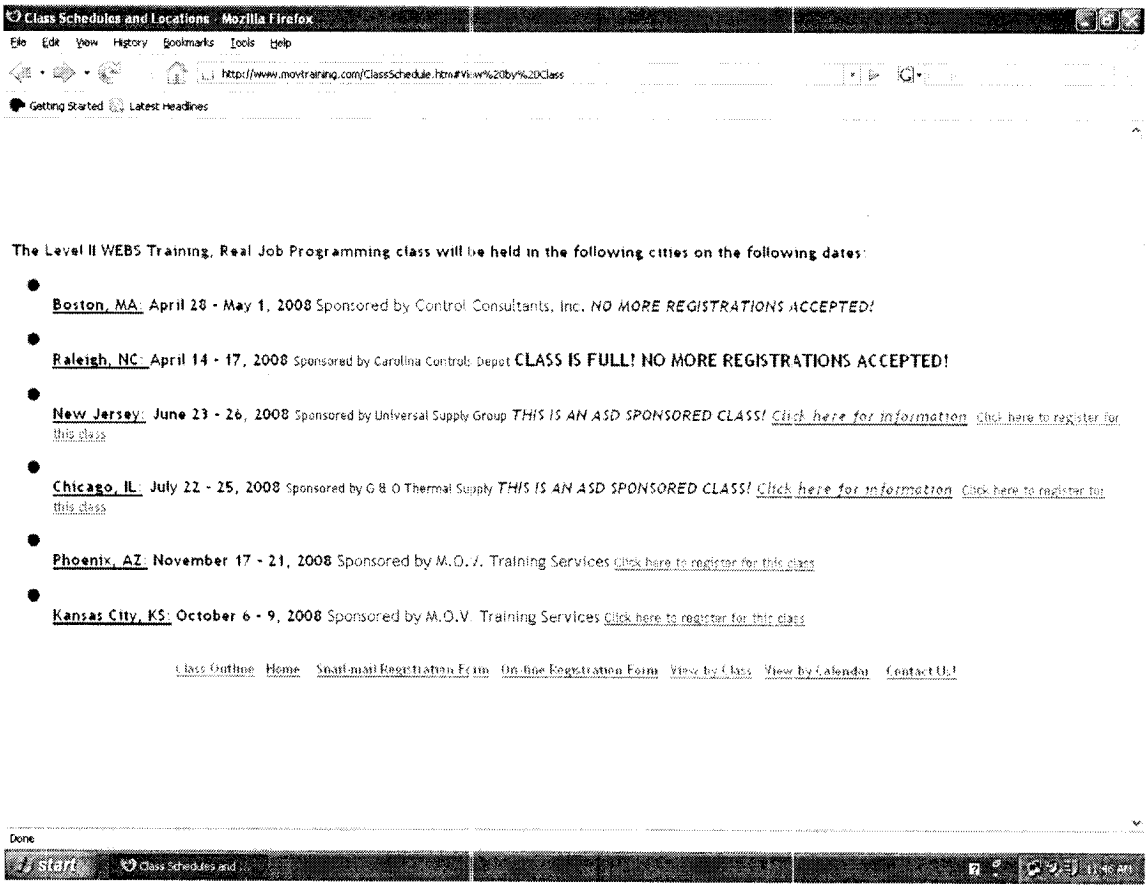
- Designing a WEBs system; choosing controllers, designing the system architecture
- Installing the WEBs program on a PC
- Programming the JACE / WEBs controllers
- Programming XL10 and XL15c controllers
- Configuring and programming the Spyder controller
- Integrating XL500 / XL50 controllers to WEBs
- Setting up Alarms, Trends and Schedules for a control system
- Configuring displays / graphics for the system
- Set up internet access to the system
- Setting up a Supervisor PC

This class is designed for the tech who has attended the Niagara AX Certification class and has earned an AX certification!

Level II WEBs Training Class Outline:

Day 1	Day 2	Day 3	Day 4
Introductions WEBs System Hardware Review WEBs / LON System Architecture Review Review of class lab specification	Configuring a CVAHU XL10 Controller Copying a Controller Configuring a VAV XL10 Controller	Programming the XL15c Controller: Logic Loops Programming the XL15c Controller: Control Loops Configuring the Spyder Controller	Assigning schedules to XL10 and XL15c Controllers Configuring Trending Configuring Alarms and Alarm Handling Configuring Displays
Lunch	Lunch	Lunch	Lunch
Loading and Registering WEBs on a PC Loading the WEBs Wizards Creating a Station in WEBs Creating a Lon Network in WEBS Creating an XL10 Controller in WEBS	Configuring Communication between XL10 Controllers Creating an XL15c Controller Programming the XL15c Controller: Start / Stop Loops	Configuring the Spyder Controller (cont.) Programming the JACE Controller: ● Reading from an XL10 / XL15c / XL50-XL500 ● Writing to an XL10 / XL15c / XL50-XL500 Configuring Schedules Configuring Holidays	Configuring Displays (Cont) Configuring the Supervisor PC ● Alarm Handling ● Trend Handling Intro to the WEBs Energy Suite and WEBs Security Systems

Note: This outline **reflects a rough time frame** of the class presentation. All subjects will be covered, but the actual day / time of the presentation may vary from this outline.



POST TRAVEL EXPENSE

FAST Office Use Only	AP Review:	YES	NO -
Trip Number:	PP8022	Date:	1/10/2008
Document #	I1488395		
Date Due:	1/11/08		
Prepared by:	Carol Maler	Email: camaler@ucsc.edu	Ext: 4972
Vendor#@	@000 61728		

Traveler's Name: YAHIA, EMAD
Traveler's Email: eyahia@ucsc.edu
Address: Central Heat Plant

Phone: 1091
Destination(s) Richmond, VA
Purpose of Travel

Departure Date: 12/9/2007 **Time:**
Return Date: 12/14/2007 **Time:**

U.S. Citizen: Yes No
Foreign: Visa Type
UC Student Campus
UC Employee Campus

Payments Made To/Or On Behalf Of Traveler

Airfare	$349.60
RegFee	$2,200.00
Lodging	$705.12
Total	$3,254.72

Enter all payments made on behalf of the traveler.

http://finaff.ucsc.edu/ap/travel/travel/TravPostInstrSC.htm

If traveler chooses to include personal travel, record times/dates based only on the business portion of the trip. Provide explanation of personal travel.

Cash [ ] *Enter cash advances from UCSC*

Description of Expense	Date 12/9/2007	Date 12/10/2007	Date 12/11/2007	Date 12/12/2007	Date 12/13/2007	Date 12/14/2007	Date 12/15/2007	TOTAL EXPENSE	COMMENTS
Airfare *						$349.60		$349.60	To/From: SJC/Richmona, VA R/T PD DOC I1481352
PC **Mileage** .485 per mile (as of Jan 1, 2007)									
Car license#: 5VIC262						$32.00		$32.00	R/T: Santa Cruz/ SJC Airport
Rental Car * *(excludes insurance)*									to/fr:
Other Transportation									to/fr
Parking/Tolls									
Conference *Registration**						$2,200.00		$2,200.00	Paid on Banner Doc I1481352
Lodging * (rm+tax only)	$117.52	$117.52	$117.52	$117.52	$117.52	$117.52		$705.12	Paid on Banner Doc I1481352
Meals & Incidentals	$32.75	$27.55	$34.00	$34.00	$34.00	$34.00	$20.64	$216.94	
Foreign Per Diem									
Long Term									
Miscellaneous (explain)									Gas for rental car
**Totals from additional pages									
TOTALS:	$150.27	$145.07	$151.52	$151.52	$151.52	$2,733.12	$20.64	$3,503.66	

Less Payments on behalf of Traveler	Less Cash Advance	Due to Traveler or <Due to Regents>
$3,254.72		**$248.94**

*** Must submit original receipts. ** Use additional forms for further expenses and explanations**

Amount to charge FOAPAL

Fund	Org	Account	Activity	Amount
19900	642206	004420	PPM878	**$248.94**

Traveler's certification: I certify that the above is a true statement, that the expenses claimed were incurred by me while on official University business on the dates shown, and that I have attached original receipts for each expense of $75.00 or more, as required by University policy. I certify that I have complied with California's auto liability insurance law while operating my personal automobile on University business.

Emad Yahia
Sign and Date

Other Authorizing Signatures
Sign and Date

/Susan Bright 1/10/08
Susan Bright, Business Manager

Revised 05/2006

ATTENDANCE REQUEST FOR JOB DEVELOPMENT

INSTRUCTIONS:

1). Complete & submit the following form *at least* one (1) month prior to the first day of class

2). Is space in the class limited? If so, is registration considered a **RUSH?** [ ] Yes [X] No

EMPLOYEE NAME: Emad Yahia	**DATE: 10/29/07**

Class title:	Niagara AX Certification Class
Class offered by:	Tridium
Class location:	Richmond, Virgina

Indicate subject and brief outline of the course:

To gain the level of technical expertise necessary to effectively and efficiently design, engineer, and program projects using the Niagara AX Framework

Indicate how this training benefit(s) the University:

To give employee skills necessary to program and maintain new systems in Baskin Eng, 2300 Delaware and other sites utilizing the Niagra AX framework

Select Course Type

[ ]	Budget/Finance	[ ]	Safety
[ ]	Customer Service	[X]	Skill Development
[ ]	IT Training	[ ]	Supervisory
[ ]	Management	[ ]	Other: _____

First Class Date:	12/10/2007	**Final Class Date:**	12/15/2007

Days of the week	Monday	Tuesday	Wednesday	Thrusday	Friday	Sat/Sun
Daily Class Hours	8:00 AM to 4:00 PM	8:00 AM to 4:00 PM	8:00 AM to 4:00 PM	8:00 AM to 4:00 PM	8:00 AM to 4:00 PM	

Totals hours from	40	
Number of work days missed:		5 day
Total Hours of the Class:		40

Please Note: if the total hours from work exceeds 8 hours in any given day, your supervisor will determine your eligiblity for overtime compensation based on departmental policy.

Estimated Course costs:	**Registration:**	**Travel:**	**Lodging:**	**Other:**	**Total:**
	$2,200.00	$500.00	$500.00	$300.00	$3,500.00

Supervisor: Don Mixon

How will work be covered: CCOMS employee will cover work for the duration of class

Approvals:

Emad Yahia _____ 29 Oct

Jim West 10-29-07

10-29-07

Alex Kilburn

TRIDIUM
3951 Westerre Parkway, Suite 350
Richmond, VA 23233
PHONE : (804) 747-4771
FAX : (804) 747 -5204

Invoice

NUMBER 100003413

DATE	PAGE
19-NOV-07	1 of 1

PURCHASE ORDER NUMBER VSET111407

SALES ORDER UMBER

PROJECT NUMBER

CUSTOMER NUMBER	LOCATION
13632	B-SANTA CRUZ

WAYBILL NUMBER

BILL TO:
UNIVERSITY CALIFORNIA SANTA CRUZ
1156 HIGH STREET
SANTA CRUZ CA 95060
United States

SHIP TO:
UNIVERSITY CALIFORNIA SANTA CRUZ
1156 HIGH STREET
SANTA CRUZ CA 95060
United States

REMIT TO:
14434 Collections Center Drive
CHICAGO IL 60693
United States

TERMS	DUE DATE	SALESPERSON	CUSTOMER CONTACT
Net 30	19-DEC-07		
SHIPPING REFERENCE		**SHIP VIA**	**SHIP DATE**
FREIGHT TERMS		**REQUESTOR/DELIVERY**	**CONFIRM TO/TELEPHONE**

ITEM NO.	PART NUMBER/DESCRIPTION	QUANTITY ORDERED	BACK ORD.	SHIPPED	UNIT PRICE	EXTENSION
1	TRN-TCP-AX TRAINING, TECHNICAL CERTIFICATION FOR AX	1		1	2,200.00	2,200.00

paid via CC
on 11/15/07

SPECIAL INSTRUCTIONS	SUBTOTAL	TAX	SHIPPING	TOTAL
EMAD YAHIA 12/10/07	2,200.00			2,200.00

ATTENDANCE REQUEST FOR JOB DEVELOPMENT

INSTRUCTIONS:

1). Complete & submit the following form *at least* one (1) month prior to the first day of class

2). Is space in the class limited? If so, is registration considered a **RUSH?** [X] Yes [ ] No

EMPLOYEE NAME: Emad Yahia	**DATE: 4/21/2008**
Class title:	Level II WEBs Training, Real Job Programming,Niagara AX Training Part 2 of Series
Class offered by:	Universal Supply Group
Class location:	Hawthorne, New Jersey

Indicate subject and brief outline of the course:

Programming XL10 and XL15c controllers. Configuring and programming the Spyder controller. Integrating XL500 / XL50 controllers to WEBs. Designing WEBs systems architecture

Indicate how this training benefit(s) the University:

The integration of Tridium and Honeywell sytems is rapidly deployed in new projects around campus, employees needs the skill set necessary to maintain and support this new system

Select Course Type

[ ]	Budget/Finance	[ ]	Safety
[ ]	Customer Service	[X]	Skill Development
[ ]	IT Training	[ ]	Supervisory
[ ]	Management	[ ]	Other: _____

First Class Date:	6/23/2008	**Final Class Date:**	12/15/2007

Days of the week	Monday	Tuesday	Wednesday	Thrusday	Friday	Sat/Sun
Daily Class Hours	8:00 AM to 5:00 PM	8:00 AM to 5:00 PM	8:00 AM to 5:00 PM	8:00 AM to 5:00 PM	8:00 AM to 5:00 PM/Travel	

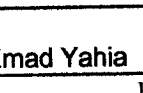
Totals hours from 40	
Number of work days missed:	5 day
Total Hours of the Class:	40

Please Note: if the total hours from work exceeds 8 hours in any given day, your supervisor will determine your eligiblity for overtime compensation based on departmental policy.

Estimated Course costs:	**Registration:**	**Travel:**	**Lodging:**	**Other:**	**Total:**
	$1,800.00	$700.00	$1,200.00	$500.00	$4,200.00

Supervisor	Dan Miceli
How will work be covered:	CECMS personnel will cover work for the duration of class

Approvals

Emad Yahia  21-Apr-2008

Employee — Date

Superintendent — Date

Supervisor — Date

Director — Date

ENERGY & ATMOSPHERE: CREDIT 3.2
BUILDING OPERATION & MAINTENANCE: BLDG SYSTEMS

1. LEED-EB Template
2. UCSC Planned Maintenance Overview
3. E2 annual, semi-annual, and quarterly PMs

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the comprehensive best practices equipment preventive maintenance program outlined below is an accurate reflection of in-house resources or contractual services delivered over the performance period.

I have provided the following to support the declaration:

☒ Documentation of ongoing operation of the best practices equipment maintenance program over the performance period.

☒ Documentation of in-house resources and/or contractual services to deliver post warranty maintenance.

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Credit 3.2 (1 point possible): Building Operation & Maintenance: Building Systems Maintenance

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-07-11	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

PHYSICAL PLANT SANTA CRUZ, CALIFORNIA 95064
Office of Work Management
Planned Maintenance

PLANNED MAINTENANCE

Overview

The Planned Maintenance (PM) department through our Building and Utility Services (B&US) division at UCSC maintains and tracks information pertaining to equipment and facilities. Histories, readings, procedures, warranty and nomenclature information is kept in our database. Our programs include both in-house craft personnel and outside contractors. The PM's are coordinated to cause the least amount of disruption to the campus. Schedules are viewable on the Web for each trade although it is important to remember that emergencies supersede scheduled maintenance.

Why Do We Perform Preventive Maintenance?

Environmental and Economic Issues:

- **Reduction of Business/Classroom Interruption**
  The average hourly business interruption cost incurred for office buildings is 0.0681 per square foot. (Source: IEEE)
- **Reduction in Life Safety Risks**
  Much of the critical equipment that our (B&US) group maintains, if not properly maintained would represent an ever-increasing risk to Life Safety through potential fire or explosion.
- **Utility Costs**
  Without preventive maintenance the electrical systems alone could lose $1,000 to $4,000 per year/building. (Source: Infrared Research, Inc.)
- **Asset Management**
  Electrical & HVAC alone comprise 20-30% of a facilities total construction cost. Approximately 75% of these asset values, if maintained properly, will result in prolonged life. Preventive Maintenance also reduces equipment repair costs and helps to decrease the volatility associated with repair budgets.

Industry Standards

Our qualified technicians, under the careful supervision of their Shop Supervisors, perform preventive maintenance tasks that meet or exceed the following standards: NFPA, IEEE, UMC, UPC, Manufacturers recommendations.

Dynamically Evolving Strategies

Planned maintenance is the purposeful rejuvenation of equipment before parts start failing. It is a maintenance strategy based on continual renewal so that you always have plant and equipment that are in good condition and hence free of age related defects.

A Planned Maintenance Procedure Based on Equipment Criticality:

The approach relies on identifying equipment criticality based on the impact that equipment failure has on production. The failure modes that cause breakdowns are identified and the necessary planned maintenance to address the failures are specified. The required frequency to perform the planned maintenance activity is set so that it is done before a failure occurs.

If you are spending the majority of your maintenance effort in reactive tasks then your maintenance costs are high. If you can spend the majority of your maintenance effort doing planned maintenance activities you will lower your maintenance costs and have a more reliable physical plant.

The Shops

The following Shops (and sub-shops) are involved daily in preventive maintenance tasks:

Building & Utility Services:

Structural Trades
- Carpenter Shop
- Paint Shop
- Sign Shop
- Restroom Maintenance Shop

Electrical Shop
- Lighting Crew
- Electrical Crew
- High Voltage Crew
- Cogen Crew
- Fire & Security Crew

HVAC Shop
- HVAC Crew
- CECMS Crew
- Filter Crew

Plumbing Shop
- Plumbing Crew

Outside Vendors

The use of outside vendors is utilized for those Preventive Maintenance tasks that either exceed our Shops capabilities or labor resources. Some of the maintenance activities we utilize outside vendors for include:

High-end Chiller Maintenance (usually performed by the manuf.)
Kitchen Hood De-Greasing
Ansul & FM200 Testing & Maintenance
Overhead Crane Maintenance
Tension Grid Testing
Sewer Meter Testing & Calibration
Hardwood Floor Cleaning & Resurfacing
Dock Lift Maintenance

Database Management

Planned Maintenance utilizes database management software as a nexus for the creation and maintenance of a 52-week maintenance calendar. Multi-year calendars are utilized as well. All Preventive Maintenance activities (PM's) are labored and have identified Standing Work Orders for time card reference.

These PM's range from daily through multi-annual in frequency.

See Attachment "A" as a sample PM utilized in our schedule.

PM ID# 878

Area: Engineering 2
Week#: 19
Date: 11/3/2007
Crew: HVAC

ENTERED

HVAC / E-2 Mechanical / Annual

81 Hrs Rev 3/17/2006

W.O. SCE2PH (81 HRS)

☐	5	B-150	AHU-05-940
☐	1	BeltAP-54	EF-03-940
☑	3	BX144	AHU-05-940
☐	1	V Belt4L340	EF-29-940
☐	1	V Belt4L340	EF-30-940
☐	3	V Belt5VX1230	AHU-03-940
☐	1	V BeltAP-54	EF-04-940
☐	2	V BeltAP-68	EF-05-940
☐	1	V BeltAX-23	EF-26-940
☐	1	V BeltAX-23	EF-27-940
☐	1	V BeltAX-23	EF-31-940
☐	1	V BeltAX-23	EF-32-940
☐	1	V BeltAX-23	EF-33-940
☐	1	V BeltAX-23	EF-34-940
☐	5	V BeltB-150	AHU-06-940
☐	3	V BeltB-158	AHU-04-940
☑	3	V BeltB-162	AHU-04-940
☐	2	V BeltB-44	FCU-04-940
☐	2	V BeltB-44	FCU-05-940
☐	2	V BeltB-44	FCU-06-940
☐	2	V BeltB-44	FCU-07-940
☐	2	V BeltB-53	AHU-02-940
☑	2	V BeltB-54	AHU-02-940
☐	3	V BeltBX-144	AHU-06-940
☑	2	V BeltBX-56	AHU-01-942
☐	2	V BeltBX123	AHU-03-940

Comunication Procedure:

PM Procedure:

Supervisor Dan Miceli, x95038. Email: dmiceli@ucsc.edu

Name:	Date:	Hours:	Name:	Date:	Hours:	Name:	Date:	Hours:
Bodine			Bodine - 4hrs			GL -		
			KL - 4hrs					
			IE - 8hrs					
			RH - 6hrs					
			JL - 31 hrs					

Notes:

W.O. SCE2PH (81 HRS)

ENG. AUDITORIUM | **Asset # 942**

AHU-01-942 AIR HANDLING UNIT AHU-07 SCE2PH FL 1 RM Auditori

"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
10/29/2006							JG	

1 On VFD.

Inspect V belts, adjust as necessary. If changed, please note.	☑	2 x	V Belt	BX-56
Inspect sheaves and bearings	☑			
Inspect heating and cooling coils, clean as necessary.	☑			
Check grease tubes to bearings.	☑			
Grease bearings and check for deflection.	☑			
Grease motor as necessary	☑			
Inspect Hoffman air bleeds as necessary.	☑			
Inspect thermometers, replace as necessary.	☑			
Inspect magnahelic, clear pickups.	☑			
Inspect blower wheels,clean as necessary.	☑			
Poke dampers, lubricate blades.	☑			
Poke heating and cooling valves.	☑			
Inspect flex duct connections.	☑			
Tighten electrical terminals	☑			
Inspect motor starter.	☑			

Record amp draw. ☐

Equip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

Date	Maintenance History
5/22/06	Replaced v-belts 2 BX-56. WO00295118 Wunder

EF-28B-942 EXHAUST FAN Amp A Amp B Amp C Inspected By — EF-28A — SCE2PH — FL R RM Auditorium ro

10/29/2006		JG
4/30/2006		MB/JI
10/30/2005		GL/JI

1 Need ext. ladder.

Inspect V belts, adjust as necessary. If changed, please note.	☐
Inspect sheaves and bearings	☐
Inspect dampers actuators and linkage as necessary.	☐
Inspect fan guards & secure.	☐
Grease bearings.	☐
Inspect grease tubes.	☐
Inspect motor starter.	☐
Tighten electrical terminals	☐
Record amp draw of motor	☐
Equip condition: Excell__Good✓Fair__Poor__ReplaceASAP__	☐

OUT OF SERVICE

te	Maintenance History

	Delta T - F	Cut In Pressure	Cut Out Pressure	Run Times
4/29/2007	20	RH		
10/29/2006	20	JG		
4/30/2006	20	MB/JI		

1 Indoor evaporator in projection room.

Condenser - Check area for signs of leaks ☑

Clean coil. ☑

Check operation of condenser fans ☑

Check for excessive vibration ☑

Evaporator - Check area for signs of leaks ☑

Clean coil. ☑

Check operation of fan or blower ☑

Check evaporator pan, clean as necessary ☑

Record Delta Temperature 20 ☑

Check air filter ☑

Test operation of thermostat ☑

out door blower motor ☑

indoor blower motor ☑

hten electrical terminals ☑

ject contactors and motor starters ☑

Equip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

Grease bearings. ☑

EF-24-942 EXHAUST FAN SCE2PH FL RM Auditorium Janitor clos

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

1 Direct Drive

Inspect motor starter. ☑

Tighten electrical terminals ☑

Equip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

EF-25-942 EXHAUST FAN SCE2PH FL RM **Janitor's Closet/Bathroom** Auditorium

Amp A	Amp B	Amp C	Inspected By

1 Direct Drive

ighten electrical terminals ☑

quip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

idio inspection. ☑

-23-942 EXHAUST FAN SCE2PH FL RM **RR** Auditorium RR

Amp A	Amp B	Amp C	Inspected By
9/2006			JG
0/2006			MB/JI
0/2005			GL/JI

Direct Drive

nspection ☑

Tighten electrical terminals ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

ENG2 | **Asset # 940**

PCON-01-940 CONDENSING WATER PUMP | SCE2PH | FL BB RM 101 Basement Mech.

	Supply	Suction	Amp A	Amp B	Amp C	Inspected By
10/29/2006						JG
4/30/2006						MB/JI

Inspect for seal leak. *use the same as PHW pumps w/seal insp. change. ☑

Inspect motor starter. ☑

Tighten electrical connections ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Record readings from gauges: Supply____Suction____. ☑

PCON-02-940 CONDENSING WATER PUMP | SCE2PH | FL BB RM 101 Basement Mech.

	Supply	Suction	Amp A	Amp B	Amp C	Inspected By
10/29/2006	50	38				JG
4/30/2006						MB/JI

Inspect for seal leak. *use the same as PHW pumps w/seal insp. change. ☑

Inspect motor starter. ☑

Tighten electrical connections ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Inspect gauges. Supply 52 Suction 32 ☑

HW-01-940 HEATING WATER PUMP SCE2PH FL BB RM 101 Basement Mec

	Supply	Suction	Amp. A	Amp B	Amp C	12-L	Added 12-L	System Temp.	Inspected By
10/29/2006	62	62							JG
4/30/2006	49	34							MB/JI
1[illegible]05	55	42							GL/JI

1 On VFD

Inspect coupling ☑ Replaced coupling

Inspect for seal leak. ☑

Coupling guard installed ☑

Inspect gauges, Supply: 52 Suction: 37 ☑

Grease bearings. ☑

Remove strainers & clean ☑

Test check valve ☑

Tighten electrical connections ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

HW-02-940 HEATING WATER PUMP SCE2PH FL BB RM 101 Basement Mech.

	Supply	Suction	Amp. A	Amp B	Amp C	12-L	Added 12-L	System Temp.	Inspected By
9/2007	60	48							RH
9/2006	70	58							JG
1/2006	47	36							MB/JI

On VFD

Inspect coupling ☑ Replaced coupling

Inspect for sea leak! ☑

Coupling guard installed ☑

Inspect gauges, Supply: 52 Suction: 32 ☑

Grease bearings. ☑

Remove strainers & clean ☑

Test check valve ☑

Tighten electrical connections ☑

Inspect motor starter. ☑

Record amp draw. ☐

Equip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

Date	Maintenance History
3/14/07	Installed 1/4 valve & union to replace leaking 1/4" nipples. WO00310085 Graff

Date	Equip PM History
10/29/06	Replaced coupling

PHW-03-940 HEATING WATER PUMP SCE2PH FL BB RM 101 Basement Mech.

	Supply	Suction	Amp. A	Amp B	Amp C	12-L	Added 12-L	System Temp.	Inspected By
4/29/2007	55	44							RH
0/29/2006	57	47							JG
/30/2006	48	31							MB/JI

1 On VFD.

spect coupling ☑ Replaced coupling

spect for seal leak. ☑

upling guard installed ☑

pect gauges, Supply: 52 Suction: 36 ☑

ase bearings. ☑ Motor bearings to be replaced on follow-up work order

Remove strainers & clean ☑

Test check valve ☑

Tighten electrical connections ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good✓ Fair__Poor__ReplaceASAP__ ☑

PCHW-01-940 CHILLED WATER PUMP SCE2PH FL BB RM 107 Basement Mech.

	Supply	Suction	CS Amt	12 L Added	Amp A	Amp B	Amp C	Inspected By
4/29/2007	60	40						RH
10/29/2006	57	50						JG
4/30/2006	65	52						MB/JI

Inspect coupling ☑

nspect for seal leak. ☑

Coupling guard installed ☑

ispect gauges, Supply: 62 Suction: 46 ☑

rease bearings. ☑

ease isolation valves as necessary ☑

move strainers & clean ☑

it check valve ☑

h electrical connections ☑

Inspect motor starter. ☑

Record amp draw of motor ☑

Equip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

Test and log CS 1606. Add 12L if below 1000. ☑

PCHW-02-940 CHILLED WATER PUMP SCE2PH FL BB RM 107 Basement Mech.

	Supply	Suction	CS Amt	12 L Added	Amp A	Amp B	Amp C	Inspected By
4/29/2007	60	47						RH
10/29/2006	63	47						JG
4/30/2006	67	43						MB/JI

Inspect coupling ☑

Inspect for seal leak. ☑

Coupling guard installed ☑

Inspect gauges, Supply: 62 Suction: 47 ☑

Grease bearings. ☑

Remove strainers & clean ☑

Test check valve ☑

Tighten electrical connections ☑

pect motor starter. ☑

cord amp draw of motor ☑

ip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

PCHW-03-940 CHILLED WATER PUMP SCE2PH FL BB RM 107 Basement Me

	Supply	Suction	CS Amt	12 L Added	Amp A	Amp B	Amp C	Inspecte
[illegible]007	-	-						RH
1[illegible]06	80	49						JG
10/30/2005	74	38						GU/J

1 On VFD

Inspect coupling ☑

Inspect seal. ☑

Coupling guard installed ☑

Inspect gauges, Supply: 64 Suction: 47 ☑

Inspect thermometers, replace as necessary. ☑

Grease bearings. ☑

Remove strainers & clean ☑

'est check valve ☑

ighten electrical connections ☑

spect motor starter. ☑

ecord amp draw of motor ☑

uip condition: Excell__Good✓_Fair__Poor__ReplaceASAP__ ☑

ıte	Maintenance History
21/05	Replaced and aligned pump. WO00286572 LaRose
12/05	Replaced and aligned coupling. WO00284493 LaRose

PCHW-04-940 CHILLED WATER PUMP SCE2PH FL BB RM 107 Basement Mec

	Supply	Suction	CS Amt	12 L Added	Amp A	Amp B	Amp C	Inspecter
4/29/2007	-	-						RH
10/29/2006	80	47						JG
10/30/2005	72	34						

Inspect coupling ☑

Inspect seal. ☑

Coupling guard installed ☑

Inspect gauges, Supply: 62 Suction: 47 ☑

Inspect thermometers, replace as necessary. ☑

Grease bearings. ☑

Remove strainers & clean ☑

Test check valve ☑

Tighten electrical connections ☑

Inspect motor starter. ☑

Record amp draw of motor ☑

Equip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

HU-01-940 AIR HANDLING UNIT SCE2PH FL 1 RM 101 Bsmt. Mech. Rm.

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
3/2007									1.2
2/2007									1.98
9/2007								RH	

On VFD

Inspect V belts, adjust as necessary. If changed, please note. ☑

Inspect sheaves and bearings ☑

Inspect dampers motor and linkage; OSA mixed air, exhaust air. ☑

Inspect heating coils, clean as necessary. ☑

Check grease tubes to bearings. ☑

Grease bearings and check for deflection. ☑

Grease motor as necessary ☑

Inspect Hoffman air bleeds as necessary. ☑

Inspect thermometers, replace as necessary. ☑

Inspect magnahelic, clear pickups. ☑

nspect blower wheels,clean as necessary. ☑

troke dampers, lubricate blades. ☑

troke heating and cooling valves. ☑

spect flex duct connections. ☑

ghten electrical terminals ☑

pect motor starter. ☑

cord amp draw. ☑

ondition: Excell__Good✓ Fair__Poor__ReplaceASAP__ ☑

Date	Equip PM History
5/8/07	Magnehelic,readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/29/07	Return fan VD bad. Repair in progress.

AHU-02-940 AIR HANDLING UNIT SCE2PH FL 1 RM 101 Bsmt. Mech. Rm.

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
5/8/2007									1.8
5/1/2007									1.5
10/29/2006								JG	

replaced belt

Inspect V belts, adjust as necessary. If changed, please note.	☑	2 x	V Belt	B-54
Inspect sheaves and bearings	☑	2 x	V Belt	B-53
Inspect dampers motor and linkage; OSA mixed air, exhaust air.	☑			
Inspect heating and cooling coils, clean as necessary.	☑			
Check grease tubes to bearings.	☑			
Grease bearings and check for deflection.	☑			
Grease motor as necessary	☑			
ıspect Hoffman air bleeds as necessary.	☑			
spect thermometers, replace as necessary.	☑			
spect magnahelic, clear pickups.	☑			
pect blower wheels,clean as necessary.	☑			
oke dampers, lubricate blades.	☑			
oke heating and cooling valves.	☑			
oect flex duct connections.	☑			

Tighten electrical terminals ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/30/06	No pockets delivered (annual?)

EF-04-940 EXHAUST FAN SCE2PH FL 1 RM 101A-ELEV. RM. Basement Mech. Rm.

Amp A	Amp B	Amp C	Inspected By
10/29/2006			JG
4/30/2006			MB/JI
10/30/2005			GL/JI

Inspect V belts, adjust as necessary. If changed, please note. ☑ 1 x V Belt AP-54

nspect sheaves and bearings ☑

ispect fan guards & secure. ☑

rease bearings. ☑

spect grease tubes. ☑

spect motor starter. ☑

ihten electrical terminals ☑

cord amp draw of motor ☑

iip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

EF-02-940 EXHAUST FAN SCE2PH FL 1 RM 108 Chiller Basement mech. rr

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

1 Motor greasing only 1 yr. severe use, 3 yr. standard use.
2 Ceiling mounted, need 8' ladder.

Inspect fan guards & secure. ☑

Grease bearings. ☑

Inspect grease tubes. ☑

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

quip condition: Excell__Good✓__Fair__Poor__ReplaceASAP__ ☑

erform audio inspection. ☑

ate	Equip PM History
0/30/05	Bearings greased in 2004. Not due again for 3 years.

F-03-940 EXHAUST FAN SCE2PH FL 1 RM 115 Elect. rm.

	Amp A	Amp B	Amp C	Inspected By
29/2006				JG
0/2006	-	-	-	MB/JI
0/2005				GL/JI

oect V belts, adjust as necessary. If changed, please note. ☑ 1 x Belt AP-54

ect sneaves and bearings ☑

ect fan guards & secure. ☑

se bearings. ☑

Inspect grease tubes. ☑

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

Date	Equip PM History
10/30/05	Bearings greased in 2004. Not due again for 3 years.

EF-01-940 EXHAUST FAN SCE2PH **FL 1 RM 116 Basement mech. rm.**

Amp A Amp B Amp C Inspected By

10/30/2005 GL/JI

1 3 yr. Motor Greasing
2 Direct Drive

nspect dampers actuators and linkage as necessary. ☑

ıspect fan guards & secure. ☑

ıspect motor starter. ☑

ghten electrical terminals ☑

:cord amp draw of motor ☑

uip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

U-02-940 FAN COIL UNIT (Cooling Only) SCE2PH **FL 1 RM 180A - 188 Tele/Data Equip. Rm.**

Inspected by Amp A Amp B Amp C

Direct Drive

sheaves and bearings ☑

Inspect fan guards & secure. ☑

Inspect V belts, adjust as necessary. If changed, please note. ☑

Audio inspection, report any excessive noise. ☑

Tighten electrical terminals ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Check condensate pump. ☑

FCU-03-940 FAN COIL UNIT (Cooling Only) SCE2PH FL 1 RM 192-194 Between classro.

Inspected by Amp A Amp B Amp C

1 Direct Drive

nspect sheaves and bearings ☑

ıspect fan guards & secure. ☑

ıspect V belts, adjust as necessary. If changed, please note. ☑

ghten electrical terminals ☑

spect motor starter. ☑

:cord amp draw. ☑

uip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Check condensate pump. ☑

FC-01-940 FAN COIL UNIT (Cooling Only) SCE2PH FL 1 RM 199 Tele/Data Equip. Rn

Inspected by	Amp A	Amp B	Amp C
4/30/2006 MB/JI			

1 Direct Drive

Direct Drive ☑

Inspect fan guards & secure. ☑

Audio inspection, report any excessive noise. ☑

Tighten electrical terminals ☑

nspect motor starter. ☑

ecord amp draw. ☑

quip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

heck condensate pan. ☑

KW-01-940 HEAT EXCHANGER (Hot Water Heater) SCE2PH FL 1 RM Mech. Mech. Rm. Level 1

	DHWTemp	HHWTemp	Diff	Plant Temp In	PlantTemp Out	Diff	Sys Psi In	Sys Psi Out	Psi drop	Closed sys Temp In Bld	Closed sys Temp Out	Sys Press In	CHW Press Out	Ind H20 out	CS amt125
9/2007		121													
9/2006		125													
0/2006	118														

temp 130 ☑

ip condition: Excell__Good__Fair__Poor__Replace ASAP__ ☑

water heater installation date ____ ☑

vater heater manufacture date ____. ☑

Date	Equip PM History
10/30/05	Only 1 temp. gauge for HHW.

HXW-02-940 HEAT EXCHANGER (Domestic Hot Water Heater) SCE2PH FL 1 RM Mech. Mech. Rm. Level

	DHWTemp	HHWTemp	Diff	Plant Temp In	PlantTemp Out	Diff	Sys Psi In	Sys Psi Out	Psi drop	Closed sys Temp In Bld	Closed sys Temp Out	Sys Press In	CHW Press Out	Ind H20 out	CS ac
4/29/2007		121													
10/29/2006		125													
4/30/2006		118													

1 Served by Plant hot water.

Equip condition: Excell__Good__Fair__Poor__Replace ASAP__ ☑

Log temp. 120 ☑

Note water heater installation date —. ☑

Note water heater manufacture date —. ☑

Date	Equip PM History
10/30/05	Only one temp gauge.

AHU-04-940 AIR HANDLING UNIT SCE2PH FL 1 RM R Roof

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
5/8/2007									1.1
5/1/2007									1.0
10/29/2006								JG	

1 On VFD

nspect V belts, adjust as necessary. If changed, please note.	☑	3	x	V Belt	B-158
nspect sheaves and bearings	☑	3	x	V Belt	B-162
ıspect dampers motor and linkage; OSA mixed air, exhaust air.	☑				
ıspect heating and cooling coils, clean as necessary.	☑				
heck grease tubes to bearings.	☑				
ease bearings and check for deflection.	☑				
ease motor as necessary	☑				

...spect Hoffman air bleeds as necessary. ☑

Inspect thermometers, replace as necessary. ☑

Inspect magnahelic, clear pickups. ☑

Inspect blower wheels,clean as necessary. ☑

Stroke dampers, lubricate blades. ☑

Stroke heating and cooling valves. ☑

Inspect flex duct connections. ☑

Tighten electrical terminals ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

Date	Maintenance History
1/21/05	Reset AHU 4. WO00278711 LaRose

Date	Equip PM History
5/8/07	Magnehelic readings taken.
7/1/07	Magnehelic readings taken and then pleats replaced.
7/29/07	Changed belt for supply fan

HU-03-940 AIR HANDLING UNIT SCE2PH FL 1 RM Roof Roof

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
7/8/2007									.9
7/1/2007									.9
7/29/2007								RH	

1 On VFD

pect V belts, adjust as necessary. If changed, please note. ☑	2	x	V Belt	BX123
ect sheaves and bearings ☑	3	x	V Belt	5VX1230

Inspect dampers motor and linkage; OSA mixed air, exhaust air. ☑

Inspect heating and cooling coils, clean as necessary. ☑

Check grease tubes to bearings. ☑

Grease bearings and check for deflection. ☑

Grease motor as necessary ☑

Inspect Hoffman air bleeds as necessary. ☑

Inspect thermometers, replace as necessary. ☑

Inspect magnahelic, clear pickups. ☑

Inspect blower wheels,clean as necessary. ☑

Stroke dampers, lubricate blades. ☑

troke heating and cooling valves. ☑

spect flex duct connections. ☑

ighten electrical terminals ☑

spect motor starter. ☑

cord amp draw. ☑

uip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Date	Maintenance History
11/1/06	Blow out door open, reset safety switch 2 doors. WO00305556 Graff

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/	Magnehelic readings taken and then pleats replaced.
4/29/07	Changed belts

AHU-05-940 AIR HANDLING UNIT SCE2PH FL 1 RM Roof Ro

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
5/8/2007									.8
5/1/2007									.8
10/29/2006								JG	

1 On VFD.

Inspect V belts, adjust as necessary. If changed, please note.	☑	5 x	B-150	
Inspect sheaves and bearings	☑	3 x	BX144	Replaced
Inspect dampers motor and linkage; OSA mixed air, exhaust air.	☑			
Inspect heating and cooling coils, clean as necessary.	☑			
Check grease tubes to bearings.	☑			
Grease bearings and check for deflection.	☑			
Grease motor as necessary	☑			
Inspect Hoffman air bleeds as necessary.	☑			
Inspect thermometers, replace as necessary.	☑			
Inspect magnahelic, clear pickups.	☑			
Inspect blower wheels,clean as necessary.	☑			
Make dampers, lubricate blades.	☑			
heating and cooling valves.	☑			

Inspect flex duct connections. ☑

Tighten electrical terminals ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/30/06	No pockets delivered (annual?)

AHU-06-940 AIR HANDLING UNIT SCE2PH FL 1 RM Roof Roof

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
5/8/2007									.70
5/1/2007									.75
10/29/2006								JG	

1 On VFD.

Inspect V belts, adjust as necessary. If changed, please note. ☑ 3 x V Belt BX-144

Inspect sheaves and bearings ☑ 5 x V Belt B-150

nspect dampers motor and linkage; OSA mixed air, exhaust air. ☑

nspect heating and cooling coils, clean as necessary. ☑

heck grease tubes to bearings. ☑

rease bearings and check for deflection. ☑

rease motor as necessary ☑

spect Hoffman air bleeds as necessary. ☑

spect thermometers, replace as necessary. ☑

Inspect magnahelic, clear pickups. ☑

Insnect blower wheels,clean as necessary. ☑

Stroke dampers, lubricate blades. ☑

Stroke heating and cooling valves. ☑

Inspect flex duct connections. ☑

Tighten electrical terminals ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good_✓_Fair__Poor__ReplaceASAP__ ☑

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/30/06	No pockets delivered (annual?)

FCU-04-940 FAN COIL UNIT SCE2PH FL 2 RM 192-A-H Computer room unit

Inspected by Amp A Amp B Amp C

ıspect sheaves and bearings ☑ 2 x V Belt B-44

spect fan guards & secure. ☑

spect V belts, adjust as necessary. If changed, please note. ☑

ıdio inspection, report any excessive noise. ☑

n electrical terminals ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

Check for debris in sump of condensate pump. ☑

Check for free movement operation in condensate pump float(s). ☑

Check condensate pump. ☑

FCU-05-940 FAN COIL UNIT SCE2PH FL 2 RM 208 Computer room unit

Inspected by Amp A Amp B Amp C

Inspect sheaves and bearings ☑ 2 x V Belt B-44

Inspect fan guards & secure. ☑

Grease bearings. ☑

Audio inspection, report any excessive noise. ☑

Tighten electrical terminals ☑

nspect motor starter. ☑

ecord amp draw. ☑

quip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

heck for debris in sump of condensate pump. ☑

Check for free movement operation in condensate pump float(s). ☑

Check condensate pump. ☑

EF-08-940 EXHAUST FAN SCE2PH **FL 2 RM 232** Motor starter in Rm 2

	Amp A	Amp B	Amp C	Inspected By
4/29/2007				RH
10/29/2006				JG
4/30/2006				MB/JI

1 3-yr lube
2 Direct Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

Addl Inspection. ☑

EF-07-940 EXHAUST FAN SCE2PH **FL 2 RM 233** 2nd flr. by rm. 233/starter rm 232

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
0/30/2005				GL/JI

1 3-yr lube
2 Direct Drive.

ıspect motor starter. ☑

ghten electrical terminals ☑

ecord amp draw of motor ☑

uip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

dio inspection. ☑

EF-09-940 EXHAUST FAN SCE2PH FL 2 RM 249B 2nd flr. by rm. 249B/starter rm. 2

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

1 3-yr. lube
2 Direct Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell Good ✓ Fair Poor ReplaceASAP ☑

Audio inspection. ☑

EF-10-940 EXHAUST FAN SCE2PH FL 2 RM 253 2nd flr. by rm. 253/starter rm. 232

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
0/30/2005				GL/JI

1 3-yr. lube.
2 Direct Drive.

ispect motor starter. ☑

ghten electrical terminals ☑

ecord amp draw of motor ☐

uip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

dio inspection. ☐

EF-12-940 EXHAUST FAN SCE2PH FL 3 RM 354 3 flr. by rm. 337A/starter rm. 3

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

1 3-yr. lube
2 Direct Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

EF-13-940 EXHAUST FAN SCE2PH FL 3 RM 354 3rd flr. by rm. 349B/starter rm. 354

	Amp A	Amp B	Amp C	Inspected By
10/[illegible]/2006				JG
4/[illegible]/2006				MB/JI
10/30/2005				GL/JI

1 3-yr. lube
2 Direct Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

EF-14-940 EXHAUST FAN SCE2PH FL 3 RM 354 3rd. flr. by rm. 353/starter rm. 35

Amp A	Amp B	Amp C	Inspected By
10/29/2006			JG
4/30/2006			MB/JI
10/30/2005			GL/JI

1 3-yr. lube
2 Direct Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good_✓Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

EF-11-940 EXHAUST FAN SCE2PH FL 3 RM 54 3rd flr. by rm. 333/starter rm. 354

Amp A	Amp B	Amp C	Inspected By
10/29/2006			JG
4/30/2006			MB/JI
10/30/2005			GL/JI

1 3-yr lube.
2 Direct Drive.

nspect motor starter. ☑

ighten electrical terminals ☑

quip condition: Excell__Good__✓Fair__Poor__ReplaceASAP__ ☑

udio inspection. ☑

EF-15-940 EXHAUST FAN SCE2PH FL 4 RM 423 4th flr. by rm. 423/starter rm. 4

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
1[illegible]/05				GL/JI

1 3-yr. lube
2 Direct Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

EF-16-940 EXHAUST FAN SCE2PH FL 4 RM 425 4th flr. by rm. 425/starter rm. 432

	Amp A	Amp B	Amp C	Inspected By
0[illegible]006				JG
[illegible]6				MB/JI
0/30/2005				GL/JI

1 3-yr. lube
2 Direct Drive.

spect motor starter. ☑

ghten electrical terminals ☑

cord amp draw of motor ☑

uip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

io inspection. ☑

EF-17-940 EXHAUST FAN SCE2PH FL 4 RM 451 4th flr. by rm. 451/starter rm. 43

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

1 3-yr. lube
2 Driect Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

Date	Equip PM History
10/31/04	Found control wire off of contactor

EF-18-940 EXHAUST FAN SCE2PH FL 4 RM 453 4th flr. by rm. 453/starter rm. 43

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
0/30/2005				GL/JI

1 3-yr. lube
2 Direct Drive.

ıspect V belts, adjust as necessary. If changed, please note. ☐

ıspect sheaves and bearings ☑

spect dampers actuators and linkage as necessary. ☐

ɔpect fan guards & secure. ☐

ease bearings. ☐

ɔect grease tubes. ☑

ɔect motor starter. ☐

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Audio inspection ☐

EF-19-940 EXHAUST FAN SCE2PH FL 5 RM 533 5th flr. by rm. 533/starter rm. 55

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

Test operation

1 3-yr. lube
2 Direct Drive.

Inspect motor starter. ☑

Tighten electrical terminals ☐

Re d amp draw of motor ☐

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☐

udio inspection. ☑

F-20-940 EXHAUST FAN SCE2PH FL 5 RM 537A 5th flr. by rm. 537A/starter rm. 554

	Amp A	Amp B	Amp C	Inspected By
v29/2006				JG
30/2006				MB/JI
/30/2005				GL/JI

1 3-yr. lube
2 Direct Drive

spect motor starter. ☐

hten electrical terminals ☐

cord amp draw of motor ☐

Equip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

EF-21-940 EXHAUST FAN SCE2PH FL 5 RM 549B 5th flr. by rm. 549B/starter rm. 55

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

1 3-yr. lube.
2 Direct Drive

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

Audio inspection. ☑

EF-22-940 EXHAUST FAN SCE2PH FL 5 RM 552 5th flr. by rm. 552/starter rm. 552

	Amp A	Amp B	Amp C	Inspected By
0/29/2006				JG
4/30/2006				MB/JI
0/30/2005				GL/JI

1 3-yr. lube
2 Direct Drive

spect motor starter. ☑

ghten electrical terminals ☑

cord amp draw of motor ☑

uip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

lio inspection. ☑

FCU-06-940 FAN COIL UNIT SCE2PH FL 5 RM 594 Computer room u

Inspected by Amp A Amp B Amp C

Inspect sheaves and bearings	☑	2 x	V Belt	B-44
Inspect fan guards & secure.	☑			
Grease bearings.	☑			
Audio inspection, report any excessive noise.	☑			
Tighten electrical terminals	☑			
Inspect motor starter.	☑			
Record amp draw.	☑			
condition: Excell__Good__Fair__Poor__ReplaceASAP__	☑			
heck for debris in sump of condensate pump.	☑			
heck for free movement operation in condensate pump float(s).	☑			
heck condensate pump.	☑			

CU-07-940 FAN COIL UNIT SCE2PH FL 5 RM 594 Computer room unit

Inspected by Amp A Amp B Amp C

pect sheaves and bearings	☑	2 x	V Belt	B-44
pect fan guards & secure.	☑			
ase bearings.	☑			

Audio inspection, report any excessive noise. ☑

Tighten electrical terminals ☑

Inspect motor starter. ☑

Record amp draw. ☑

Equip condition: Excell__Good__ Fair__Poor__ReplaceASAP__ ☑

Check for debris in sump of condensate pump. ☑

Check for free movement operation in condensate pump float(s). ☑

Check condensate pump. ☑

EF-30-940 EXHAUST FAN SCE2PH FL R RM East stairwell

	Amp A	Amp B	Amp C	Inspected By
0/29/2006				JG
/30/2006				MB/JI
0/30/2005				GL/JI

spect V belts, adjust as necessary. If changed, please note. ☑ 1 x V Belt 4L340

spect sheaves and bearings ☑

spect dampers actuators and linkage as necessary. ☑

ɔect fan guards & secure. ☑

ease bearings. ☑

ɔect grease tubes. ☑

ɔect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good✓ Fair__Poor__ReplaceASAP__ ☑

Check windows operation. ☑

EF-05-940 EXHAUST FAN SCE2PH FL R RM ROOF

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

Inspect V belts, adjust as necessary. If changed, please note. ☑ 2 x V Belt AP-68

nspect sheaves and bearings ☑

nspect dampers actuators and linkage as necessary. ☑

ıspect fan guards & secure. ☑

rease bearings. ☑

spect grease tubes. ☑

ipect motor starter. ☑

hten electrical terminals ☑

:ord amp draw of motor ☑

ip condition: Excell__Good✓ Fair__Poor__ReplaceASAP__ ☑

EF-32-940 EXHAUST FAN | SCE2PH | FL R RM Ro

	Amp A	Amp B	Amp C	Inspected By
4/29/2007				RH
10/29/2006				JG
4/30/2006				MB/JI

Inspect V belts, adjust as necessary. If changed, please note. ☑ 1 x V Belt AX-23

Inspect sheaves and bearings ☑

Inspect dampers actuators and linkage as necessary. ☑

Inspect fan guards & secure. ☑

Grease bearings. ☑

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good✓ Fair__Poor__ReplaceASAP__ ☑

ate	Equip PM History
/29/07	Replaced belt

F-33-940 EXHAUST FAN | SCE2PH | FL R RM Roof

	Amp A	Amp B	Amp C	Inspected By
29/2006				JG
0/2006				MB/JI
30/2005				GL/JI

pect V belts, adjust as necessary. If changed, please note. ☑ 1 x V Belt AX-23

ect sheaves and bearings ☑

ect dampers actuators and linkage as necessary. ☑

ect fan guards & secure. ☑

Grease bearings. ☑

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good✓Fair__Poor__ReplaceASAP__ ☑

Date	Equip PM History
4/29/07	Replaced belt

EF-27-940 EXHAUST FAN SCE2PH FL R RM Roof/starter rm. 532

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

Inspect V belts, adjust as necessary. If changed, please note. ☑ 1 x V Belt AX-23

ns, ..d sheaves and bearings ☑

nspect dampers actuators and linkage as necessary. ☑

ıspect fan guards & secure. ☑

rease bearings. ☑

spect grease tubes. ☑

ʒpect motor starter. ☑

ıhten electrical terminals ☑

ɔord amp draw of motor ☑

Equip condition: Excell__Good✓__Fair__Poor__ReplaceASAP__ ☑

Date	Maintenance History
5/22/06	Replaced v-belts 1 AX-23 WO00295118 Wunder

Date	Equip PM History
4/29/07	Replaced belt

EF-34-940 EXHAUST FAN SCE2PH FL R RM Roof/starter rm. 552

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

Inspect V belts, adjust as necessary. If changed, please note.	☑	1	x V Belt	AX-23
Inspect sheaves and bearings	☑			
nspect dampers actuators and linkage as necessary.	☑			
nspect fan guards & secure.	☑			
Grease bearings.	☑			
spect motor starter.	☑			
ghten electrical terminals	☑			
cord amp draw of motor	☑			
uip condition: Excell__Good__✓__Fair__Poor__ReplaceASAP__	☑			

e	Equip PM History
9/07	Replaced belt

31-940 EXHAUST FAN SCE2PH FL R RM Timer switch in Rm. 252

	Amp A	Amp B	Amp C	Inspected By
2006				JG
2006				MB/JI
2005				GL/JI

ct V belts, adjust as necessary. If changed, please note.	☑	1	x V Belt	AX-23

Inspect sheaves and bearings ☑

Inspect dampers actuators and linkage as necessary. ☑

Inspect fan guards & secure. ☑

Grease bearings. ☑

Inspect motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

E -940 EXHAUST FAN SCE2PH FL R RM West stairwell roof

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

ispect V belts, adjust as necessary. If changed, please note. ☑ 1 x V Belt 4L340

ispect sheaves and bearings ☑

spect dampers actuators and linkage as necessary. ☑

spect fan guards & secure. ☑

ease bearings. ☑

pect grease tubes. ☑

ct motor starter. ☑

Tighten electrical terminals ☑

Record amp draw of motor ☑

Equip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

Check windows operation. ☑

Date	Equip PM History
10/30/05	2ND Floor windows not opening.

EF-26-940 EXHAUST FAN SCE2PH FL R RM Roof 2nd flr. computer rm.

	Amp A	Amp B	Amp C	Inspected By
10/29/2006				JG
4/30/2006				MB/JI
10/30/2005				GL/JI

Inspect V belts, adjust as necessary. If changed, please note. ☑ 1 x , V Belt AX-23

Inspect sheaves and bearings ☑

nspect dampers actuators and linkage as necessary. ☑

nspect fan guards & secure. ☑

rease bearings. ☑

spect motor starter. ☑

ghten electrical terminals ☑

cord amp draw of motor ☑

uip condition: Excell__Good__Fair__Poor__ReplaceASAP__ ☑

te	Maintenance History
22/06	Replaced v-belt 1 AX-23. WO00295118 Wunder

PM ID# 878

Area: Engineering 2
Week#: 32
Date: 2/2/2008
Crew: HVAC

HVAC / E-2 Mechanical / Quarterly

9 Hrs Rev 12/10/2007

W.O. SCE2PH (9 HRS)				
	☐	5	B-150	AHU-05-940
	☐	3	BX144	AHU-05-940
	☐	3	V Belt5VX1230	AHU-03-940
	☐	5	V BeltB-150	AHU-06-940
	☐	3	V BeltB-158	AHU-04-940
	☐	3	V BeltB-162	AHU-04-940
	☐	2	V BeltB-53	AHU-02-940
	☐	2	V BeltB-54	AHU-02-940
	☐	3	V BeltBX-144	AHU-06-940
	☐	2	V BeltBX-56	AHU-01-942
	☐	2	V BeltBX123	AHU-03-940

Comunication Procedure:

PM Procedure:

Supervisor Dan Miceli, x95038. Email: dmiceli@ucsc.edu

Name:	Date:	Hours:	Name:	Date:	Hours:	Name:	Date:	Hours:
RC	4/16/08							

Notes:

W.O. SCE2PH (9 HRS)

ENG. AUDITORIUM | **Asset # 942**

AHU-01-942 AIR HANDLING UNIT AHU-07 SCE2PH FL 1 RM Auditorium

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
STAND									
11/3/2007								JI	
0/29/2006								JG	

1 On VFD.

ıspect V belts, adjust as necessary. If changed, please note.	☑	2 x	V Belt	BX-56
ıspect sheaves and bearings	☑			
ıspect heating and cooling coils, clean as necessary.	☑			
spect Hoffman air bleeds as necessary.	☑			

Inspect thermometers, replace as necessary. ☑

Inspect magnahelic, clear pickups. ☑

Inspect dampers motor and linkage; OSA mixed air, exhaust air. ☑

Date	Maintenance History
5/22/06	Replaced v-belts 2 BX-56. WO00295118 Wunder

ENG2 — Asset # 940

PHW-01-940 HEATING WATER PUMP — SCE2PH — FL **BB** RM **101** Basement Mech.

	Discharge	Suction	
11/3/2007	52	37	JI
10/29/2006	62	62	JG
4/30/2006	49	34	MB/JI

1 On VFD

Inspect coupling ☑

Inspect for seal leak. ☑

Coupling guard installed ☑

Inspect gauges, Supply: Suction: ☑

Date	Equip PM History
11/3/07	Replaced coupling

PHW-02-940 HEATING WATER PUMP — SCE2PH — FL **BB** RM **101** Basement Mech.

	Discharge	Suction	
11/3/2007	52	32	JI
4/29/2007	60	48	RH
10/29/2006	70	58	JG

1 On VFD

Inspect coupling ☑

Inspect for sea leakl. ☑

Coupling guard installed ☑

Inspect gauges, Supply: Suction: ☑

Date	Maintenance History
3/14/07	Installed 1/4 valve & union to replace leaking 1/4" nipples. WO00310085 Graff
Date	**Equip PM History**
10/29/06	Replaced coupling

PHW-03-940 HEATING WATER PUMP | SCE2PH | FL **BB** RM **101** Basement Mech.

	Discharge	Suction		
11/3/2007	52	36		JI
4/29/2007	55	44		RH
10/29/2006	57	47		JG

1 On VFD.

Inspect coupling ☑

Inspect for seal leak. ☑

Coupling guard installed ☑

Inspect gauges, Supply: Suction: ☑

Date	Equip PM History
11/3/07	Repalced coupling, motor bearings to be replaced on follow up WO.

AHU-01-940 AIR HANDLING UNIT | SCE2PH | FL **1** RM **101** Bsmt. Mech. Rm.

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
STAND									
11/3/2007								JI	
5/8/2007									1.2

1 On VFD

Inspect V belts, adjust as necessary. If changed, please note. ☑

Inspect sheaves and bearings ☑

Inspect dampers motor and linkage; OSA mixed air, exhaust air. ☑

Inspect heating coils, clean as necessary. ☑

Inspect Hoffman air bleeds as necessary. ☑

Inspect thermometers, replace as necessary. ☑

Inspect magnahelic, clear pickups. ☑

Inspect blower wheels,clean as necessary. ☑

Inspect air filters (Notify Filter Crew, as necessary) ☑

Inspect air filters (Notify Filter Crew, as necessary) ☐

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/29/07	Return fan VD bad. Repair in progress.

AHU-02-940 AIR HANDLING UNIT

SCE2PH

FL 1 RM 101 Bsmt. Mech. Rm.

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
STAND									
11/3/2007								JI	
5/8/2007									1.8

Inspect V belts, adjust as necessary. If changed, please note.	☑	2 x	V Belt	B-54
Inspect sheaves and bearings	☑	2 x	V Belt	B-53
Inspect dampers motor and linkage; OSA mixed air, exhaust air.	☑			
Inspect heating and cooling coils, clean as necessary.	☑			
Inspect Hoffman air bleeds as necessary.	☑			
Inspect thermometers, replace as necessary.	☑			
Inspect magnahelic, clear pickups.	☑			
Inspect blower wheels,clean as necessary.	☑			
Inspect air filters (Notify Filter Crew, as necessary)	☑			

Date	Equip PM History
11/3/07	Replaced 3 (B54) belts
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.

HXW-01-940 HEAT EXCHANGER (Hot Water Heater)

SCE2PH

FL 1 RM Mech. Mech. Rm. Level 1

	DHWTemp	HHWTemp	Diff	Plant Temp In	PlantTemp Out	Diff	Sys Psi In	Sys Psi Out	Psi drop	Closed sys Temp In Bld	Closed sys Temp Out	Sys Press In	CHW Press Out	Ind H20 out	CS amt125
STAND															
11/3/2007	140														
4/29/2007		121													

Log temp 123 ☐

Date	Equip PM History
11/3/07	
10/30/05	Only 1 temp. gauge for HHW.

HXW-02-940 HEAT EXCHANGER (Domestic Hot Water Heater)

SCE2PH

FL 1 RM Mech. Mech. Rm. Level 1

	DHWTemp	HHWTemp	Diff	Plant Temp In	PlantTemp Out	Diff	Sys Psi In	Sys Psi Out	Psi drop	Closed sys Temp In Bld	Closed sys Temp Out	Sys Press In	CHW Press Out	Ind H20 out	CS amt125
11/3/2007		120													
4/29/2007		121													
10/29/2006		125													

1 Served by Plant hot water.

Log temp. 124 ☐

Date	Equip PM History
10/30/05	Only one temp gauge.

AHU-04-940 AIR HANDLING UNIT SCE2PH FL 1 RM R Roof

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
STAND									
11/3/2007								JI	
5/8/2007									1.1

1 On VFD

Inspect V belts, adjust as necessary. If changed, please note.	☑	3 x	V Belt	B-158
Inspect sheaves and bearings	☑	3 x	V Belt	B-162
Inspect dampers motor and linkage; OSA mixed air, exhaust air.	☑			
Inspect heating and cooling coils, clean as necessary.	☑			
nspect Hoffman air bleeds as necessary.	☑			
nspect thermometers, replace as necessary.	☑			
ıspect magnahelic, clear pickups.	☑			
ıspect blower wheels,clean as necessary.	☑			
ıspect air filters (Notify Filter Crew, as necessary)	☑			

ate	Maintenance History
/21/05	Reset AHU 4. WO00278711 LaRose

ate	Equip PM History
/8/07	Magnehelic readings taken.
/1/07	Magnehelic readings taken and then pleats replaced.
/29/07	Changed belt for supply fan

HU-03-940 AIR HANDLING UNIT SCE2PH FL 1 RM Roof Roof

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
TAND									
3/2007								JI	
3/2007									.9

On VFD

pect V belts, adjust as necessary. If changed, please note.	☑	2 x	V Belt	BX123
ɔect sheaves and bearings	☑	3 x	V Belt	5VX1230
ɔect dampers motor and linkage; OSA mixed air, exhaust air.	☑			
ɔect heating and cooling coils, clean as necessary.	☐			
ect Hoffman air bleeds as necessary.	☑			
ect thermometers, replace as necessary.	☑			
ect magnahelic, clear pickups.	☑			

Inspect blower wheels,clean as necessary. ☑

Inspect air filters (Notify Filter Crew, as necessary) ☑

Date	Maintenance History
11/1/06	Blow out door open, reset safety switch 2 doors. WO00305556 Graff

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/29/07	Changed belts

AHU-05-940 AIR HANDLING UNIT SCE2PH FL 1 RM Roof Roof

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
STAND									
11/3/2007								JI	
5/8/2007									.8

1 On VFD.

Inspect V belts, adjust as necessary. If changed, please note. ☑ 5 x B-150

Inspect sheaves and bearings ☑ 3 x BX144

Inspect dampers motor and linkage; OSA mixed air, exhaust air. ☑

Inspect heating and cooling coils, clean as necessary. ☑

Inspect Hoffman air bleeds as necessary. ☑

Inspect thermometers, replace as necessary. ☑

Inspect magnahelic, clear pickups. ☑

Inspect blower wheels,clean as necessary. ☑

Inspect air filters (Notify Filter Crew, as necessary) ☑

Date	Equip PM History
11/3/07	Replaced BX144 belt
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.

AHU-06-940 AIR HANDLING UNIT SCE2PH FL 1 RM Roof Roof

	"A" System Amp A	"A" System Amp B	"A" System Amp C	Delta Temp °F	"B" System Amp A	"B" System Amp B	"B" System Amp C	Inspected By	Manifold Press
11/3/2007								JI	
5/8/2007									.70
5/1/2007									.75

1 On VFD.

Inspect V belts, adjust as necessary. If changed, please note. ☑ 3 x V Belt BX-144

Inspect sheaves and bearings ☑ 5 x V Belt B-150

ENERGY & ATMOSPHERE: CREDIT 4: ADDITIONAL OZONE PROTECTION

1. LEED-EB template
2. Letter from HVAC supervisor stating refrigerants used in building chillers

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project meets the following ozone protection levels:

Option A

☒ The base building HVAC, refrigeration or fire suppression systems as-built are free of CFCs, HCFCs or Halons.

Option B

☐ Emissions of refrigerants from base building HVAC and refrigeration systems have been reduced to less than 3% of charge per year over the performance period using EPA Clean Air Act. Title VI, Rule 608 procedures governing refrigerant management and reporting and leakage has been reduced over the remainder of unit life to below 25%.

☐ The base building fire suppression systems do not contain CFCs, HCFCs or Halons.

Project Name: Engineering 2 LEED EB Submittal

Credit: EA Credit 4: Additional Ozone Protection Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-24	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT
Office of Building & Utility Services
Darren Hintsala
HVAC Supervisor

SANTA CRUZ, CALIFORNIA 95064

April 16, 2008

To Whom It May Concern,

In order to achieve **EA Prerequisite 3**: Ozone Protection for the Engineering 2 building, we have attached an equipment information sheets showing the type of refrigerants, amount of refrigerants, models, and serial numbers of the two McQuay chillers. Both chillers are charged with 853 lbs of R-134a refrigerant, which is a HFC refrigerant, thus meeting this prerequisite.

The fire suppression in the Engineering 2 building contains HFC-227ea (FM-200), thus meeting the requirements for **EA Credit 4**.

If you have any questions please contact me at 831-459-5035.

Sincerely,

Darren Hintsala
HVAC Supervisor
University of California, Santa Cruz
(831) 459-5035
dwhintsa@ucsc.edu

EQ Equipment | Main | Equipment | Readings | Tasks | History | Warranty | PM Files | Refrige

EquipID: CH-01-940 | EquipDesc: CHILLER | Delta Point: | Dept: HVAC | RCH: | Supply Type: | Si

Mnf	MCQUAY	location	Mech. Rm. Level 1
Model	WSC063-0AAAM	Building	ENG2
Serial#	STNU031000057	Floor	1
Keyword	CHILLER	Room	1013A
Refrig. Type	R-134A	Duty	50 + Lbs
Chrg 1-Lbs/Oz	853	Chrg 2	
BldAsset#	940	Block	
Status	OPERATING	Zone	
Permit Required		Key#	
Equip. Condition	Excellent	Construction#	

Route: | Rou

Sort Order:

Notes: System fill pressure set - 12psi.
200 Ton Rated

Print List

Procedure by equip#: (Up to 30 lines will print out, don't wrap text).

1 On VFD

DrawingsEquip

EQ Equipment | Main | Equipment | Readings | Tasks | History | Warranty | PM Files | Refrige

EquipID: CH-02-940 | EquipDesc: CHILLER | Delta Point: | Dept: HVAC | RCH: | Supply Type: | Si

Mnf	MCQUAY	location	Basement Mech.
Model	WSC063-0AAAM	Building	ENG2
Serial#	STNU031000073	Floor	1
Keyword	CHILLER	Room	107
Refrig. Type	R-134A	Duty	50 + Lbs
Chrg 1-Lbs/Oz	853	Chrg 2	
BldAsset#	940	Zone	
Status	OPERATING	Key#	
Permit Required		Equip. Condition	Excellent
		Construction#	

Notes: System fill pressure set - 12psi. Chill water temp. setpoint 44F. 200 Ton Rated

Route: | Rou

Sort Order:

Print List

Procedure by equip#: (Up to 30 lines will print out, don't wrap text).

1 On VFD

DrawingsEquip

ENERGY & ATMOSPHERE: CREDIT 5
PERFORMANCE MEASUREMENT- ENHANCED METERING

1. LEED-EB template
2. Description of building performance improvement program
3. E2 utility history and emissions reporting
4. Spreadsheet of one day of actual output of all data recorded

(Responsible Party)

I, Patrick Testoni , declare to USGBC that continuous metering is in place for the following items and for each metered item, a program has been implemented and maintained for using the data gathered to improve building performance over the performance period:

- ☐ Lighting systems and controls
- ☒ Separate building electric meters that allow aggregation of all process electric loads
- ☒ Separate building natural gas meters that allow aggregation of all process natural gas loads
- ☐ Separate meters that allow aggregation of all indoor occupant related water use for required fixtures
- ☒ Separate meters that allow aggregation of all indoor process water use
- ☒ Separate meters that allow aggregation of all outdoor irrigation water use
- ☒ Chilled water system efficiency at variable loads (kW/ton) or cooling loads (for non-chilled water systems)
- ☐ Building-specific process energy efficiency systems and equipment
- ☒ Cooling load
- ☐ Air and water economizer and heat recovery cycles
- ☒ Boiler efficiencies
- ☐ Constant and variable motor loads
- ☐ Variable frequency drive (VFD) operation
- ☐ Air distribution static pressures and ventilation air volumes

I have provided the following documentation to support the applicable declaration above showing that:

- ☒ For each item metered provide a description of the performance improvement program implemented using the data gathered to improve system/building performance over time
- ☒ Quarterly reports on the metered data gathered and for each item metered a report card of its performance.
- ☒ One day of actual output of all data recorded

EA Credit 5.1 (1 point): Performance Measurement, >= 4 Items	Points Documented:	1
EA Credit 5.1 (1 addition point): Performance Measurement, >= 8 Items	Points Documented:	0
EA Credit 5.1 (1 additional point): Performance Measurement, >= 12 Items	Points Documented:	0

Project Name:	Engineering 2 LEED EB Submittal		
Credit:	EA Credit 5.1 - 5.3 (3 points possible): Performance Measurement - Enhanced Metering	Points Documented:	1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Patrick	Testoni	2008-09-03	TESTONIP@UCSC.EDU	
First Name	Last Name	Date	Username (Email Address)	Password

Patrick Testoni
UCSC Energy Manager
10/02/08

LEED-EB : UCSC Engineering 2 Building

EA Credit 5.1 : Performance Measurement – Enhanced Metering

Description of Performance Improvement Program:

1) Electric Meters:
    a. **Engineering 2 Bldg 480v Electric Meter**. The electric meters installed at the Engineering 2 building aggregate the 480v MCC load and the 208v plug load of the building. These meters are networked PML ION 7350 meters, which allow 5 minute trending of kW, Voltage, Current, and various other parameters. The monthly data gathered from these meters allow the Energy Management Department to benchmark the performance of the building to other similar buildings using the Cal Arch software, It also allows us to compare the energy usage to other similar months using historical data, to verify if the building is improved in its performance, and if not, to determine the cause. The interval data is used to verify building operational hours, performance of night setback control sequences, and to analyze the energy saved from commissioning improvements.
    b. Engineering 2 Bldg 208v Electric Meter: same as above
2) Domestic Water Meters:
    a. **Engineering 2 Bldg Water Meter**. The Engineering 2 domestic water use is gathered monthly and is used to determine the efficiency of the building's fixtures and equipment. Water usage is typically consistent, with only two significant variables; number of people using the building that month (class in session, break), and the makeup water for HVAC systems (building HHW). The monthly data can therefore be analyzed based on these know factors and if there are significant spikes in monthly data the fixtures and HVAC equipment can be inspected for possible leaks.
    b. **Central Heating Plant Make Up Water Meter**: The Engineering 2 building is centrally heated from the Central Heating Plant. This heating plant is monitored for any process leaks in the campus loop via a make-up water meter. This meter is recorded monthly. Since the loop is closed, any significant amount of make-up water that is recorded is analyzed and an inspection of the heating loop is started to determine the cause.
3) Irrigation Water Meter:
    a. **Engineering 2 Irrigation Meter**. A dedicated irrigation meter is read monthly in our meter reader route for the campus. The usage is analyzed

using utility management software, and if unusual large or zero readings are recorded, the system is inspected for leaks or broken valves.

4) Chilled Water BTU meters:
    a. **Primary Loop Chilled Water BTU meter**: This meter is trended in the Energy Management System. The flow, supply and return temperatures are trended hourly, and the total BTU load for the primary system is recorded hourly and monthly. This data is used to evaluate chiller performance and the balancing of flow between the primary/secondary bridge in the Engineering 2 building.
    b. **Secondary Loop (building) loop Chilled Water BTU meter**: This meter is trend by the EMS. The temperature (supply/return) and flow are trended hourly, and the BTU is trended hourly and recorded monthly. This information is used to evaluate chiller loop performance, the load profile of the building, and to assess any heating/cooling that may be occurring in the building. This meter is used to balance the flow between the production (primary) loop and the building (secondary) loop as well.
5) Heating Water BTU meters:
    a. **Engineering 2 HHW BTU meter**. This meter is trended in the EMS. The flow, supply and return temperatures are trended hourly, and the BTU is trended hourly and recorded monthly. The performance of the building is evaluated by trending heating load with heating degree days, and the hourly data is used to develop a heating load profile for the building. This load profile is compared against historical load profiles for the building, as well as other buildings on the campus to evaluate performance of the heating system. It is also compared to the chilled water load profile, to ensure no heating/cooling is occurring in the building.
    b. Central Heating Plant HHW BTU meter. This meter is trended hourly by the EMS (flow, supply/return temperature, BTU). The BTU is also recorded monthly to evaluate performance of the Central Heating Plant fire tube boilers, as well as the optimal operating conditions of the campus heating loop. Ideally, the campus heating loop runs on a low flow, high delta T operational condition. This is the most efficient operation as it saves on pumping costs and provides the buildings served (Engineering 2 included) with the best HHW conditions. By analyzing the CHP BTU meter and the building HHW trends, UCSC is able to identify if performance of the building and the plant need to be modified.
6) Natural Gas Fired Equipment
    a. **Central Heating Plant Natural Gas Meters**. Since all natural gas fired equipment that serves Engineering 2 resides outside the building (the boilers are located in the Central Heating Plant), the natural gas meters are read hourly and monthly to evaluate performance of the boiler system (when compared to the BTU meter).

	B93902	B94001	B94002	B94003	B94004	E94201	E94202	I94201	W9420	G93901	G93902	G93903	W939
	Boiler Plant (Heat Plant Xten)	E2 PRI CHW Ton/Hr	E2 SEC CHW Ton/Hr	E2 COND WTR Ton/Hr	Engineering 2 Heat Water Therms	Engineering 2 480/277V Service	Engineering 2 208V Service	E2 Irrigation	Engineering Building 2	Heat Plant Xten - Boiler #1 Gas	Heat Plant Xten - Boiler #2	Heat plant Xten - Boiler #3 Gas	Phys Plant building Xten H2O
	Boiler Plant Total Heat Productio	Chilled Water Load - Primary Loop	Chilled Water Load - Sec. Loop	Condensing Water Load	Heating Water Load	3-phase 480 Volt Bldg Load	Bldg Plug Load	Bldg Irrigation Usage	Bldg Domestic Water Usage	Central Heating Plant Boiler	Central Heating Plant Boiler	Central Heating Plant Boiler	Central Heating Plant
	therms	ton-hrs	ton-hrs	ton-hrs	therms	kWh	kWh	cubic	cubic	CCF	CCF	CCF	cubi
Aug-08	9,170	87,988	39,169	55,430	3,262	175,136	62,170	14,698	2,600	465	10,408	0	2
Jul-08	8,490	90,055	61,557	80,116	3,775	182,065	62,222	12,663	2,380	75	11,931	60	0
Jun-08	13,740	81,922	74,299	100,769	6,355	179,484	63,677	14,419	3,980	118	19,148	40	0
May-08	20,930	81,058	53,946	76,601	5,063	181,857	68,296	11,001	4,100	10,112	13,354	11,060	0
Apr-08	41,280	33,952	29,332	40,931	4,542	167,559	65,059	0	3,100	10,729	21,313	28,450	0
Mar-08	25,720	81,179	47,958	98,320	7,683	175,270	66,809	0	7,590	95	52,029	5,620	0
Feb-08	52,260	26,535	22,402	32,844	5,132	148,081	61,927	0	3,300	43,961	27,736	770	10
Jan-08	92,780	0	0	0	8,621	146,575	56,794	0	3,460	83,845	10,847	180	0
Dec-07	84,140	0	0	0	8,210	152,819	60,706	0	2,100	79,120	950	280	10
Nov-07	59,460	0	0	0	6,291	167,560	64,606	0	3,510	23,114	34,009	870	0
Oct-07	17,010	0	0	0	5,500	183,756	70,428	0	3,890	29,338	188	100	0
Sep-07	2,600	0	0	0	4,564	172,416	65,060	0	2,250	11,843	70	50	0
Aug-07	1,990	0	0	0	4,077	180,490	66,929	0	3,000	11,026	164	50	0
Jul-07	2,050	0	0	0	3,908	182,976	66,064	0	2,110	10,611	99	90	0
Jun-07	8,790	0	0	0	0	174,773	65,194	0	3,580	15,371	3,937	80	0
May-07	25,040	0	0	0	0	176,774	67,430	0	3,750	878	31,981	1,430	0
Apr-07	113,140	0	0	0	0	166,619	66,688	0	3,150	2,260	78,953	7,300	0
Mar-07	110,240	0	0	0	0	186,828	68,954	0	3,970	41,246	50,252	12,040	0
Feb-07	145,420	0	0	0	0	153,172	61,848	0	3,550	88,523	3,758	26,810	0
Jan-07	167,550	0	0	0	0	212,455	65,748	0	3,210	49,548	51,861	48,830	10
Dec-06	121,420	0	0	0	0	203,977	62,293	0	1,840	2,022	58,211	69,530	0
Nov-06	98,440	0	0	0	0	198,216	64,612	0	3,280	9,390	59,540	34,500	0
Oct-06	79,530	0	0	0	0	208,936	67,813	0	3,700	45,392	34,330	410	0
Sep-06	71,420	0	0	0	0	180,348	63,947	0	2,450	261	70,992	150	0
Aug-06	27,140	0	0	0	0	180,348	63,947	0	2,280	177	31,219	170	0
Jul-06	11,990	0	0	0	0	228,255	64,140	0	2,270	246	14,419	210	0
Jun-06	24,810	0	0	0	0	216,292	61,515	0	3,190	193	27,368	270	0
May-06	44,280	0	0	0	0	196,009	66,137	0	3,930	27,359	19,600	290	0
Apr-06	74,550	0	0	0	0	163,828	66,107	0	2,900	72,427	18,850	1,180	0
Mar-06	110,670	0	0	0	0	156,249	67,628	0	2,990	43,209	54,402	1,210	0
Feb-06	49,810	0	0	0	0	145,618	60,175	0	3,630	48,439	8,868	4,730	0
Jan-06	89,830	0	0	0	0	160,844	65,980	0	3,660	35,088	48,060	360	0
Dec-05	92,760	0	0	0	0	157,631	67,002	0	1,770	68,574	29,280	860	0
Nov-05	77,500	0	0	0	0	159,991	63,703	0	3,610	76,459	1,015	740	0
Oct-05	19,330	0	0	0	0	158,872	61,547	0	3,610	20,293	320	190	0
Sep-05	15,960	0	0	0	0	182,405	67,950	0	2,610	14,384	2,749	190	0
Aug-05	13,570	0	0	0	0	199,378	59,527	0	2,580	7,964	6,462	100	10
Jul-05	10,080	0	0	0	0	181,454	68,763	0	2,550	10,846	178	120	0

timestamp	kVA swd	kVAh tot	kVAR swd	kVARh imp	kVARh net	kVARh exp	kW swd	kWh imp	kWh net	Wh	PF sign mean
2008-Sep-22 07:00:00.000	79.88778	2212524	7.125252	316533.5	273225.3	43307.75	79.56977	2174981	2174981	0	-99.6012878
2008-Sep-22 07:15:00.000	80.10316	2212544	-2.369045	316534.1	273224.7	43308.91	79.79144	2175001	2175001	0	38.78725815
2008-Sep-22 07:30:00.000	79.99548	2212564	6.581604	316535.8	273226.4	43308.97	79.68008	2175021	2175021	0	-92.0780792
2008-Sep-22 07:45:00.000	79.71258	2212584	6.007943	316537.4	273227.9	43309.11	79.39051	2175041	2175041	0	-83.2119675
2008-Sep-22 08:00:00.000	80.8191	2212604	5.975646	316539.2	273229.4	43309.34	80.39407	2175061	2175061	0	-72.010437
2008-Sep-22 08:15:00.000	80.13705	2212624	7.136233	316541	273231.2	43309.34	79.81837	2175081	2175081	0	-99.6025848
2008-Sep-22 08:30:00.000	79.96893	2212644	7.322697	316542.8	273233	43309.34	79.61513	2175101	2175101	0	-99.5603943
2008-Sep-22 08:45:00.000	79.80918	2212664	7.817902	316544.8	273234.9	43309.34	79.3702	2175120	2175120	0	-99.4567184
2008-Sep-22 09:00:00.000	80.1125	2212684	7.134048	316546.5	273236.8	43309.34	79.79245	2175140	2175140	0	-99.6001892
2008-Sep-22 09:15:00.000	80.0331	2212704	7.425892	316548.4	273238.6	43309.34	79.67002	2175160	2175160	0	-99.5470276
2008-Sep-22 09:30:00.000	80.39436	2212724	7.906246	316550.4	273240.6	43309.34	79.95954	2175180	2175180	0	-99.4563828
2008-Sep-22 09:45:00.000	80.47841	2212744	7.247459	316552.2	273242.4	43309.34	80.1489	2175200	2175200	0	-99.5871429
2008-Sep-22 10:00:00.000	79.9543	2212764	7.211612	316554	273244.2	43309.34	79.62731	2175220	2175220	0	-99.5898514
2008-Sep-22 10:15:00.000	79.92333	2212784	7.159286	316555.8	273246	43309.41	79.50822	2175240	2175240	0	-90.406395
2008-Sep-22 10:30:00.000	80.22276	2212804	7.794447	316557.8	273247.9	43309.41	79.80135	2175260	2175260	0	-99.4776306
2008-Sep-22 10:45:00.000	79.7823	2212824	7.31279	316559.6	273249.8	43309.41	79.43372	2175280	2175280	0	-99.3438873
2008-Sep-22 11:00:00.000	79.73165	2212844	7.102427	316561.4	273251.5	43309.41	79.4155	2175300	2175300	0	-99.602562
2008-Sep-22 11:15:00.000	79.94253	2212864	6.114672	316563.1	273253.1	43309.54	79.623	2175320	2175320	0	-84.5447388
2008-Sep-22 11:30:00.000	79.92045	2212884	7.398978	316564.9	273254.9	43309.54	79.55644	2175340	2175340	0	-99.5435486
2008-Sep-22 11:45:00.000	80.0238	2212904	7.336487	316566.7	273256.7	43309.54	79.67175	2175359	2175359	0	-99.5619888
2008-Sep-22 12:00:00.000	80.27889	2212924	7.372729	316568.6	273258.6	43309.54	79.9251	2175379	2175379	0	-99.5592957
2008-Sep-22 12:15:00.000	79.34219	2212944	7.119517	316570.3	273260.3	43309.54	79.01415	2175399	2175399	0	-99.5879288
2008-Sep-22 12:30:00.000	79.30759	2212964	4.04282	316571.7	273261.4	43309.91	79.00143	2175419	2175419	0	-55.9904785
2008-Sep-22 12:45:00.000	79.65202	2212984	2.082104	316572.9	273261.9	43310.52	79.33125	2175439	2175439	0	-25.6375542
2008-Sep-22 13:00:00.000	79.81775	2213004	7.045819	316574.6	273263.7	43310.52	79.50613	2175459	2175459	0	-99.6094437
2008-Sep-22 13:15:00.000	79.55064	2213024	3.533776	316575.9	273264.5	43310.96	79.22001	2175478	2175478	0	-46.4405212
2008-Sep-22 13:30:00.000	79.25014	2213043	-2.736012	316576.5	273263.8	43312.16	78.94859	2175498	2175498	0	44.76171494
2008-Sep-22 13:45:00.000	79.24084	2213063	8.007575	316578.5	273265.8	43312.16	78.77905	2175518	2175518	0	-99.4253387
2008-Sep-22 14:00:00.000	79.18494	2213083	8.222098	316580.5	273267.9	43312.16	78.68845	2175538	2175538	0	-99.3786621
2008-Sep-22 14:15:00.000	79.35582	2213103	7.280553	316582.3	273269.7	43312.16	79.02187	2175557	2175557	0	-99.5781479
2008-Sep-22 14:30:00.000	79.8409	2213123	7.397112	316584.2	273271.6	43312.16	79.49339	2175577	2175577	0	-99.5646973
2008-Sep-22 14:45:00.000	79.6385	2213143	7.301328	316586	273273.4	43312.16	79.30217	2175597	2175597	0	-99.5787659
2008-Sep-22 15:00:00.000	80.78905	2213163	7.754823	316588	273275.3	43312.16	80.3906	2175617	2175617	0	-99.5133057
2008-Sep-22 15:15:00.000	81.91201	2213183	8.773444	316590.2	273277.5	43312.16	81.36486	2175637	2175637	0	-99.3371887
2008-Sep-22 15:30:00.000	82.15054	2213204	8.683071	316592.3	273279.7	43312.16	81.63757	2175658	2175658	0	-99.3792953

2008-Sep-22 15:45:00.000	83.73946	2213225	8.232277	316594.4	273281.8	43312.16	83.30319	2175679	2175679	0	-99.4831696
2008-Sep-22 16:00:00.000	84.38968	2213246	10.30054	316596.9	273284.3	43312.16	83.59297	2175700	2175700	0	-99.0673599
2008-Sep-22 16:15:00.000	85.88264	2213267	11.17835	316599.8	273287.1	43312.16	84.96658	2175721	2175721	0	-98.9459
2008-Sep-22 16:30:00.000	89.92461	2213290	11.74453	316602.7	273290.1	43312.16	88.95985	2175743	2175743	0	-98.9440002
2008-Sep-22 16:45:00.000	90.77489	2213313	17.16223	316607	273294.3	43312.16	88.86594	2175765	2175765	0	-97.9092941
2008-Sep-22 17:00:00.000	89.34822	2213335	9.689082	316609.4	273296.8	43312.16	88.75666	2175787	2175788	0	-99.3438492
2008-Sep-22 17:15:00.000	90.09975	2213358	11.45746	316612.3	273299.6	43312.16	89.20021	2175810	2175810	0	-99.0079193
2008-Sep-22 17:30:00.000	92.58595	2213381	10.24227	316614.8	273302.2	43312.16	91.91828	2175833	2175833	0	-99.290123
2008-Sep-22 17:45:00.000	93.64954	2213404	12.31083	316617.9	273305.3	43312.16	92.63504	2175856	2175856	0	-98.9252243
2008-Sep-22 18:00:00.000	93.65289	2213427	14.6358	316621.6	273308.9	43312.16	92.21256	2175879	2175879	0	-98.4763565
2008-Sep-22 18:15:00.000	91.38028	2213450	10.33713	316624.1	273311.5	43312.16	90.69401	2175902	2175902	0	-99.2589035
2008-Sep-22 18:30:00.000	91.2469	2213473	11.16273	316626.9	273314.3	43312.19	90.36555	2175924	2175924	0	-96.3894272
2008-Sep-22 18:45:00.000	93.153	2213496	17.2149	316631.3	273318.6	43312.19	91.23284	2175947	2175947	0	-97.9750595
2008-Sep-22 19:00:00.000	93.64463	2213520	13.40975	316634.6	273322	43312.19	92.43262	2175970	2175970	0	-98.7407303
2008-Sep-22 19:15:00.000	93.69967	2213543	12.33757	316637.7	273325	43312.19	92.68358	2175993	2175993	0	-98.9320602
2008-Sep-22 19:30:00.000	95.11446	2213567	14.31349	316641.3	273328.6	43312.19	93.75367	2176017	2176017	0	-98.6021118
2008-Sep-22 19:45:00.000	95.08234	2213591	12.44304	316644.4	273331.7	43312.19	94.03208	2176040	2176040	0	-98.9135361
2008-Sep-22 20:00:00.000	93.61446	2213614	14.13094	316647.9	273335.3	43312.19	92.2358	2176063	2176063	0	-98.5622482
2008-Sep-22 20:15:00.000	92.94646	2213637	10.17609	316650.5	273337.8	43312.19	92.29481	2176086	2176086	0	-99.3041992
2008-Sep-22 20:30:00.000	95.8295	2213661	15.27367	316654.3	273341.6	43312.19	94.29073	2176110	2176110	0	-98.4309921
2008-Sep-22 20:45:00.000	95.41125	2213685	10.57618	316656.9	273344.3	43312.19	94.72856	2176134	2176134	0	-99.2951965
2008-Sep-22 21:00:00.000	95.35635	2213709	10.94103	316659.7	273347	43312.19	94.59135	2176157	2176157	0	-99.2133102
2008-Sep-22 21:15:00.000	97.28485	2213733	11.2779	316662.5	273349.8	43312.19	96.47831	2176181	2176181	0	-99.1883774
2008-Sep-22 21:30:00.000	95.0819	2213757	9.07283	316664.8	273352.1	43312.2	94.63885	2176205	2176205	0	-98.8697128
2008-Sep-22 21:45:00.000	94.0794	2213781	2.166407	316666.1	273352.6	43313.02	93.67176	2176229	2176229	0	-22.5466957
2008-Sep-22 22:00:00.000	93.32049	2213804	3.565417	316667.7	273353.5	43313.65	92.91271	2176252	2176252	0	-42.4881821
2008-Sep-22 22:15:00.000	92.95464	2213827	6.473642	316669.5	273355.1	43313.91	92.55603	2176275	2176275	0	-76.3435364
2008-Sep-22 22:30:00.000	93.51208	2213851	9.078282	316671.8	273357.4	43313.92	92.99315	2176298	2176298	0	-98.5716095
2008-Sep-22 22:45:00.000	93.99469	2213874	8.788315	316674	273359.6	43313.92	93.55714	2176322	2176322	0	-99.5363007
2008-Sep-22 23:00:00.000	92.8454	2213897	8.546667	316676.1	273361.7	43313.92	92.44201	2176345	2176345	0	-99.5653992
2008-Sep-22 23:15:00.000	93.0141	2213921	9.47277	316678.5	273364.1	43313.92	92.4642	2176368	2176368	0	-99.4181671
2008-Sep-22 23:30:00.000	92.74924	2213944	8.761843	316680.7	273366.3	43313.92	92.3246	2176391	2176391	0	-99.5422668
2008-Sep-22 23:45:00.000	93.2318	2213967	7.573262	316682.7	273368.2	43314.05	92.81229	2176414	2176414	0	-86.714859
2008-Sep-23 00:00:00.000	93.12603	2213990	9.171835	316685.1	273370.5	43314.13	92.50832	2176437	2176437	0	-92.712944
2008-Sep-23 00:15:00.000	91.92362	2214013	8.568789	316687.2	273372.6	43314.13	91.48746	2176460	2176460	0	-99.528923
2008-Sep-23 00:30:00.000	90.50777	2214036	8.31812	316689.3	273374.7	43314.13	90.09142	2176483	2176483	0	-99.5416946
2008-Sep-23 00:45:00.000	90.22108	2214059	8.347437	316691.4	273376.8	43314.13	89.80132	2176505	2176505	0	-99.5344849

2008-Sep-23 01:00:00.000	88.98813	2214081	8.49158	316693.5	273378.9	43314.13	88.53247	2176527	2176527	0	-99.2771378
2008-Sep-23 01:15:00.000	86.93568	2214103	10.13251	316696	273381.4	43314.13	86.1831	2176549	2176549	0	-99.1471558
2008-Sep-23 01:30:00.000	86.98581	2214124	10.87642	316698.8	273384.2	43314.13	86.08626	2176570	2176570	0	-98.981514
2008-Sep-23 01:45:00.000	85.65498	2214146	8.191574	316700.8	273386.2	43314.13	85.20029	2176592	2176592	0	-99.4746094
2008-Sep-23 02:00:00.000	86.31644	2214167	11.35234	316703.7	273389	43314.13	85.33218	2176613	2176613	0	-98.8831863
2008-Sep-23 02:15:00.000	84.76637	2214188	8.339167	316705.7	273391.1	43314.13	84.28756	2176634	2176634	0	-99.4451599
2008-Sep-23 02:30:00.000	84.72148	2214210	7.706687	316707.7	273393.1	43314.13	84.34213	2176655	2176655	0	-99.554245
2008-Sep-23 02:45:00.000	85.26867	2214231	7.867345	316709.6	273395	43314.13	84.86478	2176676	2176676	0	-99.5292282
2008-Sep-23 03:00:00.000	84.02129	2214252	9.007224	316711.9	273397.3	43314.13	83.4124	2176697	2176697	0	-99.2833328
2008-Sep-23 03:15:00.000	83.34206	2214273	9.10335	316714.2	273399.5	43314.13	82.71761	2176718	2176718	0	-99.2599716
2008-Sep-23 03:30:00.000	85.58221	2214294	20.39831	316719.3	273404.6	43314.13	83.03676	2176739	2176739	0	-97.0316772
2008-Sep-23 03:45:00.000	83.12682	2214315	9.71696	316721.7	273407.1	43314.13	82.39776	2176759	2176759	0	-99.1408615
2008-Sep-23 04:00:00.000	82.37886	2214336	8.475019	316723.8	273409.2	43314.13	81.86224	2176780	2176780	0	-99.3890381
2008-Sep-23 04:15:00.000	83.74712	2214357	15.87842	316727.8	273413.2	43314.13	81.9573	2176800	2176800	0	-97.8845062
2008-Sep-23 04:30:00.000	82.80821	2214377	12.40356	316730.9	273416.3	43314.13	81.62262	2176820	2176820	0	-98.5829163
2008-Sep-23 04:45:00.000	83.29021	2214398	13.84113	316734.3	273419.7	43314.13	81.85833	2176841	2176841	0	-98.3128738
2008-Sep-23 05:00:00.000	82.05856	2214419	9.322409	316736.7	273422.1	43314.13	81.40252	2176861	2176861	0	-99.205452
2008-Sep-23 05:15:00.000	83.47784	2214439	13.38329	316740	273425.4	43314.13	82.12557	2176882	2176882	0	-98.4020538
2008-Sep-23 05:30:00.000	84.34831	2214461	18.65666	316744.7	273430.1	43314.13	82.0658	2176902	2176902	0	-97.3087769
2008-Sep-23 05:45:00.000	82.17678	2214481	10.67047	316747.3	273432.7	43314.13	81.28346	2176923	2176923	0	-98.9289246
2008-Sep-23 06:00:00.000	82.02538	2214502	7.580518	316749.3	273434.6	43314.13	81.65904	2176943	2176943	0	-99.5522003
2008-Sep-23 06:15:00.000	81.44367	2214522	7.017008	316751	273436.4	43314.16	81.11865	2176963	2176963	0	-96.7235947
2008-Sep-23 06:30:00.000	81.95715	2214542	7.689145	316752.9	273438.3	43314.16	81.56097	2176984	2176984	0	-99.5184708
2008-Sep-23 06:45:00.000	81.90043	2214563	7.897205	316754.9	273440.3	43314.16	81.46638	2177004	2177004	0	-99.4711838

MATERIALS & RESOURCES: PREREQUISITE 1.1
WASTE STREAM AUDIT

1. LEED-EB template
2. Waste audit narrative including spread sheet and photos
3. E2 Waste Reduction Policy/Narrative

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building has established minimum source reduction and recycling program elements and quantified current waste stream production volume through the following actions:

☒ Conducted a waste stream audit of the ongoing waste stream (not specific upgrade project waste) to establish a current building waste baseline that identifies the types of waste making up the waste stream and amounts of each type of waste in the waste stream. At a minimum, the audit determined the amounts for paper, glass, plastics, cardboard and metals in the waste stream.

☒ Operated over the performance period a waste reduction policy that includes source reduction purchasing strategies, collection station equipment, recycling and occupant education.

I have provided the following to support the declaration:

☒ The waste stream audit to establish building waste baseline entered in the table below.

☒ Copy of the waste reduction policy implemented to reduce waste stream through source reduction purchasing strategies, collection station equipment, recycling and occupant awareness notices.

Table 1: REQUIRED ENTRY - Building Baseline Waste Stream Audit Before Implementing Procurement/Management Policy

Waste Material By Type	Quantity currently recycled (tons/yr.)	Estimated Unsegregated Waste Per Year (tons/yr.)	Total Waste Quantity By Material (tons/yr.)	Percent of Total Annual Waste By Material (%)	Current Recycling Rate By Material (%)
Newspaper	0	0	0	0	0
Glass	0	0.26	0.26	2.25	0
Aluminum	0	0.052	0.05	0.43	0
Tin/bi-metal	0	0	0	0	0
High grade paper	0	0	0	0	0
Mixed paper	4.498	1.248	5.75	49.74	78.23
Corrugated Cardboard	0	0.572	0.57	4.93	0
Plastics	0	0.26	0.26	2.25	0
Scrap metals	0	0	0	0	0

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(Continued on Page 2)

Table 2: OPTIONAL ENTRY - Building Baseline Waste Stream Audit Before Implementing Procurement/Management Policy

Waste Material By Type		Quantity currently recycled (tons/yr.)	Estimated Unsegregated Waste Per Year (tons/yr.)	Total Waste Quantity By Material (tons/yr.)	Percent of Total Annual Waste By Material (%)	Current Recycling Rate By Material (%)
Construction / Demolition					0	0
Tires					0	0
Used motor oil					0	0
Batteries					0	0
Fluorescent lamps					0	0
Leaves					0	0
Grass					0	0
Food waste					0	0
Other waste	Plastic Bags	0	0.416	0.42	3.63	0
Other waste	Bathroom and	0	4.2	4.2	36.33	0
Other waste	Misc.	0	0.052	0.05	0.43	0
Sum-Total Value		4.498	7.06	11.56	99.99	38.91

Project Name: Engineering 2 LEED EB Submittal

Credit: MR Prerequisite 1.1: Source Reduction and Waste Management? Waste Management Policy and Waste Stream Audit

Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-06-25	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UCSC Waste Audit

Building: Engineering 2
Audit Dates: May 13 - 14, 2008

Background:

As part of the LEED-EB Green building certification, the UCSC recycling team sorted and weighed all the trash from the building for one night to see how much recyclable material is in the trash. This is called a "Waste Audit". The information gathered is then used to develop or improve recycling and waste reduction programs for the building and occupants.

Overview:

1. Grounds Department will place a covered debris box near the target building the day before the audit.
2. On the night before the audit, all trash from the target building should be placed in the debris box. Only trash from the target building should go in the box.
3. On the day of the audit, the box will be picked up, relocated to the corporation yard, and the contents sorted and weighed by the recycling crew.

Custodial Crew Notes

- All trash from the building should go into the special box.
- No trash from other buildings should go in this box.
- Do not remove recycling from the building trash for this audit. We need to see what people are throwing away.

Narrative

Trash from building was collected as above. The debris box was then moved to the corporation yard so that the contents could be sorted and weighed. The audit team cut open the trash bags and dumped the contents out onto a tarp. The materials were spread out with a rake, then sorted with grab sticks and a shovel, and sorted into various categories. The sorted materials were weighed in 30 gallon barrels, which also allowed us to track material types by volume. The weight and volume information was tallied on a worksheet as the materials were sorted. Trash was then dumped into an adjacent dumpster, and recyclable materials were diverted for recycling.

Notes on Process

Using the debris box was a great help. It allowed us to capture, store, move, and sort the material at a time and place of our choosing. If there had been inclement weather the scheduled sort day, we could have delayed the sort or moved it to another location.

Trash in the target building is currently collected on 2 schedules. Bathroom trash is collected 5 nights per week, and offices are collected twice weekly. We timed our sort to capture both pulses. In hindsight, it would have yielded more precise data to have two sorts, one for each collection cycle. We should make that change for future buildings.

Notes on Findings

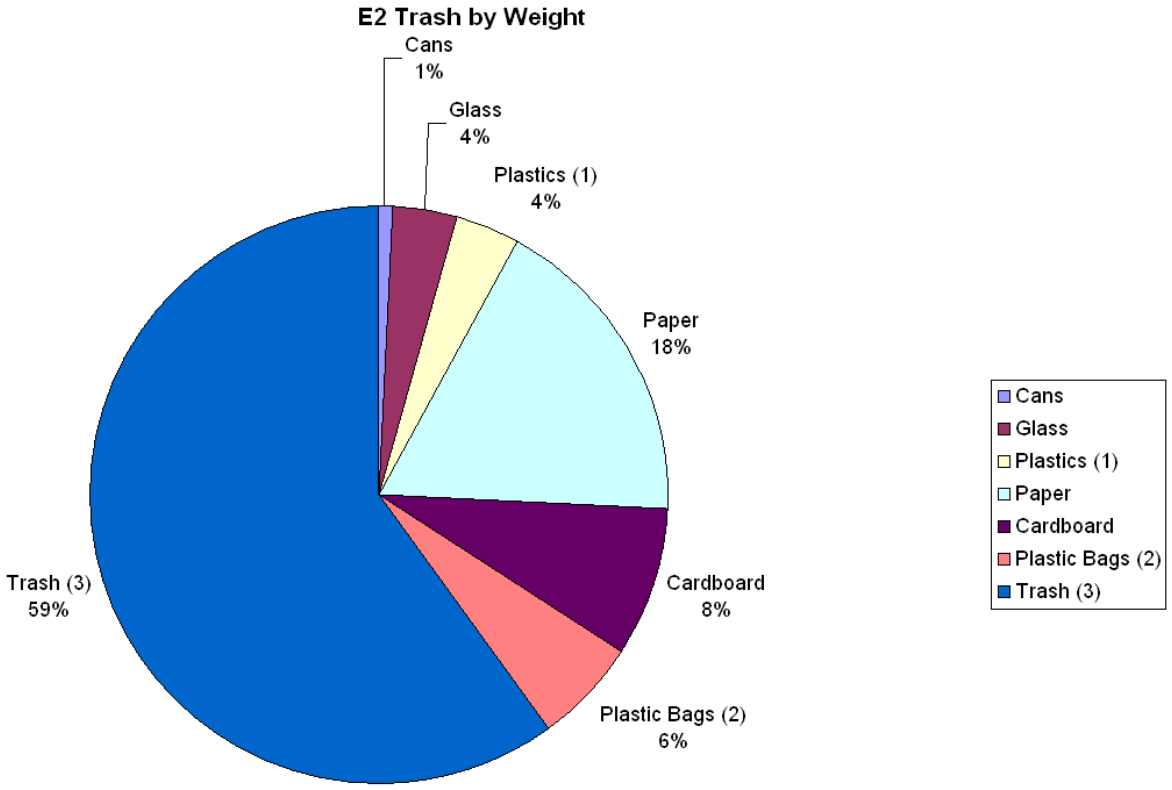
We found a significant volume of large sized trash bags that we noted in the data. There was also a large volume of smaller, wastebasket-sized liners that were not separated out, and were included in the mixed trash category.

There were very few beverage containers of any type in the trash. There are no vending machines in the building, and beverage containers are already collected in the outside areas around the building.

There was a surprisingly small amount of high-grade paper, considering the target building is a very large academic office building. Although the building has a paper recycling program in place, we are not sure that accounts for the relatively low amount of recyclable paper in the trash. Our best guess is that paper gets discarded in pulses as people finish projects or clean their offices.

E2 WASTE AUDIT WORKSHEET:

MATERIALS:	**WEIGHT**	1 week	52 weeks	tons/ yr		
Cans	1 lb	2	104	0.052 T	Paper Recycling (1 week)	173 lbs
Glass	5 lbs	10	520	0.26 T	52 weeks (1 year)	8996 lbs
Plastic	5 lbs	10	520	0.26 T	tons/year	4.498 tons
Cardboard	11 lbs	22	1144	0.572 T		
Paper	24 lbs	48	2496	1.248 T		
Garbage & Paper Towels	81 lbs	162	8424	4.212 T		
Plastic Bags	8 lbs	16	832	0.416 T		
Misc.	1 lb	2	104	0.052 T		
TOTAL WASTE	**136 lbs**	**272 lbs**	**14144 lbs/ yr**	**7.072 tons/yr**		
Percentage of waste that could have been recycled:	**40%**					


E2 Trash by Weight
Cans
1%
Glass
4%
Plastics (1)
4%
Paper
18%
Cardboard
8%
Plastic Bags (2)
6%
Trash (3)
59%
Cans
Glass
Plastics (1)
Paper
Cardboard
Plastic Bags (2)
Trash (3)

UCSC Recycling performing waste Audit- May 14th

Sifting through and categorizing waste

Separating waste by type of material

Weighing the categorized waste

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E2 WASTE REDUCTION POLICY/NARRATIVE

The UCSC Physical Plant and Recycling Program created recycling recommendations based off of Engineering 2s waste stream audit. The following policy highlights the improved occupant recycling recommendations implemented in addition to the current practices of the building.

Signage, Labeling, and Color Coordination of Trash and Recycling

The Engineering 2 building has clearly labeled 23-gallon Glutton "slim jim" blue recycling bins located in every lobby, kitchen, lounge, and conference room on each floor of E2. Outside of each main entrance of the building there are also larger 56-gallon labeled brown recycling bins next to each trashcan. Large blue recycling containers are also located outside of the two classrooms on the 1st floor to make it easy and convenient for students to properly dispose of their recyclable items while coming to and from class. In each copy room in E2 there are designated tan and white metal recycling containers for paper, clearly labeled "office paper", "white paper" and "mixed paper". See attached photos.

Staff and Custodian Training;

Suggestions were made by E2 building occupants concerning the improved recycling program during an E2 LEED-EB occupant meeting. Surveys were collected from occupants and feedback was received and then directed into an improved recycling program. The additional blue recycling bins added throughout the building are collected by UCSC Recycling Services once a week. The UCSC Recycling team has been trained in proper handling and prompt pick up for every recycling center on campus.

Occupant training for the improved recycling program was circulated via e-mail. Dave Wade, the UCSC Recycling Coordinator, sent out an e-mail to all building occupants about the improved recycling program including tips on personal steps they can take to further improve the reduce and re-use aspects of recycling.

Source Reduction:

The occupants of E2 were not in favor of replacing paper towels with high volume air hand dryers. The quite office environment of E2 is not conducive to loud noises, including air hand dryers over 70db. Some occupants also expressed concern over the cleanliness of air hand dryers which raised air temperatures because of harboring bacteria. The source reduction suggestions we did receive from occupants were to make sure the custodians are not placing extra paper towels on the restroom counters because it makes it easier to pick up more than one. The tri-fold recycled paper towel dispensers will be replaced with Kimberly Clark Microban mechanical single sheet touch-free dispensers. These new dispensers should reduce the number of paper towels discarded and adhere to the occupants sanitary wishes.

Paper Use Reduction:
The Engineering 2 building produces more paper waste and recycling than any other material. In order to address this paper consumption, the UCSC Physical Plant encourages employees to utilize double sided print technology. In addition, all new printers and copy machines must have double-sided print technology.

Computer equipment, Office equipment, and Chair Reuse and Recycling
All of UCSC's computers, monitors, faxes, phones, copy machines, chairs etc. are resold, donated or recycled by Direct Computer Disposal. Direct Computer Disposal is a full service electronics recycling company. Computers, Monitors, Televisions and other electronic devices are received or picked up on a daily basis from UCSC and are recycled at facilities in San Leandro, California.

Toner Recycling and Services:
Empty toner cartridges recycling at UCSC is through a third party vendor benefiting UCSC Child Care Services. Employees use campus mail to deliver use cartridges for recycling.

Battery Recycling:
UCSC has installed brown battery recycling bins in the copy rooms of E2 that are clearly labeled with which type of batteries are accepted for recycling (Alkaline, Carbon, Zinc, Nickel Cadmium, Nickel-Metal Hydride, Lithium, Magnesium, Silver and Mercury). In addition, small batteries may be sent via campus mail to the recycling coordinator, Dave Wade, Barn G, Physical Plant.

Letter sent out to Building Occupants via e-mail:

Recycling and Waste Reduction for E2

Dear Building Occupants:

As you may know, E2 was selected as the first building on campus to undergo LEED certification of an existing building. Certification involves looking at and improving all environmental systems of the building, including water, energy, and solid waste. I am writing to tell you about improvements to the recycling program for Engineering 2 and ask for your support and cooperation.

The primary material to recycle in most office buildings is paper, and we have added a number of new paper recycling stations throughout the building. In addition, we can provide you with a desk side paper-recycling box. In the future, we hope to offer desk side collection of recycling, but for now, we must ask you to take paper from your office to the conveniently located copy rooms or one of the established stations inside the building.

In addition to paper recycling, we are adding beverage container recycling stations throughout the building. Blue “Slim-Jim” containers will be placed in break rooms and lobbies on each floor.

We are also adding battery recycling pick-up to E2. Recycling bins for campus-generated batteries will be located in copy rooms. These bins may be used for all batteries, both single use and worn out rechargeable batteries.

Beyond asking for your participation in recycling, I am asking you to take personal steps to reduce waste and the need for recycling. The phrase “Reduce, Re-Use, Recycle” is more than a slogan; it is a hierarchy of best practices. Each of us can take concrete steps that while individually small, have large cumulative impacts.

- Reduce waste. Minimize your use of single use and disposable products. Use e-mail. Print only what is necessary, and use print preview and proofread on screen. Print and copy documents double-sided whenever possible.
- Re-Use. Buy and use a durable water bottle or coffee cup. Utilize campus mail’s re-useable intercampus mail envelopes. Use single sided copies for scratch pads. You won’t just be saving paper; you’ll be stretching the campus budget.
- Recycle! We’ve already talked about it, but it bears repeating. Studies show that recycling is one of the single most effective things we can do to combat global warming and environmental degradation. So please help. The more participation we get, the more successful our program will be.

Thank You!

Cordially,

Dave Wade

Photos of Recycling Receptacles at Engineering 2

Recycling bins located outside main entrances to E2

Blue Recycling Bins outside of classrooms on 1st Level of E2.

Blue Recycling bin in lobby. Also smaller ones located in lounges, break & conference rooms (see below)

Paper Recycling located in every copy rooms throughout E2.

Slim Jim Recycling Containers that were added to break rooms, kitchens, lobbies, and lounges throughout E2.

MATERIALS & RESOURCES: PREREQUISITE 1.2
STORAGE & COLLECTION OF RECYCABLES

1. LEED-EB template
2. E2 floor plans highlighting areas for recycling

(Responsible Party)

I, Louise Huttinger , declare to USGBC that an easily accessible area of appropriate size has been dedicated to serve the recycling needs of the entire building. (Building will be granted an exception to the requirement in this prerequisite for an identified material if it can be documented for an existing building that there are no public or private recycling services available within the region where the building is located (within 50 miles of the building) for one or more of the identified materials).

The separation, collection and storage area for recycling will accommodate the following materials (at a minimum):

☒ Paper

☒ Corrugated cardboard

☒ Glass

☒ Plastics

☒ Metals

Total area of building recycling space: (Although there is no specific size requirement for compliance with MR Prerequisite 1.2, Table 2 in the LEED-EB Reference Guide can be used as a guideline to size the recycling area based on building square footage. It is based on the City of Seattle's ordinance on minimum areas for recycling and storage of recyclables in commercial and residential buildings.)

Total area of recycling spaces in building (square feet) =	62
Total building floor area (square feet) =	152,077
Achievement of recommended recycling space areas:	No

I have provided the following documentation to support the declaration:

☒ Plan showing the area(s) dedicated to recycled material collection and storage.

Project Name: Engineering 2 LEED EB Submittal

Credit: MR Prerequisite 1.2: Source Reduction and Waste Management? Storage & Collection of Recyclables

Prerequisite Documented: **Yes**

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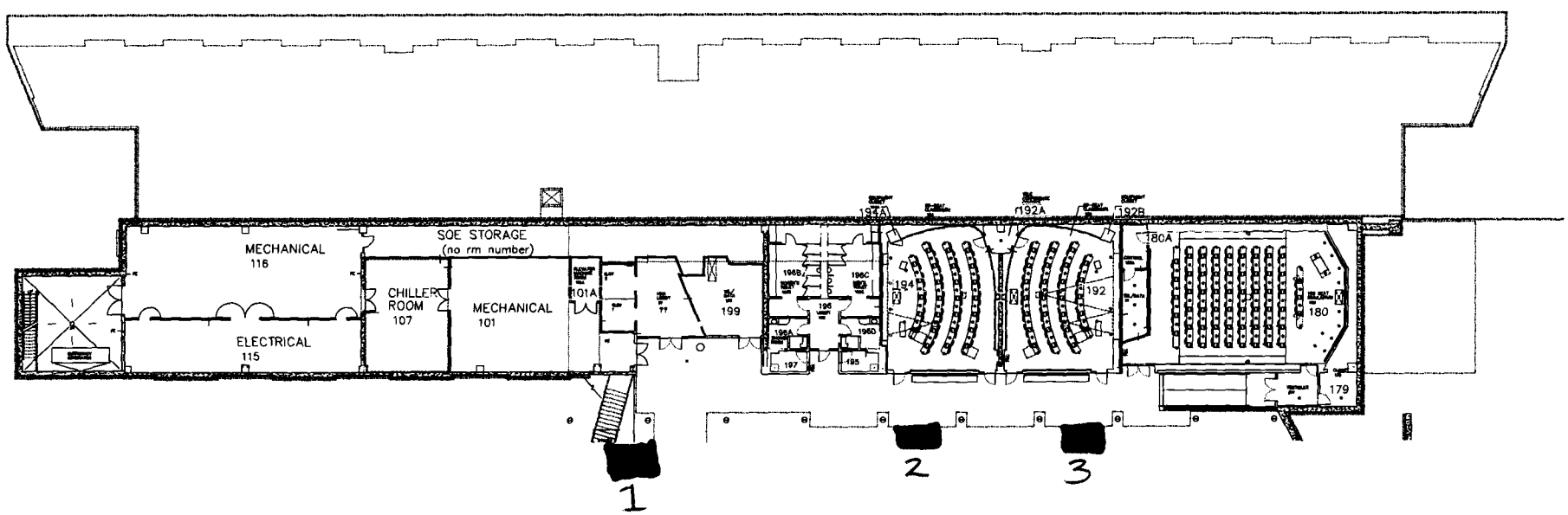
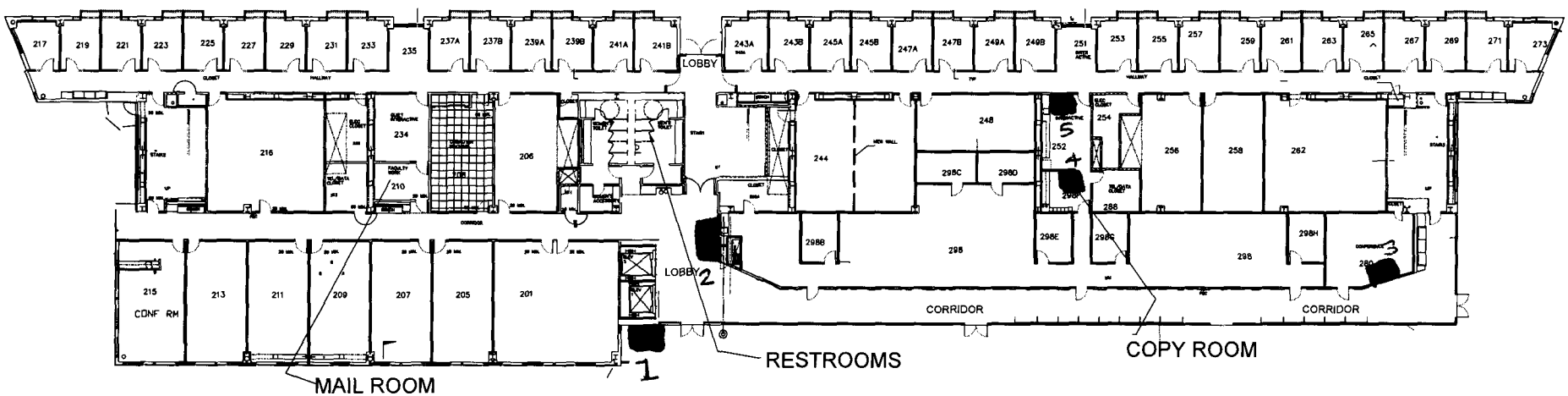
Louise	Huttinger	2008-10-03	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

ENGINEERING BLDG
1st FLOOR



1. 5ft² outdoor recycling bin for mixed beverage containers (plastics, cans, glass)
2. 5ft² outdoor recycling bin (plastics, cans, glass)
3. 5ft² outdoor recycling bin (plastics, cans, glass)

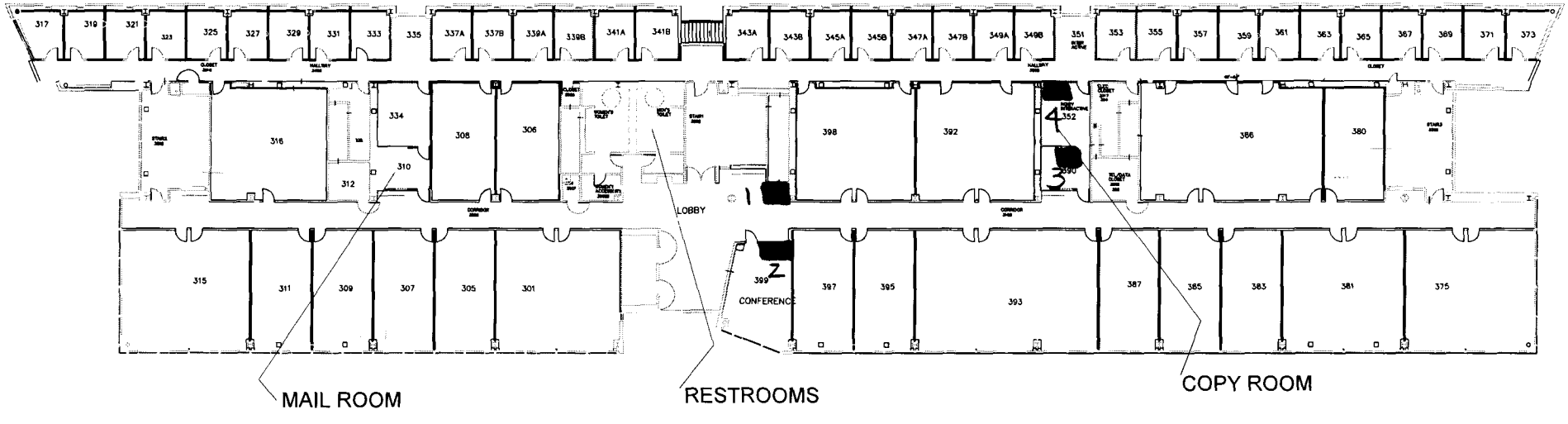
ENGINEERING BUILDING
2nd FLOOR



1. 5ft² outdoor recycling bin (plastics, cans, glass)
2. 2ft² indoor recycling bin (plastics, cans, glass) in main lobby
3. 2ft² indoor recycling bin (plastics, cans, glass) in conference room.
4. ~~4~~ 4.5 ft² paper recycling station in copy room

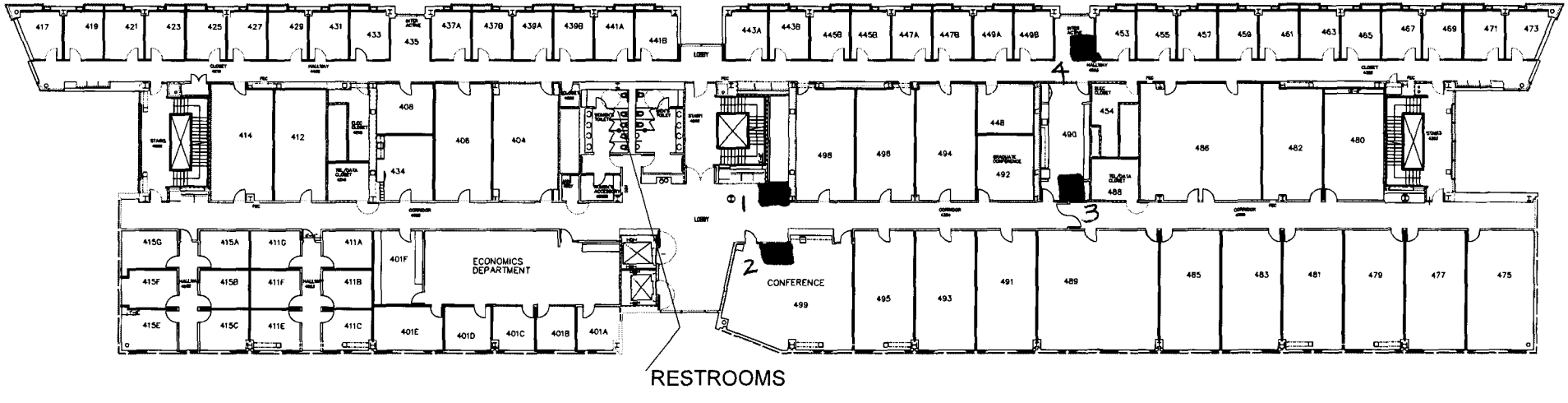
5. 2ft² indoor recycling bin (plastics, cans, glass) in break room.

ENGINEERING BLDG
3rd FLOOR



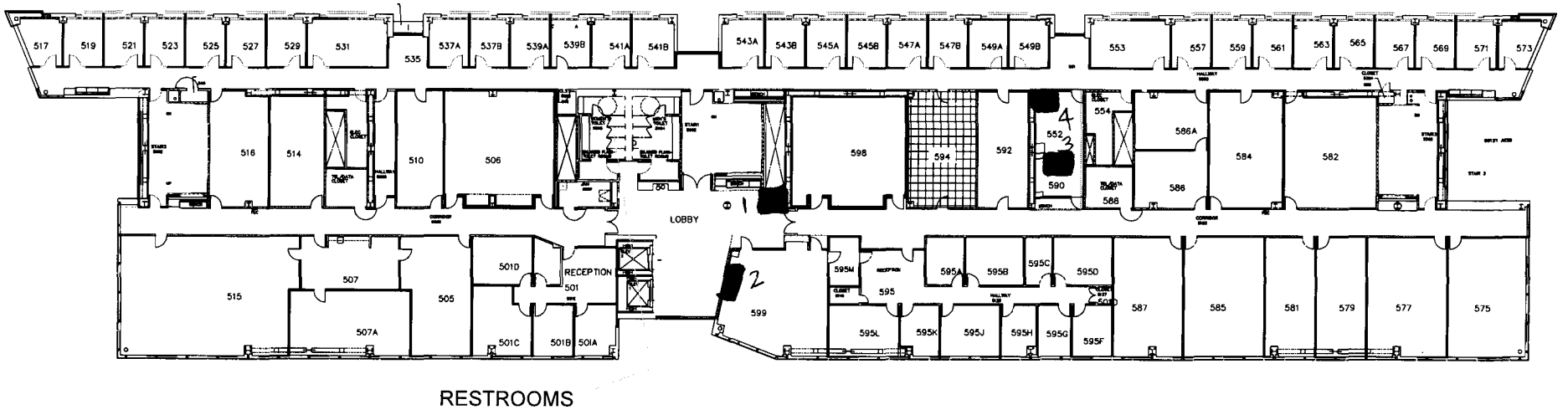
1. 2ft² mixed recycling bin in main lobby (plastic, cans, glass)
2. 2ft² mixed recycling bin in conference room (plastics, cans, glass)
3. 4.5ft² paper recycling station in copy room.
4. 2ft² mixed recycling bin in break room. (plastics, cans, glass)

ENGINEERING BLDG
4th FLOOR



1. 2ft² mixed recycling bin in main lobby (plastics, cans, glass)
2. 2ft² mixed recycling bin in conference room (plastics, cans, glass)
3. 2ft² mixed recycling bin in break room (plastics, cans, glass)
4. 4.5ft² paper recycling station in communal printing station.

E2 5TH FLOOR



1. 2ft² mixed recycling bin (cans, plastic, glass) in main lobby.
2. 2ft² mixed recycling bin (cans, plastic, glass) in conference room.
3. 4.5ft² paper recycling bin in copy room.
4. 2ft² mixed recycling bin (cans, plastic, glass) in break room.

MATERIALS & RESOURCES: PREREQUISITE 2
TOXIC MATERIAL SOURCE REDUCTION,
REDUCED MERCURY IN LIGHT BULBS

1. LEED-EB template
2. E2 Lamp Purchasing Policy
3. E2 Mercury calculation narrative
4. Invoice of lamps purchased during performance period
5. MSDS sheets of low-mercury lamps

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building has established and maintained a toxic material source reduction program to reduce the amount of mercury brought into buildings through purchases of mercury-containing light bulbs through the following actions:

☒ Maintain mercury content of all mercury containing light bulbs below 100 picograms per lumen hour of light output (picogram/lumen hour), on weighted average, for all mercury containing light bulbs acquired for the existing building and associated grounds.

Calculation Methodology (The same calculations apply to both MR Prerequisite 2 and MR Credit 6)

Note on Obtaining Mercury Data:
Successfully completing the picogram per lumen hour calculations requires information about the mercury content in milligrams per bulb for each type of mercury-containing bulb in the building. This information should be obtained from MSDSs or other public literature from the manufacturer, or by directly contacting the manufacturer/vendor and requesting a written statement reporting mercury content values.

Please note that mercury values generated by TCLP (Toxicity Characteristic Leaching Procedure) tests do not reflect total mercury content or mercury concentration in the bulb, and therefore are not appropriate for use in the LEED-EB calculations. These values are reported in mg of mercury per liter of test solution, and cannot be converted to total mercury content through calculations.

Table 1: Mercury Calculation for a Light Bulb Purchasing Plan

Type of Light Bulb	Quantity per Light Bulb Type	Hg Content per Bulb [mg]	Design Light Output per Bulb [lumens]	Rated Life per Bulb [hours]	Total Hg Content by Bulb Type [grams]	Total Lumen Hours by Bulb Type [hours]
F32T8/ADV835/XEW/AL	564	1.7	2,425	36,000	0.96	49,237,200,000
PL-C 26W/835/4P/ALTO	1,174	1.4	1,550	12,000	1.64	21,836,400,000
FT40DL/830/RS	908	4.5	2,709	20,000	4.09	49,195,440,000
FT36DL/830	32	5	2,494	12,000	0.16	957,696,000
CF42DT/E/IN/835	26	4.5	2,752	12,000	0.12	858,624,000
CF13DD/E/835	235	2.5	774	12,000	0.59	2,182,680,000
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
					0	
				Totals	7.56	124,268,040,00
				Weighted Average Mercury Content [Picograms / Lumen Hour]		60.84

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(Continued on Page 2)

I have provided the following to support the declaration:

☒ Copy of the organizational policy specifying that all future purchases of mercury-containing light bulbs will be made in such a way that the average mercury content of the light bulbs is less than the specified level in picograms/lumen hour.

☒ Records of all acquisitions during the performance period of mercury-containing light bulbs for use in the building and grounds.

☒ Manufacturer Material Safety Data Sheets (MSDS) for each type of light bulb purchased showing mercury content of the light bulbs in milligrams (If MSDS show range of mercury contents in milligrams, use the highest value given in these calculations).

Project Name: Engineering 2 LEED EB Submittal

Credit: MR Prerequisite 2: Toxic Material Source Reduction?Reduced Mercury in Light Bulbs

Prerequisite Documented: **Yes**

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-06-23	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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SANTA CRUZ, CALIFORNIA 95064

Engineering 2- Fluorescent Lights Purchasing and Recycling Policy

The University of California Santa Cruz has an aggressive energy conservation program in which fluorescent lamps are used instead of incandescents wherever feasible. All fluorescent lamps do contain Mercury, a highly persistent and toxic chemical that accumulates in human, fish and wildlife. UCSC has addressed this serious environmental toxicity hazard by requiring that all new fluorescent lamps purchased must be low-mercury and TCLP compliant. Specifically, all fluorescent lamps purchased must have a mercury content of less than 5 mg per bulb. This policy also requires that the mercury content of the light bulbs acquired for the Engineering 2 building must be less than 80 picograms per lumen hour on average. In addition, all fluorescent lamps must be recycled and the vendor must provide a recycling receipt.

The Engineering 2 building is re-lamped every 3-4 years. A scheduled re-lamp did not fall in the building's performance period (May-July 2008). Philips linear fluorescent and compact fluorescent bulbs were purchased during the performance period for spot checks. The next scheduled re-lamp must comply with the above mercury content policy.

Jim Dunne
E2 LEED Project Manager
Associate Director- UCSC Physical Plant

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PHYSICAL PLANT SANTA CRUZ, CALIFORNIA 95064

To: USGBC LEED-EB Application Review Committee
Re: MR Prereq2 & Credit 6: Toxic Material Source Reduction, Reduced Mercury

The E2 mercury content was calculated using a lighting audit conducted in the early May 2008. Each type of fluorescent lamp was then researched to find their mercury content per bulb. We then decided which bulbs to replace, based on their high mercury content and the economic feasibility of their replacements.

Below is a table of the E2 Lighting Audit. The lamps that are being replaced with lower-mercury equivalents have the name and manufacturer in green below.

ENGINEERING 2 LIGHTING AUIDT

Lamp/Part #	F032/735/ECO	CF32DT/E/IN/830	CF26DT/E/IN/830	CF26DD/E/835	FP54/830/HO/ECO	50T4Q/CL	FT40DL/830/RS	FT36DI/830	CF42DT/E/IN/835	50MR16	CF13DD/E/835
MSDS Lamp Type	Lin Fluor	Comp Fluor	Comp Fluor	Comp Fluor	Pentron	Halogen	Comp Fluor	Lin Fluor	Comp Fluor	Halogen	Comp Fluor
Purchasing Policy Replacement	F32T8/ADV835/XEW/ALTO	PL-C26W/835/4P/ALTO	PL-C26W/835/4P/ALTO	PL-C26W/835/4P/ALTO							
Total# in E2	564	556	518	100	1224	32	908	32	26	74	235

By replacing Sylvania linear fluorescent and compact fluorescent lamps with Phillips Alto II ones, we were able to achieve a weighted average mercury content of 60.84 picograms per lumen hour.

RAYVERN LIGHTING SUPPLY CO., INC.

INVOICE

7901 Somerset Blvd.
Suite C
Paramount, CA 90723
(562)634-7020
(800)367-4499
Fax: (562)634-7697

PLEASE REMIT TO
P.O. Box 91
PARAMOUNT, CA 90723

E-Mail: sales@rayvern.com www.rayvern.com

Customer Copy

Number	114349
Date	05/15/08
Page	1

Bill To:		Ship To:	
2402	U.C. SANTA CRUZ-PHYSICAL PLANT SERVICE CENTER-BARN G 1156 HIGH STREET SANTA CRUZ, CA 95064 #153525B 5/22/08	USC95	U.C. SANTA CRUZ PHYSICAL PLANT-SHOP STORE 1156 HIGH STREET SANTA CRUZ, CA 95064

Date	PO/Reference #	Ordered By	Terms	Slsp	Wh	Ship Via
05/15/08	P0314023	PO/FAX	NET 30	FJP	01	UPS/PPC

Line	Item	Description	Ordered	Shipped	Backordered	UM	Price	Extension
01	677137828	F32T8/ADV835/XEW/ALTO (25W)	50	50	0	EA	3.590	179.50
02	677383364	PL-C 26W/35/4P 40 10*	50	50	0	EA	4.970	248.50

324754

Merchandise	Misc	Discount	Tax	Freight	Total Due
428.00	.00	.00	36.38	30.00	494.38

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Sustainable Lighting Calculator summary

File: UCSC-E2BuildingMercuryData

Brand	Lamp	Lamps per Fixture	# of Fixtures	HG Content per Bulb [mg]	Design Light Output per Bulb	Rated Life per Bulb [hours]	Description	Rating (pg/Lu-hr)
Area 1								**30.2** ✓✓ **UNDER**
Philips	F32T8/ADV835/XLL ALTO 25W	1	50	1.7	2330	36000	4 ft T8 Fluorescent	20.2 ✓✓ **UNDER**
Philips	PL-C 26W/835/4P/ALTO	1	50	1.4	1550	12000	Pin Base Compact Fluorescent	75.2

Rating for this facility: 30.2 ✓✓ **UNDER**

Add Another Area

Display Print-Friendly Version | Prepare LEED Application

Calculator tools: - Select -

✓✓ Indicates average mercury content of lamps is 70 or below picograms per Lumen-Hour.

✓ Indicates average mercury content of lamps is 71 - 90 picograms per Lumen-Hour.

✸ Indicates average mercury content of lamps is over 90 picograms per Lumen-Hour.

This calculator is not intended as a final or official determination of LEED credit eligibility. It is intended to be used for developing a low mercury lighting plan for a building that can be used in a LEED-EB (v2.0 - MR Prerequisite 2 & Credit 6) (V2008 – MR Credit 4.1-4.2) and LEED-NC (Innovation Point) certification application. This calculator also helps the user understand how specifying and installing low-mercury lamps featuring ALTO Technology from Philips Lighting Co., can make a positive contribution toward the goal of reducing the amount of mercury being brought into buildings in light bulbs. For official information about the U.S. Green Buildings Council LEED program, please visit: www.usgbc.org. Philips Lighting Co. is a corporate member of the USGBC.

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Philips Energy Advantage T8 Lamps featuring ALTO II™ Technology

Ideal for applications requiring maximum energy savings

T8 COLLECTION

ALTO II™ means 50% less mercury than the original ALTO T8 lamps†

† Original 2', 3' and 4' T8 lamps featuring ALTO® Lamp Technology had 3.5mg of mercury. New 2', 3' and 4' T8 lamps featuring ALTO II™ Technology have 1.7mg of mercury.

Energy savings, extra low mercury

Philips Energy Advantage T8 lamps offer high energy savings in an environmentally responsible lamp.

Outstanding energy savings

- Save 7 watts per lamp instantly when compared to a 32W T8 lamp
- Save $21 in energy costs over the rated average life of the lamp*
- Operates on any Instant Start and Programmed Start Ballast‡

Extended life

- Reduce maintenance costs by extending the relamping cycle
- Warranty period: 30 months

Better for the environment

- Only 1.7mg of mercury with ALTO II™ Technology
- Reduced impact on the environment without sacrificing performance

(*, ‡ See back of page for footnotes)

PHILIPS
sense and simplicity

Ordering, Electrical and Technical Data

	Product Number	Ordering Code	Watts	Pack. Qty.	Color Temp. (Kelvin)	Nom. Length (In.)	Rated Average Life (hrs)[1] 12-hr on Ins. Start	12-hr on Prog. Start	Approx. Initial Lumens[2]	Design Lumens[3]	CRI	Lumen Maint.
E ●	13781-0	F32T8/ADV830/XEW/ALTO	25	25	3000	48	30,000	36,000	2500	2425	85	97%
E ●	13782-8	F32T8/ADV835/XEW/ALTO	25	25	3500	48	30,000	36,000	2500	2425	85	97%
E ●	13783-6	F32T8/ADV841/XEW/ALTO	25	25	4100	48	30,000	36,000	2500	2425	85	97%
E ●	13784-4	F32T8/ADV850/XEW/ALTO	25	25	5000	48	30,000	36,000	2400	2330	85	97%
E ●	14732-2	F32T8/ADV830/EW/ALTO	28	25	3000	48	30,000	36,000	2725	2645	85	97%
E ●	14733-0	F32T8/ADV835/EW/ALTO	28	25	3500	48	30,000	36,000	2725	2645	85	97%
E ●	14734-8	F32T8/ADV841/EW/ALTO	28	25	4100	48	30,000	36,000	2725	2645	85	97%
E ●	14735-5	F32T8/ADV850/EW/ALTO	28	25	5000	48	30,000	36,000	2675	2595	85	97%
E ●	14771-0	F32T8/ADV830/EW/ALTO	30	25	3000	48	30,000	36,000	2850	2765	85	97%
E ●	14772-8	F32T8/ADV835/EW/ALTO	30	25	3500	48	30,000	36,000	2850	2765	85	97%
E ●	14773-6	F32T8/ADV841/EW/ALTO	30	25	4100	48	30,000	36,000	2850	2765	85	97%
E ●	14774-4	F32T8/ADV850/EW/ALTO	30	25	5000	48	30,000	36,000	2800	2715	85	97%

1) Average life under engineering data with lamps turned off and restarted once every 12 operating hours.

2) Approximate initial lumens. The lamp lumen output is based upon lamp performance after 100 hours of operating life, when the output is measured during operation on a reference ballast under standard laboratory conditions. For expected lamp lumen output, commercial ballast manufacturers can advise the appropriate ballast factor for each of their ballasts when they are informed of the designated lamp. The ballast factor is a multiplier applied to the designated lamp lumen output.

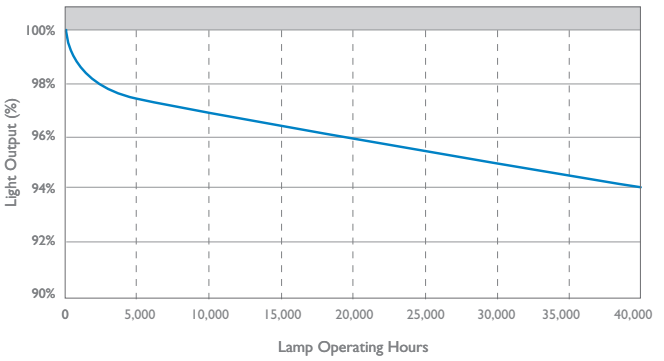
3) Design lumens are the approximate lamp lumen output at 40% of the lamp's rated average life. This output is based upon measurements obtained during lamp operation on a reference ballast under standard laboratory conditions.

E Lamp meets US Federal Minimum Efficiency Standards.

● This lamp is better for the environment because of its reduced mercury content. All Philips ALTO II™ lamps give you end-of-life options which can simplify and reduce your lamp disposal costs depending on your state and local regulations.

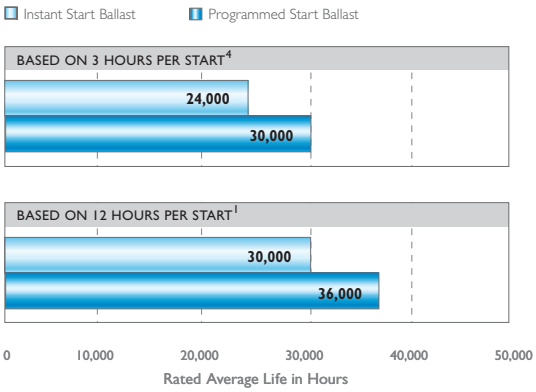
97% Lumen Maintenance

Philips Energy Advantage T8 Lamps



Rated Average Life

Philips Energy Advantage T8 Lamps



4) Average life under specified test conditions with lamps turned off and restarted no more frequently than once every 3 operating hours. Lamp life is appreciably longer if lamps are started less frequently.

Footnotes from front page:

* Based on wattage savings (7w) x rated average life (30,000 hours) x kWh rate ($ .10).

‡ Starting voltage should be equal to or greater than 550V. These lamps are not recommended for use where the temperature in fixture is below 70°F. Striations may occur where air movement is present in fixture. For best operation, use ballast with anti-striation circuitry.

Specifications are subject to change without notice.
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P-5782-B

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Sappi claims that the pulp used in the manufacture of Magno Dull paper is derived from environmentally certified forests.

Philips PL-C 4-Pin Compact Fluorescent Lamps

featuring ALTO® *Lamp Technology*

Enhanced Performance Lamps

Ideal for downlights and wall washers in general lighting and wall sconces in decorative lighting

- **Enhanced Performance**
  - –PL-C 4-Pin has 80% light output between 55˚F and 127˚F[1]
  - –PL-C 4-Pin has 80% lumen maintenance at 12,000 hrs[2]
- **Quad Tube Design**
  Very compact design: available in 13W, 18W and 26W
- **Excellent Color Rendering**
  82 Color Rendering Index (CRI)
- **Broad Range of Color Temperature**
  Available in 2700, 3000, 3500 and 4100K
- **Dimmable**
  PL-C 4-pin rapid start lamps may be used with electronic dimming ballasts
- **12,000 Hour Rated Average Life[3]**
- **Energy Saving**
  Designed for use with electronic ballasts for lower operating costs and flicker-free starting
- **ALTO® Lamp Technology**
  Passes EPA's TCLP[4] test for non-hazardous waste

1) 80% light output in a base-up position
2) 80% lumen maintenance on high frequency gear (warm start)
3) Average life under specified test conditions with lamps turned off and restarted no more frequently than once every 3 operating hours. Lamp life is appreciably longer if lamps are started less frequently.
4) Toxic Characteristic Leaching Procedure

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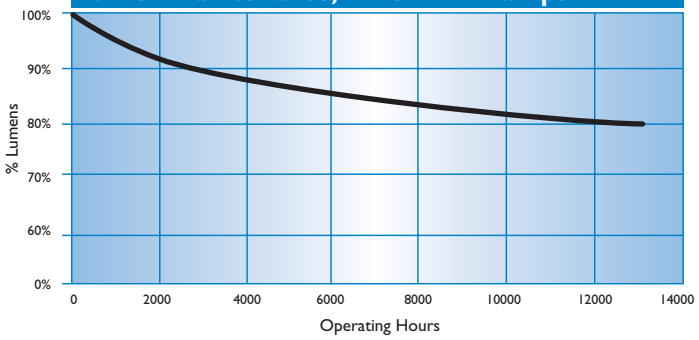
Philips PL-C 4-Pin Compact Fluorescent Lamps featuring ALTO® Lamp Technology

Electrical, Technical and Ordering Data (Subject to change without notice)

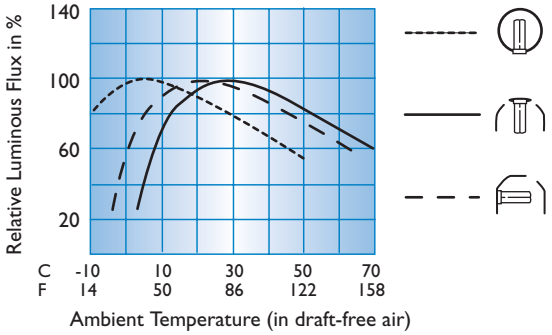
Product Number	Ordering Code	Watts	Bulb	Base	Generic Description	Pkg. Qty.	Color Temp. (Kelvin)	MOL (In.)	Rated Avg. Life (Hrs.)[1]	Approx. Initial Lumens[2]	Design Lumens[3]	CRI
38325-7	PL-C 13W/827/4P/ALTO	13	PL-C	G24q-1	CFQ13W/G24q/827	10	2700	5 3/16	12,000	900	775	82
38326-5	PL-C 13W/830/4P/ALTO	13	PL-C	G24q-1	CFQ13W/G24q/830	10	3000	5 3/16	12,000	900	775	82
38327-3	PL-C 13W/835/4P/ALTO	13	PL-C	G24q-1	CFQ13W/G24q/835	10	3500	5 3/16	12,000	900	775	82
38328-1	PL-C 13W/841/4P/ALTO	13	PL-C	G24q-1	CFQ13W/G24q/841	10	4100	5 3/16	12,000	900	775	82
38329-9	PL-C 18W/827/4P/ALTO	18	PL-C	G24q-2	CFQ18W/G24q/827	10	2700	5 11/16	12,000	1250	1075	82
38330-7	PL-C 18W/830/4P/ALTO	18	PL-C	G24q-2	CFQ18W/G24q/830	10	3000	5 11/16	12,000	1250	1075	82
38332-3	PL-C 18W/835/4P/ALTO	18	PL-C	G24q-2	CFQ18W/G24q/835	10	3500	5 11/16	12,000	1250	1075	82
38333-1	PL-C 18W/841/4P/ALTO	18	PL-C	G24q-2	CFQ18W/G24q/841	10	4100	5 11/16	12,000	1250	1075	82
38334-9	PL-C 26W/827/4P/ALTO	26	PL-C	G24q-3	CFQ26W/G24q/827	10	2700	6 1/2	12,000	1800	1550	82
38335-6	PL-C 26W/830/4P/ALTO	26	PL-C	G24q-3	CFQ26W/G24q/830	10	3000	6 1/2	12,000	1800	1550	82
38336-4	PL-C 26W/835/4P/ALTO	26	PL-C	G24q-3	CFQ26W/G24q/835	10	3500	6 1/2	12,000	1800	1550	82
38337-2	PL-C 26W/841/4P/ALTO	26	PL-C	G24q-3	CFQ26W/G24q/841	10	4100	6 1/2	12,000	1800	1550	82

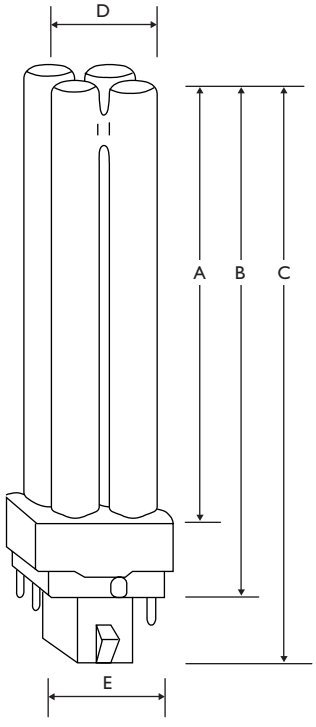
1) Average life under specified test conditions with lamps turned off and restarted no more frequently than once every 3 operating hours. Lamp life is appreciably longer if lamps are started less frequently.
2) Approximate initial lumens. The lamp lumen output is based upon lamp performance after 100 hours of operating life, when the output is measured during operation on a reference ballast under standard laboratory conditions.
3) Design lumens are the approximate lamp lumen output at 40% of the lamp's rated average life. This output is based upon measurements obtained during lamp operation on a reference ballast under standard laboratory conditions.

Lumen Maintenance, PL-C 4-Pin Lamps



Luminous Flux vs. Burning Positions





Lamp Dimensions: Inches (mm)			
	PL-C 13W/4p	PL-C 18W/4p	PL-C 26W/4p
A	3.9 (99)	4.4 (111)	5.2 (132)
B	4.6 (117)	5.1 (129)	5.9 (150)
C	5.2 (132)	5.7 (144)	6.5 (165)
D	1.1 (28)	1.1 (28)	1.1 (28)
E	1.4 (35)	1.4 (35)	1.4 (35)

MATERIALS & RESOURCES: CREDIT 1.1
CONSTRUCTION, DEMOLITION & RENOVATION

1. LEED-EB template
2. Letter stating that UCSC has construction specifications requiring a 75% construction waste diversion rate.
3. UCSC Construction Waste Management Policy

(Responsible Party)

I, Jim Dunne , declare to USGBC that this project has implemented a waste management plan and diverted the following quantities of construction, demolition and land-clearing waste to uses other than landfill.

Note: Project teams must use consistent units of measure for tables. Specify the units of measurement used for either weight or volume (e.g., tons, yards, etc.)

* Measured in: ◯ Tons ◯ Yards ◯ User Defined Value

Table 1: Example of Materials Sent to Landfill and Incineration disposal by Weight is Explained in the Table Below.

Type of Waste to Landfill and Incineration disposal	Type of Disposal	Amount of Waste To Landfill
	Total Waste Sent to Landfill	

Table 2: The quantity and type of diverted materials and means of diversion are explained in the table below.

Type of Diverted Material	Type of Diversion	Amount of Diverted Material

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(Continued on page 2)

Total Quantity of Diverted Waste	
Total Waste Sent to Landfill	
Total Quantity of Waste	
Percentage of Waste Diverted from Landfill	0

I have provided the following to support the declaration:

☒ Copy of the waste management policy that specifies inclusion of waste management specifications for any future building retrofit, renovation or modification that may occur on the site.

☒ Calculations demonstrating the amount of construction wastes diverted, OR a written statement declaring that no building or site retrofits, renovations or modifications were carried out in the building or on the site during the performance period.

MR Credit 1.1 (1 Point):
Diverted from Landfill and Incineration >= 50%

Points Documented: **0**

MR Credit 1.2 (1 Additional Point):
Diverted from Landfill and Incineration => 75%

Points Documented: **0**

Project Name: Engineering 2 LEED EB Submittal

Credit: MR Credit 1.1 - 1.2: Construction, Demolition and Renovation Waste Management Points Documented: **0**

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	9-10-08	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

SAVE TEMPLATE TO LEED-ONLINE | PRINT TEMPLATE

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT SANTA CRUZ, CALIFORNIA
95064

May 6th, 2008

To: US Green Building Council- LEED-EB Program
Re: Documentation for MR 1.1 & 1.2 Construction Demo and Renovation for E2-UCSC

This letter is to confirm that UCSC has in place a construction waste diversion policy and construction specification requiring a 75% diversion rate. Specification PDF also submitted with this point. No building retro fit, renovation, or modifications will happen in E2 during the performance period.

J. Dunne
Assoc. Director
Physical Plant
UCSC

SECTION 01738

Construction Waste Management

1.01 SUMMARY

A. Environmental Issues: Project requires special Construction Waste Management Program:

1. Divert a minimum of 75 percent of project waste from landfill (weight basis).
2. Extract and re-cycle materials from the waste stream.
3. Effect optimum control of solid wastes.
4. Prevent environmental pollution and damage.

B. Related Work:

1. Section 01010 Summary of Work
2. Section 01500 Construction Facilities and Temporary Controls
3. Section 01700 Contract Closeout
4. Section 02070 Selective Demolition
5. Section 02080 Asbestos Removal

1.02 DEFINITIONS

A. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively.

B. Class III Landfill: A landfill that accepts non-hazardous waste such as household, commercial, and industrial waste, including construction, remodeling, repair, and demolition operations.

C. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

D. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, trash, debris, and rubble resulting from land-clearing, construction, remodeling, repair, and demolition operations and other similar materials.

1. Rubbish: Includes both combustible and noncombustible wastes, such as paper, boxes, glass, crockery, metal and lumber scrap, tin cans, and bones, and other similar materials.
2. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings that result from construction or maintenance and repair work, and other similar materials.

E. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes, and other similar materials.

F. Sanitary Wastes:

1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food, or other similar materials.

G. Sewage: Domestic sanitary sewage.

1.03 GENERAL REQUIREMENTS

A. The Contractor shall furnish labor, containers, transportation and payment of any disposal fees for materials removed during selective demolition and/or new construction and identified to be recycled.

B. The Contractor shall prepare and submit the appropriate LEED™ template.

1. The Construction Waste Management Plan shall include a list of anticipated types and quantities of waste materials (weight basis) generated from the project site and proposed sitting locations for waste containers.
2. The Waste Management Progress Report shall be revised and re-submitted as required by the University's Representative.

C. Review of Contractor's Construction Waste Management Program will not relieve Contractor of responsibility for control of pollutants and other environmental protection measures.

1.04 HAZARDOUS MATERIALS

A. The University has identified all known hazardous substances in this project. Comply with requirements listed in the following Sections:

1. Section 02080 Asbestos Removal

1.05 SUBMITTALS

A. Waste Management Plan(Non-Hazardous Materials) shall include:

1. The Waste Management Plan shall include a list of anticipated types and quantities of waste materials generated from the Project site and proposed siting locations(including map) for waste/recycling containers. The plan shall identify materials to be recycled, re-used or salvaged. It shall include efforts at source reduction, material handling procedures and collection of weight and hauling destination information.

2. Source Reduction: List processes that minimize waste such as working with suppliers to take back or buy back substandard, rejected or unused items and to deliver supplies using returnable pallets and containers. Also include procedures to minimize breakage, mishandling, contamination, and other factors that reduce job site waste.

3. Material Handling Procedures: List means by which source separated waste materials will be protected from contamination, and the means for recycling them consistent with requirements for acceptance by designated facilities.

4. Submit to the University Representative within 10 days after the Notice to Proceed and prior to any waste removal. Update and resubmit the Waste Management Plan prior to final inspection. The final update shall include:

a. Total amount of waste in tons landfilled from the Project

and the identity of the transfer/landfill.

b. Total amount(in tons) of each material recycled, reused, or salvaged from the Project and the receiving party.

c. Total amount(in tons) of all materials recycled in tons.

d. Total percentage of material recycled in tons.

B. Waste Management Progress Report:

1. The Waste Management Progress Report shall include a summary of waste materials(recycled, salvaged, reused, disposed, etc.) by the Project. The Progress Report shall contain the amount of material(in tons) and the destination(landfill facility, material recovery facility, transfer station, used building materials yard, etc.) Attach weigh bills, disposal fees paid and other documentation confirming amount and disposal location of waste/recycled materials.

2. Update monthly and submit on the first business day of each calendar month.

1.06 EXECUTION

A. Distribute copies of the Waste Management Plan to the University's Representative.

B. Designate an on-site person responsible for instructing workers and overseeing sorting and recording of waste/recyclable materials.

C. Meetings: Contractor shall conduct a Construction Waste Management meeting as a part of the pre-construction meeting. Meeting shall include subcontractors affected by the Waste Management Plan as well as the University's Representative.

D. Recycling: Implement recycling program that includes separate collection of waste materials of following types as applicable to Project:

1. Asphalt.
2. Land clearing debris.
3. Soil.
4. Trees and shrubs.
5. Concrete and concrete blocks.
6. Brick and masonry materials.
7. Untreated lumber.
8. Clean dimensional wood and palette wood.
9. Plywood, oriented strand board, and medium density fiberboard.
10. Paper—bond.
11. Paper (e.g. newsprint).
12. Cardboard and paper packaging materials.
13. Plastics.
14. Rigid foam.
15. Insulation.
16. Ferrous metal.
17. Non-ferrous metals (e.g. copper, aluminum, etc.).
18. Glass.
19. Gypsum board (unpainted).
20. Carpet and pad.
21. Paint.
22. Beverage containers.
23. Plumbing fixtures.

24. Electrical fixtures and wires.
25. Others as noted on the Waste Management Plan that has been approved by the University.

C. Separation of Waste: Recycling and waste bin areas shall be limited to areas approved on the Waste Management Plan. Recycling and waste bins are to be kept neat, clearly marked, and list acceptable and unacceptable materials in order to avoid contamination of materials.

D. Handling: Keep materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process:

1. Clean materials that are contaminated prior to placing in collection containers.
2. Arrange for collection by or delivery to appropriate recycling center or transfer station that accepts construction and demolition waste for purpose of recycling.

END OF SECTION 01738

MATERIALS & RESOURCES: CREDIT 4.1-4.3
SUSTAINABLE CLEANING PRODUCTS & MATERIALS

1. LEED-EB template
2. Green cleaning process narrative
3. E2 Sustainable Cleaning Products & Materials Purchasing Policy
4. Documentation of green cleaning productions and materials purchased for E2

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has implemented a sustainable purchasing program to reduce the environmental impacts of cleaning products, disposable janitorial paper products and trash bags that meet the following sustainability criteria:

Cleaning Products

Sustainability Criteria A: Cleaning products that meet the Green Seal GS-37 standard if applicable

OR

Sustainability Criteria B: If GS-37 is not applicable (e.g., for products such as carpet cleaners, floor finishes or strippers), use products that comply with the California Code of Regulations maximum allowable VOC levels.

Disposable Janitorial Paper Products and Trash Bags

Sustainability Criteria C: Disposable janitorial paper products and trash bags that meet the minimum requirements of U.S. EPA's Comprehensive Procurement Guidelines.

I have provided the following to support the declaration:

☒ a copy of the organizational policy that specifies use of sustainability criteria for purchases of covered materials for use in the building or on the site.

☒ documentation of all covered materials purchased and total cost of these purchases over the performance period.

☒ documentation of all covered materials purchases that meet one or more of the specified sustainability criteria and the cost of these purchases over the performance period.

☒ calculations of the percentage of covered materials purchased that meet one or more of the specified sustainability criteria (on a cost basis).

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(Continued on Page 2)

Table: Fraction of Sustainable Products and Materials Purchased Over the Performance Period
(One point up to a maximum of 3 points will be awarded for each 30% the total annual sustainable purchases (on a cost basis). Please do not document sustainable and non-sustainable product and material purchases in the same row.)

Date of Materials Purchase	Description of What Was Purchased	Sustainable MRc4.1-4.3 Purchases ($)	Sustainability Criteria that was met (insert letter A-C from above)	Non-Sustainable MRc4.1-4.3 Category Purchases ($)
02-07-08	Glacier Green Seal Glass Cleaner	71.48	A	
02-07-08	Shimmer Green Seal Glass Cleaner	70.34	A	
02-07-08	Trailwinds Maintex	149.89	A	
02-20-08	Spartan Waterfree Urinal Cleaner	17.52	A	
02-20-08	Spartan Graffiti Remover Sac Soybean	45.48	A	
02-20-08	Glacier Green Seal Rest Room Cleaner	26.94	A	
02-20-08	Trailwinds Maintex	33.3	A	
02-20-08	Shimmer Green Seal Rest Room Cleaner	33.3	A	
02-20-08	Pristine Degreaser Heavy Duty	33.3	A	
03-03-08	Spartan Waterfree Urinal Cleaner	17.52	A	
03-03-08	Spartan Graffiti Remover Sac Soybean	45.48	A	
03-03-08	Glacier Green Seal Rest Room Cleaner	26.94	A	
03-03-08	Maintex Trailwinds, Shimmer and Pristine Green Seal Cleane	99.9	A	
04-04-08	Spartan Biorenewable Glass Cleaner	21	A	
05-21-2008	Bag, Plastic 2.0 Mil 40" X 48"		------	209.85
05-07-2008	Towel, Paper, White Multifold, Scott	1,132.06	C	
05-21-2008	Tissue, Rolled, Single- Ply Toilet, James River	899.08	C	

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(Continued on Page 3)

Total Sustainable MRc4.1-4.3 Purchases ($)	2,723.53
Total Non-Sustainable MRc4.1-4.3 Purchases ($)	209.85
Total MRc4.1-4.3 Purchases ($)	2,933.38
Percentage Sustainable MRc4.1-4.3 Purchases	92.85

MR Credit 4.1 (1 point):
Sustainable Cleaning Products and Materials => 30%

Points Documented: 1

MR Credit 4.2 (1 Additional Point):
Sustainable Cleaning Products and Materials => 60%

Points Documented: 1

MR Credit 4.3 (1 Additional Point):
Sustainable Cleaning Products and Materials => 90%

Points Documented: 1

Project Name: Engineering 2 LEED EB Submittal

Credit: MR Credit 4.1 - 4.3: Sustainable Cleaning Products and Materials

Points Documented: 3

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Louise	Huttinger	2008-10-03	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

MR CREDIT 4: Sustainable Cleaning Products and Materials Narrative

The UCSC Green Operations Group, a team of UCSC Physical Plant employees, was pleased to take on the task of implementing a green cleaning program for the Engineering 2 building. George Vallerga, the UCSC Custodial Superintendent, oversaw all selections and purchases of sustainable cleaning products and materials that entered the building.

UCSC already purchases paper janitorial supplies that meet the EPA's Comprehensive Procurement Guidelines, so no purchasing changes had to be made in this area. A few months before the performance period began (Jan- April 08) George selected dilution systems, Green Seal GS-37 certified chemicals, and sustainable cleaning equipment to be purchased and then used during the performance period (May-Sept 08).

To document this credit, all of George's invoices were submitted a long with a print out of purchases made at the UCSC Shop stores for the Engineering 2 building. Although the trash bag liners purchased during the performance period did not meet the EPAs standard, the UCSC Physical Plant is looking into switching to compost able "biobags" or ones with a higher post consumer recycled content.

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E2 Sustainable Cleaning Products and Materials Purchasing Policy

UCSC is committed to reducing the environmental impacts of cleaning products, disposable janitorial paper products and trash bags. The following purchasing policy was developed for the Engineering 2 building to meet LEED-EB requirements for sustainable cleaning products and materials. All in house staff and outsourced service providers are required to comply with this policy. Since janitorial supplies are purchased in bulk for all buildings on campus, this policy will be rolled out to all academic buildings at UCSC.

CLEANING PRODUCTS

All cleaning products purchased must meet the Green Seal GS-37 standard. For products such as carpet cleaners, floor finishes or strippers, which are not applicable for this certification, they must comply with the California Code of Regulations maximum allowable VOC levels. To verify that products are Green Seal GS-37 certified please refer to the list provided at the Green Seal website at http://www.greenseal.org/findaproduct/index.cfm

DISPOSABLE JANITORIAL SUPPLIES

All disposable janitorial paper products and trash bags must meet the minimum requirements of U.S EPA's Comprehensive Procurement Guidelines.

Paper Towels- must be at least 40% post consumer content
Toilet Paper- must be at least 20% post consumer content
Plastic Trash Bags- must be at least 10% post consumer content

E2 STOCK ISSUE TRANSACTIONS (MAY-SEPT 2008)

W0038	GONZALE	06/11/08	CE2	BAG, PLASTIC, 2.0 MIL, 40" X 48", BX/100	3.	$29.97	$89.90	$209.85
W0038	GREENWE	07/23/08	CE2	BAG, PLASTIC, 2.0 MIL, 40" X 48", BX/100	2.	$29.96	$59.91	
W0038	GREENWE	05/21/08	CE2	BAG, PLASTIC, 2.0 MIL, 40" X 48", BX/100	2.	$30.02	$60.04	
W0480	GREENWE	08/20/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	5.	$20.62	$103.12	$1,132.06
W0480	GREENWE	05/28/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	4.	$22.35	$89.39	
W0480	GREENWE	08/27/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	5.	$20.62	$103.12	
W0480	GREENWE	06/04/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	5.	$22.35	$111.74	
W0480	GONZALE	06/11/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	6.	$21.37	$128.23	
W0480	GREENWE	06/25/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	2.	$21.31	$42.62	
W0480	GREENWE	09/17/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	5.	$20.61	$103.04	
W0480	GREENWE	07/23/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	4.	$21.30	$85.22	
W0480	GREENWE	07/30/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	6.	$21.30	$127.82	
W0480	GREENWE	05/21/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	6.	$22.35	$134.09	
W0480	GREENWE	05/07/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	6.	$22.35	$134.09	
W0480	GREENWE	08/06/08	CE2	TOWEL, PAPER, WHITE MULTIFOLD, JAMES RIVER #20389	5.	$20.73	$103.67	
W0572	GREENWE	08/27/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	2.	$41.93	$83.86	$899.08
W0572	GREENWE	05/07/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	2.	$43.25	$86.51	
W0572	GREENWE	09/17/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	2.	$41.93	$83.86	
W0572	GREENWE	06/04/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	2.	$43.25	$86.51	
W0572	GREENWE	07/23/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	4.	$43.25	$173.02	
W0572	GREENWE	08/20/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	3.	$41.93	$125.79	
W0572	GREENWE	06/25/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	4.	$43.25	$173.02	
W0572	GREENWE	05/21/08	CE2	TISSUE, ROLLED SINGLE-PLY TOILET, JAMES RIVER #020	2.	$43.25	$86.51	

Cole

[redacted]

707-745-8900; Fax 707-745-8901

Invoice Date	Invoice#
02/07/08	595166a

Bill to: 080204-1
UC SANTA CRUZ
1156 HIGH ST
BARN G
SANTA CRUZ, CA 95064-1077

4976

Ship to: 080204-1
UC SANTA CRUZ
1156 HIGH ST
BARN G
SANTA CRUZ, CA 95064-1077

Customer #	P.O. Number	Sales Code	Terms of Sale	Required Date	Order Date	Shipping Method
080204-1	GEORGE	74 RICHARD SMOKER	NET 30	02/07/08	02/06/08	50 JOE FIELDS

Special Instructions:

Qty Ord	Qty Ship	Qty B/O	U/M	Product Code / Description	Price/UM	Pr	Extention	Tx
3	3		EA	HS115 / RACK 3 GALLON WIRE HYDRO SYSTEMS 1-EA	83.87	EA	251.61	Y
2	2		EA	HS48781 / PROPORTIONER TASKMISER DUAL SELECT W/GUN 1-E	0.00	EA	0.00	Y
12	12		EA	MT290023 / GLACIER BOTTLE SECONDARY 12/CS	0.75	EA	9.00	Y
36	36		EA	CO922H / TRIGGER SPRAYER 5802 8.25" HEAD IMPACT 200-CS	0.61	EA	21.96	Y
7	7		GAL	MT164404 / PRISTINE DEGREASER HEAVY DUTY MAINTEX 164404 4X1GAL-CS	16.65	GAL	116.55	Y
1	1		CS	MT180304 / GLACIER GREEN SEAL GLASS CLEANER 4X1GAL	62.48	CS	62.48	Y
1	1		CS	MT143204 / SHIMMER GREEN SEAL RESTROOM CLEANER 4X1GAL	66.59	CS	66.59	Y
5	5		EA	MT290016 / SHIMMER BOTTLE SECONDARY 12/CS	0.75	EA	3.75	Y
1	1		GAL	MT120104 / TRAILWINDS MAINTEX 120104 4X1GAL-CS	16.65	GAL	16.65	Y
2	2		CS	MT120104 / TRAILWINDS MAINTEX 120104 4X1GAL-CS	66.62	CS	133.24	Y
1	1		CS	SPN3503 / * CLEANER RESTROOM GREEN SOLUTIONS 3503 12X1QTS 12QT/CS	38.40	CS	38.40	Y
12	12		EA	MT164404B / BOTTLE PRISTINE MAINTEX EMPTY SECONDARY IMPRINT 12-CS	1.96	EA	23.52	Y
10	10	0	EA	TUMOP30S / MICROFIBER LARGE WET MOP HEAD TUMAY MOP30-S BLUE 12/CS	11.20	EA	112.00	Y
12	12		EA	TU74RED / MICROFIBER LAUNDERABLE TERRY CLOTH, RED, 16"x16" 250/CS	1.32	EA	15.84	Y
12	12		EA	TU74GR / MICROFIBER LAUNDERABLE TERRY CLOTH GREEN 16" X 16" 250/CS	1.39	EA	16.68	Y

Comments:

Returned merchandise subject to 20% Restocking Charge.
1.5% per month service charge (18% per annum) will be charged on all accounts past due.
Customer agrees to pay all court costs and attorney's fees for the obligation herein in the event litigation ensues for collection of same. $20 fee will be added for collections.

Thank You for your order!

NONTAX TOTAL:	0.00
TAXABLE TOTAL:	888.27
FREIGHT CHARGE:	0.00
LABOR CHARGE:	0.00
SALES TAX:	75.50
TOTAL INVOICE:	963.77

MATERIALS & RESOURCES: CREDIT 5.1
OCCUPANT RECYCLING

1. LEED-EB template
2. E2 Waste Reduction Policy/Narrative
3. Occupant recycling measurements and narrative
4. Additional recycling calculations taken over performance period

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has implemented a building occupant waste reduction and recycling program that addresses the separation, collection and storage of materials for recycling and diversion from landfill disposal or incineration over the performance period that meet the following criteria:

☒ Addresses the separation, collection and storage of (at a minimum) paper, glass, plastics, cardboard/OCC, metals, batteries and fluorescent light bulbs.

☒ Collects and recycles at least 95% of the batteries used and collects and recycles at least 95% of the fluorescent light bulbs used.

I have provided the following to support the declaration:

☒ a copy of the building occupant waste reduction and recycling policy.

☒ quarterly summary reports on the total waste produced by the building along with hauler documentation

☒ calculations of the amount of each type waste in the table below by weight or volume that has been recycled over the performance period.

Note: Project teams must use consistent units of measure for tables. Specify the units of measurement used for either weight or volume (e.g., tons, yards, etc.)

* Measured in: ◉ Tons ○ Yards ○ User Defined Value

Table: REQUIRED ENTRY - Amount of Total Waste Stream Diverted/Recycled By Type of Material

Waste Material By Type	Quantity currently recycled	Estimated Unsegregated Waste Per Year	Total Waste Quantity By Material	Percent of Total Annual Waste By Material (%)	Current Recycling Rate By Material (%)
Newspaper				0	0
Glass				0	0
Aluminum				0	0
Tin/bi-metal				0	0
High grade paper	2.834		2.83	21.67	100.14
Mixed paper	0.0572		0.06	0.46	95.33
Corrugated Cardboard				0	0
Plastics				0	0
Scrap metals				0	0
Batteries*	0.104		0.1	0.77	104
Fluorescent light bulbs*	0.007499		0.01	0.08	74.99

***Note: Current Recycling Rate By Material for Batteries and Fluorescent light bulbs must each be 95% to earn credit.**

Table: OPTIONAL ENTRY - Amount of Total Waste Stream Diverted/Recycled By Type of Material

Waste Material By Type		Quantity currently recycled	Estimated Unsegregated Waste Per Year	Total Waste Quantity By Material	Percent of Total Annual Waste By Material (%)	Current Recycling Rate By Material (%)
Used motor oil					0	0
Construction / Demolition					0	0
Tires					0	0
Other waste	Mixed Recyclin	1.222		1.22	9.34	100.16
Other waste	Bathroom and		8.84	8.84	67.69	0
Other waste					0	0
Sum-Total Value		4.22	8.84	13.06	100.01	32.31

MR Credit 5.1 (1 point):
Divert/Recycle 30% of total waste stream (by weight or volume)

Points Documented: 0

MR Credit 5.2 (1 Additional Point):
Divert/Recycle 40% of total waste stream (by weight or volume)

Points Documented: 0

MR Credit 5.3 (1 Additional Point):
Divert/Recycle 50% of total waste stream (by weight or volume)

Points Documented: 0

Project Name: Engineering 2 LEED EB Submittal

Credit: MR Credit 5.1 - 5.3: Occupant Recycling

Points Documented: 0

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Louise	Huttinger	2008-10-06	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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E2 WASTE REDUCTION POLICY/NARRATIVE

The UCSC Physical Plant and Recycling Program created recycling recommendations based off of Engineering 2s waste stream audit. The following policy highlights the improved occupant recycling recommendations implemented in addition to the current practices of the building.

Signage, Labeling, and Color Coordination of Trash and Recycling

The Engineering 2 building has clearly labeled 23-gallon Glutton "slim jim" blue recycling bins located in every lobby, kitchen, lounge, and conference room on each floor of E2. Outside of each main entrance of the building there are also larger 56-gallon labeled brown recycling bins next to each trashcan. Large blue recycling containers are also located outside of the two classrooms on the 1st floor to make it easy and convenient for students to properly dispose of their recyclable items while coming to and from class. In each copy room in E2 there are designated tan and white metal recycling containers for paper, clearly labeled "office paper", "white paper" and "mixed paper". See attached photos.

Staff and Custodian Training;

Suggestions were made by E2 building occupants concerning the improved recycling program during an E2 LEED-EB occupant meeting. Surveys were collected from occupants and feedback was received and then directed into an improved recycling program. The additional blue recycling bins added throughout the building are collected by UCSC Recycling Services once a week. The UCSC Recycling team has been trained in proper handling and prompt pick up for every recycling center on campus.

Occupant training for the improved recycling program was circulated via e-mail. Dave Wade, the UCSC Recycling Coordinator, sent out an e-mail to all building occupants about the improved recycling program including tips on personal steps they can take to further improve the reduce and re-use aspects of recycling.

Source Reduction:

The occupants of E2 were not in favor of replacing paper towels with high volume air hand dryers. The quite office environment of E2 is not conducive to loud noises, including air hand dryers over 70db. Some occupants also expressed concern over the cleanliness of air hand dryers which raised air temperatures because of harboring bacteria. The source reduction suggestions we did receive from occupants were to make sure the custodians are not placing extra paper towels on the restroom counters because it makes it easier to pick up more than one. The tri-fold recycled paper towel dispensers will be replaced with Kimberly Clark Microban mechanical single sheet touch-free dispensers. These new dispensers should reduce the number of paper towels discarded and adhere to the occupants sanitary wishes.

Paper Use Reduction:
The Engineering 2 building produces more paper waste and recycling than any other material. In order to address this paper consumption, the UCSC Physical Plant encourages employees to utilize double sided print technology. In addition, all new printers and copy machines must have double-sided print technology.

Computer equipment, Office equipment, and Chair Reuse and Recycling
All of UCSC's computers, monitors, faxes, phones, copy machines, chairs etc. are resold, donated or recycled by Direct Computer Disposal. Direct Computer Disposal is a full service electronics recycling company. Computers, Monitors, Televisions and other electronic devices are received or picked up on a daily basis from UCSC and are recycled at facilities in San Leandro, California.

Toner Recycling and Services:
Empty toner cartridges recycling at UCSC is through a third party vendor benefiting UCSC Child Care Services. Employees use campus mail to deliver use cartridges for recycling.

Battery Recycling:
UCSC has installed brown battery recycling bins in the copy rooms of E2 that are clearly labeled with which type of batteries are accepted for recycling (Alkaline, Carbon, Zinc, Nickel Cadmium, Nickel-Metal Hydride, Lithium, Magnesium, Silver and Mercury). In addition, small batteries may be sent via campus mail to the recycling coordinator, Dave Wade, Barn G, Physical Plant.

Letter sent out to Building Occupants via e-mail:

Recycling and Waste Reduction for E2

Dear Building Occupants:

As you may know, E2 was selected as the first building on campus to undergo LEED certification of an existing building. Certification involves looking at and improving all environmental systems of the building, including water, energy, and solid waste. I am writing to tell you about improvements to the recycling program for Engineering 2 and ask for your support and cooperation.

The primary material to recycle in most office buildings is paper, and we have added a number of new paper recycling stations throughout the building. In addition, we can provide you with a desk side paper-recycling box. In the future, we hope to offer desk side collection of recycling, but for now, we must ask you to take paper from your office to the conveniently located copy rooms or one of the established stations inside the building.

In addition to paper recycling, we are adding beverage container recycling stations throughout the building. Blue “Slim-Jim” containers will be placed in break rooms and lobbies on each floor.

We are also adding battery recycling pick-up to E2. Recycling bins for campus-generated batteries will be located in copy rooms. These bins may be used for all batteries, both single use and worn out rechargeable batteries.

Beyond asking for your participation in recycling, I am asking you to take personal steps to reduce waste and the need for recycling. The phrase “Reduce, Re-Use, Recycle” is more than a slogan; it is a hierarchy of best practices. Each of us can take concrete steps that while individually small, have large cumulative impacts.

- Reduce waste. Minimize your use of single use and disposable products. Use e-mail. Print only what is necessary, and use print preview and proofread on screen. Print and copy documents double-sided whenever possible.
- Re-Use. Buy and use a durable water bottle or coffee cup. Utilize campus mail’s re-useable intercampus mail envelopes. Use single sided copies for scratch pads. You won’t just be saving paper; you’ll be stretching the campus budget.
- Recycle! We’ve already talked about it, but it bears repeating. Studies show that recycling is one of the single most effective things we can do to combat global warming and environmental degradation. So please help. The more participation we get, the more successful our program will be.

Thank You!

Cordially,

Dave Wade

Photos of Recycling Receptacles at Engineering 2

Recycling bins located outside main entrances to E2

Blue Recycling Bins outside of classrooms on 1st Level of E2.

Blue Recycling bin in lobby. Also smaller ones located in lounges, break & conference rooms (see below)

Paper Recycling located in every copy rooms throughout E2.

Slim Jim Recycling Containers that were added to break rooms, kitchens, lobbies, and lounges throughout E2.

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PHYSICAL PLANT SANTA CRUZ, CALIFORNIA 95064

To: US Green Building Council, Existing Buildings Program
Re: MR Credit 5: Occupant Recycling

After implementing the new recycling program for the Engineering 2 building, the UCSC Recycling team performed an audit to track improvements in diversion rates from the landfill. Waste and recycling collection was diverted for one week and then weighed by category.

CATEGORY	Quantity Recycled	Quantity sent to landfill
Bathroom & Lab Waste	0	17680 lbs/yr
High GradeOffice Paper	5668 lbs/year	0
Mixed Paper	1144 lbs/year	0
Mixed stream recycling (plastics, cans, glass)	2244 lbs/year	0
Batteries	208 lbs/year	0
CFLs	15 lbs/year	0

Total Weight of Recycled Materials	9279 lbs/year	
Total Weight of Unsegregated Waste and Recycling	26959	
% waste diverted from landfill	34.40%	

The battery weight was taken from the battery recycling bins in E2. The CFL weight was calculated from an estimated 150 bulbs per year being recycled that each weighed 1.6 ounces.

Waste weights were taken from UCSC owned hauling vehicles. UCSC hauls all its own waste and each vehicle has on board scales.

The data from this waste audit was collected before students began their fall quarter classes, which explains the small weight of mixed stream recycling. Although this data is a snap shot of our improved recycling program at E2, we believe that our recycling rate will increase during the school year.

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SANTA CRUZ, CALIFORNIA 95064

To: USGBC LEED-EB Application Review Committee
Re: MR Credit 5: Occupant Recycling

The University of California Santa Cruz does not contract with outside haulers for waste and recycling disposal. Instead, the UCSC Recycling Program hauls, weighs, and tracks waste and recycling for the entire campus. In addition to the waste stream audit, the UCSC Recycling Team also tracked E2 waste diversion for each month of the performance period- in July, August and September of 2008. The final audit was the best recycling rate, thus it was used for the submittal of MR Credit 5.

Below are the manual tracking sheets for July and August:

UCSC RECYCLING DEPT- JULY E2 WASTE AUDIT	
CATEGORIES	**LBS/WEEK**
Bathroom/Lab Trash	310
High grade Paper	88
Mixed paper	20
Mixed Stream Recyling (bottles, cans, glass)	32
Batteries	4
CFLs	0.28
TOTAL WASTE	454
RECYCLED WASTE	148
WASTE DIVERSION	32%

MATERIALS & RESOURCES: CREDIT 6
ADDITIONAL TOXIC MATERIAL REDUCTION-REDUCED MERCURY IN LIGHT BULBS

1. LEED-EB template
2. For all other documentation, see MR Prerequisite 2

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building has established and maintained a toxic material source reduction program to reduce the amount of mercury brought into buildings through purchases of light bulbs through the following actions:

☒ Maintain mercury content of all mercury containing light bulbs below 80 picograms per lumen hour of light output (picogram/lumen hour),

☒ Calculate the weighted average mercury content of these light bulbs using Table 1 provided with the MR Prerequisite 2 worksheet.

Note: Please complete MR p2 before attempting this credit. The weighted average mercury content [Picograms / Lumen Hour] should be pulled directly from the MR p2 worksheet.

Mercury Content [Picograms / Lumen Hour]	60.84
Mercury Content [Picograms / Lumen Hour] below 80	**Yes**

I have provided the following documentation to support the declaration above:

☒ a copy of the organizational policy specifying that all future purchases of mercury-containing light bulbs will be made in such a way that the average mercury content of the light bulbs is less than the specified level in picograms/lumen hour.

☒ records of all acquisitions during the performance period of mercury-containing light bulbs for use in the building and grounds.

☒ manufacturer MSDSs for each type of light bulb purchased showing mercury content of the light bulbs in milligrams (If an MSDS shows ranges of mercury contents in milligrams, use the highest value given in these calculations).

☒ calculations in Table 1 provided with the MR Prerequisite 2 worksheet demonstrating that the weighted average mercury content of these light bulbs is less than the specified level in picograms per lumen hour.

Project Name: Engineering 2 LEED EB Submittal

Credit: MR Credit 6: Additional Toxic Material Reduction?Reduced Mercury in Light Bulbs

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2009-02-13	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

INDOOR ENVIRONMENTAL QUALITY: PREREQ 1
OUTSIDE AIR INTRO & EXHAUST SYSTEMS

1. LEED-EB template
2. E2 HVAC building description
3. Confirmation letter from a registered campus engineer, Tal Rabiah, that the E2 building's outside air ventilation distribution complies with AHSRAE 62.1-2004.
4. Alpha air balance test, report and tabular data for the HVAC systems in E2.

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building complies with the following:

☒ Is fully compliant with and supplies at least the outdoor air ventilation rate required by ASHRAE 62.1-2004, or if this is infeasible, supplies at least 10 CFM/person.

☒ Implementation and maintainence of an HVAC System Maintenance Program to ensure the proper operations and maintenance of HVAC components as they relate to IAQ.

☒ Tested and maintained the operation of all building exhaust systems including bathroom, shower, kitchen, and parking exhaust system.

I have provided the following to support the declaration:

☒ a letter and backup tabular information from a mechanical engineer or HVAC system specialist demonstrating that the existing building outside-air (OA) ventilation distribution system supplies at least the outdoor air ventilation rate required by ASHRAE 62.1-2004 or if this is not feasible due to the physical constraints of the existing ventilation system, modify or maintain the system to supply at least 10 CFM/person.

☒ a letter and backup tabular information from a mechanical engineer or HVAC system specialist demonstrating that the exhaust air HVAC systems serving the building are operating as designed.

☒ the results of quarterly inspections of the building OA/exhaust air system to verify that the system is operating as intended over the performance period.

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Prerequisite 1: Outside Air Introduction and Exhaust Systems Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-10-06	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

Engineering 2 Building Description

Total Area: 149,000 sq. ft (gross)
Number of floors: 5
Type of building: offices, classrooms, labs, data center
Year built: 2004

HVAC

6 air handler units provide ventilation to the building. Each air handler has supply and return fans with VFD speed control, a filter bank, economizer dampers, pre-heat and cooling coils. Each air handler (AHU) is operated on an occupancy schedule and optimum start sequence that can be overridden via the BMS from the Central Heat Plant. Supply fan speed is controlled via a ¾ EOL static sensor. The return fan speed tracks the supply fan set point. A DDC controller regulates and monitors the operation of damper set and the heating and cooling coils to control supply air temperature. The DDC will send status and temperature alarms to the Central Heat Plant if parameters do not meet the control loop set points.

- **Total CFM Capacity of AHUS**: 140,629 (measured)
- **Total Exhaust CFM from building:** 6755 (measured)

VAV/CAV

Each air handler provides conditioned air to VAV and CAV terminal units that serve various zones on each floor. The terminal boxes are monitored and controlled by individual stand-alone DDC controllers. All points are accessed and monitored adjusted or overridden via the Honeywell operator workstation at the Central Heat Plant. The VAV box damper actuator and modulating reheat valve in sequence to maintain the space set points. When the zone temperature is below set point the VAV box damper actuator will modulate towards the minimum volume set point. If the zone temperature remains below set point the reheat control valve will modulate open. If the zone temperature continues to remain below set point the VAV damper will modulate towards the maximum CFM set point. When the zone temperature is above set point the VAV box damper will modulate towards maximum CFM set point and the reheat valve will be closed. The zone sensor maintains either a heating or cooling set point based on zone temperature. The VAV damper will maintain a minimum CFM and reheat the space as the zone temperature drops. As the space temperature increases the reheat valve will close, as the space temperature increases the VAV damper will open to allow additional CFM to meet the cooling CFM set point.
The CAV terminal box damper will modulate to maintain a constant air volume. When the zone temperature is below the set point the reheat valve will modulate open. When the zone temperature is above the set point the reheat valve will close.

Chilled water plant

The chilled water plant is comprised of 2 McQuay chillers using R134 refrigerant and associated primary and secondary pumping systems. The chillers start and stop based on cooling valve position and occupancy schedules. The chillers are staged off and on in a lead lag configuration to meet the cooling demands of the building. The DDC will send status and temperature alarms to the Central Heat Plant if parameters do not meet the control loop set points.

CRAC units

Computer Room Air Conditioners are located in 2 data centers on level 2 and level 5. The spaces are cooled via chilled water from the building chiller plant piped to each CRAC unit. The units filter and circulate the air within the space to maintain proper operating temperatures for server racks that perform research for the campus. The CRAC unit performance and the zone temperature are monitored at the central plant via the EBI front end.

Heating system

Both domestic and heating water loads are met by the central heating water loop. Heating water temperatures are maintained via a combination of Co-Generation and Clever-Brooks boilers. Heating water is distributed through out the building via heating water pumps with VFD speed control. Pump speed is controlled via a ¾ EOL differential pressure sensor. The secondary heating water pumps will operate in a lead/ lag manner to meet the demands of heating water. The DDC will send status and temperature alarms to the Central Heat Plant if parameters do not meet the control loop set points.

BMS & Front end

The building DDC system is manufactured by Honeywell and consists of several types of Honeywell XL-5000 controllers. Control logic for start stop, status, high and low alarms, sequencing and PID algorithms reside with in the controllers. System graphic's and alarm points are monitored 24/7 at the Central Heat Plant EBI front end. Some system functions can be overridden from the EBI front end for troubleshooting and system diagnostics. Trends can be developed so that system performance can be tracked via the EBI front end.

Work order system

All alarm conditions are transferred into a work orders from our central Operations Support Group. Once the work order is generated it is assigned to the appropriate craft to be prioritized by the Supervisor.

Lighting

The BMS will interface to the lighting controller in order to provide the following functionality. 4 lighting zones interface into the BMS via dry contacts. Separate time programs in the BMS will activate & deactivate building lighting at the start or end of an occupancy period.

Preventative maintenance inspection program

Various departments within Physical Plant based on a weekly calendar inspection matrix make routine inspections. This includes but is not limited to HVAC (filter) BMS, fire & security, electrical (lighting), plumbing, carpentry, and paint and lock shop services. P.M programs are distributed to the crafts on a weekly basis from a central P.M. department. Follow up work orders are generated to complete repairs as required by the shops performing the inspections.

MBCx partnership with Enovity

UCSC and Enovity are under contractual agreement to perform Monitoring-Based Building Commissioning for the Engineering 2 building. The decision was reached to go ahead with MBCx for two reasons. 1 to assist with LEED certification and 2 to gain and confirm

confidence that our building is operating at a top performance level from a utilities aspect as well as from a comfort level.

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANNING & CONSTRUCTION

SANTA CRUZ, CALIFORNIA 95064

JAN 30th, 2009

To: USGBC LEED-EB Application Review Committee
Re: IEQ Prerequisite 1: Outdoor Air Introduction and Exhaust Systems

In reply to the review comments and technical advice, attached is documentation, in a schedule format, indicating calculated compliance of the existing ventilation system at the UCSC Engineering 2 building with ASHRAE 62.1-2004.

Critical zones were selected for the calculations. Also attached is a sheet that defines each item in the submittal schedule. This critical zone analysis focused on the types of rooms in this building, which consist of classrooms, dry labs, conference rooms, and different sized offices. The spreadsheet method was utilized in these calculations.

Sincerely,

Tal Rabiah

Tal Rabiah P.E.
Senior Mechanical Engineer
UCSC Physical Planning & Construction

Schedule Critical Zone Analysis for Engineering 2

Column Specification

Room# (CPSM)
This column is the room number as assigned by Capital Planning and Space Management, and is the number that appears on the placecard outside the doors on the actual building.
This information is published on the FacilitiesLink website (ucsc.digicality.com).

Room# (plans)
This field is the room number as it appears on the architectural sheets (BP 5A), and is the room number used to identify rooms in their Air Balance Report.

Room Type
This field is the occupancy category as assigned by Capital Planning and Space Management. This information is published on the FacilitiesLink website (ucsc.digicality.com). This was used to lookup the required outside air/person and outside air/sq. ft. in the ASHRAE 62.1-2004 guidelines.

Req. O.A./person
From ASHRAE 62.1-2004, table 6-1. The occupancy category determining this value was inferred from the "Room Type" field described above.

Max People
This is an estimate of the highest occupancy of the room. If a maximum occupancy was specified on a plate in the room, this occupancy was used. Otherwise, the max occupancy was estimated by counting the number of seats in the room. (Where seats are taken to mean the number of places set for occupants plus the number of chairs in the room that aren't at an aforementioned workspace.)

Sq Ft
This column reflects the gross square footage of the room. This information is published by Capital Planning and Space Management on the FacilitiesLink website (ucsc.digicality.com).

Ventilation Efficiency
From ASHRAE 62.1-2004, TABLE 6-2

Required Outside Air
This column is the flow rate of outside air to the room as required by ASHRAE standard 62.1-2004. This is computed as follows:
(Required Outside Air) =
(Req. O.A./person *Max People + Req. O.A./sq ft* Sq Ft) / (Ventilation Efficiency)

Supp air to rm (cfm)
This is the total rate of supply air provided to the room. This data comes from the Air Balance Report compiled by Associated Air Balance, Inc. as of May 20, 2004. The value is the sum of the maximum flow rates from each supply diffuser in the room.

AHU Serving Rm.
This column specifies which Air Handling Units supply air to this room. This appears in the Air Balance Report compiled by Associated Air Balance, Inc. as of May 20, 2004.

Critical Zone Analysis for Engineering 2 LEED EB Certification

Floor	Room # (CPSM)	Room # (plans)	Room Type	RequiredO.A. /person	Required O.A./sq ft	Max No. of People	SpaceSq Ft	Ventilation Efficiency	Required CFM Of Outside Air	Supply air to rm (cfm)	AHU Serving Rm.
1	180	1114	*Teaching Classroom*	7.5	0.18	104	1991	1.2	950	3600	1
1	192	1112	*Classroom- Lecture*	7.5	0.06	59	1175	1.2	430	1750	2
1	194	1110	*Classroom- Lecture*	7.5	0.06	59	1166	1.2	425	1750	2
2	206	2211	*Teaching Laboratory*	7.5	0.18	12	585	1	195	900	4
2	216	2217	*Teaching Laboratory*	7.5	0.18	20	914	1	315	1695	3
2	244	2311	*Teaching Laboratory*	7.5	0.18	12	450	1	170	850	5
2	246	2312	*Teaching Laboratory*	7.5	0.18	10	471	1	160	850	5
2	248	2313	*Teaching Laboratory*	7.5	0.18	10	462	1	160	850	5
2	256	2321	*Teaching Laboratory*	7.5	0.18	14	565	1	205	815	6
2	258	2322	*Teaching Laboratory*	7.5	0.18	14	488	1	195	830	6
2	262	2323+2324	*Teaching Laboratory*	7.5	0.18	24	952	1	350	1635	6
2	280	2114	*Conference Room*	5	0.06	24	408	1	145	500	6
3	306	3211	*Teaching Laboratory*	7.5	0.18	14	509	1	195	900	4
3	308	3212	*Teaching Laboratory*	7.5	0.18	12	520	1	185	905	4
3	316	3217	*Teaching Laboratory*	7.5	0.18	18	914	1	300	1530	3
3	380	3324	*Teaching Laboratory*	7.5	0.18	10	462	1	160	915	6
3	386	3321	*TeachingLaboratory*	7.5	0.18	30	1469	1	490	840	6
3	392	3313	*Teaching Laboratory*	7.5	0.18	34	957	1	425	850	5
3	398	3311+3312	*Teaching Laboratory*	7.5	0.18	20	936	1	320	2040	5
4	406	4211	*Conference Room*	5	0.06	10	518	1	80	360	4
4	408	4212	*Office*	5	0.06	12	465	1	90	750	4
4	410	4214	*Conference Room*	5	0.06	6	259	1	45	250	4
4	414	4127	*Office*	5	0.06	12	401	1	85	760	3
4	416	4218	*Lecture Laboratory*	7.5	0.18	20	505	1	240	885	3
4	434	4213	*Office*	5	0.06	6	199	1	40	255	4
4	448	4314	*Office*	5	0.06	6	119	1	35	260	5
4	480	4324	*Teaching Laboratory*	7.5	0.18	10	465	1	160	830	6
4	482	4323	*Office*	5	0.06	10	465	1	80	840	6
4	486	4321	*Teaching Laboratory*	7.5	0.18	24	986	1	355	835	6
4	490	4316	*Conference Room*	5	0.06	10	394	1	75	820	5
4	492	4315	*Conference Room*	5	0.06	20	259	1	115	300	5
4	494	4313	*Office*	5	0.06	14	486	1	100	750	5

4	496	4312	*Office*	5	0.06	14	464	1	100	520	5
4	498	4311	*Office*	5	0.06	14	458	1	95	515	5
5	506	5211	*Lecture Laboratory*	7.5	0.18	48	847	1	510	1430	4
5	510	5212	*Teaching Laboratory*	7.5	0.18	6	382	1	115	705	4
5	514	5215	*Teaching Laboratory*	7.5	0.18	10	423	1	150	780	3
5	516	5216	*Teaching Laboratory*	7.5	0.18	6	484	1	130	835	3
5	556	5318	*Conference Room*	5	0.06	10	296	1	70	320	6
5	580	5323	*Lecture Laboratory*	7.5	0.18	24	730	1	310	1200	6
5	584	5322	*Office*	5	0.06	10	593	1	85	1020	6
5	586	5321	*Conference Room*	5	0.06	10	296	1	70	320	6
5	592	5313	*Teaching Laboratory*	7.5	0.18	6	411	1	120	820	5
5	594	5312	*Teaching Laboratory*	7.5	0.18	6	515	1	140	120	5
5	598	5311	*Teaching Laboratory*	7.5	0.18	12	844	1	240	1505	5
									9410	34890	

ALPHA AIR BALANCING AGENCY, INC.

TEST AND BALANCE REPORT

UNIVERSITY OF CALIFORNIA SANTA CRUZ

ENGINEERING BUILDING 2 AHU-1 THRU AHU-6

OUTSIDE AIR VERIFICATION

SANTA CRUZ, CALIFORNIA

PRESENTED TO: **REGENTS OF UNIVERSITY OF CALIFORNIA SANTA CRUZ**

SUBMITTED BY: ROMY A. GONZALES

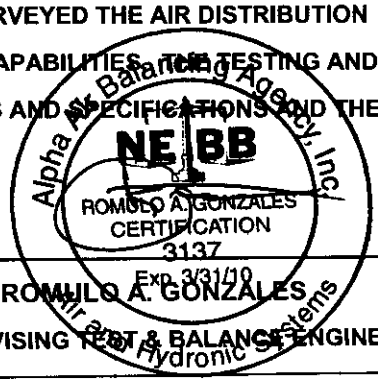
PROJECT NUMBER: 2008-2522

TEST AND BALANCE REPORT

PROJECT:	**UNIVERSITY OF CALIFORNIA SANTA CRUZ** ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
LOCATION:	SANTA CRUZ, CALIFORNIA
ARCHITECT:	**ANSHEN AND ALLEN**
MECHANICAL ENGINEER:	**ARUP CONSULTING ENGINEERS**
MECHANICAL CONTRACTOR:	**KINETICS MECHANICAL SERVICES, INC.**
OWNER:	**REGENTS OF THE** **UNIVERSITY OFCALIFORNIA SANTA CRUZ**
TESTED AND BALANCED BY:	ALPHA AIR BALANCING AGENCY, INC. P.O. BOX 3948 CARMEL, CALIFORNIA 93921 TEL. # (831) 625-8195 FAX. # (831) 625-8196

PROJECT CERTIFICATION

THIS IS TO CERTIFY THAT ALPHA AIR BALANCING AGENCY, INC. HAS SURVEYED THE AIR DISTRIBUTION SYSTEM DESCRIBED HEREIN TO THEIR OPTIMUM PERFORMANCE AND CAPABILITIES. THE TESTING AND BALANCING HAVE BEEN PERFORMED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS AND THE RESULTS OF THESE TESTS ARE HEREIN LISTED.



PROJECT NO: 2008-2522

DATE: 9/25/2008

CERTIFIED BY: _____

ROMULO A. GONZALES

SUPERVISING TEST & BALANCE ENGINEER

Table of Contents

GENERAL NOTES

1. Unless otherwise noted, indicated **CFM** (Cubic Feet per minute) is at standard conditions.
2. Where no number is indicated under the velocity or **FPM** column, test readings were measured with Alnor Balometer flowhood model 6461 which reads in direct **CFM**.
3. Flow instruments used for velocity and pressure readings:
   - Rotating vane anemometer by Air Flow Model EDRA-6E.
   - Air data multi-meter electronic micro manometer by Shortridge Instruments Model ADM-870.
   - Dwyer Magnehelic gauges & pitot tubes.
4. Any variances from design quantities are noted on the remarks column throughout this report.
5. Auto mode building pressure **+0.021" W.C.** (Reference location: 2nd floor elevator lobby.)

ABBREVIATIONS USED

AHU	-	AIR HANDLER UNIT
CFM	-	CUBIC FEET PER MINUTE
CO_2	-	CARBON DIOXIDE
E.A.	-	EXHAUST AIR
FPM	-	FEET PER MINUTE
HP/BHP	-	HORSEPOWER / BRAKE HORSEPOWER
HZ	-	HERTZ
N.S.	-	NOT SPECIFIED
PPM	-	PARTS PER MILLION
RPM	-	REVOLUTIONS PER MINUTE
S.F.	-	SQUARE FEET
VFD	-	VARIABLE FREQUENCY DRIVE
W.C.	-	WATER COLUMN

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921-3948

Phone# (831) 625-8195 Contractor's License # 708453

AIR MOVING EQUIPMENT SHEET

DATE: 9/25/2008

PAGE: 1 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION

ADDRESS: SANTA CRUZ, CALIFORNIA

SYSTEM: AIR HANDLER UNIT AHU-1

EQUIPMENT NUMBER	AHU-1	
LOCATION	MECHANICAL ROOM	
MANUFACTURER	VENTROL	
MODEL NUMBER	ITF-1-2	
SERIAL NUMBER	10767-01	
SPACE SERVED	DATA NOT AVAILABLE	

FAN DATA	DESIGN	ACTUAL	DESIGN	ACTUAL
TOTAL CFM - FAN	3600	4740		
TOTAL CFM - OUTLET / INLET	NOT SPECIFIED	4740 *		
RETURN AIR CFM	NOT SPECIFIED	0		
OUTSIDE AIR CFM	NOT SPECIFIED	4740		
EXTERNAL STATIC PRESSURE	NOT SPECIFIED	2.02"		
INLET PRESSURE	NOT SPECIFIED	-1.42"		
DISCHARGE PRESSURE	NOT SPECIFIED	0.60"		
FAN RPM	NOT SPECIFIED	2289		

MOTOR DATA	DESIGN	ACTUAL	DESIGN	ACTUAL
MOTOR MANUFACTURER	NOT SPECIFIED	BALDOR		
MOTOR HP/BHP	5	5		
PHASE	3	3		
VOLTAGE	460	DNT		
AMPERAGE	6.4	DNT		
MOTOR RPM / VFD HERTZ	1750	1765 / 60 HZ		

BELT SIZE	B54	
MOTOR SHEAVE/GROOVES	2VP56 X 1 1/8" / 2	
FAN SHEAVE/GROOVES	2TB38 X B 1 3/16" / 2	

REMARKS:

* CO_2 Sensor set point = 920 , above test taken @ 1200 PPM

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-1 OUTSIDE AIR

DESIGN CFM	NOT SPECIFIED	**DESIGN VELOCITY**	NOT SPECIFIED
ACTUAL CFM	4740	**ACTUAL VELOCITY**	845
NET DIMENSIONS	23"X37"	**NET FREE AREA S.F.**	5.61
TOTAL OF READINGS	5070	**NUMBER OF READINGS**	6
AVERAGE VELOCITY	845	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

612	418
773	534
1562	1171

REMARKS:

CO_2 Sensor set point = 920 , above test taken @ 1200 PPM

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921-3948

Phone# (831) 625-8195 Contractor's License # 708453

AIR MOVING EQUIPMENT SHEET

DATE: 9/25/2008

PAGE: 3 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION

ADDRESS: SANTA CRUZ, CALIFORNIA

SYSTEM: AIR HANDLER UNIT AHU-2

EQUIPMENT NUMBER	AHU-2	
LOCATION	MECHANICAL ROOM	
MANUFACTURER	VENTROL	
MODEL NUMBER	ITF-1-2	
SERIAL NUMBER	10767-02	
SPACE SERVED	DATA NOT AVAILABLE	

FAN DATA	DESIGN	ACTUAL	DESIGN	ACTUAL
TOTAL CFM - FAN	3500	4600		
TOTAL CFM - OUTLET / INLET	NOT SPECIFIED	4600		
RETURN AIR CFM	NOT SPECIFIED	0		
OUTSIDE AIR CFM	NOT SPECIFIED	4600 *		
EXTERNAL STATIC PRESSURE	NOT SPECIFIED	2.05"		
INLET PRESSURE	NOT SPECIFIED	-1.63"		
DISCHARGE PRESSURE	NOT SPECIFIED	0.42"		
FAN RPM	NOT SPECIFIED	2125		

MOTOR DATA	DESIGN	ACTUAL	DESIGN	ACTUAL
MOTOR MANUFACTURER	NOT SPECIFIED	BALDOR		
MOTOR HP/BHP	5	5		
PHASE	3	3		
VOLTAGE	460	DNT		
AMPERAGE	6.4	DNT		
MOTOR RPM / VFD HERTZ	1750	1642 / 56 HZ		

BELT SIZE	B54	
MOTOR SHEAVE/GROOVES	2VP56 X 1 1/8" / 2	
FAN SHEAVE/GROOVES	2TB38 X B 1 3/16" / 2	

REMARKS:

* CO_2 Sensor set point = 917 , above test taken @ 1150 PPM

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 4 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-2 OUTSIDE AIR

DESIGN CFM	NOT SPECIFIED	**DESIGN VELOCITY**	NOT SPECIFIED
ACTUAL CFM	4600	**ACTUAL VELOCITY**	820
NET DIMENSIONS	23"X37"	**NET FREE AREA S.F.**	5.61
TOTAL OF READINGS	4920	**NUMBER OF READINGS**	6
AVERAGE VELOCITY	820	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

386	263
705	806
1326	1434

REMARKS:

CO_2 Sensor set point = 917 , above test taken @ 1150 PPM

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921-3948

Phone# (831) 625-8195 Contractor's License # 708453

AIR MOVING EQUIPMENT SHEET

DATE: 9/25/2008

PAGE: 5 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION

ADDRESS: SANTA CRUZ, CALIFORNIA

SYSTEM: AIR HANDLER UNIT AHU-3 SUPPLY FAN

EQUIPMENT NUMBER	**AHU-3 SUPPLY**	
LOCATION	ROOF	
MANUFACTURER	VENTROL	
MODEL NUMBER	ITF-E-2	
SERIAL NUMBER	10767-03	
SPACE SERVED	DATA NOT AVAILABLE	

FAN DATA	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM - FAN	NOT SPECIFIED	34845		
TOTAL CFM - OUTLET / INLET	NOT SPECIFIED	34845		
RETURN AIR CFM	NOT SPECIFIED	32665		
OUTSIDE AIR CFM	2000	2180		
EXTERNAL STATIC PRESSURE	NOT SPECIFIED	1.74"		
INLET PRESSURE	NOT SPECIFIED	-0.28"		
DISCHARGE PRESSURE	NOT SPECIFIED	1.46"		
FAN RPM	NOT SPECIFIED	674		

MOTOR DATA	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
MOTOR MANUFACTURER	NOT SPECIFIED	BALDOR		
MOTOR HP/BHP	40	40		
PHASE	3	3		
VOLTAGE	460	DNT		
AMPERAGE	46.0	DNT		
MOTOR RPM / VFD HERTZ	1775	1240 / 41.9 HZ		

BELT SIZE	5VX1230 / 3	
MOTOR SHEAVE/GROOVES	3B5V74 X B 2 1/8" / 3	
FAN SHEAVE/GROOVES	3B5V136 X B 2 3/16" / 3	

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 6 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-3 SUPPLY AIR

DESIGN CFM	NOT SPECIFIED	**DESIGN VELOCITY**	NOT SPECIFIED
ACTUAL CFM	34845	**ACTUAL VELOCITY**	765
NET DIMENSIONS	80"X82"	**NET FREE AREA S.F.**	45.55
TOTAL OF READINGS	27525	**NUMBER OF READINGS**	36
AVERAGE VELOCITY	765	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

598	663	754	763	987	794
800	887	709	689	559	568
590	607	735	781	907	979
888	794	712	682	594	587
633	655	790	708	856	947
1078	979	858	842	765	787

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 7 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-3 OUTSIDE AIR

DESIGN CFM	2000	**DESIGN VELOCITY**	81.6
ACTUAL CFM	2180	**ACTUAL VELOCITY**	89
NET DIMENSIONS	104 3/4"X35 1/2"	**NET FREE AREA S.F.**	24.5
TOTAL OF READINGS	1861	**NUMBER OF READINGS**	21
AVERAGE VELOCITY	89	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

73	60	50
80	103	90
118	121	142
158	209	173
113	92	77
53	69	52
0	37	-25

REMARKS:

UCSC Facilities computer CFM read-out = 2200.

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921-3948

Phone# (831) 625-8195 Contractor's License # 708453

AIR MOVING EQUIPMENT SHEET

DATE: 9/25/2008

PAGE: 8 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION

ADDRESS: SANTA CRUZ, CALIFORNIA

SYSTEM: AIR HANDLER UNIT AHU-4 SUPPLY FAN

EQUIPMENT NUMBER	**AHU-4 SUPPLY**	
LOCATION	ROOF	
MANUFACTURER	VENTROL	
MODEL NUMBER	ITF-E-2	
SERIAL NUMBER	10767-04	
SPACE SERVED	DATA NOT AVAILABLE	

FAN DATA	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM - FAN	NOT SPECIFIED	35439		
TOTAL CFM - OUTLET / INLET	NOT SPECIFIED	35439		
RETURN AIR CFM	NOT SPECIFIED	27500		
OUTSIDE AIR CFM	8000	7939		
EXTERNAL STATIC PRESSURE	NOT SPECIFIED	2.56"		
INLET PRESSURE	NOT SPECIFIED	-0.74"		
DISCHARGE PRESSURE	NOT SPECIFIED	1.82"		
FAN RPM	NOT SPECIFIED	586		

MOTOR DATA	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
MOTOR MANUFACTURER	NOT SPECIFIED	BALDOR		
MOTOR HP/BHP	50	50		
PHASE	3	3		
VOLTAGE	460	DNT		
AMPERAGE	57.0	DNT		
MOTOR RPM / VFD HERTZ	1775	1333 / 45.3 HZ		

BELT SIZE	BX162 / 3	
MOTOR SHEAVE/GROOVES	3B5V110 X B 2 1/8" / 3	
FAN SHEAVE/GROOVES	3TB250 C B 2 11/16" / 3	

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 9 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-4 SUPPLY AIR

DESIGN CFM	NOT SPECIFIED	**DESIGN VELOCITY**	NOT SPECIFIED
ACTUAL CFM	35439	**ACTUAL VELOCITY**	554
NET DIMENSIONS	94"X98"	**NET FREE AREA S.F.**	63.97
TOTAL OF READINGS	19957	**NUMBER OF READINGS**	36
AVERAGE VELOCITY	554	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

538	650	601	586
562	576	620	523
568	540	601	574
491	522	537	491
469	542	533	449
538	564	541	596
559	561	509	601
581	647	535	560
581	536	541	554

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 10 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-4 OUSTIDE AIR

DESIGN CFM	8000	**DESIGN VELOCITY**	238.8
ACTUAL CFM	7939	**ACTUAL VELOCITY**	237
NET DIMENSIONS	111 1/2"x45 1/2"	**NET FREE AREA S.F.**	33.5
TOTAL OF READINGS	7588	**NUMBER OF READINGS**	32
AVERAGE VELOCITY	237	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

565	688	225	152
802	694	230	162
707	679	212	119
414	443	218	66
191	161	73	53
80	87	58	0
82	75	41	37
77	34	64	75

REMARKS:

UCSC Facilities computer CFM read-out = 8081.

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921-3948

Phone# (831) 625-8195 Contractor's License # 708453

AIR MOVING EQUIPMENT SHEET

DATE: 9/25/2008

PAGE: 11 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION

ADDRESS: SANTA CRUZ, CALIFORNIA

SYSTEM: AIR HANDLER UNIT AHU-5 SUPPLY FAN

EQUIPMENT NUMBER	**AHU-5 SUPPLY**	
LOCATION	ROOF	
MANUFACTURER	VENTROL	
MODEL NUMBER	ITF-E-2	
SERIAL NUMBER	10767-05	
SPACE SERVED	DATA NOT AVAILABLE	

FAN DATA	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
TOTAL CFM - FAN	NOT SPECIFIED	28922		
TOTAL CFM - OUTLET / INLET	NOT SPECIFIED	28922		
RETURN AIR CFM	NOT SPECIFIED	26738		
OUTSIDE AIR CFM	2000	2184		
EXTERNAL STATIC PRESSURE	NOT SPECIFIED	1.63"		
INLET PRESSURE	NOT SPECIFIED	-0.16"		
DISCHARGE PRESSURE	NOT SPECIFIED	1.47"		
FAN RPM	NOT SPECIFIED	478		

MOTOR DATA	**DESIGN**	**ACTUAL**	**DESIGN**	**ACTUAL**
MOTOR MANUFACTURER	NOT SPECIFIED	BALDOR		
MOTOR HP/BHP	60	60		
PHASE	3	3		
VOLTAGE	460	DNT		
AMPERAGE	68.0	DNT		
MOTOR RPM / VFD HERTZ	1775	1063 / 36.1 HZ		

BELT SIZE	B150 / 5	
MOTOR SHEAVE/GROOVES	5B5V90 X B 2 3/8" / 5	
FAN SHEAVE/GROOVES	5B5V200 X B 2 11/16" / 5	

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-5 SUPPLY AIR

DESIGN CFM	NOT SPECIFIED	**DESIGN VELOCITY**	NOT SPECIFIED
ACTUAL CFM	28922	**ACTUAL VELOCITY**	421
NET DIMENSIONS	101"X98"	**NET FREE AREA S.F.**	68.7
TOTAL OF READINGS	15152	**NUMBER OF READINGS**	36
AVERAGE VELOCITY	42	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

355	377	412	474	478	554
317	355	386	446	426	511
323	386	459	411	497	501
304	219	320	379	458	421
404	401	469	504	539	339
475	431	423	527	440	525

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 13 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-5 OUTSIDE AIR

DESIGN CFM	2000	**DESIGN VELOCITY**	54.9
ACTUAL CFM	2184	**ACTUAL VELOCITY**	60
NET DIMENSIONS	116 3/4"X47 1/4"	**NET FREE AREA S.F.**	36.4
TOTAL OF READINGS	1928	**NUMBER OF READINGS**	32
AVERAGE VELOCITY	60	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

47	57	37	51
81	61	68	36
152	171	59	43
252	223	58	39
146	117	47	0
53	25	-31	0
0	0	37	53
47	33	0	0

REMARKS:

UCSC Facilities computer CFM read-out = 2085.

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921-3948

Phone# (831) 625-8195 Contractor's License # 708453

AIR MOVING EQUIPMENT SHEET

DATE: 9/25/2008

PAGE: 14 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION

ADDRESS: SANTA CRUZ, CALIFORNIA

SYSTEM: AIR HANDLER UNIT AHU-6

EQUIPMENT NUMBER	AHU-6	
LOCATION	ROOF	
MANUFACTURER	VENTROL	
MODEL NUMBER	ITF-E-2	
SERIAL NUMBER	10767-06	
SPACE SERVED	DATA NOT AVAILABLE	

FAN DATA	DESIGN	ACTUAL	DESIGN	ACTUAL
TOTAL CFM - FAN	NOT SPECIFIED	32083		
TOTAL CFM - OUTLET / INLET	NOT SPECIFIED	32083		
RETURN AIR CFM	NOT SPECIFIED	29645		
OUTSIDE AIR CFM	2000	2438		
EXTERNAL STATIC PRESSURE	NOT SPECIFIED	1.79"		
INLET PRESSURE	NOT SPECIFIED	-0.29"		
DISCHARGE PRESSURE	NOT SPECIFIED	1.5"		
FAN RPM	NOT SPECIFIED	536		

MOTOR DATA	DESIGN	ACTUAL	DESIGN	ACTUAL
MOTOR MANUFACTURER	NOT SPECIFIED	BALDOR		
MOTOR HP/BHP	60	60		
PHASE	3	3		
VOLTAGE	460	DNT		
AMPERAGE	68	DNT		
MOTOR RPM / VFD HERTZ	1775	1193 / 39.5 HZ		

BELT SIZE	B150	
MOTOR SHEAVE/GROOVES	5B5V90 X B 2 3/8" / 5	
FAN SHEAVE/GROOVES	5B5V200 X B 2 11/16" / 5	

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 15 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-6 SUPPLY AIR

DESIGN CFM	NOT SPECIFIED	**DESIGN VELOCITY**	NOT SPECIFIED
ACTUAL CFM	32083	**ACTUAL VELOCITY**	467
NET DIMENSIONS	101"X98"	**NET FREE AREA S.F.**	68.7
TOTAL OF READINGS	16796	**NUMBER OF READINGS**	36
AVERAGE VELOCITY	467	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

504	506	480	488	446	504
488	471	476	460	439	451
493	489	476	428	412	494
437	474	480	468	431	501
297	485	497	489	453	489
465	481	473	440	449	482

REMARKS:

ALPHA AIR BALANCING AGENCY, INC.

P.O. BOX 3948, CARMEL, CALIFORNIA 93921
Phone # (831) 625-8195 Contractor's License # 708453

VELOCITY PROFILE

DATE: 9/25/2008
PAGE: 16 OF 16

PROJECT NAME: UNIVERSITY OF CALIFORNIA SANTA CRUZ
ENGINEERING BUILDING 2 AHU-1 THRU AHU-6 OUTSIDE AIR VERIFICATION
ADDRESS: SANTA CRUZ, CALIFORNIA
SYSTEM: AHU-6 OUTSIDE AIR

DESIGN CFM	2000	**DESIGN VELOCITY**	54.9
ACTUAL CFM	2438	**ACTUAL VELOCITY**	67
NET DIMENSIONS	116 3/4"X47 1/4"	**NET FREE AREA S.F.**	36.4
TOTAL OF READINGS	2137	**NUMBER OF READINGS**	32
AVERAGE VELOCITY	67	**CORRECTION FACTOR**	1.0

(as viewed from downstream)

-35	52	+29	44
64	66	65	36
87	98	68	72
139	133	72	63
139	124	37	68
77	70	71	82
81	73	80	67
28	45	42	58

REMARKS:

UCSC Facilities computer CFM read-out = 2100.

INDOOR ENVIRONMENTAL QUALITY: PREREQ 2
ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL

1. LEED-EB template
2. Confirmation letter from the Associate Director of the UCSC Physical Plant, James Dunne, stating that there is no smoking in and within 25 feet of all building, and that there are designated smoking areas.
3. UCSC Environmental Health & Safety Campus Policy: Smoking on Campus

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the project prevents or minimizes exposure of building occupants, indoor surfaces, and systems to Environmental Tobacco Smoke (ETS) through the following actions:

Option A. Prohibit smoking in the building through:

☒ Prohibition of smoking in the building,

☒ Locating any exterior designated smoking areas at least 25 feet away from building entries, outdoor air intakes and operable windows.

I have provided the following to support Option A selected above:

☒ A declaration signed by the building owner or responsible party, declaring that the building will be operated under a policy prohibiting smoking along with a statement describing the location of exterior smoking areas.

Option B. Establish negative pressure in the rooms with smoking through:

☐ Prohibition of smoking in the building except in designated smoking areas.

☐ Location of any exterior designated smoking areas at least 25 feet away from building entries, outdoor air intakes and operable windows.

☐ Providing for one or more designated smoking rooms designed to effectively contain, capture and remove ETS from the building by directly exhausting ETS to the outdoors, away from air intakes and building entry paths, with no re-circulation of ETS-containing air to the non-smoking area of the building, and enclosement with impermeable deck-to-deck partitions and operation at a negative pressure compared with the surrounding spaces of at least an average of 5 Pa (0.02 inches of water gauge) and with a minimum of 1 Pa (0.004 inches of water) when the door(s) to the smoking room are closed.

☐ Verification of smoking room differential air pressure performance by conducting 15 minutes of measurement, with a minimum of one measurement every 10 seconds, of the differential pressure in the smoking room with respect to each adjacent area and in each adjacent vertical chase with the doors to the smoking room closed. The testing was conducted with each space configured for worst case conditions of transport of air from the smoking rooms to adjacent spaces.

I have provided the following to support Option B selected above:

☐ A declaration signed by the facility manager or responsible party demonstrating that the design criteria described in the credit requirements have been met and performance has been verified using the method described in the credit requirements.

(Continued on Page 2)

Option C. Reduce air leakage between rooms with smoking and non-smoking areas in residential buildings only through:

☐ Prohibition of smoking in all common areas of the building,

☐ Location of any exterior designated smoking areas at least 25 feet away from building entries, outdoor air intakes and operable windows.

☐ Minimization of uncontrolled pathways for ETS transfer between individual residential units by sealing penetrations in walls, ceilings, and floors in the residential units, and by sealing vertical chases adjacent to the units. Residential units must demonstrate less than 1.25 square inches leakage area per 100 square feet of enclosure area (i.e. sum of all wall, ceiling, and floor areas).

☐ Weather-stripping of all doors in the residential units leading to common hallways to minimize air leakage into the hallway.

☐ Demonstration of acceptable sealing of residential units by a blower door test conducted in accordance with ASTM 779-03, Standard Test Method for Determining Air Leakage Rate By Fan Pressurization.

☐ Use of the progressive sampling methodology defined in Chapter 7 (Home Energy Rating Systems (HERS) Required Verification and Diagnostic Testing) of the California Residential Alternative Calculation Method Approval Manual.

I have provided the following to support Option C selected above:

☐ A declaration signed by the facility manager or responsible party demonstrating that the design criteria described in the credit requirements have been met and performance has been verified using the method described in the credit requirements.

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-05-05	**lhutting@ucsc.edu**	
First Name	Last Name	Date	**Username (Email Address)**	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

May 6th, 2008

To: US Green Building Council- LEED-EB Program
Re: Documentation for IEQ PreReq2: Environmental Tobacco Smoke (ETS) Control for UCSC

According to the UCSC Environmental Health and Safety Policy EHS0001, smoking is strictly prohibited within all campus buildings and within 25 feet of all outdoor surrounding areas.
As a campus building, Engineering 2 is operated under this policy. For those individuals who do wish to smoke, there is an exterior designated space more than 30 feet from the west entrance to the E2 building where receptacles are available for the disposal of cigarettes.

James Dunne
Project Manager- E2 LEED-EB Submittal
Associate Director-UCSC Physical Plant

Smoking on Campus

(Policy EHS0001)

I. Purpose/Scope of the Policy

It is the primary goal of UC Santa Cruz to promote a safe and healthy atmosphere for students, faculty, staff, and visitors on the University of California, Santa Cruz campus through reducing the health risks associated with tobacco smoke. The intent of this policy is to protect the rights of the nonsmoking community to breathe smoke-free air. This policy bans smoking in areas occupied by the nonsmoking population and applies to all individuals on the UCSC campus and includes all nonresidential University buildings and vehicles.

This policy discusses (A) possible health issues related to smoking, (B) the sale of tobacco products, and (C) responsibilities; (D) describes prohibited and designated smoking areas; and (E) provides additional information on stop smoking programs. This policy does not apply to (1) private rooms or apartments within dormitories, or (2) other residential buildings.

II. Detailed Policy Statement

A. Health Issues

1. The U.S. Public Health Service documents on the health consequences of smoking have conclusively established cigarette smoking as the largest single preventable cause of premature death and disability in the United States. In addition, recent evaluation of the data on low level exposure to environmental tobacco smoke has led the Surgeon General to conclude:

    a. Involuntary smoking is a cause of disease, including lung cancer, in healthy nonsmokers.

    b. Simple separation of smokers and nonsmokers within the same air space may reduce, but does not eliminate, exposure of nonsmokers to environmental tobacco smoke.

2. Cigarette smoke is a complex mixture of over 1200 identified substances which affect indoor air quality. Among them are carbon monoxide, nicotine, hydrogen cyanide, metals, aldehydes, phenol, ammonia, and sulfur dioxide. Exposure to these and other potentially harmful substances through environmental tobacco smoke in the workplace can be substantial both in duration and intensity. This is of particular concern for individuals exposed to industrial toxins whose effects may be intensified by tobacco smoke.

B. Sale of Tobacco Products

Tobacco products will not be sold on campus through either vending machines or campus establishments.

C. Responsibilities

Implementation of the campus smoke-free environment policy will be the responsibility of every student, faculty member, staff person, and visitor on campus. Building sponsors shall be responsible for ensuring that the policy is implemented and enforced in all areas under their jurisdiction. Individual supervisors shall be responsible for enforcement within their units.

D. Prohibited and Designated Smoking Areas

1. **Smoking will be prohibited in the following areas:**

   a. in all indoor areas of all public buildings on campus (no smoking signs will be posted on outside doors and entryways), specifically including but not limited to:

   - classrooms
   - meeting rooms
   - lecture and concert halls
   - libraries
   - computer rooms
   - study rooms
   - food preparation areas
   - eating facilities
   - offices (both private and shared)
   - laboratories
   - studios
   - medical facilities
   - child care centers
   - entryways
   - lobbies
   - reception areas
   - hallways
   - elevators
   - stairwells
   - break rooms
   - restrooms
   - shops
   - storerooms
   - garages
   - indoor sports facilities

   b. in the outside areas within 25 feet of building doorways, windows, and ventilation air intakes. (This includes patios underneath building windows.)

   c. in all University-owned vehicles, including shuttles, automobiles, and all types of delivery, maintenance, and service vehicles.

2. **Outside areas near a building may be designated as smoking areas provided that:**

   a. smoke will not enter the building

   b. it is not a thoroughfare for nonsmokers

c. receptacles are available for the disposal of cigarettes

E. Stop Smoking Programs

UCSC supports and assists efforts to stop smoking by providing literature, referrals to community cessation programs and by sponsoring periodic campus smoking cessation programs. (A portion of the cost of completed campus-sponsored programs for faculty and staff may be subsidized when funds are available for this purpose.)

a. Faculty and staff may obtain information from the campus Employee Assistance Services Program.

b. Students may obtain information from the Student Health Center.

III. Definitions

IV. Getting Help

The campus ADA Compliance Officer for Facilities, Transportation, and Computing Access provides training and assistance to campus units (including help with completing forms, carrying out procedures, or interpreting policy).

If you need help with ...	Contact ...
...enforcement of this policy	Your building coordinator. (If you do not know who your building coordinator is, ask your unit head.)
...no smoking signs for your office/building	The Work Order desk (x94444).
...designating a smoking area	The ADA Compliance Officer for Facilities, Transportation, and Computing Access (x93759).
...education about the effects of tobacco	The Alcohol and Other Drug Abuse Prevention Program Coordinator (x94866).
...smoking cessation programs for employees	The Employee Assistance Program (1-800-654-6717).
...smoking cessation programs for students	Cowell Student Health Center (x92211).

V. Applicability and Authority

This policy on *Smoking on Campus* applies to all individuals on the UCSC campus and includes all non-residential University buildings and vehicles.

This policy supersedes all previous campus policies on this subject.

The campus ADA Compliance Officer for Facilities, Transportation and Computing Access is the campus authority for the *Smoking on Campus* policy.

This policy was reviewed and approved by the Chancellor on May 7, 1997. Next review date is January 1999.

VI. Related Policies/References for More Information

INDOOR ENVIRONMENTAL QUALITY: PREREQ 3
ASBESTOS REMOVAL OR ENCAPSULATION

1. LEED-EB template
2. Confirmation letter from Brent Cooley, the UCSC Industrial Hygienist & Biological Safety Officer, that there is no asbestos in the building.
3. Letter from DPR Construction Company stating that during the construction of E2, no materials containing asbestos were used.

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has reduced the potential exposure of building occupants to asbestos and prevented any associated harmful effects of asbestos in existing buildings.

I have provided the following to support the declaration:

Option A

☒ A letter from the facility manager, an accredited asbestos program manager or asbestos inspector stating that asbestos-containing materials are not present in the building, on the building exterior or on the site.

Option B

☐ A description of the current asbestos management program that identifies the applicable regulatory requirements and explains how the program is addressing asbestos remaining in the building on an ongoing basis.

☐ A narrative that includes a review of the past asbestos work done on the building and on the building site and use of this data to prepare the history based component of the asbestos survey for the building and the site by collecting the available information on: (1) Where asbestos has been removed, (2) Where asbestos remains and (3) How the remaining asbestos is being addressed.

☐ An asbestos survey updated for the building and the site with current information by: (1) sampling additional likely locations in building and on the site for asbestos and (2) testing samples to see if asbestos is present.

☐ An updated asbestos management program, if applicable, with the addition of any new locations with asbestos identified in the survey including a description of how the asbestos remaining in the building is being addressed on an ongoing basis.

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Prerequisite 3: Asbestos Removal or Encapsulation Prerequisite Documented: Yes

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Louise	Huttinger	2008-06-19	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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ENVIRONMENTAL HEALTH & SAFETY

SANTA CRUZ, CALIFORNIA 95064

June 19, 2008,

To: US Green Building Council EED Existing Buildings Program

Re: Documentation for IEQ Prerequisite 3: Asbestos Removal or Encapsulation Control UC Office of the President, 1111 Franklin St. Oakland Building

There is no asbestos in the University of California Santa Cruz Engineering 2 facility located at UC Santa Cruz, 1156 High Street, Santa Cruz, CA 95064. The Engineering 2 building was constructed without the use of any asbestos containing products. A site inspection, visual evaluation for suspect asbestos materials and follow up with the University Physical Plant services performed on June 19, 2008 confirmed no suspect asbestos materials are present in the building, on the building exterior or on the site.

Brent Cooley, MS, CIH, CSP
****
Industrial Hygienist & Biological Safety Officer

Environmental Health & Safety
University of California Santa Cruz
1156 High Street
Santa Cruz, CA 95064

phone: 831-459-5394
cell: 831-212-2553
fax: 831-459-3209
web: ehs.ucsc.edu

IEQ Prerequisite 3: Asbestos Removal or Encapsulation

("Responsible Party")
I, Brent Cooley, declare that the building project has reduced the potential exposure of building occupants to asbestos and prevented any associated harmful effects of asbestos in existing buildings.

I have provided the following to support the declaration:

Option A
☑ A letter from the facility manager, and accredited asbestos program manager or asbestos inspector stating that asbestos-containing material are not present in the building, on the building exterior or on the site.

OR

Option B
☐ A description of the current asbestos management program that identifies the applicable regulatory requirements and explains how the program is addressing asbestos remaining in the building on an ongoing basis.

☐ A narrative that includes a review of the past asbestos work done on the building and on the building site and use of this data to prepare the history based component of the asbestos survey for the building and the site by collecting the available information on: (1) Where asbestos has been removed, (2) Where asbestos remains and (3) How the remaining asbestos is being addressed.

☐ An asbestos survey updated for the building and the site with current information by: (1) sampling additional likely locations in building and on the site for asbestos and (2) testing samples to see if asbestos is present.

☐ An updated asbestos management program, if applicable, with the addition of any new locations with asbestos identified in the survey including a description of how the asbestos remaining in the building is being addressed on an ongoing basis.

IEQ Pr3 Prerequisite Documented

Name: Brent Cooley

Organization: UC Santa Cruz, EH&S Office

Role in project: AHERA Certified Asbestos Building Inspector, Cal/OSHA Approval Number: CA-002-06 / CA-002-08

Signature: Brt A. Cooley

Date: 6/19/2008

File last modified: June 14, 2006

DPR
Construction Inc.

May 27, 2008

SUBJECT: UNIVERSITY OF CALIFORNIA, SANTA CRUZ, ENGINEERING 2 BUILDING, PROJ. NO. 7401

To Whom It May Concern:

On behalf of DPR Construction Company, I am writing to confirm that in the construction of the Engineering 2 Building, University of California, Santa Cruz, located at 1156 High Street, Santa Cruz, California, no materials containing asbestos were used.

If you have any questions regarding the information provided, please contact George Hurley, or myself, at (408) 370-2322 or FAX (408) 370-2422.

Jose Refuerzo, Project Manager
DPR Construction, Inc.
1510 South Winchester Blvd.
San Jose, CA 95128

INDOOR ENVIRONMENTAL QUALITY: PREREQ 4 POLYCHLORINATED BIPHENYL (PCB) REMOVAL

1. LEED-EB template
2. Confirmation letter stating that there are no PCB containing materials present in the E2 building.

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has reduced the potential exposure of building occupants to PCBs and PCB combustion by products in case of fire in the building.

I **have provided the following to support the declaration:**

Option A

☒ A letter from the facility manger or a qualified PCB management professional stating that PCB-containing materials are not present

Option B

☐ A description of the current PCB management program that identifies the applicable regulatory requirements and explains how the program is addressing PCBs remaining in the building on an ongoing basis.

☐ A narrative that includes a review of the past PCB work done on the building and on the building site and use of this data to prepare the history based component of the PCB survey for the building and the site collecting the available information on: (1) Where PCBs have been removed, (2) Where PCB s remains and (3) How the remaining PCBs are being addressed.

☐ A PCB survey updated for the building and the site with current information by: (1) sampling additional likely locations in building and on the site for PCBs and (2) testing samples to see if PCBs are present.

☐ An updated PCB management program, if applicable, with the addition of any new locations with PCBs identified in the survey including a description of how PCBs remaining in the building are being addressed on an ongoing basis.

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Prerequisite 4: Polychlorinated Biphenyl (PCB) Removal Prerequisite Documented: Yes

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-05-07	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

May 6th, 2008

To: US Green Building Council- LEED-EB Program
Re: Documentation for IEQ PreReq4: Polychlorinated Biphenyl (PCB) Removal

There are no PCB containing materials present in the UCSC Engineering 2 building. In the 1980's the Public Utilities Commission mandated that all transformers must be retrofitted to be PCB free. The Engineering 2 building was built in 2003, after this requirement, and thus its ballasts are PCB free.

James Dunne
Project Manager- E2 LEED-EB Submittal
Associate Director-UCSC Physical Plant

INDOOR ENVIRONMENTAL QUALITY: CREDIT 5.1
INDOOR CHEMICAL & POLLUTANT SOURCE CONTROL, NON-CLEANING SYSTEM- REDUCED PARTICULATES IN AIR

1. LEED-EB template
2. Purchase order of MERV14 filters for use in E2 building.
3. E2 PM document showing that a regular schedule for maintenance and replacement of these filters has been established and followed over the performance period.

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the following indoor chemical and pollutant source control measures have been taken over the performance period:

☒ Filters with particle removal effectiveness MERV 13 or greater for all outside air intakes and for the returns for the re-circulation of inside air.

☒ Establishment and following of a regular schedule for maintenance and replacement of these filters.

I have provided the following to support the declaration:

☒ Documentation that the building has had in place over the performance period, filters with particle removal effectiveness MERV 13 or greater for all outside air intakes and for the returns for the re-circulation of inside air.

☒ Documentation that a regular schedule for maintenance and replacement of these filters has been established and followed over the performance period.

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Credit 5.1 (1 point possible): Indoor Chemical and Pollutant Source Control, Non-Cleaning, Reduce Particulates in Air Distribution

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-18	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

WO Number: WO00320883 WORK ORDER TICKET

Description: RCH: ENG 2, PURCHASE MER-14 AIR FILTERS FOR AHU'S

Enter User:	SMITHJS	Schedule Date:	10-JAN-2008
Type:	SCHVAC	Due Date:	30-JAN-2008
Status:	POO	Modify Date:	23-JAN-2008
Priority:	3	Start Date:	10-JAN-2008
Method:		Nonavailable Time:	
Crew:	HVAC	Req Type:	Service
Craft:	ZONE2	Req Number:	SR00019297
Assigned To:		Requestor:	DUNNE, JIM
Est Hours:	14	Telephone:	9-3411
Site:	UCSC	Mail Code:	
Building:	ENGINEER 2	Department:	PP
Bldg Desc:	940 ENGINEERING BUILDING 2	CP Number:	82105
Floor:		Equipment:	
Room:		Nomenclature:	

Task List

PLEASE CREATE WORK ORDER OFF OF CFR 82105.

1) PURCHASE OF MERV-14 AIR FILTERS FOR ENGINEERING2 AHUS TO REPLACE EXISTING PLEAT AND POCKET FILTERS.

THESE FILTERS WILL COMPLY WITH THE LEED-EB REQUIREMENT IN THE IEQ SECTION FOR CREDIT 5.1 (INDOOR CHEMICAL AND POLLUTANT SOURCE CONTROL).

PLEASE ASSIGN TO D. MICELI.

JS

PM ID# 904

Area: Engineering 2
Week#: 45
Date: 5/3/2008
Crew: Filter

ENTERED

Filter / E-2 Filters / Multi-Annual

15.5 Hrs Rev 5/24/2007

FILTER CHANGE TO LEEDS STANDARD ON W/O. 2 MONTHS AGO

W.O. SCE2PF (14.5 HRS)
W.O. SCE2PH (1 HRS)

☐	2	Pleat12x24x2	AHU-01-940
☐	2	Pleat12x24x2	AHU-01-942
☐	2	Pleat12x24x2	AHU-02-940
☐	3	Pleat12x24x2	AHU-03-940
☐	4	Pleat12X24X2	AHU-04-940
☐	4	Pleat12x24x2	AHU-05-940
☐	5	Pleat12X24X2	AHU-06-940
☐	1	Pleat16x22x1	FCU-03-940
☐	1	Pleat17x34x1	FCU-02-940
☐	1	Pleat17x46x1	FCU-01-940
☐	6	Pleat18X24X4	FCU-04-940
☐	6	Pleat18X24X4	FCU-05-940
☐	6	Pleat18X24X4	FCU-06-940
☐	6	Pleat18X24X4	FCU-07-940
☐	1	Pleat24x24x2	AHU-01-940
☐	2	Pleat24x24x2	AHU-01-942
☐	1	Pleat24x24x2	AHU-02-940
☐	12	Pleat24X24X2	AHU-03-940
☐	20	Pleat24X24X2	AHU-04-940
☐	20	Pleat24x24x2	AHU-05-940
☐	20	Pleat24X24X2	AHU-06-940
☐	2	Pocket12x24x12	AHU-01-940
☐	2	Pocket12x24x12	AHU-01-942
☐	2	Pocket12x24x12	AHU-02-940
☐	3	Pocket12x24X12	AHU-03-940
☐	4	Pocket12X24X12	AHU-04-940
☐	4	Pocket12x24x12	AHU-05-940
☐	5	Pocket12X24X12	AHU-06-940
☐	1	Pocket24x24x12	AHU-01-940
☐	2	Pocket24x24x12	AHU-01-942
☐	1	Pocket24X24X12	AHU-02-940
☐	12	Pocket24X24X12	AHU-03-940
☐	20	Pocket24X24X12	AHU-04-940
☐	20	Pocket24X24X12	AHU-05-940
☐	20	Pocket24X24X12	AHU-06-940

RETURN TO JEFF DO NOT DO.

Did not do, per your instruction of "Do Not Do".
4/30/08
Mike Hanson
Returning "Not Done".

Comunication Procedure:

PM Procedure:

Supervisor Mike Hanson, x92581. Email: mjhanson@ucsc.edu

Name:	Date:	Hours:	Name:	Date:	Hours:	Name:	Date:	Hours:

Notes:

W.O. SCE2PF (14.5 HRS)

ENG. AUDITORIUM — Asset # 942

AHU-01-942 AIR HANDLING UNIT — AHU-07 SCE2PF — FL 1 RM Auditorium

STAND
11/3/2007 JI
10/29/2006 JG

1 On VFD.

Change air filters.	☐	2	x	Pocket	24x24x12
Change air filters.	☐	2	x	Pocket	12x24x12
Change air filters.	☐	2	x	Pleat	24x24x2
Change air filters.	☐	2	x	Pleat	12x24x2

Date	Maintenance History
5/22/06	Replaced v-belts 2 BX-56. WO00295118 Wunder

ENG2 — Asset # 940

AHU-01-940 AIR HANDLING UNIT — SCE2PF — FL 1 RM 101 Bsmt. Mech. Rm.

STAND
11/3/2007 JI
8/2007 1.2

1 On VFD

ange air filters.	☐	2	x	Pocket	12x24x12
ange air filters.	☐	1	x	Pocket	24x24x12
ange air filters.	☐	2	x	Pleat	12x24x2
nge air filters.	☐	1	x	Pleat	24x24x2

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/29/07	Return fan VD bad. Repair in progress.

AHU-02-940 AIR HANDLING UNIT | SCE2PF | FL 1 RM 101 Bsmt. Mech. Rm.

STAND
11/3/2007 JI
5/8/2007 1.8

Change air filters.	☐	1	x	Pocket	24X24X12
Change air filters.	☐	2	x	Pocket	12x24x12
Change air filters.	☐	1	x	Pleat	24x24x2
Change air filters.	☐	2	x	Pleat	12x24x2

Date	Equip PM History
11/3/07	Replaced 3 (B54) belts
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.

FCU-02-940 FAN COIL UNIT (Cooling Only) | SCE2PF | FL 1 RM 180A - 188 Tele/Data Equip. Rm.

11/3/2007 JI

1 Direct Drive

Change air filters.	☐	1	x	Pleat	17x34x1

CU-03-940 FAN COIL UNIT (Cooling Only) | SCE2PF | FL 1 RM 192-194 Between classrooms

1/3/2007 JI

1 Direct Drive
2 Actual measurements of filter bracket 16.25 x 21.75.

Change air filters.	☐	1	x	Pleat	16x22x1

FCU-01-940 FAN COIL UNIT (Cooling Only) SCE2PF FL 1 RM 199 Tele/Data Equip. Rm

11/3/2007 JI
4/30/2006 MB/JI
1 Direct Drive

Change air filters.	☐	1	x	Pleat	17x46x1

AHU-04-940 AIR HANDLING UNIT SCE2PF FL 1 RM R Roof

STAND
11/3/2007 JI
5/8/2007 1.1
1 On VFD

Change air filters.	☐	20	x	Pocket	24X24X12
Change air filters.	☐	4	x	Pocket	12X24X12
Change air filters.	☐	20	x	Pleat	24X24X2
Change air filters.	☐	4	x	Pleat	12X24X2

Date	Maintenance History
1/21/05	Reset AHU 4. WO00278711 LaRose

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/29/07	Changed belt for supply fan

AHU-03-940 AIR HANDLING UNIT SCE2PF FL 1 RM Roof Roof

STAND
11/3/2007 JI
5/8/2007 .9
1 On VFD

hange air filters.	☐	12	x	Pocket	24X24X12
hange air filters.	☐	3	x	Pocket	12x24X12
hange air filters.	☐	12	x	Pleat	24X24X2
hange air filters.	☐	3	x	Pleat	12x24x2

11/1/06	Blow out door open, reset safety switch 2 doors. WO00305556 Graff

Date	Equip PM History
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.
4/29/07	Changed belts

AHU-05-940 **AIR HANDLING UNIT** SCE2PF **FL 1 RM Roof** Roo

STAND
11/3/2007 JI
5/8/2007 .8

1 On VFD.

Change air filters.	☐	20	x	Pocket	24X24X12
Change air filters.	☐	4	x	Pocket	12x24x12
Change air filters.	☐	20	x	Pleat	24x24x2
Change air filters.	☐	4	x	Pleat	12x24x2

Date	Equip PM History
11/3/07	Replaced BX144 belt
5/8/07	Magnehelic readings taken.
5/1/07	Magnehelic readings taken and then pleats replaced.

\HU-06-940 **AIR HANDLING UNIT** SCE2PF **FL 1 RM Roof** Roof

1/3/2007 JI
5/8/2007 .70
5/1/2007 .75

1 On VFD.

hange air filters.	☐	20	x	Pocket	24X24X12
ange air filters.	☐	5	x	Pocket	12X24X12
ange air filters.	☐	20	x	Pleat	24X24X2
ange air filters.	☐	5	x	Pleat	12X24X2

e	Equip PM History
/07	Magnehelic readings taken.
/07	Magnehelic readings taken and then pleats replaced.
)/06	No pockets delivered (annual?)

[illegible] FAN COIL UNIT | SCE2PF | FL 2 RM 192-A-H Computer room un

11/3/2007 JI

Change air filters. ☐ 6 x Pleat 18X24X4
#131042P3

FCU-05-940 FAN COIL UNIT | SCE2PF | FL 2 RM 208 Computer room unit

11/3/2007 JI

Change air filters. ☐ 6 x Pleat 18X24X4
#131042P3

FCU-06-940 FAN COIL UNIT | SCE2PF | FL 5 RM 594 Computer room unit

11/3/2007 JI

Change air filters. ☐ 6 x Pleat 18X24X4
#131042P3

FCU-07-940 FAN COIL UNIT | SCE2PF | FL 5 RM 594 Computer room unit

11/3/2007 JI

Change air filters. ☐ 6 x Pleat 18X24X4
#131042P3

W.O. SCE2PH (1 HRS)

ENG. AUDITORIUM | Asset # 942

XT-942 Exterior | SCE2PH | FL RM

/4/2005 DC

ean area around HVAC equipment. ☐

ate	Equip PM History
7/05	Outside corner stone 2nd level deck area facying JBEB missing along hand rail across from 298. All else looks good.

INDOOR ENVIRONMENTAL QUALITY: CREDIT 6.1 CONTROLLABILITY OF SYSTEMS, LIGHTING

1. LEED-EB template
2. Letter confirming that the E2 building provides lighting controls for at least 50% of building occupants.
3. E2 floor plans showing location of lighting controls.

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has provided a high level of lighting control by individual occupants or specific groups in multi-occupant spaces (i.e. classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants over the performance period through the following actions:

☒ Provided lighting controls for at least 50% of building occupants.

☒ Enabled adjustments to suit individual task needs and preferences, or those of a group sharing a multi-occupant space or workgroup area.

Table 1: Calculations for Individual Occupant Workspace Controls

Floor	Private Offices		Individual Workstations in Multi-Occupant Spaces		Other Individual Workstations		Total Number of Workspaces	Number with Temperature & Ventilation Controls
	Total Number	Number with Controls	Total Number	Number with Controls	Total Number	Number with Controls		
2	41	41	85	85	0	0	126	126
3	36	36	96	96	0	0	132	132
4	53	53	92	92	0	0	145	145
5	44	44	96	96	0	0	140	140
Totals							543	543
Percent of Individual Occupant Workspaces with Lighting Controls								100

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(Continued on Page 2)

Table 2: Lighting Calculations for Group Multi-Occupant Spaces

Room Name or Description	Area [SF]	Lighting Controls		Qualifying Space	
		Number Required	Number Present	Yes/No	Area [SF]
Classrooms	5,800	6.96	7	Yes	5,800
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0
		0		No	0

Area of Qualifying Group Multi-Occupant Spaces [SF]	5,800
Total Area of Group Multi-Occupant Spaces [SF]	5,800
Percent Qualifying Group Multi-Occupant Spaces	100

I have provided the following to support the declaration:

☒ Documentation signed by the responsible party, demonstrating and declaring that the required lighting controls are provided.

☒ Drawings showing location of lighting controls.

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Credit 6.1 (1 point possible): Controllability of Systems ? Lighting Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-06-05	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA · SANTA CRUZ

PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

June 2nd, 2008

To: US Green Building Council- LEED-EB Program
Re: Documentation for IEQ Credit 6.1: Lighting Controllability

Below Is an email from Jeff Dunnavant, an MBCx consultant from Enovity, confirming that E2 satisfies IEQ Credit 6.1

Patrick,

Attached is the LEED Credit 6.1 form you sent the other day. The form was filled out by Rick Miller, the electrical engineer (and LEED certification instructor) who did the lighting audit, and Kyle Marsh, our LEED engineer. The number of individual workspaces in the lab rooms were □estimated□ from what Rick and I saw during our walkthrough in February.

The credit submittal asks for drawings to be attached, which you will need to provide (we only have photographs of the lighting drawings which are not very good). The scanned drawings you sent at the beginning of our project did not include the lighting plans.

Jeff Dunnavant
Project Manager, Enovity Inc
t 415-974-0390 x119

From: Kyle Marsh
Sent: Thursday, May 15, 2008 12:19 PM
To: Jeff Dunnavant; rickmiller@rnm-eng.com
Subject: LEED Credit Scorecard

We completed the lighting counts and the LEED Credit 6 form, which can be found here:
G:\PROJECTS\UC Santa Cruz\0408.001 Eng2 Lighting Audit

Methodology was as reviewed with Rick Miller: Estimate 4-5 workspaces per lab room, and count the individual offices. All spaces had control, so the building comes in at 100%.

Kyle

James Dunne
Project Manager- E2 LEED-EB Submittal
Associate Director-UCSC Physical Plant

ELECTRICAL LEGEND

POWER

- MAIN SWITCHBOARD, DISTRIBUTION BOARD OR MOTOR CONTROL CENTER
- PANELBOARD, 277/480V, SURFACE MOUNTED
- PANELBOARD, 277/480V, FLUSH MOUNTED
- PANELBOARD, 120/208V, SURFACE MOUNTED
- PANELBOARD, 120/208V, FLUSH MOUNTED
- ELECTRICAL MOTOR CONNECTION
- JUNCTION BOX, MOUNT ABOVE ACCESSIBLE CEILING UON (C=FLUSH MOUNTED IN CEILING)
- JUNCTION BOX, WALL MOUNTED, +38" UON (A= +60", B= +18", C= FLUSH WITH CEILING)
- JUNCTION BOX, FLOOR MOUNTED
- DUPLEX CONVENIENCE RECEPTACLE OUTLET, MOUNT AT +38" UON
- DUPLEX CONVENIENCE RECEPTACLE OUTLET, MOUNT AT +18" UON
- DOUBLE DUPLEX CONVENIENCE RECEPTACLE OUTLET, MOUNT AT +38" UON
- DOUBLE DUPLEX CONVENIENCE RECEPTACLE OUTLET, MOUNT AT +18" UON
- DUPLEX CONVENIENCE RECEPTACLE OUTLET FLUSH MOUNTED IN CEILING
- DUPLEX CONVENIENCE RECEPTACLE OUTLET, MOUNT ABOVE COUNTER, +44" UON
- SPECIAL PURPOSE DUPLEX, DOUBLE DUPLEX OR FLUSH FLOOR DUPLEX RECEPTACLE OUTLET; LETTER INDICATES TYPE OF LOAD AND/ OR SYSTEM:
  - I = ISOLATED GROUND
  - D = DEDICATED CIRCUIT
  - G = GROUND FAULT INTERRUPTER
  - C = COMPUTER EQUIPMENT (SEE DETAIL 4, SHEET E7.02)
- SINGLE CONVENIENCE RECEPTACLE OUTLET, MOUNT AT + 38" UON
- QUAD RECEPTACLE OUTLET IN FLUSH FLOOR BOX
- DUPLEX RECEPTACLE OUTLET IN FLUSH FLOOR BOX
- FLUSH FLOOR BOX WITH FURNITURE FEED COVER PLATE. CONNECT TO FURNITURE. COORDINATE CONNECTION TYPE WITH FURNITURE MANUFACTURER.
- COMBINATION POWER/DATA FLUSH FLOOR BOX WITH HINGED COVER
- COMBINATION POWER/DATA FLUSH FLOOR BOX WITH FURNITURE FEED COVER PLATE. CONNECT BOTH POWER AND DATA TO FURNITURE. COORDINATE CONNECTION TYPE WITH FURNITURE MANUFACTURER.
- SPECIALTY RECEPTACLE OUTLET, MOUNT AT +38" UON TYPE AS INDICATED; WHERE NO TYPE IS INDICATED, ASSUME NEMA TYPE 15-20R
- FLUSH POKE-THRU FITTING FOR POWER. FURNITURE FEED COVER ASSEMBLY. CONNECT TO FURNITURE WITH 3/4" LIQUID TIGHT FLEXIBLE CONDUIT. WIREMOLD RC7AFFTC OR EQUAL.
- PB — PULLBOX, SIZE AND TYPE AS SPECIFIED BY NUMBERED NOTE
- 2 AF — SAFETY DISCONNECT SWITCH, 3 POLE UON
  - A: 30A NON-FUSED AF: 30A FUSED
  - B: 60A NON-FUSED BF: 60A FUSED
  - C: 100A NON-FUSED CF: 100A FUSED
  - D: 200A NON-FUSED DF: 200A FUSED
  - NUMBER 2 INDICATES 6 POLE SWITCH
- 2 — ENCLOSED MAGNETIC STARTER, FVNR UON, NUMBER INDICATES NEMA SIZE
- 2 — COMBINATION MAGNETIC STARTER FVNR UON, NUMBER INDICATES NEMA SIZE
- PACKAGE CONTROLLER OR STARTER FURNISHED AND INSTALLED UNDER ANOTHER DIVISION, BUT CONNECTED UNDER THIS DIVISION. SEE DIVISION 15 FOR VFD SPECS.
- CONNECTION TO EQUIPMENT PROVIDED UNDER OTHER DIVISIONS OR BY OWNER
- S — SINGLE POLE TOGGLE SWITCH, MOUNTED AT +38" UON
- S_2 — DOUBLE POLE TOGGLE SWITCH, MOUNT AT +38" UON
- S_3 — THREE-WAY TOGGLE SWITCH, MOUNT AT +38" UON
- S_4 — FOUR-WAY TOGGLE SWITCH, MOUNT AT +38"UON
- S_D — DIMMER SWITCH, MOUNT AT +38" UON
- S_M — WALL SWITCH TYPE OCCUPANCY SENSOR, MOUNT AT +38" UON.
- S_K — KEY OPERATED SWITCH, MOUNT AT +38" UON
- S_P — TOGGLE SWITCH WITH PILOT LIGHT, MOUNT AT +38" UON
- S_T — MOTOR RATED SWITCH WITH THERMAL OVERLOAD PROTECTION AND CONTROL RELAY. MOUNT NEAR EQUIPMENT AS DISCONNECT. SEE DETAIL 1, SHEET E7.01.
- $\pm_A$ — SINGLE POLE THREE POSITION, MOMENTARY CONTACT LIGHTING CONTROL STATION, MOUNT AT +38" UON. (A = ZONE A, B = ZONE B, ETC.)
- DRIVEN GROUND ROD IN WELL WITH ACCESS COVER
- M_S — CEILING MOUNTED MOTION SENSOR (ALSO PROVIDE ASSOCIATED RELAYS AS REQUIRED). S=ULTRASONIC TYPE SENSOR. SEE DETAIL 8/E7.05.
- M_S — CEILING MOUNTED DIRECTIONAL MOTION SENSOR (ALSO PROVIDE ASSOCIATED RELAYS AS REQUIRED). S=ULTRASONIC TYPE SENSOR. SEE DETAIL 8/E7.05.
- P — PHOTOCELL - CEILING MOUNTED, CONNECTED TO LIGHTING CONTROL PANEL
- 120V, 20A RECEPTACLES OUTLET MOUNTED UNDER RAISED FLOOR. SEE DETAIL 1 SHEET E7.02.
- 208V, 30A RECEPTACLES OUTLET MOUNTED UNDER RAISED FLOOR. SEE DETAIL 1 SHEET E7.02.
- PUSH BUTTON AUTOMATIC DOOR ACTUATOR, MOUNT +38" UON.
- F — JUNCTION BOX FOR FUTURE CEILING FAN, FLUSH MOUNTED IN CEILING. 4" SQ., 2" DEEP OUTLET BOX WITH BLANK COVERPLATE TO MATCH CEILING FINISH. PROVIDE EXTRA GANG SPACE IN WALL SWITCH BACK BOX FOR FUTURE FAN CONTROL SWITCH AND CONNECT TO CEILING FAN BACK BOX WITH 3/4"C. CENTER CEILING JUNCTION BOX IN ROOM AND COORDINATE WITH CEILING FINISH PATTERN.

RACEWAYS

- CONDUIT AND WIRE HOMERUN. HASH MARKS INDICATE NO. OF WIRES; NO HASH MARKS INDICATE 2#12+#12G UON. PROVIDE A SEPARATE NEUTRAL FOR EACH RECEPTACLE BRANCH CIRCUIT. EACH HOMERUN SHALL INCLUDE A GREEN WIRE GROUND CONDUCTOR. SEE GN#5.
- CONDUIT AND WIRE RUN CONCEALED IN WALL OR CEILING SPACE. MINIMUM 3/4"C.
- CONDUIT AND WIRE RUN EXPOSED ON WALL OR CEILING
- CONDUIT AND WIRE RUN CONCEALED, UNDER SLAB OR UNDERGROUND
- T — TELEPHONE SYSTEM CONDUIT, MINIMUM 1", WITH PULLWIRE, UON. SEE TELECOM DWG FOR CABLING.
- CONDUIT TURNED UP
- CONDUIT TURNED DOWN
- M — POWER/TELECOM MULTI-OUTLET SURFACE RACEWAY. WHERE MORE THAN ONE CIRCUIT IS PROVIDED FOR A LENGTH OF RACEWAY, ALTERNATE THE CIRCUIT CONNECTIONS TO THE RECEPTACLES (I.E. FIRST RECEPTACLE GETS CIRCUIT "A", SECOND RECEPTACLE GETS CIRCUIT "B", THIRD RECEPTACLE GETS CIRCUIT "A", ETC.)
- CABLE TRAY, WIRE BASKET TYPE
- CABLE TRAY, SOLID BOTTOM TYPE
- CONDUIT SLEEVES WITH PLASTIC BUSHINGS, BOTH ENDS. (2)1-1/2"C UON. PROVIDE FIRE RATED ASSEMBLY FOR FIRE RATED WALLS.

LIGHTING (SEE GN#15)

- FLUORESCENT LIGHTING FIXTURE, RECESSED
- FLUORESCENT LIGHTING FIXTURE, SURFACE MOUNTED
- FLUORESCENT FIXTURE CONNECTED TO EMERGENCY SOURCE
- EM — INCANDESCENT, FLUORESCENT OR H.I.D. LIGHTING FIXTURE, CEILING MOUNTED
- INCANDESCENT, FLUORESCENT OR H.I.D. LIGHTING FIXTURE, WALL MOUNTED
- EM EM — INCANDESCENT, FLUORESCENT OR H.I.D. LIGHTING FIXTURE CONNECTED TO EMERGENCY SOURCE
- EMG EMG — INCANDESCENT, FLUORESCENT OR H.I.D. LIGHTING FIXTURE WITH EMERGENCY GENERATOR TRANSFER DEVICE (EMG). NORMAL AND EMERGENCY FEEDS CONNECT TO "EMG", THRU FEED NOT ALLOWED. SEE DETAIL 1, SHEET E7.05.
- EXIT LIGHT FIXTURE, CEILING OR WALL MOUNTED, DIRECTIONAL ARROW(S) AS INDICATED

(SEE LIGHTING FIXTURE SCHEDULE FOR LIGHTING SYMBOL)

CONVENTIONS

- 1 — NUMBERED SHEET NOTE: REFERS TO NOTES ON SAME SHEET AS REFERENCE
- 1 — NUMBERED SHEET NOTE: APPLIES TO DRAWING DETAIL CONTAINING THE NOTE ONLY.
- EF-2 — EQUIPMENT IDENTIFICATION TAG
- P90A — CABLE AND/OR RACEWAY TAG; P = POWER, T = TELEPHONE; SEE FEEDER SCHEDULE THIS SHEET
- DETAIL REFERENCE: A = DETAIL DESIGNATION; E-3 = SHEET NUMBER REFERENCE
- LIGHTING FIXTURE IDENTIFICATION TAG: F = FIXTURE TYPE; 100 = QUANTITY AND WATTAGE OF LAMP(S)

SINGLE LINE

- CIRCUIT BREAKER; NA = NON-AUTOMATIC, ST = WITH SHUNT TRIP
- DRAW-OUT CIRCUIT BREAKER
- TRANSFORMER, KVA RATING AS SHOWN ON DRAWING
- GROUND CONNECTION
- FUSED SWITCH
- DM — DIGITAL METERING, MODEL 7330 WITH ETHERNET MANUFACTURED BY POWER MEASUREMENT LIMITED
- GFI — GROUND FAULT SENSING RELAY
- MEDIUM VOLTAGE CIRCUIT INTERRUPTER

SIGNAL

- D — SMOKE DETECTOR, SEMI-FLUSH MOUNTED IN CEILING
- D — SMOKE DETECTOR, SURFACE MOUNTED ON WALL
- D — SMOKE DETECTOR, SURFACE MOUNTED ON CEILING
- D — SMOKE DETECTOR, DUCT MOUNTED
- H — HEAT DETECTOR, SEMI-FLUSH MOUNTED IN CEILING
- H — HEAT DETECTOR, SURFACE MOUNTED ON CEILING
- F — FIRE ALARM MANUAL PULL STATION, WALL MOUNTED AT +48" UON
- F — FIRE ALARM HORN, WALL MOUNTED AT 80" OR 6" BELOW CEILING, WHICHEVER IS LOWER.
- F — FIRE ALARM HORN/STROBE STATION, WALL MOUNTED AT 80" OR 6" BELOW CEILING, WHICHEVER IS LOWER
- F — FIRE ALARM VISUAL STROBE ANNUNCIATOR, WALL MOUNTED AT 80" OR 6" BELOW CEILING, WHICHEVER IS LOWER
- FS — FIRE SPRINKLER SYSTEM FLOW SWITCH CONNECTION
- TS — FIRE SPRINKLER SYSTEM TAMPER SWITCH CONNECTION(S)
- FACP — FIRE ALARM CONTROL PANEL
- R — MAGNETIC DOOR HOLD-OPEN/RELEASE DEVICE - INSTALL & CONNECT DEVICE SPECIFIED UNDER OTHER DIVISION
- SMOKE DAMPER CONNECTION WITH MOTOR DISCONNECT. ASSOCIATED CORRIDOR SMOKE DETECTOR SHALL ACTIVATE DAMPER.
- PIV — POST MOUNTED INDICATOR VALVE
- AI — FIRE ALARM ADDRESSABLE INTERFACE UNIT
- OM — FIRE ALARM OUTPUT MODULE
- S — SPEAKER, FLUSH MOUNTED IN CEILING
- S — SPEAKER, SURFACE MOUNTED ON WALL
- C — CAMERA, SEMI-FLUSH MOUNTED IN CEILING
- C — CAMERA, SURFACE MOUNTED ON WALL
- M — MICROPHONE, FLUSH MOUNTED IN CEILING
- CATV — CATV CONNECTION OUTLET
- PHONE/DATA OUTLET BACKBOX, MOUNT +38" UON. INCLUDES 4" SQ., 2" DEEP OUTLET BOX WITH SINGLE GANG RING AND 1" CONDUIT UP IN WALL AND STUBBED OUT ABOVE ACCESSIBLE CEILING. (WHERE TWO OUTLETS ARE CONNECTED TO THE SAME CONDUIT, IT SHALL BE 1-1/4") SEE TELECOM DWGS FOR JACKS AND CABLING.
- SAME AS ABOVE EXCEPT INSTALLED ABOVE COUNTER. MOUNT +44" UON.
- SAME AS ABOVE EXCEPT MOUNT +18" UON.
- PHONE/DATA OUTLET BACKBOX, MOUNT +38" UON. INCLUDES 4" SQ., 2" DEEP OUTLET BOX WITH SINGLE GANG RING AND 1" CONDUIT STUBBED TO THE NEAREST CABLE TRAY (WHERE TWO OUTLETS ARE CONNECTED TO THE SAME CONDUIT, IT SHALL BE 1-1/4"). SEE TELECOM DRAWINGS FOR JACKS AND CABLING.
- SAME AS ABOVE EXCEPT INSTALLED ABOVE COUNTER. MOUNT +44" UON.
- SAME AS ABOVE EXCEPT MOUNT +18" UON.
- W — TELEPHONE ONLY OUTLET, MOUNT +42" AFF UON. INCLUDES 4"x 4"x 2" OUTLET BOX WITH SINGLE GANG RING. SEE TELECOM DRAWINGS FOR JACKS AND CABLING.

  W = WALL MOUNTED
  P = PUBLIC PHONE
  C = CAMPUS PHONE

- FLUSH POKE THRU FITTING FOR TELECOM WITH 2" CONDUIT STEM LARGE CAPACITY FURNITURE FEED ASSEMBLY. CONNECT TO FURNITURE WITH 1 1/4" LIQUID TIGHT FLEXIBLE CONDUIT. WIREMOLD RC9AM2TC OR EQUAL.
- WIRELESS ACCESS POINT, RECESS MOUNTED IN THE CEILING. INCLUDES RECESSED 4" SQ., 2" DEEP OUTLET BOX AND 3/4" CONDUIT STUBBED OUT TO THE NEAREST CABLE TRAY.
- PHONE/DATA OUTLET, FLUSH FLOOR MOUNTED WITH TWO GANG OUTLET BOX AND 1-1/4" CONDUIT UP IN WALL AND STUBBED OUT ABOVE ACCESSIBLE CEILING.
- PHONE/DATA FLUSH FLOOR BOX WITH FURNITURE FEED COVER PLATE. CONNECT TO FURNITURE. COORDINATE CONNECTION TYPE WITH FURNITURE MANUFACTURER.
- SECURITY DOOR CARD READER LOCATION REFER TO DETAIL 2, SHEET E7.05 AND "SEC" SERIES DRAWINGS FOR ADDITIONAL REQUIREMENTS. WHERE CONNECTIONS FOR A GIVEN LOCATION ARE NOT SHOWN ON "SEC" SERIES DRAWINGS, TREAT AS FUTURE. LOCATION AND PROVIDE BLANK COVER PLATES FOR ALL BOXES.
- SECURITY DOOR COMBINATION DEVICE LOCATION. REFER TO DETAIL 3, SHEET E7.05 AND "SEC" SERIES DRAWINGS FOR ADDITIONAL REQUIREMENTS, INCLUDING SECURITY DEVICE TYPES.
- SECURITY DOOR POSITION SWITCH LOCATION. REFER TO DETAIL 1, SHEET E7.03 AND "SEC" SERIES DRAWINGS FOR ADDITIONAL REQUIREMENTS, INCLUDING SECURITY DEVICE TYPES.

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MCC	MOTOR CONTROL CENTER
C	CONDUIT	N, NEUT	NEUTRAL
CKT	CIRCUIT	(N)	NEW
CB	CIRCUIT BREAKER	NEC	NATIONAL ELECTRICAL CODE
CT	CURRENT TRANSFORMER	NTS	NOT TO SCALE
(E)	EXISTING	OL	OVERLOAD RELAY
EMCS	ENERGY MANAGEMENT CONTROL SYSTEM	PNL	PANELBOARD
EM	EMERGENCY	PB	PUSHBUTTON SWITCH
EP	EXPLOSION PROOF	PC	PHOTOCELL
EPO	EMERGENCY POWER OFF	PT	POTENTIAL TRANSFORMER
FLUOR	FLUORESCENT	(R)	RELOCATED
FVNR	FULL VOLTAGE NON-REVERSING	RS	RIGID STEEL
F	FUSED	TYP	TYPICAL
FA	FIRE ALARM	UON	UNLESS OTHERWISE NOTED
G, GND	GROUND	VSD	VARIABLE SPEED DRIVE
GN	GENERAL NOTE	WP	WEATHERPROOF
GFI	GROUND FAULT INTERRUPTER	XFMR	TRANSFORMER
HID	HIGH INTENSITY DISCHARGE		
IC	INTERRUPTING CAPACITY		
JB	JUNCTION BOX		

FEEDER SCHEDULE

SYMBOL	CONDUIT & WIRE
P65A	3#6 - 1"C
P65B	3#6 + #8G - 1-1/4"C
P65C	4#6 - 1-1/4"C
P65D	4#6 + #8G - 1-1/4"C
P65E	3#6 + #1N + #8G - 1-1/4"C
P65F	3#6 + #1N + #8G + #8IG - 1-1/4"C
P85A	3#4 - 1-1/4"C
P85B	3#4 + #8G - 1-1/4"C
P85C	4#4 - 1-1/4"C
P85D	4#4 + #8G - 1-1/4"C
P85E	3#4 + 1/0N + #8G - 1-1/2"C
P85F	3#4 + 1/0N + #8G +#8IG - 1-1/2"C
P100A	3#3 - 1-1/4"C
P100B	3#3 + #6G - 1-1/4"C
P100C	4#3 - 1-1/2"C
P100D	4#3 + #6G - 1-1/2"C
P100E	3#3 + #3/0N + #6G - 1-1/2"C
P100F	3#3 + #3/0N + #6G +#6IG - 1-1/2"C
P115A	3#2 - 1-1/4"C
P115B	3#2 + #6G - 1-1/4"C
P115C	4#2 - 1-1/2"C
P115D	4#2 + #6G - 1-1/2"C
P115E	3#2 + #3/0N + #6G - 1-1/2"C
P115F	3#2 + #3/0N + #6G +#6IG - 1-1/2"C
P130A	3#1 - 1-1/2"C
P130B	3#1 + #6G - 1-1/2"C
P130C	4#1 - 1-1/2"C
P130D	4#1 + #6G - 2"C
P130E	3#1 + 250MCM N + #6G - 2"C
P130F	3#1 + 250MCM N + #6G +#6IG - 2"C
P150A	3#1/0 - 1-1/2"C
P150B	3#1/0 + #4G - 1-1/2"C
P150C	4#1/0 - 2"C
P150D	4#1/0 + #4G - 2"C
P150E	3#1/0 + 300MCM N + #4G - 2-1/2"C
P150F	3#1/0 + 300MCM N + #4G +#4IG - 2-1/2"C
P175A	3#2/0 - 2"C
P175B	3#2/0 + #4G - 2"C
P175C	4#2/0 - 2"C
P175D	4#2/0 + #4G -2"C
P175E	3#2/0 + 500MCM N + #4G - 2-1/2"C
P175F	3#2/0 + 500MCM N + #4G +#4IG - 2-1/2"C
P200A	3#3/0 - 2"C
P200B	3#3/0 + #4G - 2"C
P200C	4#3/0 - 2"C
P200D	4#3/0 + #4G - 2-1/2"C
P200E	3#3/0 + 500MCM N + #4G - 3"C
P200F	3#3/0 + 500MCM N + #4G +#4IG - 3"C
P230A	3#4/0 - 2-1/2"C
P230B	3#4/0 + #2G - 2-1/2"C
P230C	4#4/0 - 2-1/2"C
P230D	4#4/0 + #2G - 2-1/2"C
P230E	3#4/0 + 600MCM N + #2G - 3"C
P230F	3#4/0 + 600MCM N + #2G +#2IG - 3"C
P255A	(3)250MCM - 2-1/2"C
P255B	(3)250MCM + #2G - 2-1/2"C
P255C	(4)250MCM - 3"C
P255D	(4)250MCM + #2G - 3"C
P255E	(3)250MCM + (2)250MCM N + #2G - 3-1/2"C
P255F	(3)250MCM + (2)250MCM N + #2G +#2IG - 3-1/2"C
P310A	(3)350MCM - 3"C
P310B	(3)350MCM + #2G - 3"C
P310C	(4)350MCM - 3"C
P310D	(4)350MCM + #2G - 3-1/2"C
P310E	(3)350MCM + (2)350MCM N + #2G - 4"C
P310F	(3)350MCM + (2)350MCM N + #2G +#2IG - 4"C
P380A	(3)500MCM - 3-1/2"C
P380B	(3)500MCM + #1G - 3-1/2"C
P380C	(4)500MCM - 3-1/2"C
P380D	(4)500MCM + #1G - 4"C
P380E	(3)500MCM + (2)500MCM N + #1G - 4"C
P380F	(3)500MCM + (2)500MCM N + #1G +#1IG - 4"C
P420A	(3)600MCM - 3-1/2"C
P420B	(3)600MCM + #1G - 3-1/2"C
P420C	(4)600MCM - 3-1/2"C
P420D	(4)600MCM + #1G - 4"C
P420E	(3)600MCM + (2)600MCM N + #1G - 4"C

FEEDER SCHEDULE NOTES:

FOR MULTIPLE FEEDERS, SIZE OF EACH GROUND WIRE SHALL BE UPSIZED FOR CIRCUIT BREAKER SIZE PER SECTION 250-95:

C.B. SIZE	GROUND WIRE
400A	#2
600A	#1
800A	#1/0
1000A	#2/0
2000A	250MCM

GENERAL NOTES

1. PROVIDE A COMPLETE WORKING ELECTRICAL INSTALLATION WITH ALL EQUIPMENT CALLED FOR IN PROPER OPERATING CONDITION. DOCUMENTS DO NOT UNDERTAKE TO SHOW OR LIST EVERY ITEM TO BE PROVIDED. WHEN AN ITEM NOT SHOWN OR LISTED IS CLEARLY NECESSARY FOR PROPER OPERATION OF EQUIPMENT WHICH IS SHOWN OR LISTED, PROVIDE THE ITEM WHICH WILL ALLOW THE SYSTEM TO FUNCTION PROPERLY AT NO INCREASE IN CONTRACT PRICE.
2. WHERE TWO 3-LAMP FIXTURES ARE LOCATED CLOSE TOGETHER AND ARE SWITCHED TOGETHER, THEY SHALL BE TANDEM-WIRED TYPE WITH A TOTAL OF THREE BALLASTS CONTROLLING THE SIX LAMPS.
3. WHERE TWO SWITCHES ARE SHOWN CONTROLLING A GROUP OF LIGHTING FIXTURES, THEY SHALL BE DOUBLE-LEVEL SWITCHED, WITH ONE SWITCH CONTROLLING THE INNER LAMP(S) OF EACH FIXTURE AND THE OTHER SWITCH CONTROLLING THE OUTER LAMPS.
4. ALL SLAB CONDUIT PENETRATIONS SHALL COMPLY WITH CBC SECTION 710.
5. HASH MARKS ARE SHOWN ONLY FOR HOMERUNS. CONTRACTOR IS RESPONSIBLE FOR INSTALLING THE CORRECT NUMBER OF CONDUCTORS CONSISTENT WITH DESIGN INTENT AS INDICATED ON THESE DRAWINGS AND WITH CODE COMPLIANCE.
6. PROVIDE SEPARATE NEUTRAL FOR ALL RECEPTACLE BRANCH CIRCUITS. SEE DETAIL4, SHEET E7.02.
7. CONNECT POWER TO ALL ELECTRIFIED MODULAR FURNITURE.
8. VOICE/DATA OUTLETS SYMBOLS SHOW LOCATION ONLY AND DO NOT INDICATE NUMBER AND TYPE OF VOICE/DATA CABLES TO BE INSTALLED. REFER TO TELECOM DWGS FOR VOICE/DATA JACKS AND CABLING.
9. FOR ALL TELE/DATA CONDUIT STUBBED OUT TO CABLE TRAY OR SIMILAR PATHWAY, PROVIDE AND INSTALL BUSHING ON FREE ENDS OF CONDUITS.
10. WHERE MORE THAN ONE HOMERUN IS SHOWN CONNECTED TO THE SAME CIRCUIT, INSTALL A JUNCTION BOX NEAR THE PANELBOARD AND SPLICE CONDUCTORS IN BOX. DO NOT RUN MULTIPLE CONDUCTORS TO THE SAME CIRCUIT BREAKER.
11. ALL EQUIPMENT, DEVICES AND LIGHT FIXTURES LOCATED OUTDOORS SHALL BE UL LISTED FOR WET LOCATION OR BE ENCLOSED IN A NEMA 3R ENCLOSURE.
12. WHERE WIRE SIZES ARE INDICATED ON THE PLANS FOR INDIVIDUAL CIRCUITS, THE WIRE SIZE INDICATED SHALL BE CARRIED THROUGH TO CIRCUIT TERMINATION POINT UON.
13. PROVIDE ACOUSTICAL TREATMENT FOR ALL CONDUIT AND OUTLET BOX PENETRATIONS IN ACOUSTICAL PARTITIONS.
14. PROVIDE COMPLETE CONDUIT AND WIRING FOR TELECOM SYSTEM. REFER TO "T" SERIES DRAWINGS.
15. SEE LIGHTING FIXTURE SCHEDULE FOR MARKINGS IN FIXTURE SYMBOLS WHICH INDICATE TYPE.
16. SEE CIVIL DRAWINGS FOR EXACT ROUTING OF UNDERGROUND CONDUITS ON SITE.
17. WHERE OCCUPANCY SENSORS ARE INDICATED, THEY SHALL BE CONNECTED TO CONTROL ALL LIGHT FIXTURES IN THAT ROOM. WHERE ROOMS HAVE MULTIPLE SENSORS, CONNECT SENSOR TOGETHER AND CONTROL POWER TO LIGHTS AT A SINGLE POINT. PROVIDE "POWER PACKS" AS REQUIRED TO ACHIEVE FUNCTIONS SHOWN.
18. CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL MECHANICAL, PLUMBING AND ALL OTHER EQUIPMENT REQUIRING ELECTRICAL CONNECTION PRIOR TO ANY WORK.
19. CONTRACTOR SHALL EXTEND WIRING FROM ALL JUNCTION BOXES, SWITCHES, ETC. AND MAKE FINAL CONNECTION AS REQUIRED TO ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS.
20. ALL MOUNTING HEIGHTS SHOWN ARE TO CENTER LINE OF OUTLET OR DEVICE AND SHALL APPLY UNLESS INDICATED OTHERWISE.
21. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES RELATING TO WORK TO VERIFY SPACE IN WHICH WORK WILL BE INSTALLED. MAINTAIN HEADROOM AND MINIMUM CODE REQUIRED WORKING CLEARANCES AT ALL TIMES.
22. LOCATION OF LOCAL WALL SWITCHES ARE SUBJECT TO MODIFICATIONS. AT OR NEAR DOORS, INSTALL SWITCHES ON SIDE OPPOSITE TO DOOR HINGES. VERIFY FINAL HINGE LOCATION IN FIELD PRIOR TO ANY WORK.
23. CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL WALL OUTLET BOXES FOR SWITCHES, RECEPTACLES ETC. WITH TACK BOARDS, CABINETS, CHALKBOARDS, FURNITURES, EQUIPMENTS ETC. TO AVOID CONFLICT.
24. WHERE ELECTRIC MOTORS OR HEATERS ARE INSTALLED IN HUNG CEILING, PROVIDE DISCONNECT SWITCH IN HUNG CEILING WITHIN REACH FROM ACCESS POINT.
25. PROVIDE PULL WIRE IN EACH RACEWAY RUN OVER 10 FEET IN LENGTH, IN WHICH PERMANENT WIRING IS NOT INSTALLED.
26. SEE MECHANICAL AND PLUMBING DRAWINGS FOR ADDITIONAL CONNECTION REQUIREMENTS TO CONTROL PANELS AND TRANSFORMERS, 120V FOR CONTROL SYSTEM, EP AND PE SWITCHES, TIME CLOCK, VALVES, STATS, RELAYS, DUCT SMOKE DETECTOR LOCATION, ETC. INDICATED ON CONTROL WIRING DIAGRAMS. VERIFY FINAL CONTROL WIRING REQUIREMENTS WITH DIVISION 15 PRIOR TO ANY WORK AND PROVIDE ALL NECESSARY WIRING, DEVICES AND CONNECTIONS AS REQUIRED.
27. LIGHTING, POWER, TELEPHONE AND COMMUNICATIONS OUTLETS SHALL NOT BE PLACED BACK TO BACK. OUTLETS SHALL BE SEPARATED MIN. OF 24" IN FIRE AND ACOUSTICALLY RATED WALLS AND MIN. 18" IN NON-RATED WALLS.
28. PROVIDE PULLBOXES WHEREVER NECESSARY TO FACILITATE PULLING OF CONDUCTORS. COORDINATE LOCATIONS OF BOXES WITH OTHER TRADES TO AVOID CONFLICT. PULLBOXES SHALL BE ACCESSIBLE. THE SIZE OF EACH PULLBOX SHALL COMPLY WITH CEC REQUIREMENTS.
29. FOR DEDICATED CIRCUIT RECEPTACLES, PROVIDE NEMA TYPE 5-20R U.O.N.
30. WHERE MORE THAN ONE LIGHT SWITCH OCCURS AT SAME LOCATION, SWITCHES SHALL BE MOUNTED IN A MULTIPLE GANG BOX UNDER A SINGLE COVER PLATE. PLATES WITH MORE THAN (3) LIGHT SWITCHES SHALL BE LABELED TO INDICATE THE LIGHT FIXTURES CONTROLLED. SWITCH(ES) CONTROLLING LIGHTS ON EMERGENCY CIRCUIT SHALL BE IN A SEPARATE BOX OR GANGED BOXES UNDER THE SAME COVER PLATE AS THE OTHER SWITCHES.
31. ALL ELECTRIC MATERIAL SHALL BE LISTED BY "UL" FOR THE TYPE OF APPLICATION AND "UL" LABEL SHALL APPEAR ON ALL ELECTRICAL EQUIPMENT.
32. REFER TO ARCHITECTURAL DRAWINGS FOR ALL CEILING TYPE AND HEIGHTS, EXACT LOCATIONS OF DEVICES.
33. CONDUIT SHALL NOT BE INSTALLED RUNNING HORIZONTALLY IN CONCRETE UNLESS SPECIFICALLY SHOWN ON STRUCTURAL DRAWINGS.
34. PROJECT INCLUDES PAINTING EXPOSED BUILDING SERVICES. REFERENCE SPECIFICATION SECTION 09900 - PAINTINGS AND COATINGS FOR PREPARATION OF SURFACES TO RECEIVE PAINT.
35. EMERGENCY POWER RECEPTACLES SHALL BE YELLOW IN COLOR.

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DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

2	09.19.03	SECURITY COMMENTS
1	08.06.03	RFI #488

REVISIONS

2	01.31.03	ADDENDUM #2
1	02.12.03	ADDENDUM #5

UNIVERSITY OF CALIFORNIA, SANTA CRUZ
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
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BID PACKAGE No. 4A

KEY PLAN

ELECTRICAL LEGEND AND GENERAL NOTES

UCSC FILE #: 7401

SCALE: NONE
DATE:
FILE: 407E001.DWG
SCRIPT:

AS-BUILT

E0.01

PROJECT NO: REI-300012

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PLOT TIME: 01/09/2003 03:45 PM
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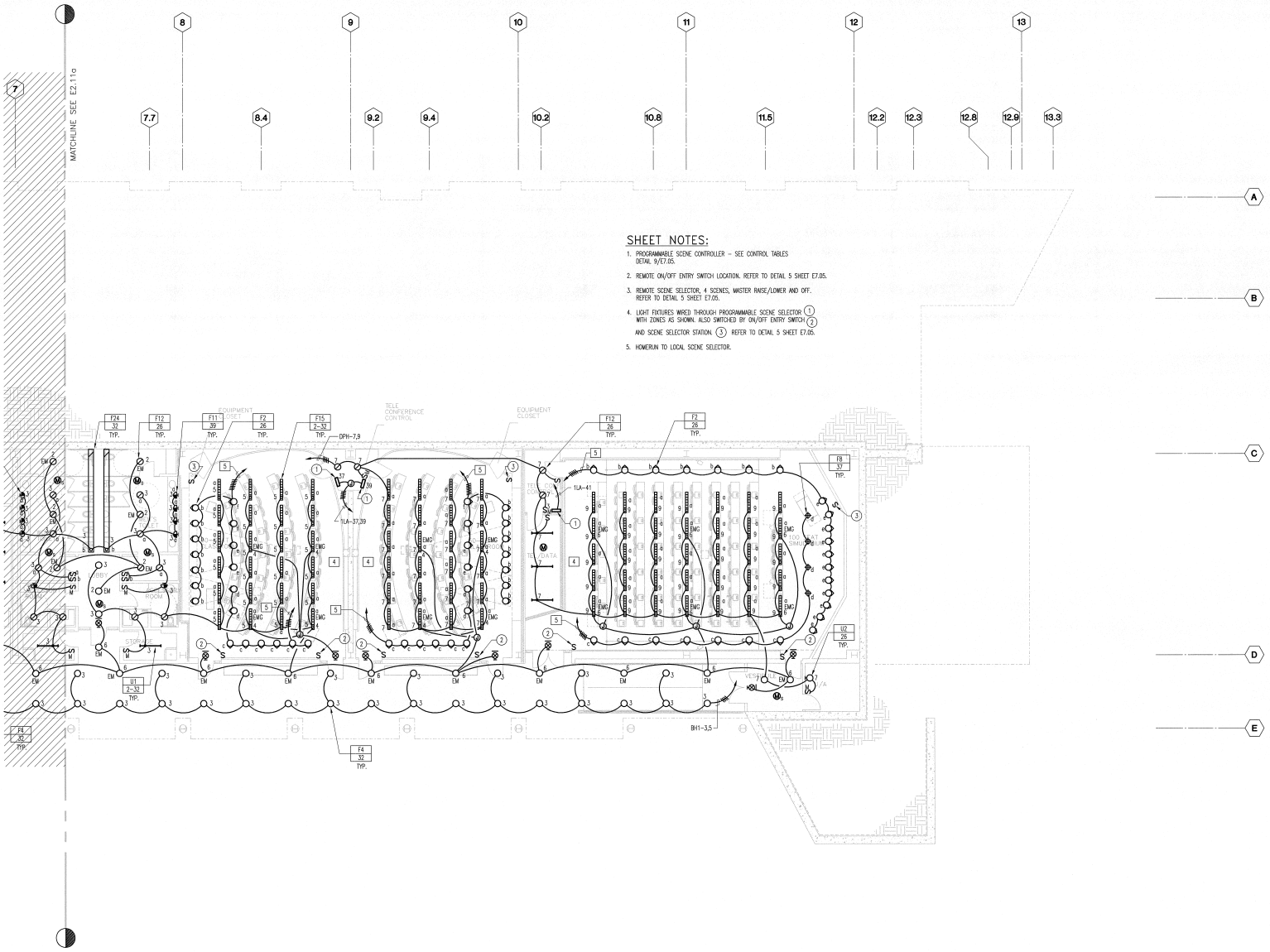
MOD. BY: ben fils-aimes
MOD. TIME: 04/09/2003 01:13 PM



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DWG NAME: C:\temp\temp swap\24407-elec-plans\407e201a-b.dwg

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CAD PT. BRD.	ENG. MR	APP. TM
09 JAN 2003		

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DESIGN/BUILD CONTRACTORS
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65 OAK GROVE STREET, SAN FRANCISCO, CA 94102 (415) 575-1600
2450 W. BROADWOOD, SUITE 101, MESA, AZ 85202 (480) 621-4222
102 3RD BRIDGE ROAD, SUITE 2B-3, RED BANKS, NJ 07724 (520) 752-2002
1300 NE 48TH AVE., SUITE 1300, HILLSBORO, OR 97124 (503) 615-6100

DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

REVISIONS

2	01.31.03	ADDENDUM #2
5	02.12.03	ADDENDUM #5

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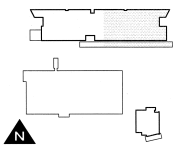
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN



FIRST FLOOR - EAST LIGHTING PLAN

UCSC FILE # 7401

SCALE: 1/8"=1'-0"
DATE:
FILE: 407E201A-B.DWG
SCRIPT:

AS-BUILT E2.01b

PROJECT NO: REI-300012

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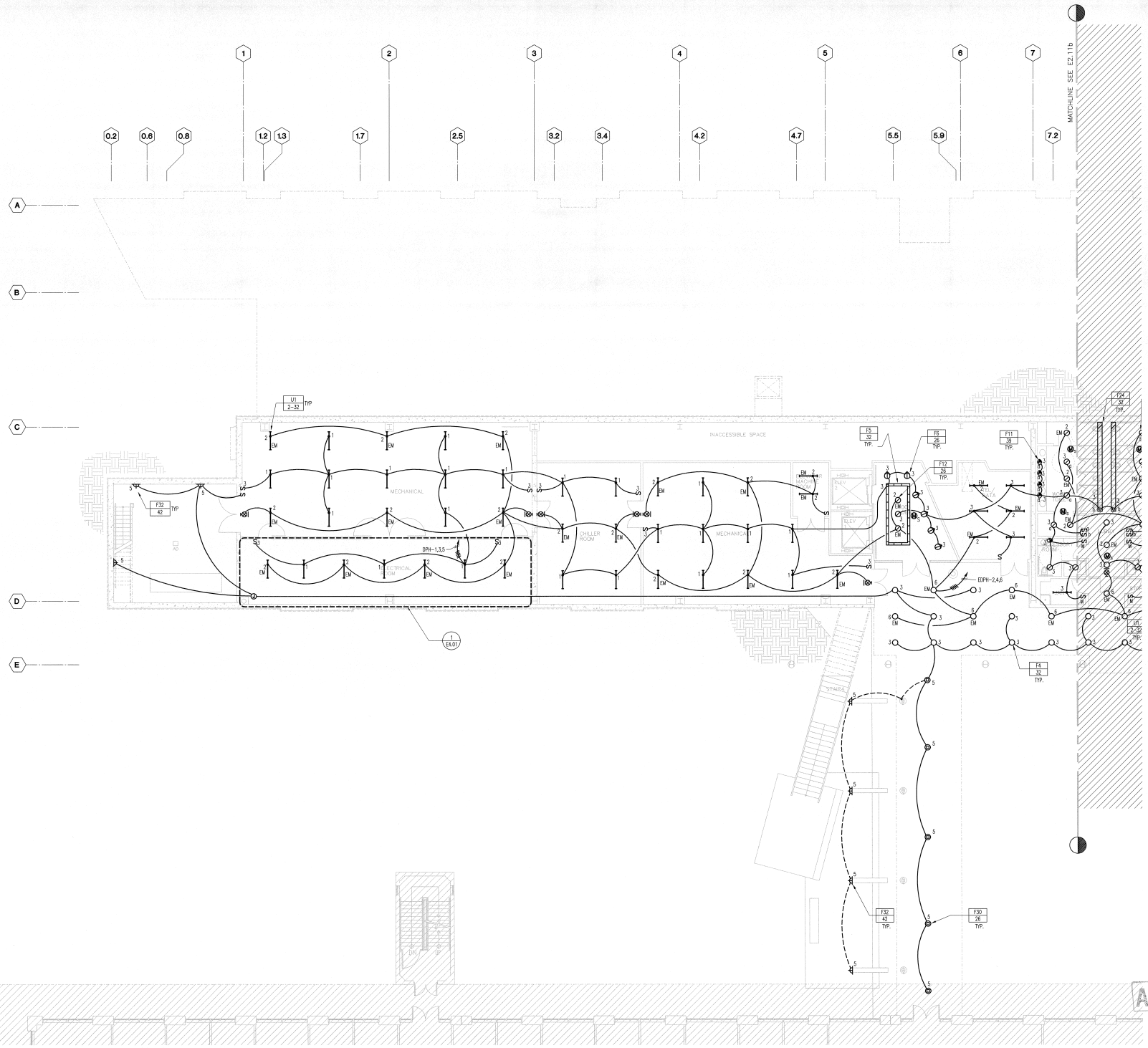

406

PLOT BY: mark lamb
PLOT DATE: 01/09/2003 09:49 AM
DWG SCALE: 1=1
DWG NAME: C:\temp\temp dwgs\32407-elec-plans\407e201a-b.dwg

MOD BY: anthony thrasher
MOD. DATE: 01/31/2003 4:54:04 PM

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CAD PE, BRD	ENG MR	APP TW
09 JAN 2003		

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85 ONE GRAND STREET, SAN FRANCISCO, CA 94103 (415) 275-1800
2452 W. BROMWOOD, SUITE 101, MESA, AZ 85202 (480) 921-4022
103 RIO RANCHO BLVD., SUITE 2B-3, RIO RANCHO, NM 87124 (505) 792-3300
1300 NE 68TH AVE., SUITE 1200, HILLSBORO, OR 97124 (503) 615-8100

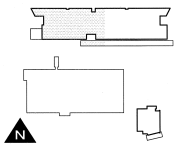
DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

REVISIONS		
2	01.31.03	ADDENDUM #2
5	02.12.03	ADDENDUM #5
1 4	06.11.03	RFI #519

UNIVERSITY OF CALIFORNIA, SANTA CRUZ
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN



FIRST FLOOR - WEST LIGHTING PLAN

UCSC FILE # 7401

SCALE: 1/8"=1'-0"
DATE:
FILE: 407E201A-B.DWG
SCRIPT:

AS-BUILT

E2.01a

PROJECT NO: REI-300012

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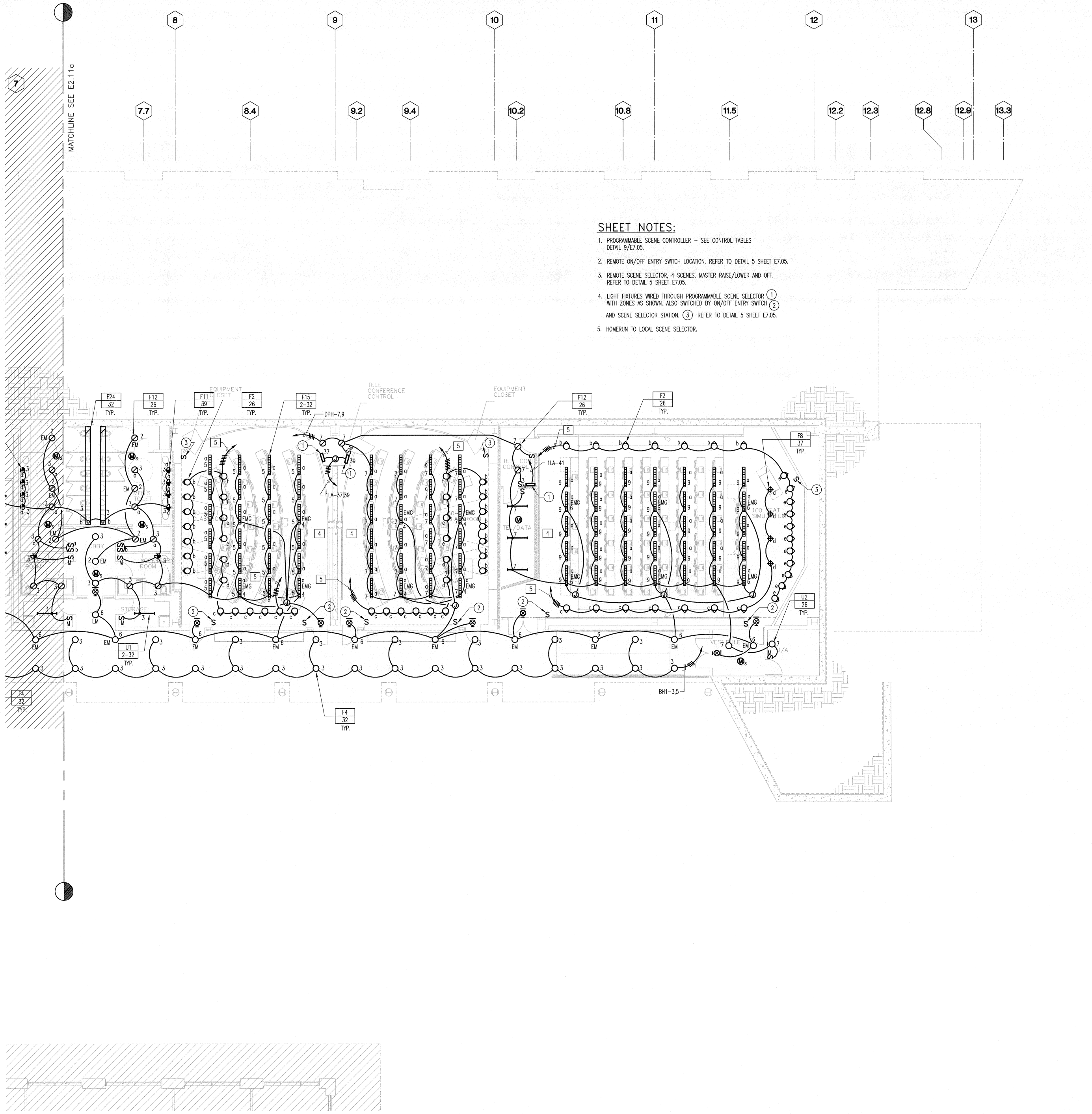

SHEET NOTES:

1. PROGRAMMABLE SCENE CONTROLLER – SEE CONTROL TABLES DETAIL 9/E7.05.
2. REMOTE ON/OFF ENTRY SWITCH LOCATION. REFER TO DETAIL 5 SHEET E7.05.
3. REMOTE SCENE SELECTOR, 4 SCENES, MASTER RAISE/LOWER AND OFF. REFER TO DETAIL 5 SHEET E7.05.
4. LIGHT FIXTURES WIRED THROUGH PROGRAMMABLE SCENE SELECTOR (1) WITH ZONES AS SHOWN. ALSO SWITCHED BY ON/OFF ENTRY SWITCH (2) AND SCENE SELECTOR STATION. (3) REFER TO DETAIL 5 SHEET E7.05.
5. HOMERUN TO LOCAL SCENE SELECTOR.

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CAD PF, BRD	ENG MR	APR TW
09 JAN 2003		

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ROSENDIN ELECTRIC, INC.
DATE 06/22/04

REVISIONS

2	01.31.03	ADDENDUM #2
5	02.12.03	ADDENDUM #5

UNIVERSITY OF CALIFORNIA, SANTA CRUZ
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN

FIRST FLOOR – EAST
LIGHTING PLAN
UCSC FILE # 7401
SCALE: 1/8"=1'-0"
DATE:
FILE: 407E201A-B.DWG
SCRIPT:

AS-BUILT E2.01b

PROJECT NO: REI-300012

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PLOT BY: mark russin MOD. BY: anthony fresquez
PLOT TIME: 10/20/2003 09:49 AM MOD. TIME: 05/24/2004 03:04 PM
DWG SCALE: 1=1
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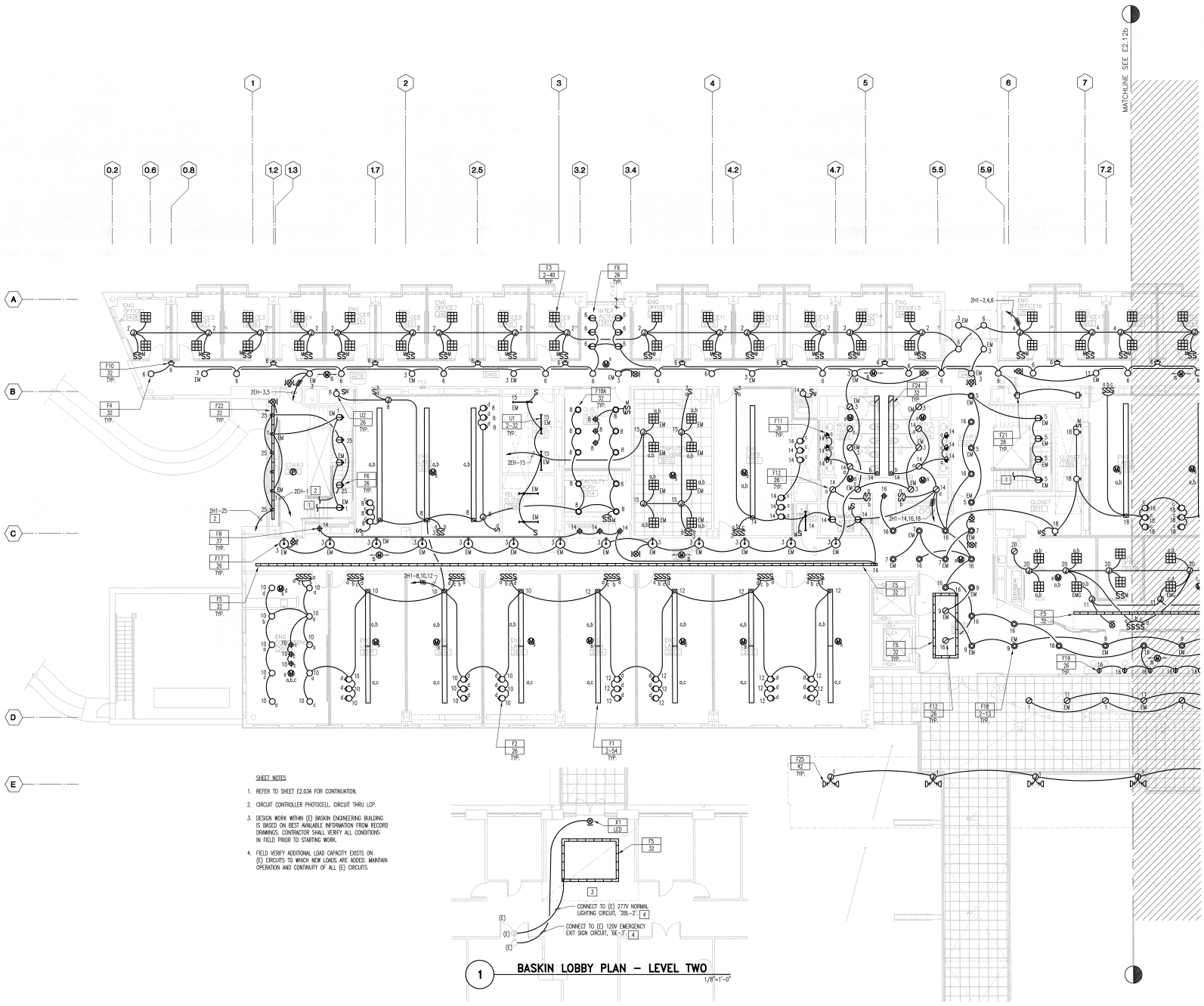

408

PLOT BY: mark ranoh
PLOT DATE: 01/15/2004 05:59 PM
DWG SCALE: 1=1
DWG NAME: C:\temp\temp dwgs\32407-elec-plans\407e202a-b.dwg

WORK BY: tiffany hoopes
WORK DATE: 05/29/2004 03:54 PM

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CAD FF_ERD	ENG MR	APP. TW
09 JAN 2003		

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88 OAK GROVE STREET, SAN FRANCISCO, CA 94103 (415) 575-1600
2402 W. BRUCKNOOD, SUITE 101, MESA, AZ 85202 (480) 821-4022
103 RD AMOND BLVD, SUITE 20-3, RD AMOND, NM 87074 (505) 792-2000
1200 NE 181H AVE., SUITE 120A, HILLSBORO, OR 97124 (503) 615-0100

DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

REVISIONS		
3	01.15.04	BASKIN LOBBY
4	02.05.03	ADDENDUM #4
7	05.12.03	RATED WALL CHANGE
10	07.14.03	RFI #390

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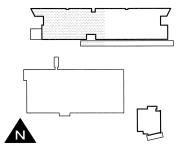
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN



SECOND FLOOR - WEST LIGHTING PLAN

UCSC FILE # 7401

SCALE: 1/8"=1'-0"
DATE:
FILE: 407E202A-B.DWG
SCRIPT:

AS-BUILT E2.02a

PROJECT NO: REI-300012

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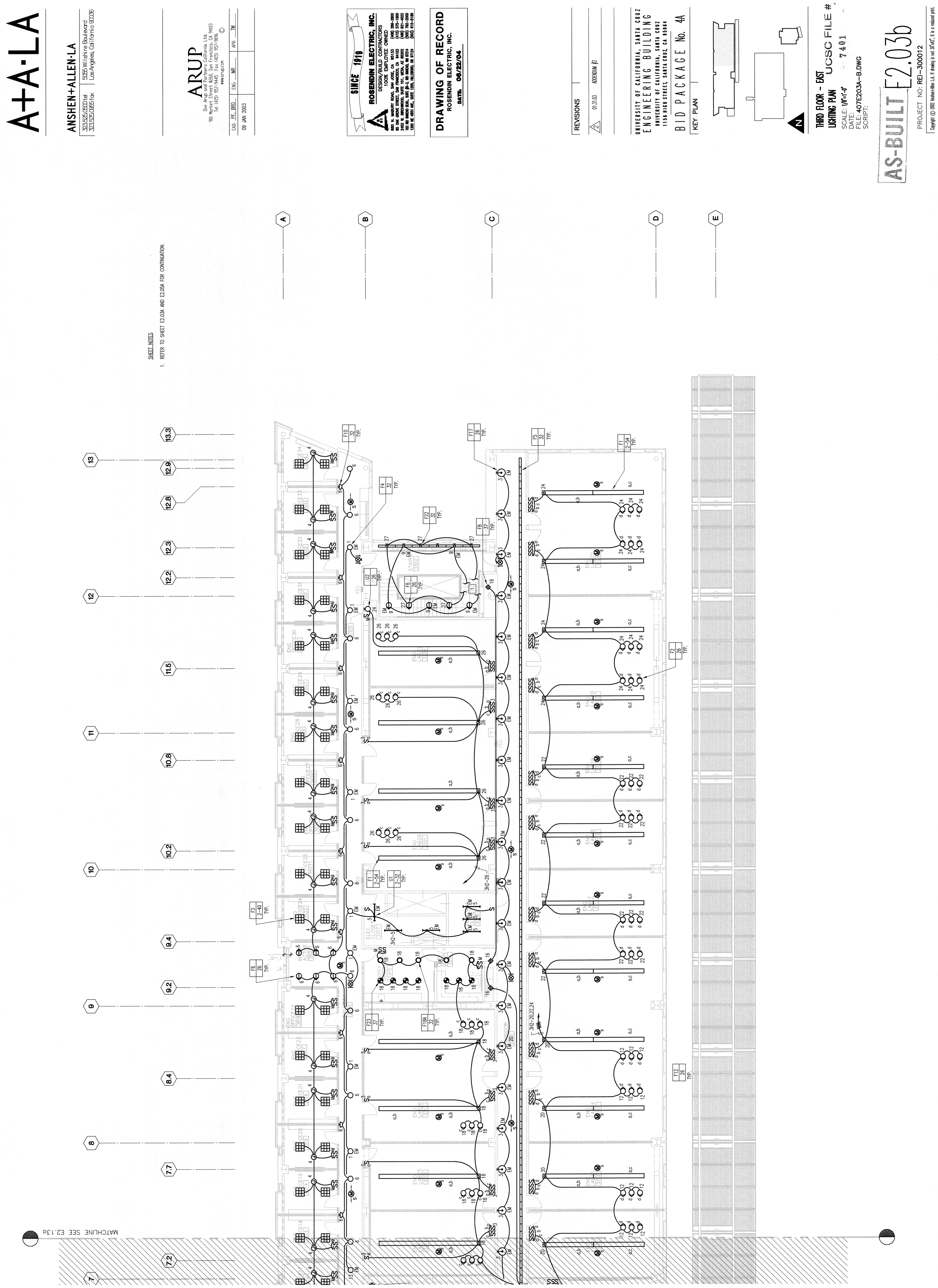
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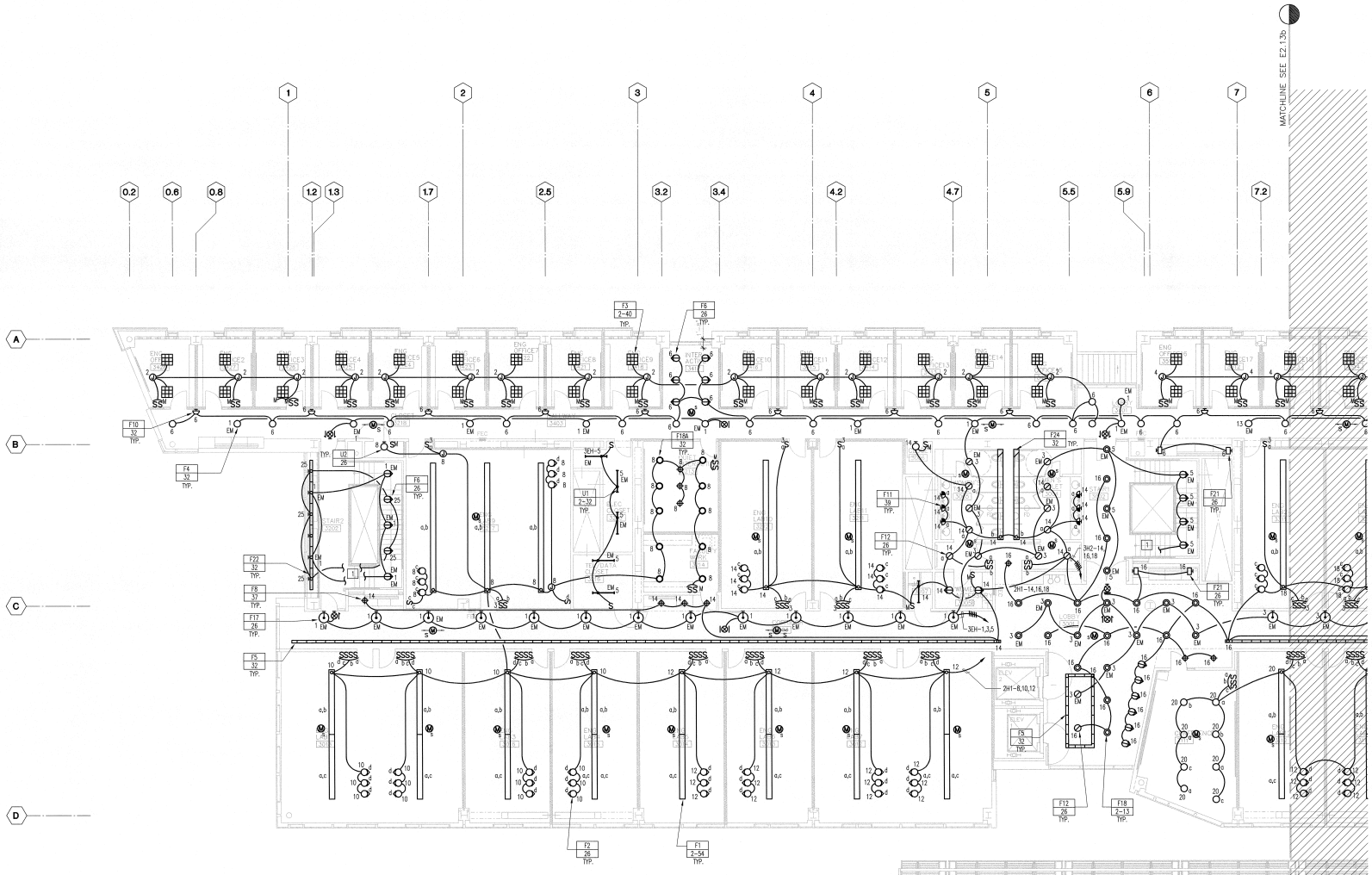
DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04
REVISIONS
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
ENGINEERING BUILDING
BID PACKAGE No. 4A
KEY PLAN
THIRD FLOOR - EAST
LIGHTING PLAN
UCSC FILE # 7401
FILE: 407E203A-B.DWG
AS-BUILT
E2.03b
PROJECT NO: REI-300012
SHEET NOTES
1. REFER TO SHEET E2.03A AND E2.05A FOR CONTINUATION.



SHEET NOTES

1. REFER TO SHEET E2.02A AND E2.04A FOR CONTINUATION.

410

PLOT BY: Pompey Pantoja
PLOT DATE: 1/7/2005 09:57 AM
DWG SCALE: 1=1
DWG NAME: J:\24007\A_project_data\A-03_drawings\dwt\407E203a-1.dwg

MOD. BY: ben rio-haynes
MOD. DATE: 04/09/2003 11:19 PM

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102 RD RANCHO BLVD., SUITE 25-3, RIO RANCHO, NM 87174 (505) 792-2000
1305 NE 40TH AVE., SUITE 120A, HILLSBORO, OR 97124 (503) 810-0180

DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

REVISIONS

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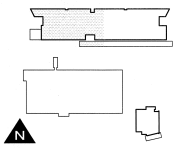
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
115K HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN



THIRD FLOOR - WEST
LIGHTING PLAN

UCSC FILE # 7401

SCALE: 1/8"=1'-0"
DATE:
FILE: 407E203A-B.DWG
SCRIPT:

AS-BUILT

E2.03a

PROJECT NO: REI-300012

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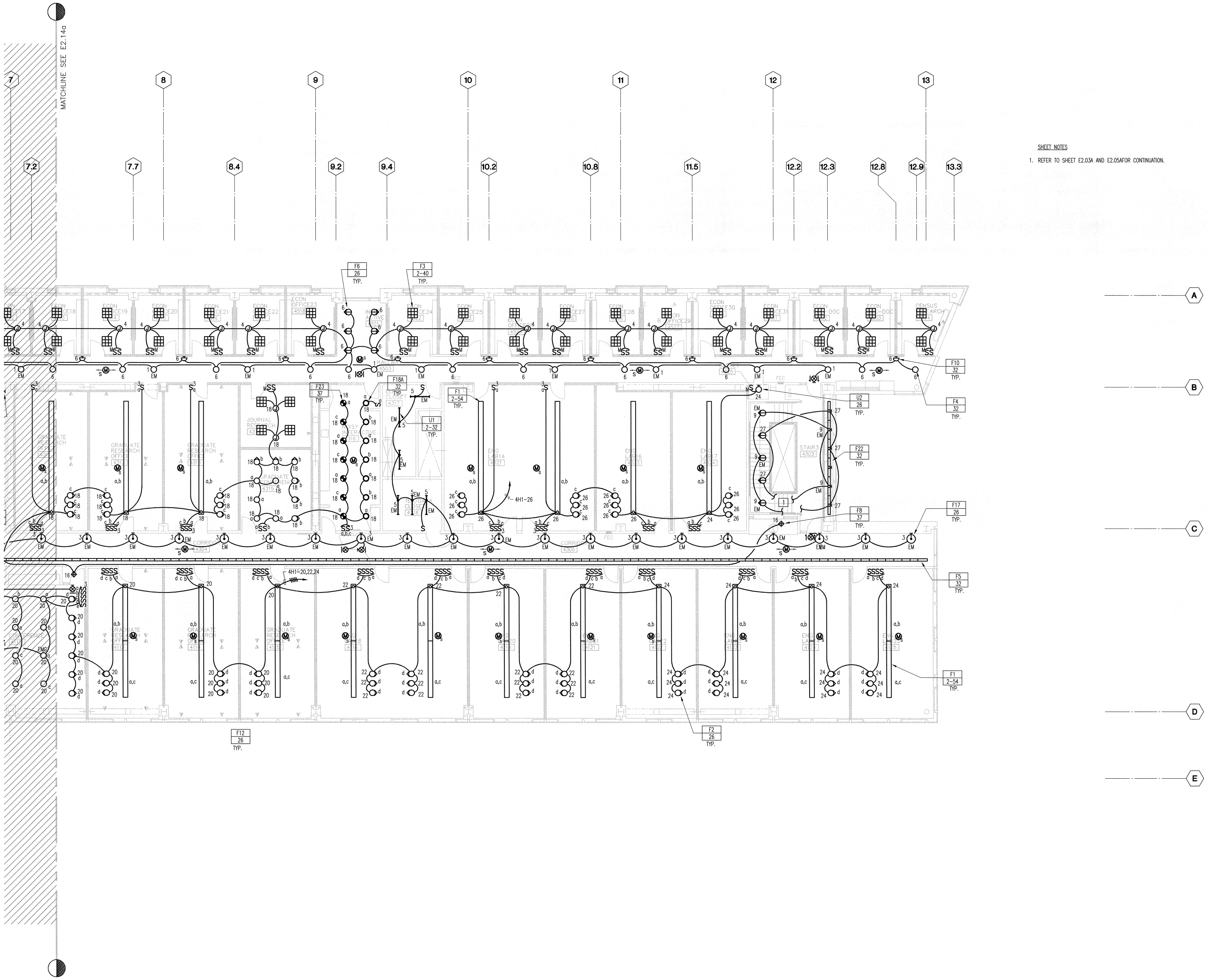

SHEET NOTES

1. REFER TO SHEET E2.03A AND E2.05AFOR CONTINUATION.

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ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

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BID PACKAGE No. 4A

KEY PLAN

FOURTH FLOOR - EAST
LIGHTING PLAN UCSC FILE #
SCALE: 1/8"=1'-0" 7401
DATE:
FILE: 407E204A-B.DWG
SCRIPT:

AS-BUILT E2.04b

PROJECT NO: REI-300012

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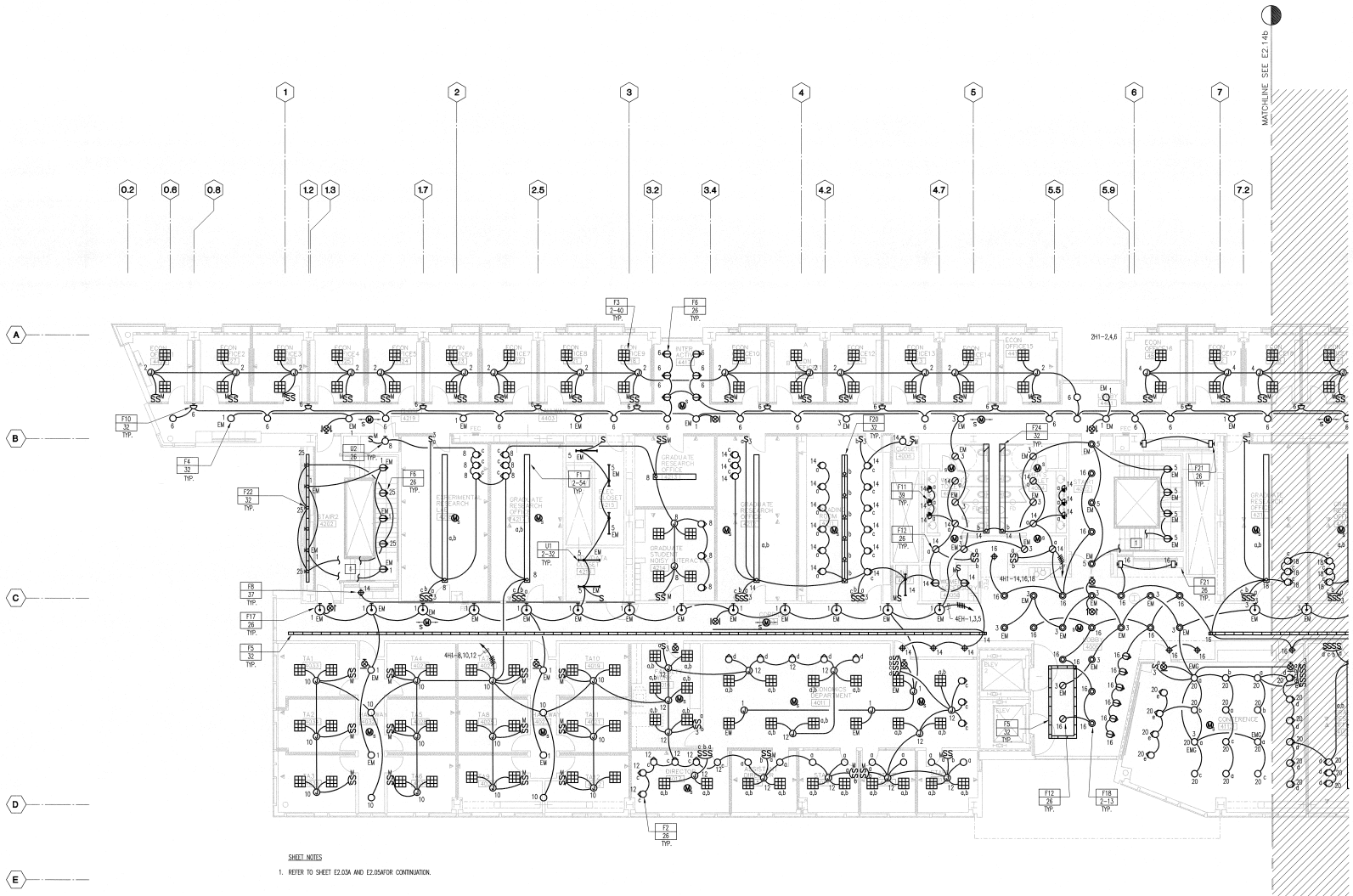
PLOT BY: Pompey Festejo
PLOT TIME: 12/12/2002 09:55 AM
DWG SCALE: 1=1
DWG NAME: J:\32407\4_project_data\4-03_drawings\elec\407E204a-b.dwg
MOD. BY: ben rios-duryea
MOD. TIME: 04/09/2003 01:20 PM



412

PLOT BY: Pompey Pantoja
PLOT DATE: 1/7/2003 09:55 AM
DWG SCALE: 1=1
DWG NAME: J:\3740\4_project_data\4-03_drawings\Arch\407E204a-b.dwg

MOD. BY: ken rita-thorpe
MOD. DATE: 04/09/2003 01:20 PM

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09 JAN 2003		

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103 RIO RANCHO BLVD., SUITE 2D-3, RIO RANCHO, NM 87124 (505) 792-2000
1300 NE 48TH AVE., SUITE 120L, HILLSBORO, OR 97124 (503) 615-0180

DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

REVISIONS

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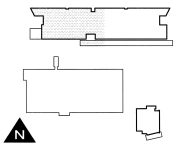
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN



FOURTH FLOOR - WEST
LIGHTING PLAN

UCSC FILE # 7401

SCALE: 1/8"=1'-0"
DATE:
FILE: 407E204A-B.DWG
SCRIPT:

AS-BUILT E2.04a

PROJECT NO: REI-300012

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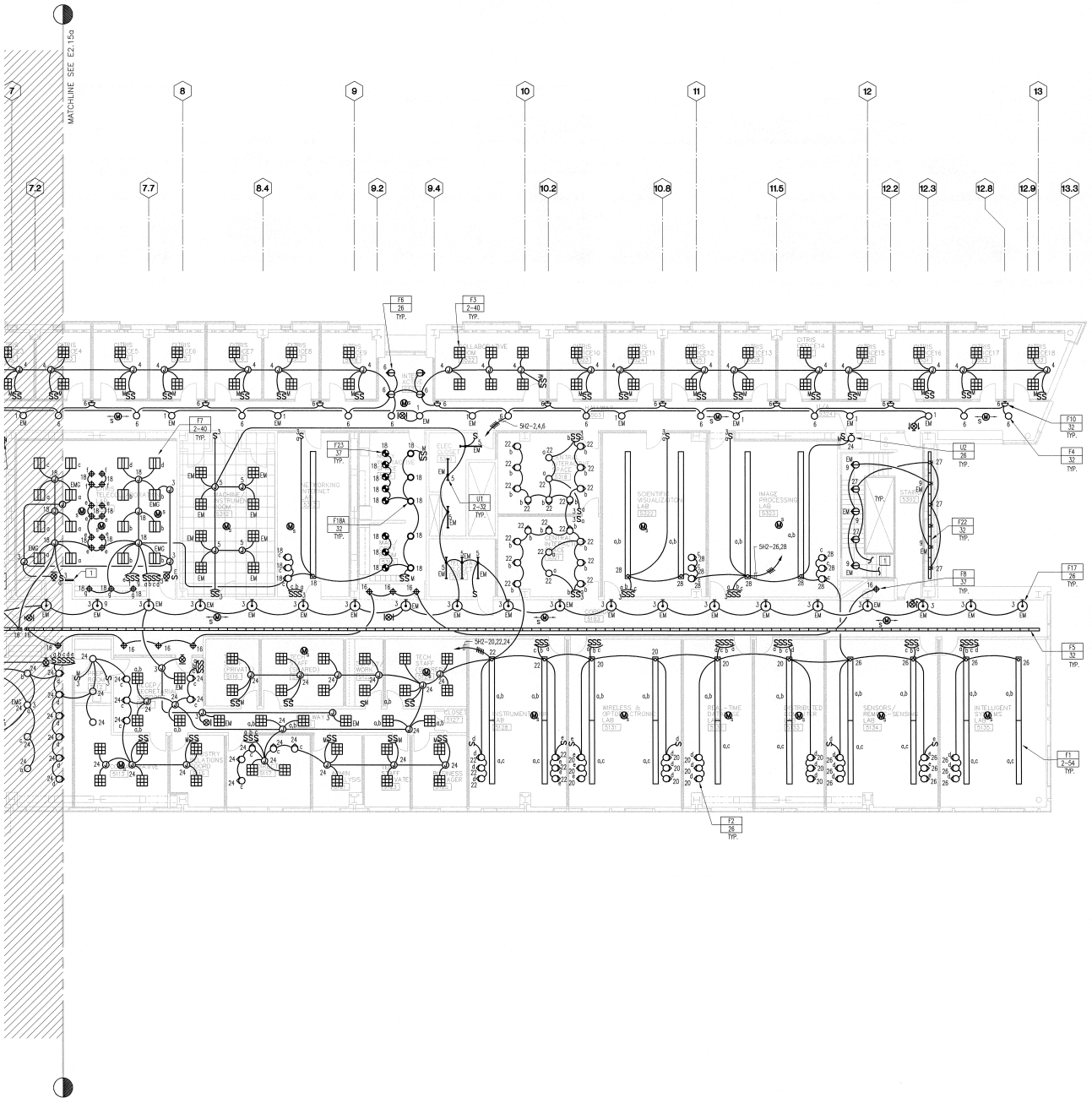

SHEET NOTES

1. REFER TO SHEET E2.06A FOR CONTINUATION.

413

PLOT BY: Ben Ritz-Dynes
PLOT DATE: 01/14/2003 10:18 PM
DWG SCALE: 1=1
DWG NAME: J:\2407\4_project_data\4-02_drawings\elec\407E205a-b.dwg

MOD. BY: Ben Ritz-Dynes
MOD. DATE: 01/09/2003 10:21 PM

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09 JAN 2003		

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DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

REVISIONS	
5	02.12.03 ADDENDUM #5

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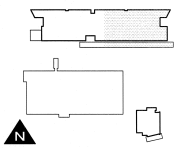
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN



FIFTH FLOOR - EAST
LIGHTING PLAN

UCSC FILE # 7401

SCALE: 1/8"=1'-0"
DATE:
FILE: 407E205A-B.DWG
SCRIPT:

AS-BUILT

E2.05b

PROJECT NO: REI-300012

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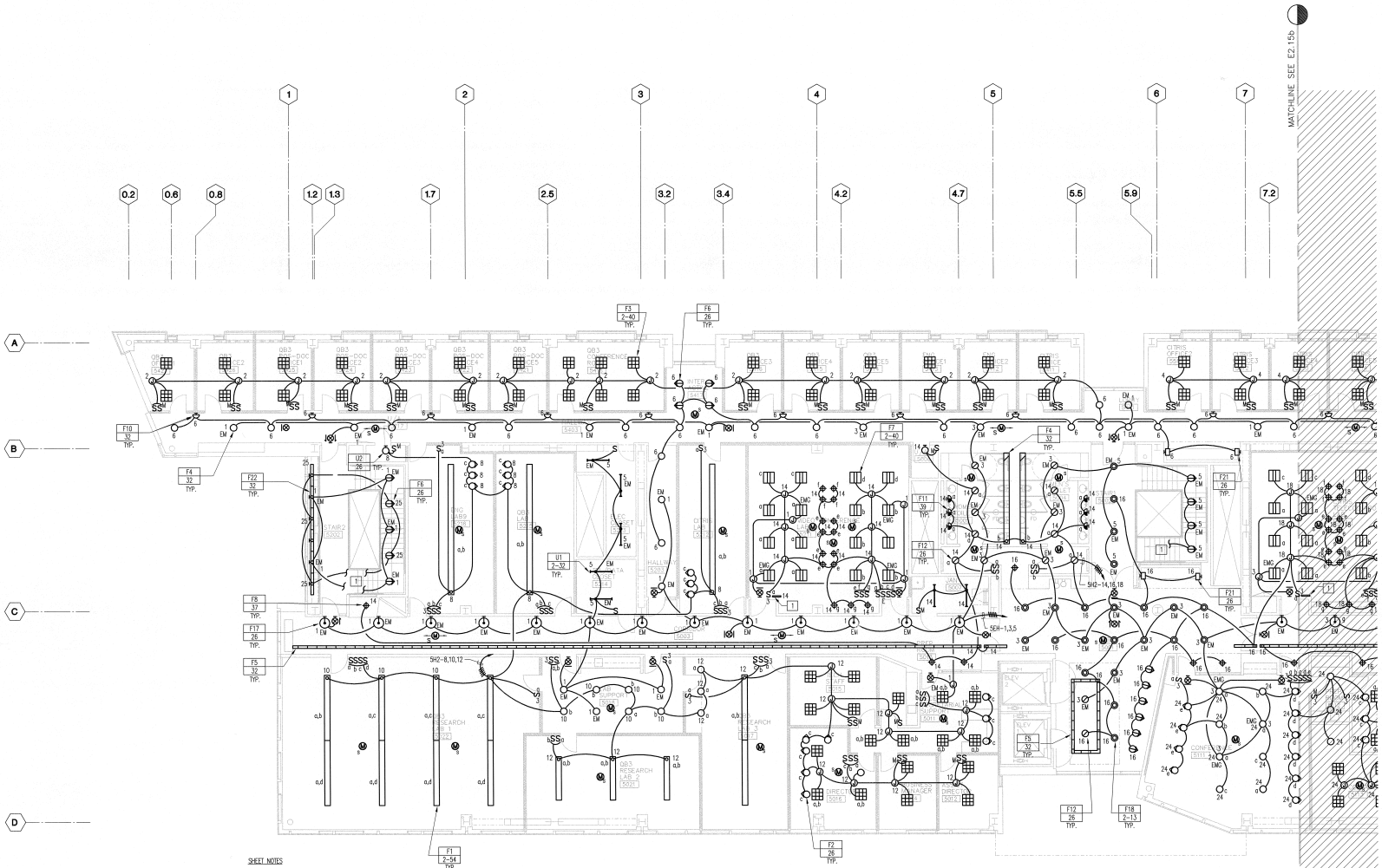

414

PLOT BY: Rh-Rh-Orion
PLOT TIME: 01/14/2003 03:18 PM
DWG SCALE: 1=1
DWG NAME: J:\2407\A_project_data\A-03_drawings\elec\407E205A-B.dwg
MOD. TIME: 01/09/2003 01:21 PM
MOD. BY: Rh-Rh-Orion

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Tel (415) 957-9445 Fax (415) 957-9096
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CAD PC, BRD	ENG: MR	APP: TM
09 JAN 2003		

SINCE 1919
ROSENDIN ELECTRIC, INC.
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45 OAK GROVE STREET, SAN FRANCISCO, CA 94102 (415) 575-1600
3455 W. BROADWOOD, SUITE 101, MESA, AZ 85202 (480) 921-4222
103 RD RANCH BLVD, SUITE 20-3, RD RANCH, NM 87114 (505) 792-2000
1300 NE 40TH AVE., SUITE 1200, HILLSBORO, OR 97124 (503) 615-0100

DRAWING OF RECORD
ROSENDIN ELECTRIC, INC.
DATE: 06/22/04

REVISIONS		
4	02.05.03	ADDENDUM #4

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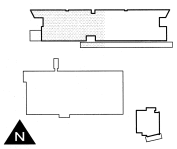
ENGINEERING BUILDING
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
1156 HIGH STREET, SANTA CRUZ, CA 95064

BID PACKAGE No. 4A

KEY PLAN



FIFTH FLOOR - WEST
LIGHTING PLAN UCSC FILE # 7401
SCALE: 1/8"=1'-0"
DATE:
FILE: 407E205A-B.DWG
SCRIPT:

AS-BUILT E2.05a

PROJECT NO: REI-300012

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INDOOR ENVIRONMENTAL QUALITY: CREDIT 10.1
GREEN CLEANING, ENTRYWAY SYSTEMS

1. LEED-EB template
2. Letter confirming that E2 has entryway mats in place and stating various locations throughout the building
3. In-voice from Cleansource for entryway mats
4. E2 floor plan highlighting entryway mat locations
5. Photos of entryway mats
6. Product information sheet for the Andersen Waterhog Eco Mats

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has reduced exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment over the performance period through the following actions:

☒ Utilized entryway systems (grills, grates, mats etc.) to reduce the amount of dirt, dust, pollen and other particles entering the building at all entryways and developed the associated cleaning strategies to maintain those entryway systems, as well as the exterior walkways.

I have provided the following supplementary documentation to support the declaration:

☒ A building plan and photos showing all high-volume entryways and installed entryway systems (grills, grates, mats, etc.) and the written procedures for cleaning and maintaining these entryway systems.

☒ Quarterly reports over performance period documenting that these entryway systems have been effectively used, cleaned and maintained on a regular basis.

Fill in the Quarterly Reports below according to the duration of your declared LEED-EB performance period (this period must be the same for all prerequisites and credits). Fill in at least the minimum number of quarters required according to the ranges shown to the right.
Select the appropriate button:

Performance Period Length	Minimum Quarters to Fill In
◉ 3-5 months	Quarter 1
○ 6-8 months	Quarter 1 - Quarter 2
○ 9-11 months	Quarter 1 - Quarter 3
○ 12+ months	Quarter 1 - Quarter 4

(Continued on page 2)

Quarterly Reports	Year 1			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Name of person currently responsible for making sure that the Entryway System Green Cleaning Program continues to work well	George Vallerga			
Date responsible person provided quarterly report information listed below	2008-09-16			
Questions that the responsible person must answer each quarter:				
Has the Entryway System Green Cleaning Program been effectively maintained over the last quarter?	(•) Yes ( ) No	( ) Yes ( ) No	( ) Yes ( ) No	( ) Yes ( ) No
Has the Entryway System Green Cleaning Program continued to work well over the last quarter?	(•) Yes ( ) No	( ) Yes ( ) No	( ) Yes ( ) No	( ) Yes ( ) No
Are there any problems with the Entryway System Green Cleaning Program that need to be remedied? (Insert a numbered list of problems or insert "None")	None			
If any problems with these programs were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	None			
Are there any opportunities for improving the Entryway System Green Cleaning Program? (insert a numbered list of opportunities or insert "None")	None			
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	None			

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Credit 10.1 (1 point possible): Green Cleaning, Entryway Systems Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-09-18	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

To: US Green Building Council LEED for Existing Buildings Program
Re: IEQ Credit 10.1 Green Cleaning, Entryway Systems

In order to improve indoor air quality and reduce exposure of occupants and maintenance personnel to particle contaminants, the Engineering 2 building has entryway mats at all high volume entrances throughout the building.

Each entrance to Engineering 2 has an Andersen Waterhog Eco-Mat that is made from 100% recycled PET post-consumer recycled fiber reclaimed from drink bottles and 15% post-consumer recycled tires. The entryway mats are long enough for each foot to hit the mat two times when walking (approximately 12 feet in length). Each mat is vacuumed daily to ensure optimal effectiveness.

E2 Entryway Mat Locations: (photo documentation attached)

1. 1st floor main lobby to elevators
2. 2nd floor East main building entrance
3. 2nd floor West main building entrance
4. 2nd floor North main building entrance.

Sincerely,

Louise Huttinger

Louise Huttinger
UCSC Physical Plant
Green Operations Group-
LEED-EB Assistant Project Manager

INVOICE

CleanSource
THE CLEANING SUPPLY EXPERTS

650 BRENNAN STREET
SAN JOSE, CALIFORNIA 95131
PHONE: (800) 436-1907

INVOICE DATE	INVOICE NO.	P.O. NO.	PAGE #
09/12/08	1785814-00	P0322620	1

SHIP POINT	SHIP VIA	SHIPPED	TERMS
CLEANSOURCE, SAN JOSE	OUR TRUCK	09/12/08	NET 30 DAYS

RECEIVED BY	DATE	TIME	PLACED BY
d greenwell	09/12/08	07:30	FAX

CUST.#: 210496

SHIP TO: UCSC PHYSICAL PLANT
1156 HIGH ST

SANTA CRUZ, CA 95064-1077

I574016
9/24/08

BILL TO: UC SANTA CRUZ, PHYSICAL PLANT
1156 HIGH ST, BARN G
ATTN: CAROL MALER
SANTA CRUZ, CA 95064

Remit To Address:
CleanSource
P.O. Box 49107
San Jose, CA 95161-9107

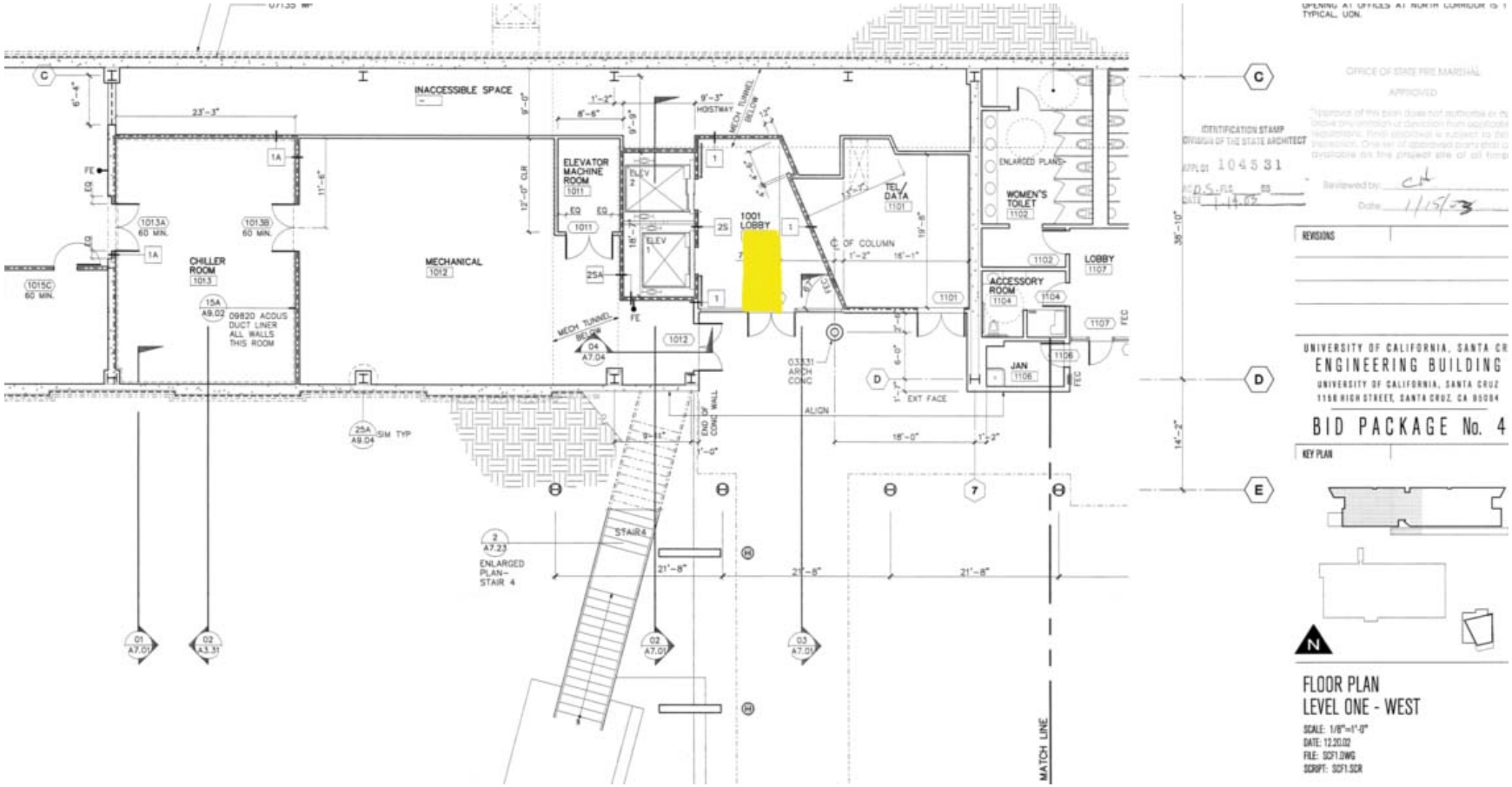
LINE NO.	PRODUCT AND DESCRIPTION	QUANTITY ORDERED	QUANTITY B.O.	QTY. SHIPPED	QTY. U/M	UNIT PRICE	AMOUNT (NET)
1	271181 MAT 6'X7' SMO BEVELED 2243 ECO GRAND ELITE EA ********** COLOR:BLACK SMOKE **********	1	0	1	EA	265.00 *	265.00
2	271188 MAT 6'X11.6' SMO BEVELED 2243 ECO GRAND ELITE EA ********** COLOR:BLACK SMOKE **********	3	0	3	EA	429.00 *	1287.00
						Taxable Purcha	1552.00
						Nontaxable Pur	0.00
2	Lines Total	Qty Shipped Total		4		Total	1552.00
						Taxes*	131.92
						Invoice Total	1683.92

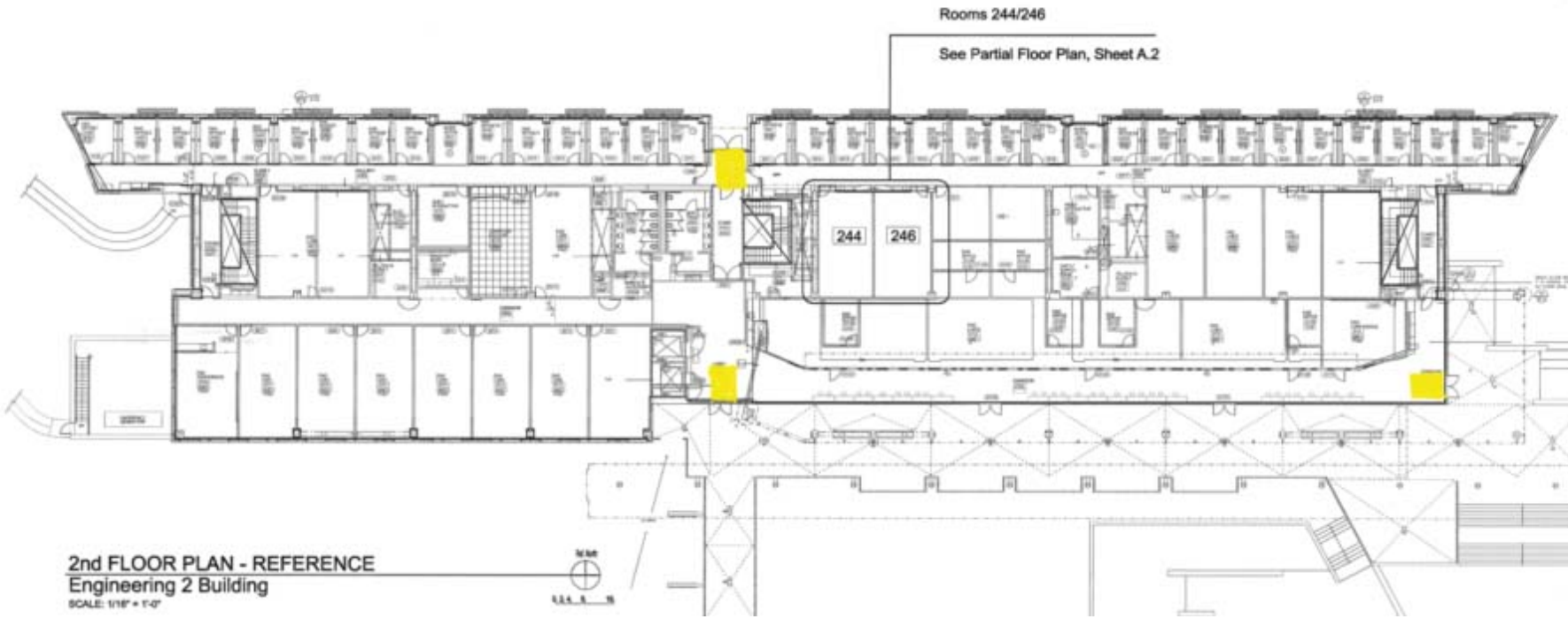
3 18987

Last Page

FOR INVOICE/PAYMENT INQUIRIES CONTACT credit@cleansource.com or CALL 877-577-1114

E2 Building Plan with Entryway Mat Locations

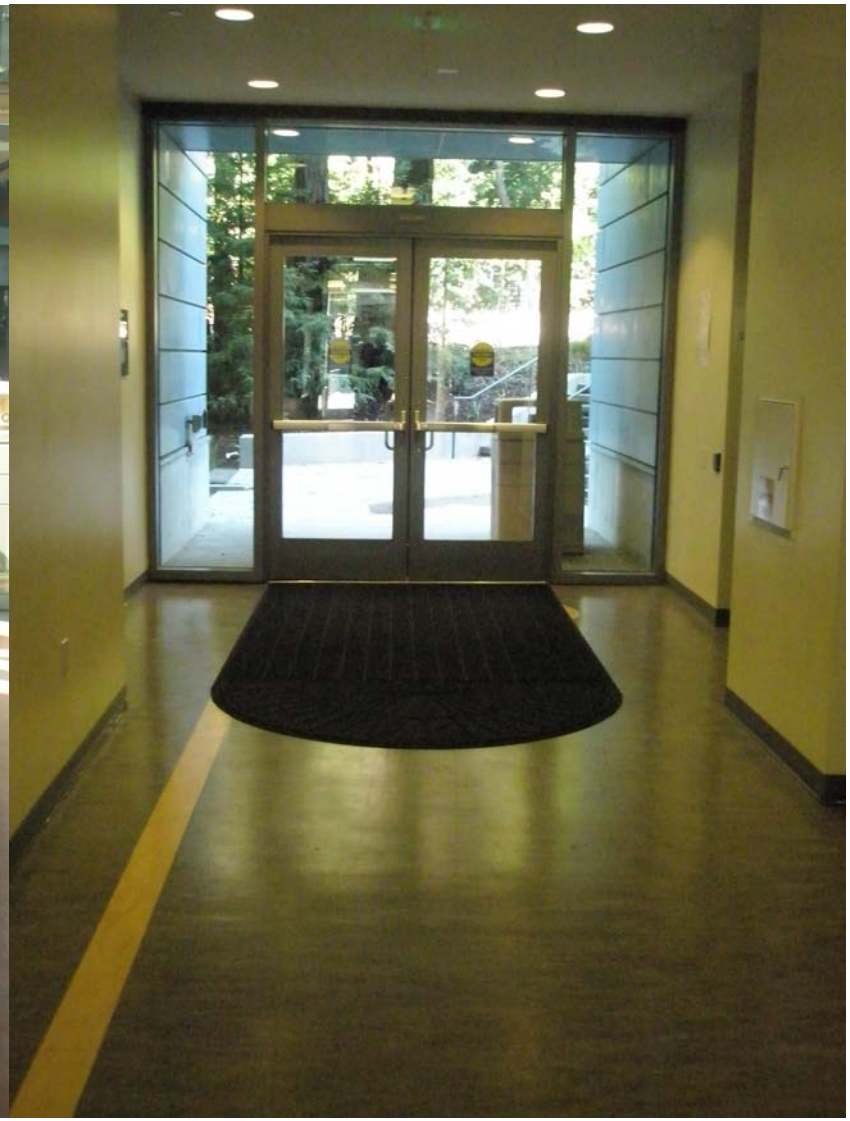



Rooms 244/246
See Partial Floor Plan, Sheet A.2
244
246
2nd FLOOR PLAN - REFERENCE
Engineering 2 Building
SCALE: 1/16" = 1'-0"

Level 1- Entrance to Lobby

Level 2- East Main Entrance

Level 2- West Main Entrance



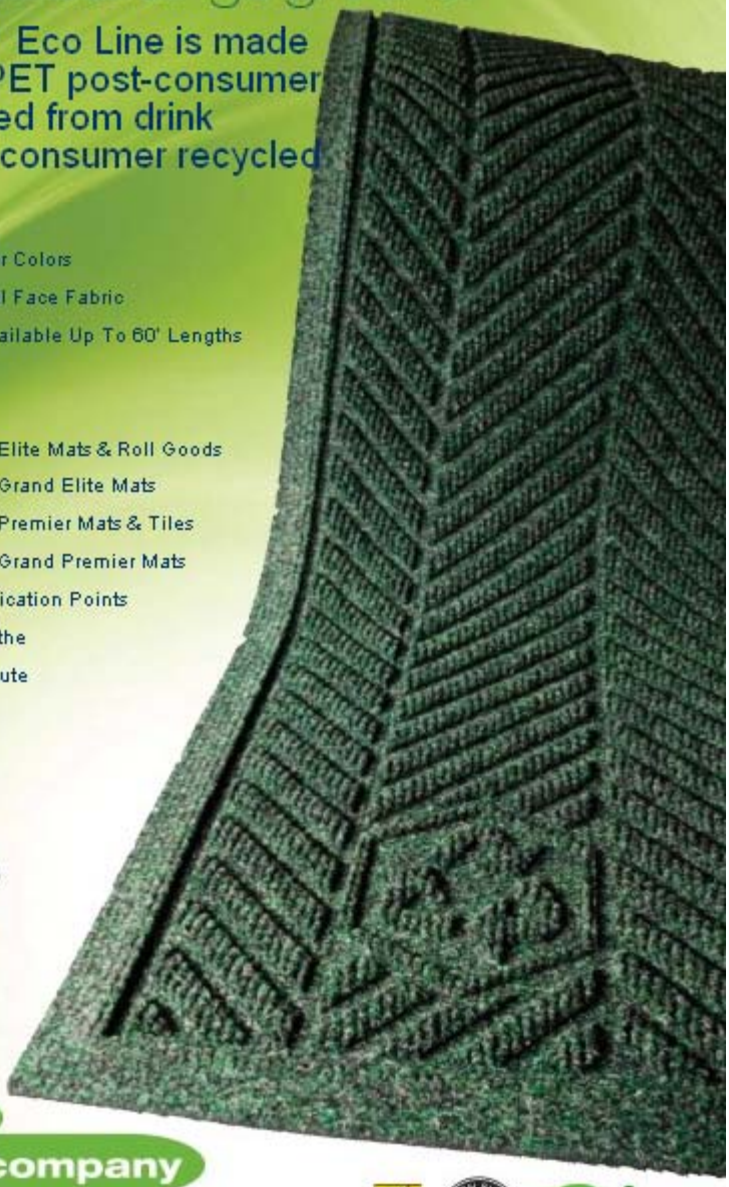
Level 2- North Main Entrance

WATERHOG™ eco

we make buildings greener

Our NEW Waterhog™ Eco Line is made from 100% recycled PET post-consumer recycled fiber reclaimed from drink bottles and 15% post-consumer recycled tires

- Available in Eight Designer Colors
- Heavy Durable Commercial Face Fabric
- 35", 45" and 70" Widths Available Up To 60' Lengths All Styles
- Styles Available:
  - Waterhog Eco Elite Mats & Roll Goods
  - Waterhog Eco Grand Elite Mats
  - Waterhog Eco Premier Mats & Tiles
  - Waterhog Eco Grand Premier Mats
- Gain valuable LEED Certification Points
- Certified Slip Resistant by the National Floor Safety Institute



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INDOOR ENVIRONMENTAL QUALITY: CREDIT 10.3 GREEN CLEANING- LOW ENVIRONMENTAL IMPACT CLEANING POLICY

1. LEED-EB template
2. E2 Low Environmental Impact Cleaning Policy
3. Documentation of custodial training
4. Letter from the Custodial Supervisor, George Valerga, stating compliance with carpet and floor cleaning requirements during the performance period.
5. MSDS sheets of green cleaning products

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has reduced exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment over the performance period through the following actions:

Implementation of a low-impact environmental cleaning policy over the performance period that addresses:

☒ Sustainable cleaning systems.

☒ Use of sustainable cleaning products.

☒ Use of chemical concentrates and appropriate dilution systems.

☒ Proper training of maintenance personnel in the hazards, use, maintenance and disposal of cleaning chemicals, dispensing equipment, and packaging.

☒ Use of hand soaps that do not contain antimicrobial agents (other than as a preservative system), except where required by health codes and other regulations (i.e. food service and health care requirements).

☒ Use of cleaning equipment that reduces impacts on IAQ.

I have provided the following supplementary documentation to support the declaration:

☒ A copy of the low environmental impact cleaning policy adopted by your organization.

☒ Documentation that this policy has been followed over the performance period including:

- ☒ Documentation on the chemical and cleaner dispensing and dilution equipment used.
- ☒ Documentation identifying the date and activities associated with floor maintenance.
- ☒ Documentation of cleaning worker training.

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(Continued on page 2)

Completing Quarterly Reports is Optional for this Credit

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Name of person currently responsible for making sure that the Low Environmental Impact Cleaning Policy continues to work well	George Vallerga							
Date responsible person provided quarterly report information listed below	2008-09-26		None		None		None	
Questions that the responsible person must answer each quarter:								
Has the Policy been effectively maintained over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Has the Policy continued to work well over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
What are the best available Low Environmental Impact Cleaning Policy Purchase quantities for the last quarter and the year to date?	At least 80% of cleaning purchases adhere to policy							
Are the Low Environmental Impact Cleaning PolicyPurchase quantities for the last quarter and the year to date on track for achieving the policy goals for the building?	Yes							
Are there any problems with the Policy that need to be remedied? (Insert a numbered list of problems or insert "None")	None							
If any problems with these policies were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	None							
Are there any opportunities for improving the Policy? (insert a numbered list of opportunities or insert "None")	None							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	None							

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Project Name:	Engineering 2 LEED EB Submittal		
Credit:	IEQ Credit 10.3 (1 point possible): Green Cleaning, Low Environmental Impact Cleaning Policy	Points Documented:	1

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Louise	Huttinger	2008-10-01	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

ENGINEERING 2: LOW ENVIRONMENTAL IMPACT CLEANING POLICY

The UCSC Physical Plant and Custodial Services are strongly committed to providing a clean, healthy and productive work environment for all building occupants. This policy provides documentation of our current best custodial practices along with additional changes made to the operation of our Engineering 2 building. The products, equipment and cleaning procedures highlighted in this policy ensure improved indoor air quality, occupant health and comfort in the workplace.

I. USE OF SUSTAINABLE CLEANING PRODUCTS AND SYSTEMS

95% of the chemicals used in the Engineering 2 buildings are Green Seal-37 certified. All other specialty chemicals that are not Green Seal 37 certified must be zinc-free, have low VOC and be produced from Bio-renewable resources. Custodians only use the products supplied by the University for cleaning and are prohibited in bringing their own cleaning products. Custodians are also are properly trained to use all cleaning solutions and appropriate dilution systems. Here is a list and brief description of the cleaning solutions currently being used in the Engineering 2 building:

Spartan Green Solutions Line: Spartan's Green Solutions is a well-rounded assortment of Green Seal- 37 certified products that meet the buildings most fundamental cleaning tasks. Currently using Tri Base Multi-Purpose cleaner, glass cleaner, carpet cleaner, floor seal and finish, and floor finish remover, and water-free urinal cleaner all from the Green Solutions line.

SKILCRAFT-Spartan Graffiti Remover SAC: Graffiti remover SAC is a ready-to-use, *53%* bio-based product. **A** combination of soybean and corn esters, this efficient solvent blend helps to replace hazardous, toxic and environmentally harmful products in the workplace. Graffiti Remover SAC has a non-offensive odor.

BioAugmentation Consume Drop In Drain: Consume Drop-in-a-Drain is a blend of several strains of non-pathogenic microorganisms stabilized in an organic carrying agent and encapsulated in a unique water-soluble packet. The microbes or digesters consume or "eat" the organic build-up on pipes, in effect eliminating buildups and keeping pipes free flowing. Used in all restroom drains In E2, controlling male odors and bacterial growth.

II. USE OF CHEMICAL CONCENTRATED AND DILUTION SYSTEMS

The UCSC Custodial Services use automatic chemical dilution systems, which are installed in every janitor closet (one on each floor), for the Engineering 2 building. Custodial services currently uses the Accudose Proportioning and Dispensing Systems made by Hydro. Using this system, dilution is controlled by drawing chemicals through metering tips of varying size

and injecting this metered amount into the water flow. The Accudose Dilution system allows custodians to make accurate dilutions which prevents excess chemical discharge into the local waste water system. The concentration and dilution of chemicals also allows a large reduction in packaging of cleaning supplies.

III. TRAINING OF MAITENANCE PERSONNEL

The UCSC custodial staff receives on-going training on the current campus cleaning protocol and proper usage of proportioning systems. For the Engineering 2 building, all staff and supervisors have been trained on the new Spartan Green Solutions chemical systems, including:

- Proper mixing and dilution of concentrates
- Replenishment of spent chemicals
- Proper use and maintenance of dispensing units
- Proper recycling of empty cleaning solution containers.

In addition, MSDS sheets have been placed in proper binders in custodial closets and staff using the new chemicals have been fully trained.

IV. USE NO-ANTIMICROBIAL HAND-SOAPS

The Engineering 2 building restrooms have under the counter pump hand soap units that have been replaced with retrofit GOJO Green Seal Certified Foam soap dispensers. The dispensers use Lite'n Foamy Sunflower Fresh foaming hand soap, which contains non anti-microbial agents.

V. USE OF CLEANING EQUIPMENT THAT REDUCES IMPACTS ON IAQ

UCSC Custodial Services has adopted the following policies and procedures, and has instituted a comprehensive procurement program for the purchasing of equipment in the Engineering 2 building.

- **Vacuum Cleaners:** All current vacuums are the Windsor upright equipped with Hepa filters, and have a noise level of 70db or below. Future replacement vacuums will be Pro Team, this change in equipment will enable the "Team Cleaning" process, reducing the amount of equipment in each facility, and decrease repair cost. The Pro Team vacuum will allow staff to vacuum carpet, and hard surface floors with same equipment, creating better indoor air quality and reducing task time. Pro Team backpack vacuums have lower noise levels, less vibration and proven ergonomics, resulting in less indoor noise pollution and less industrial injuries.
- **Carpet hot water extraction machine:** E2 uses premixed chemical from the automatic chemical dispensing units that are installed in all janitorial closets on all floors within the Engineering #2 Building. Carpet dries with in 24 hours using a Green Seal Certified carpet cleaning chemical) from Spartan Chemicals
- **Automatic floor scrubbers:** The custodial services use the Tennant ECHO which provides less than 70db noise level and a gel battery powered machine. The ECHO system uses a high tech water only technology, using no chemicals, producing higher shine, longer lasting floor finish, and a slip resistant surface by eliminating surfactant residuals.

HYDRO CHEMICAL DILUTION SYSTEM

GREEN SEAL –37 CERTIFIED CLEANING SOLUTIONS

WATER FREE URINAL CLEANER

POSTED DIRECTIONS ON HOW TO CLEAN THE WATERLESS URINALS

MICROFIBER SCRUBBER AND HAND TOWELS

UCSC E-2 LEED-EB 01-10-08---009-30-08
CUSTODIAL TRAINING LOG

03-05-08) Richard Smoker from Cole supply trained all E-2 staff on new chemical dispersion system, Cole supply provided all labeled spray bottles and MSDS sheets, and trained staff on how to fill both buckets and spray bottles. Staff was instructed to spray cleaners on rag when possible then wipe surface to avoid unnecessary airborne chemical particles. Color-coded micro fiber rags and mops that are task specific, have been provided and demonstrated by George Valerga. Staff requested washer machine for the micro-fiber rags and mops.

04-19-08) Richard Smoker, Joe Fields, George Valerga Meet with staff for follow up training, Used new Chemical dispensing unit to fill the "Advance Auto scrubber" and cleaned tile floors with staff, each staff was trained and observed using the equipment

05-01-08) Department wide safety meeting: Back safety, Chemical safety, ergonomics, Staff received new washer machine for micro fiber rags and mops.

06-02-08) Regina Putyrae from Pro Team Vacuums trained E-2 staff on how to use back pack vacuums and Indoor Air Quality,

06-10-08) MSDS training

07-10-08) Bill from CleanSource trained staff on 3m micro fiber rags and mops. How to sanitize floors, restrooms, desks, doors, and fountains. Staff requested 48" micro fiber mops to clean halls.

08-07-08) Trained E-2 staff on how to move furniture safely.

09-18-08) UCSC Fire Department Trained E-2 staff on fire safety.

09-29-08) E-2 Staff received 48"and more 24"

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PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

To: USGBC LEED-EB Application Review Committee
Re: IEQ Credit 10.3: Green Cleaning, Low Environmental Impact Cleaning Policy

The custodial crew for the Engineering 2 building did not scrub wax or buff any hard surface floors May -September 2008. All floor surfaces are spot mopped nightly and wet mopped once a week using micro fiber flat/wet mop followed by a micro fiber dry mop, so that the building occupants have little exposure to extension cords or to wet surfaces, since the building is used 24 hours per day. All carpets are spot cleaned nightly as needed, no major carpet cleaning was performed during the months of May to September 2008.

Sincerely,

George Valerga
Sr. Superintendent
Custodial Services
UCSC Physical Plant

New Green Products

Maintex has introduced the High Sierra Product line which has been formulated to minimize the impact on workers and building occupants while delivering the highest level of cleaning performance. The High Sierra Line contains environmentally preferred chemical components such as Hydrogen Peroxide and D-Limonene that have replaced traditional harsh acids, solvents and other hazardous ingredients. Maintex is pleased to announce the High Sierra product line has been certified by Green Seal to comply or exceed the GS-37 requirements.

Green Seal is an independent non-profit organization dedicated to protecting the environment by promoting the manufacture, sale and implementation of environmentally responsible products. Green Seal has developed stringent environmental, safety and performance standards, approved by the EPA, for institutional cleaning products referred to as ﷺGS-37 Standardsﷺ. Maintex High Sierra Glacier Glass & Surface Cleaner, Pristine Cleaner/Degreaser, Shimmer Restroom Cleaner and Trailwinds Floor Cleaner have all met Green Seal Standards.

Pristine

A powerful cleaner/degreaser that will clean a wide range of surfaces including walls, tile, floors, countertops, kitchen appliances, machinery and any water washable surface.

Glacier

A safe, environmentally preferable glass and surface cleaner formulated with hydrogen peroxide and modified citrus derivatives. Designed to leave windows, glass, plexiglass, windshields and light fixtures crystal clear and streak free. Leaves no residue.

Trailwinds

A safe, environmentally preferable floor cleaner formulated with hydrogen peroxide and modified citrus derivatives. Wil not dull floor finish.

Shimmer

A high performance cleaner that will remove unpleasant odors, soap scum, body oils and urine deposits which are common in restroom environments.

Spartan Chemical Company, Inc.
Material Safety Data Sheet

SECTION I: PRODUCT INFORMATION

Product Name or Number (as it appears on label):
GREEN SOLUTIONS CARPET CLEANER
Product Number: 3509
2-Liter Cartridge 104: 3514

Product Division:
Janitorial

Spartan Chemical Company, Inc.
1110 Spartan Drive
Maumee OH 43537

Product/Technical Information: **1-(800)-537-8990**
Medical Emergency: **1-(888)-314-6171 (24 hours)**
Chemical Leak/Spil Emergency: **CHEMTREC 1-(800) 424-9300 (24 hours)**

Shipping Description: Cleaning compounds, liquid, n.o.s.

NFPA Ratings:	HMIS Ratings:
Health: 1- Slight	**Health:** 1- Slight
Fire: 0 - Minimal	**Fire:** 0 - Minimal
Reactivity: 0 - Minimal	**Reactivity:** 0 - Minimal
	Pers. Prot. Equip.: See Section VIII

SECTION II: HAZARDOUS INGREDIENTS

(Listed when present at 1% or greater, carcinogens at 0.1% or greater) All component chemicals are listed or exempted from listing on the "TSCA Inventory" of chemical substances maintained by the U.S. Environmental Protection Agency.

Chemical Name(s)	%Wt	CAS Registry No.	Table Z-1-A TWA mg/m^3	Table Z-1-A STEL mg/m^3	Table Z-1-A CEILING mg/m^3	NTP, IARC or OSHA Carcinogen
Sodium octanesulfonate	5-10	5324-84-5	Not Established	Not Established	Not Established	No

SECTION III: PHYSICAL DATA

Boiling Point:	212 °F	Vapor Pressure:	Unknown
Vapor Density (AIR = 1):	Unknown	Solubility in Water:	Complete
pH:	8.0-9.0	Specific Gravity (H_2O=1):	1.01 @ 75 F
Evaporation Rate (but.ace.=1):	<1	Percent Solid by Weight:	5-10%
Physical State:	Liquid		
Appearance & Odor:	Clear liquid, mild odor.		

SECTION IV: FIRE & EXPLOSIVE HAZARD DATA

Flash Point:	>212 °F	Method Used:	Estimate
Flammable Limits:	Not Established	Flame Extension:	N/A
Extinguishing Media:	Product does not support combustion. Use extinguishing media appropriate for surrounding fire.		
Special Fire Fighting Procedures:	Wear NIOSH approved self-contained breathing apparatus and protective clothing. Cool fire-exposed containers with water spray.		
Unusual Fire & Explosive Hazards:	Combustion products are toxic.		

SECTION V: HEALTH HAZARD DATA

Threshold Limit Value:	Not established	Primary Routes of Entry:	Inhalation, Skin Contact, Eyes; Oral

Effects of Overexposure-Conditions to Avoid:	**Causes eye irritation:** Symptoms may include pain, redness, swelling and tearing **May cause skin irritation.** Symptoms may include pain, redness and swelling. **May be harmful if swallowed:** Symptoms may include nausea, vomiting, pain and diarrhea. **Inhalation of product mist may cause respiratory irritation:** Symptoms may include coughing and difficulty breathing. **Avoid contact with eyes, skin or clothing. Do not taste or swallow. Avoid breathing product mist.**
Conditions Aggravated by Use:	Use of this product may aggravate preexisting skin; eye and respiratory disorders including asthma and dermatitis.
Emergency & First Aid Procedures:	
Eyes:	Flush eyes with water for at least 15 minutes. Remove contact lenses. Get medical attention.
Skin:	Remove contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention if irritation persists. Wash contaminated clothing before reuse.
Ingestion:	Do not induce vomiting unless advised by physician or poison control center. Drink one or two glasses of water to dilute product. Get medical attention. Do not give anything by mouth to an unconscious person.
Inhalation:	Move person to fresh air. Get medial attention if irritation persists.

SECTION VI: REACTIVITY DATA

Stability:	Stable	Incompatible Materials:	Strong oxidizers
Hazardous Decomposition Products:	Carbon monoxide, Carbon dioxide	Hazardous Polymerization:	Will Not Occur

SECTION VII: SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:	Small spills of one gallon or less may be flushed with plenty of water to sanitary sewer system (If permitted by local sewer regulations). Dike and contain large spills with inert material and transfer liquid to containers for recovery or disposal.
Waste Disposal Method:	Assure conformance with federal, state and local regulations.

SECTION VIII: SPECIAL PROTECTION INFORMATION

Respiratory Protection:	Not normally required. However if respiratory irritation occurs; the use of a NIOSH approved respirator suitable for the use-conditions and chemicals in Section II should be considered.
Ventilation:	Provide good general ventilation. Local exhaust ventilation may be necessary for some operations.
Protective Gloves(Specify Type):	Impervious rubber or other waterproof gloves are recommended when handling undiluted product.
Eye Protection(Specify Type):	Splash goggles are recommended when handling undiluted product.
Other Protective Equipment:	See 29 CFR 1910.132-138 for further guidance.

SECTION IX: SPECIAL PRECAUTIONS

Precautions; Handling & Storing:	Wash thoroughly with soap and water after handling.
Other Precautions:	Keep out of reach of children.

© SCC 05/03/2006

GREEN SOLUTIONS CARPET CLEANER
Ref: 29 CFR 1910.1200 (OSHA)

Name: Ronald T. Cook
Effective Date: 05/03/2006
Changes: Reviewed

Title: Manager, Regulatory Affairs
Supercedes: 11/20/2003

This document has been prepared using data from sources considered technically reliable. It does not constitute a warranty, express or implied, as to the accuracy of the information contained herein. Actual conditions of use and handling are beyond sellers control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State and Local laws and regulations.

Spartan Chemical Company, Inc.
Material Safety Data Sheet

SECTION I: PRODUCT INFORMATION

Product Name or Number (as it appears on label):
GREEN SOLUTIONS ALL PURPOSE CLEANER
Product Number: 3501
2-Liter Cartridge 101: 3511

Product Division:
Janitorial

Spartan Chemical Company, Inc.
1110 Spartan Drive
Maumee OH 43537

Product/Technical Information: **1-(800)-537-8990**
Medical Emergency: **1-(888)-314-6171 (24 hours)**
Chemical Leak/Spil Emergency: **CHEMTREC 1-(800) 424-9300 (24 hours)**

Shipping Description: Cleaning compounds, liquid, n.o.s.

NFPA Ratings:	HMIS Ratings:
Health: 2 - Moderate	**Health:** 2 - Moderate
Fire: 0 - Minimal	**Fire:** 0 - Minimal
Reactivity: 0 - Minimal	**Reactivity:** 0 - Minimal
	Pers. Prot. Equip.: See Section VIII

SECTION II: HAZARDOUS INGREDIENTS

(Listed when present at 1% or greater, carcinogens at 0.1% or greater) All component chemicals are listed or exempted from listing on the "TSCA Inventory" of chemical substances maintained by the U.S. Environmental Protection Agency.

Chemical Name(s)	%Wt	CAS Registry No.	Table Z-1-A TWA mg/m^3	Table Z-1-A STEL mg/m^3	Table Z-1-A CEILING mg/m^3	NTP, IARC or OSHA Carcinogen
Alkyl polyglycoside	1-5	132778-08-6	Not Established	Not Established	Not Established	No
Sodium carbonate	1-5	497-19-8	Not Established	Not Established	Not Established	No
Polyethylene glycol	1-5	9003-11-6	Not Established	Not Established	Not Established	No
propoxylated	1-5	77-92-9	Not Established	Not Established	Not Established	No
Citric Acid	1-5	68439-46-3	Not Established	Not Established	Not Established	No
Alcohol ethoxylate						

SECTION III: PHYSICAL DATA

Boiling Point:	212 °F	Vapor Pressure:	Unknown
Vapor Density (AIR = 1):	Unknown	Solubility in Water:	Complete
pH:	7.0-8.0	Specific Gravity (H_2O=1):	1.01 @ 75 F
Evaporation Rate (but.ace.=1):	<1	Percent Solid by Weight:	5-10%
Physical State:	Liquid		
Appearance & Odor:	Clear liquid, mild odor.		

SECTION IV: FIRE & EXPLOSIVE HAZARD DATA

Flash Point:	>212 °F	Method Used:	Estimate
Flammable Limits:	Not Established	Flame Extension:	N/A
Extinguishing Media:	Product does not support combustion. Use extinguishing media appropriate for surrounding fire.		
Special Fire Fighting Procedures:	Wear NIOSH approved self-contained breathing apparatus and protective clothing. Cool fire-exposed containers with water spray.		
Unusual Fire & Explosive Hazards:	Combustion products are toxic.		

SECTION V: HEALTH HAZARD DATA

Threshold Limit Value:	Not established	Primary Routes of Entry:	Inhalation, Skin Contact, Eyes; Oral

Effects of Overexposure-Conditions to Avoid:	**Causes eye irritation:** Symptoms may include pain, redness, swelling and tearing **Causes skin irritation:** Symptoms may include pain, redness and swelling. **May be harmful if swallowed:** Symptoms may include nausea, vomiting, pain and diarrhea. **Inhalation of product mist may cause respiratory irritation:** Symptoms may include coughing and difficulty breathing. **Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid breathing product mist.**
Conditions Aggravated by Use:	Preexisting skin; eye and respiratory disorders. May affect people with asthma.
Emergency & First Aid Procedures:	
Eyes:	Flush eyes with water for at least 15 minutes. Remove contact lenses. Get medical attention.
Skin:	Remove contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention if irritation persists. Wash contaminated clothing before reuse.
Ingestion:	Do not induce vomiting unless advised by physician or poison control center. Drink one or two glasses of water to dilute product. Get medical attention. Do not give anything by mouth to an unconscious person.
Inhalation:	Move person to fresh air. Get medial attention if irritation persists.

SECTION VI: REACTIVITY DATA

Stability:	Stable	Incompatible Materials:	Strong oxidizers
Hazardous Decomposition Products:	Carbon monoxide, Carbon dioxide	Hazardous Polymerization:	Will Not Occur

SECTION VII: SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:	Small spills of one gallon or less may be flushed with plenty of water to sanitary sewer system (If permitted by local sewer regulations). Dike and contain large spills with inert material and transfer liquid to containers for recovery or disposal.
Waste Disposal Method:	Same as above.

SECTION VIII: SPECIAL PROTECTION INFORMATION

Respiratory Protection:	Not normally required when good general ventilation is provided. However if respiratory irritation occurs; the use of a NIOSH approved respirator suitable for the use-conditions and chemicals in Section II should be considered.
Ventilation:	Provide good general ventilation. Local exhaust ventilation may be necessary for some operations.
Protective Gloves(Specify Type):	Impervious rubber or other waterproof gloves are recommended.
Eye Protection(Specify Type):	Splash goggles are recommended to prevent eye contact.
Other Protective Equipment:	See 29 CFR 1910.132-138 for further guidance.

SECTION IX: SPECIAL PRECAUTIONS

Precautions; Handling & Storing:	Wash thoroughly with soap and water after handling.
Other Precautions:	Keep out of reach of children.

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Name:	Ronald T. Cook	Title:	Manager, Regulatory Affairs
Effective Date:	06/30/2005	Supercedes:	11/20/2003
Changes:	Update Section IX		

GREEN SOLUTIONS ALL PURPOSE CLEANER

Ref: 29 CFR 1910.1200 (OSHA)

This document has been prepared using data from sources considered technically reliable. It does not constitute a warranty, express or implied, as to the accuracy of the information contained herein. Actual conditions of use and handling are beyond sellers control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State and Local laws and regulations.

Spartan Chemical Company, Inc.
Material Safety Data Sheet

SECTION I: PRODUCT INFORMATION

Product Name or Number (as it appears on label):
GREEN SOLUTIONS FLOOR FINISH REMOVER
Product Number: 3505

Product Division:
Janitorial

Spartan Chemical Company, Inc.
1110 Spartan Drive
Maumee OH 43537

Product/Technical Information: **1-(800)-537-8990**
Medical Emergency: **1-(888)-314-6171 (24 hours)**
Chemical Leak/Spil Emergency: **CHEMTREC 1-(800) 424-9300 (24 hours)**

Shipping Description: Cleaning compounds, liquid, n.o.s.

NFPA Ratings:	HMIS Ratings:
Health: 2 - Moderate	**Health:** *2 - Moderate; Chronic Hazard
Fire: 0 - Minimal	**Fire:** 0 - Minimal
Reactivity: 0 - Minimal	**Reactivity:** 0 - Minimal
	Pers. Prot. Equip.: See Section VIII

SECTION II: HAZARDOUS INGREDIENTS

(Listed when present at 1% or greater, carcinogens at 0.1% or greater) All component chemicals are listed or exempted from listing on the "TSCA Inventory" of chemical substances maintained by the U.S. Environmental Protection Agency.

Chemical Name(s)	%Wt	CAS Registry No.	Table Z-1-A TWA mg/m^3	Table Z-1-A STEL mg/m^3	Table Z-1-A CEILING mg/m^3	NTP, IARC or OSHA Carcinogen
*Diethylene glycol monobutyl ether	25-30	112-34-5	Not Established	Not Established	Not Established	No
Benzyl alcohol	5-10	100-51-6	44 (AIHA)	Not Established	Not Established	No
Monoethanolamine	1-5	141-43-5	7.5	15	Not Established	No
Alcohol ethoxylate	1-5	68439-46-3	Not Established	Not Established	Not Established	No

Comment: *This substance is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (SARA) and of 40 CFR 372.

SECTION III: PHYSICAL DATA

Boiling Point:	200 °F	Vapor Pressure:	Unknown
Vapor Density (AIR = 1):	Unknown	Solubility in Water:	Complete
pH:	10.5-11.5	Specific Gravity (H_2O=1):	1.008
Evaporation Rate (but.ace.=1):	<1	Percent Solid by Weight:	30-40
Physical State:	Liquid		
Appearance & Odor:	Clear liquid, mild odor		

SECTION IV: FIRE & EXPLOSIVE HAZARD DATA

Flash Point:	> 200°F	Method Used:	ASTM-D56
Flammable Limits:	N/A	Flame Extension:	N/A
Extinguishing Media:	Carbon dioxide, dry chemical, synthetic foam or water.		
Special Fire Fighting Procedures:	Wear NIOSH approved self-contained breathing apparatus and protective clothing. Cool fire-exposed containers with water spray.		
Unusual Fire & Explosive Hazards:	Combustion products are toxic.		

SECTION V: HEALTH HAZARD DATA

Threshold Limit Value:	Not Established	Primary Routes of Entry:	Inhalation, Skin Contact, Eyes & Oral

Effects of Overexposure-Conditions to Avoid:	**Causes severe eye irritation:** Symptoms include pain, redness, swelling of the conjunctiva and possible tissue damage. **Causes severe skin irritation:** Symptoms include pain, swelling and redness. Harmful contact may not cause immediate pain. **Harmful if absorbed through the skin.** **Harmful if swallowed:** Causes irritation to esophagus and mucous membranes with symptoms of pain, nausea, vomiting and diarrhea. **Inhalation of product vapors or mist may cause respiratory irritation:** Symptoms may include coughing and difficulty breathing. Contains benzyl alcohol which may cause headache, dizziness, nausea and drowsiness. Contains monoethanolamine which may cause liver and kidney damage with repeated exposure. **DO NOT GET IN EYES, ON SKIN OR CLOTHING. AVOID BREATHING PRODUCT VAPOR OR MIST. DO NOT TASTE OR SWALLOW. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.**
Conditions Aggravated by Use:	Use of this product may aggravate preexisting skin; eye and respiratory disorders including asthma and dermatitis.

Emergency & First Aid Procedures:

Eyes:	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses. Get medical attention.
Skin:	Remove contaminated clothing. Flush skin with plenty of water for at least 15 minutes. Get medical attention if irritation persists. Wash contaminated clothing before reuse.
Ingestion:	Get medical attention. Do not induce vomiting. Drink one or two glasses of water to dilute product. Do not give anything by mouth to an unconscious person.
Inhalation:	In case of respiratory irritation or dizziness; move person to fresh air. If not breathing; give artificial respiration. If breathing is difficult; give oxygen. Get medical attention if irritation persists.

SECTION VI: REACTIVITY DATA

Stability:	Stable	Incompatible Materials:	Strong acids and oxidizing agents
Hazardous Decomposition Products:	None known	Hazardous Polymerization:	Will Not Occur

SECTION VII: SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:	Small spills of one gallon or less may be flushed with plenty of water to sanitary sewer system (If permitted by local sewer regulations). Dike and contain large spills with inert material and transfer liquid to containers for disposal. Keep spill out of storm sewers and waterways.
Waste Disposal Method:	Dispose of in compliance with all federal, state and local laws and regulations.

SECTION VIII: SPECIAL PROTECTION INFORMATION

Respiratory Protection:	Not normally required when good general ventilation is provided.
Ventilation:	Provide good general ventilation. Local exhaust ventilation may be necessary for some operations.
Protective Gloves(Specify Type):	Neoprene, nitrile or rubber gloves are recommended to prevent skin contact.
Eye Protection(Specify Type):	Splash goggles are recommended to prevent eye contact.
Other Protective Equipment:	Rubber or other impervious footwear is recommended to prevent skin contact. Use of rubber apron, face shield and other protective equipment may be considered to prevent or minimize contact with this product. See 29 CFR 1910.132-138 for further guidance.

SECTION IX: SPECIAL PRECAUTIONS

Precautions; Handling & Storing:	Keep container tightly closed. Store in a cool, dry area. Protect from freezing. Do not store above 120°F. Do not mix with other chemicals.
Other Precautions:	Keep out of reach of children.

© SCC 06/01/2007

Name:	Ronald T. Cook	Title:	Manager, Regulatory Affairs
Effective Date:	06/01/2007	Supercedes:	04/25/2006
Changes:	Update Section II		

GREEN SOLUTIONS FLOOR FINISH REMOVER
Ref: 29 CFR 1910.1200 (OSHA)

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BIO 53 BASED

Graffiti Remover SAC™

A Soy And Corn Biobased Product
Designed to Remove Tough Marks and Stains

PRODUCT DESCRIPTION:
Graffiti Remover SAC is a ready-to-use BioRenewables product based on a biobased solvent, which is naturally derived from agricultural ingredients. A combination of soybean and corn esters, this efficient solvent blend helps to replace hazardous, toxic and environmentally harmful products in the workplace. A safer solvent alternative to petroleum based solvents. Graffiti Remover SAC is translucent yellow in color and has a non-offensive odor.

Why Biobased?
There have been several Government initiatives over the past five years in an attempt to reduce our nation's dependency on foreign energy and increase support for our agricultural industry. The Farm Security and Rural Investment Act (FSRIA) addresses biobased products and defines them as commercial or industrial products that are composed, in whole or significant part, of biological products or renewable domestic agricultural materials or forestry materials. Therefore, industrial raw materials, such as surfactants and solvents are now being produced from renewable plant or animal resources, which are typically biodegradable, friendlier to the environment and supportive of the agricultural industry. The federal government has mandated, through the FSRIA, that federal agencies purchase biobased products whenever possible.

Biobased Formula Seal
Graffiti Remover SAC is certified by a third party to contain 53% biobased material. The testing was performed by an outside, USDA approved, laboratory to insure the biobased content of Graffiti Remover SAC. The biobased seal, found on product labels and literature, allows end users to easily identify the biobased content in each BioRenewables product. This seal guarantees the percentage of ingredients that are made from renewable resources.

SURFACE SAFE ON:

- Glazed Tile
- Stainless Steel
- Desk Tops
- Fiberglass
- Metal
- Marble
- Chrome
- Aluminum
- Glass
- Formica®
- Lexan®
- Porcelain

VERSATILE AND EFFECTIVE:
Graffiti Remover SAC is a versatile formula that works against tough marks and stains. The formula is powerful enough to remove typical graffiti markings: paint, marker, ink, crayon and pencil. It will also take away scuff marks, wax residue and adhesive with ease. Graffiti Remover SAC also cleans the soiled surface marred by graffiti, eliminating the need for a second cleaning step. When removing marks from stainless steel, Graffiti Remover SAC does an outstanding job cleaning and polishing the surface.

A PLEASANT AND EASY TO USE PRODUCT
This BioRenewables product requires no diluting; simply spray onto surface from the RTU bottle. This method of application helps to eliminate employee confusion, incorrect dilutions and chemical spills. Graffiti Remover SAC is pleasant to work with and produces minimal fumes compared to other graffiti removal products. Meets VOC specifications for graffiti removers.

DIRECTIONS FOR USE:
Some individuals may be sensitive to ingredients in this product. Before using, read product label and MSD sheet. If questions remain, consult your employer or a physician.

NOT INTENDED FOR USE ON PAINTED SURFACES OR LAQUER COATED BRASS OR METAL. MAY REMOVE PAINT FROM WALL OR OTHER SURFACE.

1. Spray Graffiti Remover SAC evenly onto surface to be cleaned.
2. Let product penetrate soil for 2-5 minutes. Agitate with a sponge, brush or cloth. Difficult marks may require extra contact time or repeat applications.
3. If necessary, rinse thoroughly.

SPECIFICATION DATA:
Specific Gravity – 0.834@ 24°C/75°F
Density – 6.94 lbs./gal.
pH – n/a
Flash Point (Tag Closed Cup) – 64°C/147°F
Viscosity – water thin
Color – translucent yellow
Stability –
a. Shelf @ 24°C/75°F – one year minimum
b. Accelerated @ 49°C/120°F – 60 days minimum
c. Freeze/Thaw – will withstand a minimum of one cycle
Phosphate free
Biodegradable
VOC Compliant

PACKAGING:
Graffiti Remover SAC is packaged in PET Resin RTU Quart Bottles, 12 per case. Each package includes 3 Solvent Resistant Trigger Sprayers. Also available in Gallons, 4 per case. Standard label copy is available in English, Spanish and French. Secondary labels are also available.

Be sure to read all Directions, Precautionary and First Aid Statements on product labels before use of this or any Spartan product. Material Safety Data Sheets for all Spartan products are available from your authorized Spartan distributor or by visiting www.spartanchemical.com.

GUARANTEE:
Spartan's modern manufacturing and laboratory control insure uniform quality. If dissatisfied with performance of product, any unused portion may be returned for credit within one year of date of manufacture. Use product as directed and read all precautionary statements.

Some material may require special handling or application. Please refer to the appropriate Material Safety Data Sheet, literature and label.

Spartan Chemical Company, Inc.
Material Safety Data Sheet

SECTION I: PRODUCT INFORMATION

Product Name or Number (as it appears on label):
WATERFREE URINAL CLEANER
Product Number: 7180

Product Division:
Janitorial

Spartan Chemical Company, Inc.
1110 Spartan Drive
Maumee OH 43537

Product/Technical Information: **1-(800)-537-8990**
Medical Emergency: **1-(888)-314-6171 (24 hours)**
Chemical Leak/Spil Emergency: **CHEMTREC 1-(800) 424-9300 (24 hours)**

Shipping Description: Cleaning compounds, liquid, n.o.s.

NFPA Ratings:	HMIS Ratings:
Health: 2 - Moderate	**Health:** 2 - Moderate
Fire: 0 - Minimal	**Fire:** 0 - Minimal
Reactivity: 0 - Minimal	**Reactivity:** 0 - Minimal
	Pers. Prot. Equip.: See Section VIII

SECTION II: HAZARDOUS INGREDIENTS

(Listed when present at 1% or greater, carcinogens at 0.1% or greater) All component chemicals are listed or exempted from listing on the "TSCA Inventory" of chemical substances maintained by the U.S. Environmental Protection Agency.

Chemical Name(s)	%Wt	CAS Registry No.	Table Z-1-A TWA mg/m^3	Table Z-1-A STEL mg/m^3	Table Z-1-A CEILING mg/m^3	NTP, IARC or OSHA Carcinogen
Lactic acid	5-10	79-33-4	Not Established	Not Established	Not Established	No

SECTION III: PHYSICAL DATA

Boiling Point:	212 °F	Vapor Pressure:	Unknown
Vapor Density (AIR = 1):	Unknown	Solubility in Water:	Complete
pH:	1.0-2.0	Specific Gravity (H_2O=1):	1.013 @ 75 F
Evaporation Rate (but.ace.=1):	<1	Percent Solid by Weight:	5-10 %
Physical State:	Liquid		
Appearance & Odor:	Pale blue liquid, Sweet acid odor		

SECTION IV: FIRE & EXPLOSIVE HAZARD DATA

Flash Point:	>200 °F	Method Used:	Estimate
Flammable Limits:	Not Established	Flame Extension:	N/A
Extinguishing Media:	Product does not support combustion. Use extinguishing media appropriate for surrounding fire.		
Special Fire Fighting Procedures:	Wear NIOSH approved self-contained breathing apparatus and protective clothing. Cool fire-exposed containers with water spray.		
Unusual Fire & Explosive Hazards:	Combustion products are toxic.		

SECTION V: HEALTH HAZARD DATA

Threshold Limit Value:	Not established	Primary Routes of Entry:	Inhalation, Skin Contact, Eyes; Oral

Effects of Overexposure-Conditions to Avoid:	**Causes moderate eye irritation:** Symptoms may include pain, redness, swelling and tearing **May cause skin irritation:** Symptoms may include pain, redness and swelling. **May be harmful if swallowed:** Symptoms may include nausea, vomiting, pain and diarrhea. **Inhalation of product mist may cause respiratory irritation:** Symptoms may include coughing and difficulty breathing. **Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid breathing product mist. Wash thoroughly with soap and water after handling.**
Conditions Aggravated by Use:	Use of this product may aggravate preexisting skin; eye and respiratory disorders including asthma and dermatitis.
Emergency & First Aid Procedures:	
Eyes:	Flush eyes with water for at least 15 minutes. Remove contact lenses. Get medical attention.
Skin:	Remove contaminated clothing. Flush skin with water for at least 15 minutes. Get medical attention if irritation persists. Wash contaminated clothing before reuse
Ingestion:	Do not induce vomiting. Drink one or two glasses of water to dilute product. Get medical attention. Never give anything by mouth to an unconscious person.
Inhalation:	Move person to fresh air. Get medial attention if irritation persists.

SECTION VI: REACTIVITY DATA

Stability:	Stable	Incompatible Materials:	Strong oxidizers; hypochlorites
Hazardous Decomposition Products:	Carbon monoxide, Carbon dioxide	Hazardous Polymerization:	Will Not Occur

SECTION VII: SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:	Small spills of one gallon or less may be flushed with plenty of water to sanitary sewer system (If permitted by local sewer regulations). Dike and contain large spills with inert material and transfer liquid to containers for disposal. Keep spill out of storm sewers and waterways.
Waste Disposal Method:	Dispose of in compliance with all federal, state and local laws and regulations.

SECTION VIII: SPECIAL PROTECTION INFORMATION

Respiratory Protection:	Not normally required when good general ventilation is provided. However if respiratory irritation occurs, the use of a NIOSH approved respirator suitable for the use-conditions and chemicals in Section II should be considered.
Ventilation:	Provide good general ventilation. Local exhaust ventilation may be necessary for some operations.
Protective Gloves(Specify Type):	Rubber or other waterproof gloves are recommended.
Eye Protection(Specify Type):	Splash goggles are recommended to prevent eye contact.
Other Protective Equipment:	For further guidance see 29 CFR 1910.132-138.

SECTION IX: SPECIAL PRECAUTIONS

Precautions; Handling & Storing:	Do not use with other chemicals. Mixtures of this product with other chemicals, particularly those containing chlorine (hypochlorite) bleach, may result in the production of toxic gases. Store in a cool dry place.
Other Precautions:	Keep out of reach of children.

© SCC 08/30/2006

WATERFREE URINAL CLEANER
Ref: 29 CFR 1910.1200 (OSHA)

Name: Ronald T. Cook
Title: Manager, Regulatory Affairs
Effective Date: 08/30/2006
Changes: New Product

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INDOOR ENVIRONMENTAL QUALITY: CREDIT 10.4 & 10.5 GREEN CLEANING- LOW ENVIRONMENTAL IMPACT PEST MANAGEMENT POLICY

1. LEED-EB template
2. Documentation of UCSC Ground Services Integrated Pest Management Program
3. Educational flyer for building occupants about the Integrated Pest Management Program with the contact information of the IPM coordinator at E2.

(Responsible Party)

I, Jim Dunne , declare to USGBC that the building project has reduced exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment over the performance period through the following actions:

Development, implementation and maintenance of a low environmental impact integrated indoor pest management policy that:

☒ Specifies that all cleaning products included in the integrated pest management policy meet the requirements identified in MR credit 4.1-4.3.

☒ Promotes safer alternatives to chemical pesticides while preventing economic and health damage caused by pests.

☒ Implements the use of integrated pest management techniques to reduce the need for reliance on chemical pesticides.

☒ Ensures that clear and accurate notification concerning the use of pesticides, when necessary, be made available so that measures may be taken to prevent and address pest problems effectively without endangering occupants, janitorial workers or visitors.

☒ Addresses integrated methods, site or pest inspections, pest population monitoring, an evaluation of the need for pest control, and one or more pest control methods, including sanitation, structural repairs, mechanical and living biological controls, other non-chemical methods, and, if nontoxic options are unreasonable and have been exhausted, a least toxic pesticide.

☒ Includes a communication strategy to provide notification of the integrated pest management system. The communication strategy shouldinclude information and notice to tenants or directly to occupants in an owner-occupied building; a description of the integrated pest management system and a list of all pesticides, including any least toxic pesticide that may be used in the building as part of the integrated pest management system; the name, address, and telephone number of the contact person of the building; and a statement that the contact person maintains the product label and material safety data sheet (MSDS) of each pesticide used by the building, that the label or MSDS is available for review upon request, and that the contact person is available for information and comment. • The communications strategy should also address "Universal Notification," which requires notification not less than 72 hours before a pesticide, other than a least toxic pesticide, is applied in a building or on surrounding grounds that the building maintains and address under what circumstances an emergency application of pesticides in a building or on surrounding grounds being maintained by the building can be conducted without complying with the earlier provisions. In addition, address notification strategies to ensure that occupants and janitorial workers are notified 24 hours in advance of the pesticide application.

I have provided the following supplementary documentation to support the declaration:

☒ A copy of the low environmental impact pest management policy adopted by the organization.

☒ Documentation that the Low Environmental Impact Pest Management Policy has been followed during the performance period.

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(Continued on page 2)

Completing Quarterly Reports is Optional for this Credit

Quarterly Reports	Year 1							
	Quarter 1		Quarter 2		Quarter 3		Quarter 4	
Name of person currently responsible for making sure that the Low Environmental Impact Pest Management Program continues to work well	Gary Cunningham							
Date responsible person provided quarterly report information listed below	7-31-08							
Questions that the responsible person must answer each quarter:								
Has the Program been effectively maintained over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Has the Program continued to work well over the last quarter?	(•) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No	( ) Yes	( ) No
Are there any problems with the Program that need to be remedied? (Insert a numbered list of problems or insert "None")	none							
If any problems with these programs were identified, how have these been remedied? (Insert a numbered list of remedies or insert "None")	none							
Are there any opportunities for improving the Program? (insert a numbered list of opportunities or insert "None")	none							
If any opportunities for improvements were identified, how have these been implemented? (List opportunities and how each has been implemented or "None")	none							

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Credit 10.4-10.5 (2 points possible): Green Cleaning: Low Environmental Impact Pest Management Policy

Points Documented: 2

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

James	Dunne	9-15-08	jfdunne@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT SANTA CRUZ, CALIFORNIA 95064

Wednesday, January 28, 2009

To: US Green Building Council- LEED-EB Program
Re: Documentation for EA 10.4 & 10.5 Integrated Pest Management for E2-UCSC

This letter is to confirm that UCSC Grounds Services has an integrated pest management program in place and operational for the Engineering 2 building. Integrated Pest Management is a method of pest control that draws on several different disciplines in order to effectively solve pest problems in a socially acceptable, and environmentally aware manner. The Grounds Services Pest Manager provides integrated pest management of pests, including education and consultation services.

UCSC campus contact is Contact: Gary Cunningham at (831) 459-2252 or email gcunning@ucsc.edu

UCSC PESTICIDE USE POLICY:
Effective Date: July 1, 1997

UC Santa Cruz Policy
Environmental Health & Safety

Pesticide Use

(Policy EHS0003)

I. Purpose of the Policy

The University of California is concerned with maintaining a safe environment on its premises and abiding by state, local and federal regulations relating to health and safety. Pest control, as accomplished through an Integrated Pest Management Program, seeks to regulate the numbers and activities of pests, flora or fauna, where such pests threaten a safe and sanitary environment or threaten to destroy or damage university property. As a matter of policy, control methods used will be those with minimum negative impact upon environmental quality and may include physical, mechanical, cultural, biological and educational tactics. All non chemical pest control methods will be explored and exhausted before pesticides are used. This policy defines responsibilities and provides guidelines for selecting and applying pest control measures and pest control materials (pesticides).

II. Detailed Policy Statement

A. Responsibilities

1. Grounds Services's Pest Management Office:

All pesticides used by Grounds Services will be coordinated by the Grounds Services Pest Management Staff,. Grounds Services is responsible for inspections, recommendations, identifying control methods, and maintaining Grounds Services pesticide inventory data.
a. When pests are or threaten to become a problem on university property, Grounds Services's Pest Management Office will be notified, allowing as much time as possible for pest control operations to be undertaken.
b. Grounds Services Pest Manager will inspect the area, monitor the pest population, and assess the problems related to pest infestation, then formulate an integrated pest management remedial approach, which may include activities such as preventive maintenance, custodial practices, landscaping, and occupant education.
c. Proposed pest control measures involving new materials shall be submitted on a Pesticide Use *Request* form to EH&S for approval. EH&S will evaluate each request, ascertaining that safety requirements and applicable guidelines have been provided for, and will approve proposed operations based upon independent investigation and applicable regulations.
d. Using only EH&S approved pest control measures and materials, Grounds Services will coordinate pest control treatments with campus personnel assigned responsibility for the building(s) or area(s) involved.

The E2 Building Coordinator is Bob Vitale, Director of Laboratories and Facilities (831) 459-3794, rvitale@soe.ucsc.edu

The E2 Building Coordinator will maintain a binder with material supplied by Grounds Services containing the Label and MSDS for each material that may be used inside E2.

The E2 Building Coordinator will make the Labels and MSDS available upon request to building occupants and Custodial Staff. Current internet URLS will be sufficient for those with internet skills and access.

The E2 Building Coordinator will activate the required "Universal Notification" occupant notification procedure 72 hours before the application of pesticide inside E2, with an exception for the application of contained non-volatile baits. No notification will be required for the application of contained non-volatile baits

e. Depending upon the type of pest control operations, Grounds Services, or personnel approved by them, will inspect treated areas to determine the timing of re-occupancy and the effectiveness of the control methods.
f. Grounds Services shall perform periodic pest risk evaluations of UCSC properties. Inspections for particular species will coincide with biological factors such as seasonal population growths and reproduction cycles.
g. Grounds Services or EH&S may perform inspections of adjunct campus pesticide activities or storage areas in order to assess compliance with applicable regulations and Campus Policy.
h. Grounds Services Pest Management Staff in Coordination with the E2 Building Coordinator will implement an educational/informational display in a public area of E2 that includes:

1. A description of Integrated Pest management and useful tips for common E2 pests
2. The name and contact information for the E2 Building Coordinator, the Grounds Services Pest Manager, and the Physical Plant work Order desk.
3. A statement indicating the E2 Building Coordinator has Labels and MSDS's for all pesticides that may be used inside the building and that the E2 Building Coordinator will make the Labels and MSDS available upon request to building occupants and Custodial Staff

g. An Emergency Pesticide Application may be made with 24 hours advance notice to all occupants in cases where research or public events will be significantly disrupted if such an application is not made.

2. Environmental Health & Safety:
EH&S's responsibilities include evaluating and approving all pesticide use in accordance with applicable regulations, information pertinent to
individual species and conditions, and good health and safety practices.

3. Campus Units: *Unit managers are responsible for ensuring that the activities of their unit are in accordance with this policy.*

B. Restrictions

1. Training
Adequate training, as determined by Department of Pesticide Regulation, Grounds Services and EH&S, must be completed prior to pesticide use. Training required may vary depending upon the degree of employee

responsibility and the hazard potential of anticipated operations. Pesticides will be used only under the direction ofa licensed operator, and the applicator shall be familiar with all pertinent governmental and campus regulations.

2. Pesticide Materials

Whenever possible, pest control materials will be limited to those that are least toxic. More toxic pesticides will be authorized only under special conditions based upon amounts required, hazard potential, the absence of a less toxic effective material, degradation rates, and consideration of the hazard of the pests versus the hazard of the pest control material.

3. Pesticide Storage and Disposal

All pesticide containers and service containers will be stored and labeled in accordance with state and federal pesticide regulations. Outdated or unusable materials and all pesticide waste shall be property contained and disposed in accordance with applicable state and federal regulations.

4. Equipment Care

All equipment used to apply pesticides (e.g. foggers, sprayers), other pest control equipment (e.g. traps, cages), and pesticide safety equipment (e.g. warning signs, protective clothing, eye protection, respirators) shall be thoroughly checked by the applicator for proper selection and operation before each use. After each use, they shall be thoroughly cleaned and checked for proper operation.

5. Purchase of Pesticides

Only EH&S approved pesticides may be purchased. Units may purchase EH&S-approved pesticides independently, providing they report pesticide purchases quarterly to that office. Quantities of pesticides purchased shall be proportional to the anticipated need to ensure all materials will be used.

6. Medical

Medical examinations for campus personnel assigned to pest control operations using pesticides will be made at the discretion of EH&S or as required by applicable regulations. Any suspected overexposure or adverse physical effects sustained by anyone using or exposed to pest control agents will be promptly reported to EH&S.

III. Definitions

Pesticide**:** Any substance (or mixture) intended for preventing, destroying, repelling or mitigating any pest or intended for use as a plant regulator, defoliant, or desiccant.

IV. Getting Help

EH&S will provide training and assistance to campus units (including help with completing forms, carrying out procedures, or interpreting policy). Additionally, this office is available to discuss pest control strategies and environmental health issues with the campus community.

If you need help with ...
Contact ...

Pest problem
Work Order Desk x4444

Pesticide safety information
EH&S, x3541 or x2553

V. Applicability and Authority

This policy on Pesticide use applies to all campus units except it will not apply to research areas where access by the campus community is controlled. Additionally, the University does not intend to regulate the purchase of over-the- counter products by private individuals living in campus residential facilities to be used exclusively within that residence. Campus residents are encouraged, however, to seek the advice of EH&S before buying any pesticide for personal use.

This is a new policy and thus supersedes any campus practice in existence prior to its effective date.

The campus EH&S Office is the campus authority for the pesticide use policy.

This policy was reviewed and approved by the Chancellor on x/x/97. Next review date is x/x/99.

US Green Building Council- LEED-EB Program
Indoor Environmental Quality
Integrated Pest Management (IPM)

UCSC Grounds Services has an integrated pest management program in place and operational for the Engineering 2 building.

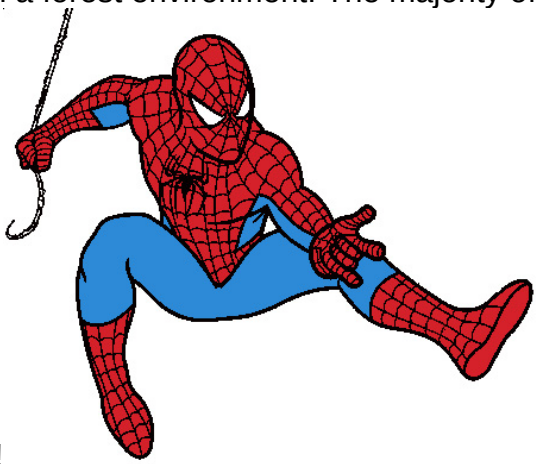
IPM: (EPA definition) The coordinated use of pest and environmental information with available pest control methods to prevent unacceptable levels of pest damage or inconvenience by the most economical means and with the least possible hazard to people, property, and the environment. Pesticide use would be the last alternative after physical, mechanical, and cultural control measures have been exhausted.

Useful tips for preventing common interior pests yourself – the first choice of IPM

- **Ants** – Sanitation – clean any food spills, rinse out food and drink containers before recycling or disposing, avoid build up of container recycling in your office space. Check potted plants before watering for ant nesting, especially in the winter months – water will drive them out of the pot and onto your desk!
- **Yellow Jackets** - Rinse out food and drink containers before recycling or disposing, make sure windows have tight screens to prevent entry.
- **Rats and mice** - Do not prop open doors especially in the evening. Do not leave windows open over night. Do not hang a bird feeder out your window this will entice rodents and create a food source. Check the clearance under the door and or look for any other points of entry into your space.

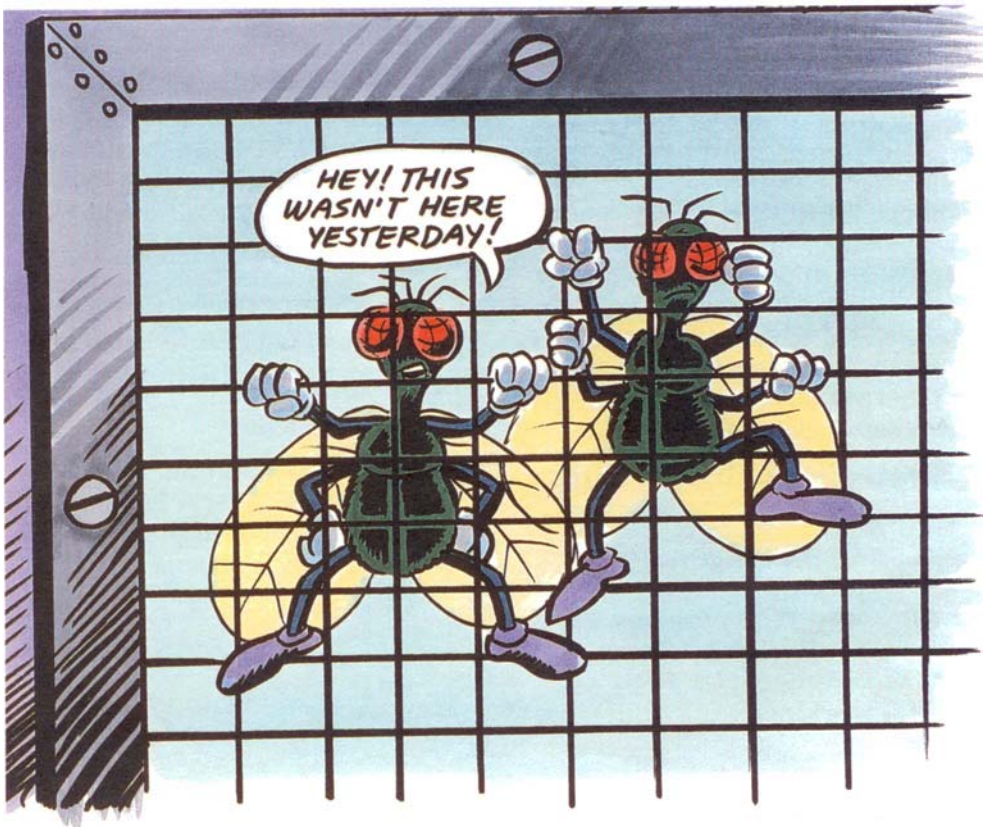
- Mice can squeeze through gaps ¼" or larger, rats can get through gaps ½" or larger. Report any suspected points of entry and/or have them modified.

- **Fleas** - Keep floor area clear and accessible for Custodial Services to clean entire floor space. Fleas like the edges of floors where eggs will not be disturbed. Avoid clutter, keep things off the floor as much as possible.
- **Cockroaches** - Keep break rooms with refrigerators or other warmth generating appliances and equipment clean. Cockroaches need overnight warm spots with food and moisture nearby.
- **Spiders** - We work in a forest environment. The majority of spiders here are beneficial.



Try to accommodate!

- **Flies** - Make sure all windows have tight screens.



Contacts for coordinating IPM at E2

- The E2 Building Coordinator is Bob Vitale, Director of Laboratories and Facilities (831) 459-3794, rvitale@soe.ucsc.edu
- The Grounds Services Pest Manager is Gary Cunningham. Please contact Gary through the E2 Building Coordinator or the Physical Plant Work Order Desk at 459-4444.
- The Physical Plant Work Order Desk may be reached at 459-4444

Labels and MSDS's (Material Safety Data Sheets) for any Pesticide that may be used at this Facility

- The E2 Building Coordinator is Bob Vitale, Director of Laboratories and Facilities (831) 459-3794, rvitale@soe.ucsc.edu

- The E2 Building Coordinator maintains a notebook with product labels and MSDS's for any interior pesticide that may be used at E2. This will be made available for review by the Building Coordinator upon request with reasonable time to accommodate. Most material labels and MSDS's are available on line as well.

INDOOR ENVIRONMENTAL QUALITY: CREDIT 10.6 GREEN CLEANING, LOW ENVIRONMENTAL IMPACT CLEANING EQUIPMENT POLICY

1. LEED-EB template
2. Low Environmental Impact Cleaning Equipment Policy
3. Description of the custodial departments cleaning frequencies.
4. Records of janitorial equipment used in E2 with an example equipment maintenance log for the performance period.
5. Vendor specifications for each type of cleaning equipment used in the E2 building.

(Responsible Party)

I, Louise Huttinger , declare to USGBC that the building project has reduced exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants, which adversely impact air quality, health, building finishes, building systems and the environment over the performance period through the following actions:

☒ Development, adoption and maintenance of a cleaning equipment policy for the use of janitorial equipment that maximizes effective reduction of building contaminants with minimum environmental impact and meets the following requirements:

- ☒ Vacuum cleaners meet the requirements of the Carpet & Rug Institute "Green Label" Testing Program - Vacuum Cleaner Criteria and be capable of capturing 96% of particulates 0.3 microns in size and shall operate with a sound level less than 70dBA.
- ☒ Hot water extraction equipment for deep cleaning carpet be capable of removing sufficient moisture such that carpets can dry in less than 24 hours.
- ☒ Powered maintenance equipment including floor buffers, burnishers and automatic scrubbers be equipped with vacuums, guards and/or other devices for capturing fine particulates, and shall operate with a sound level less than 70dBA.
- ☒ Propane-powered floor equipment have high-efficiency, low-emissions engines.
- ☒ Automated scrubbing machines be equipped with variable-speed feed pumps to optimize the use of cleaning fluids.
- ☒ Battery-powered equipment be equipped with environmentally preferable gel batteries.
- ☒ Where appropriate, active micro fiber technology be used to reduce cleaning chemical consumption and prolong life of disposable scrubbing pads.
- ☒ Powered equipment be ergonomically designed to minimize vibration, noise and user fatigue.
- ☒ Equipment have rubber bumpers to reduce potential damage to building surfaces.
- ☒ A log has been kept for all powered housekeeping equipment to document the date of equipment purchase and all repair and maintenance activities and includes vendor cut sheets for each type of equipment in use in the log book.

I have provided the following to support the declaration:

☒ A copy of the low environmental impact janitorial equipment policy adopted by the organization.

☒ A record of the janitorial equipment used in the building and a log of the maintenance of each piece of equipment over the performance period.

☒ Vendor specifications for each type of equipment in use.

Project Name: Engineering 2 LEED EB Submittal

Credit: IEQ Credit 10.6 (1 point possible): Green Cleaning: Low Environmental Impact Cleaning Equipment Policy

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2008-10-01	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

SANTA BARBARA • SANTA CRUZ

PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

UC SANTA CRUZ- ENGINEERING 2 BUILDING: LOW ENVIRONMENTAL IMPACT CLEANING EQUIPMENT POLICY

The UCSC Custodial Services adheres to the following green cleaning equipment policy. The cleaning equipment used in the Engineering 2 building maximizes the effectiveness of the E2 Low-Environmental Impact Cleaning Policy. The requirements of this policy reduce the E2 occupants and custodians exposure to potentially hazardous chemicals and contaminants, protecting them from adverse impact air quality. Developing this policy has allowed the University to roll out these requirements campus-wide, implementing green cleaning and equipment upgrades to buildings throughout the UCSC campus. In addition, all future equipment upgrades or replacements at UCSC will abide by the following standards:

I. Vacuum Cleaners

Vacuum cleaners currently used and purchased in the future must meet the requirements of the Carpet and Rug Institute "Green Label" Testing program. All vacuums must be capable of capturing 96% of particulates, .3 microns in size and operate with a sound level less than 70 dba. All equipment has rubber bumpers in order to reduce damage to building surfaces, and are ergonomically designed to minimize vibration, noise and user fatigue. Currently, E2 is using Windsor vacuums with Hepa filtering systems that meets these requirements.

II. Hot Water Extraction Equipment

All hot water extraction equipment for deep cleaning carpets is capable of removing sufficient moisture such that carpets dry in less than 24 hours after being cleaned. All powered hot water extraction equipment is ergonomically designed to minimize vibration, noise, and user fatigue.

III. Buffers, Burnishers, and Automatic Scrubbers

Floor buffers, burnishers, automatic scrubbers and other powered equipment are equipped with devices for capturing fine particulates and operate with a sound level below 70dba. Automatic floor scrubber and the hot water carpet-cleaning machine are filled via the automatic chemical dispensing units and variable speed feed pumps to optimize the use of cleaning fluids. All equipment has rubber bumpers to reduce potential damage to building services and is ergonomically designed to minimize vibration, noise and user fatigue.

IV. Micro Fiber Technology

Micro fiber technology is used to reduce cleaning chemical consumption and prolongs life of disposable scrubbing pads. Micro fiber rags, wet mops, dust mops, high dusters and hand dust cloths have replaced standard cotton mops and

feather dusters. Custodial staff has been trained not to spray any chemical directly onto surfaces or into the air, but to spray all needed premixed chemical into the Micro Fiber rag, and utilize the rag to apply the chemical to the surface.

V. Battery and Propane Powered Equipment

All equipment powered by batteries is equipped with environmentally preferable gel batteries. If equipment is powered by propane, it must be high efficiency, and low emissions engines.

VI. Custodial Equipment Log

A log is kept for all powered cleaning equipment to document the date of purchase, and all repair and maintenance activities. The log must also contain vendor cut sheets for each type of equipment used in the logbooks.

Microfiber rags on custodial cart

Microfiber Mop

Microfiber scrubber pad and clohs

Microfiber duster

Windsor Vaccum

Custodial Department Cleaning Frequencies

Night Operations

(OMP Areas – State Funded)

Restrooms

Nightly

- Cleaned and restocked

Classrooms, seminar & conference rooms and lounges

Nightly

- Empty pencil sharpeners
- Empty wastebaskets, changing liners as necessary
- Dry wipe all chalkboards
- Dust mop floors, spot mop as necessary
- Vacuum carpeted areas

Once per week

- Damp mop areas that have concrete, terrazzo or resilient tile floors.

Offices

Two times per week

- Empty wastebaskets, changing liners as necessary
- Dust mop floors
- Vacuum carpeted areas (Note: we do not vacuum personal rugs)

Once per week

- Spot mop floors

Once per month

- Damp mop areas that have concrete, terrazzo or resilient tile floors.

Computer areas

Nightly

- Empty pencil sharpeners
- Empty wastebaskets, changing liners as necessary
- Dry wipe all chalkboards
- Dust mop floors, spot mop as necessary
- Vacuum carpeted areas

Three times per week

- Spot clean glass in doors

Computer areas

Once per week

- Damp mop floor with a well wrung mop and remove obvious soil, marks and scuff

Corridors and lobbies

Nightly

- Empty wastebaskets, changing liners as necessary
- Clean drinking fountains
- Vacuums entrance mats
- Clean glass entry doors
- Vacuum/dust mop floors
- Spot mop to remove heavy soil or spills

Once per week

- Damp mop all floors

Stairwells

Nightly

- Police litter

Once per week

- Sweep or vacuum stairs

Once per month

- Wash handrails with detergent solution

Lecture Halls

Nightly

- Empty pencil sharpeners
- Empty wastebaskets, changing liners as necessary
- Dry wipe all chalkboards
- Dust podium area, lectern, sills and ledges
- Dust mop floors, spot mop as necessary
- Vacuum carpeted areas

Once per week

- Spot clean glass in doors and walls

Once per month

- Damp mop concrete floors
- Vacuum upholstery

Research laboratories and office laboratory combinations

Nightly

- Empty pencil sharpeners
- Empty wastebaskets (non hazardous), changing liners as necessary
- Dust mop floors, sweep floors with a push broom

Once per week

- Dry wipe all chalkboards (upon request in a private lab)

Twice per month

- Damp mop areas that have concrete, terrazzo or resilient tile floors.

Carpet shampooing	**12-18 months depending on staffing and workload**
Floor waxing	**12-18 months depending on staffing and workload**
Window washing	**Once every 3 years**

If services are needed beyond those noted or at an increased frequency go to Requesting Special Services on Cleaning Frequencies web page.

From: "Donald S Nichols" <dnichols@ucsc.edu>
Subject: E2 Equipment
To: gvalerga@ucsc.edu

Hello George,
The machinery inventory for Eng 2 is as follows:

1st floor:
Proteam Tailvac DT-100 #16-016158 Sept 07
replaced 1/09 w/Proteam Super Quarter-Vac SQV-100 #76-009127

2nd floor:
Proteam Quarter-Vac QV-2000 #22-023833 June 08
replaced 1/09 w/Proteam Super Quarter-Vac SQV-100 #76-009780

3rd floor:
Windsor Sensor SR-15 #L 19003227 Sept 07

Proteam Tailvac DT-100 #16-16167 Sept 07
replaced 1/09 w/Proteam Super Quarter-Vac SQV-100 #76-009353

4th floor:
Proteam Tailvac DT-100 #16-016169 Sept 07

Proteam Quarter-Vac QV-2000 #22-02843 June 08

5th floor:
Windsor Sensor SR-15 #L 19003300 Sept 07

Proteam Tailvac DT-100 #16-016160 Sept 07

Haier Clothes Washer HLP21E #CAOHFOEO 100X8430235 June 08

-Scott

LOCATION: 3RD FLOOR ENGINEERING 2
EQUIPMENT TYPE: VACUUM BACKPACK
MODEL: PRO-TEAM TAILVAC DT-100
SERIAL NUMBER: 16-016167

1/7/08

DATE	BELT/BRUSH	HOSE/TOOLS	CORD/PLUG	BAG/FILTERS	ACTIONS
2/27/08					ASSIGNED TO BUILDING
4/8/08	NA	ok	ok	ok	GENERAL SERVICE. NO PROBLEMS
6/3/08	NA	OK	OK	OK	GENERAL SERVICE
7/8/08	NA	OK	CORD PULLED OUT FROM BODY	OK	CORD REATTACHED TO BODY
8/12/08	NA	OK	OK	OK	GENERAL SERVICE
10/3/08	NA	OK	OK	OK	GENERAL SERVICE
12/4/08	NA	OK	OK	OK	GENERAL SERVICE

Vacuums

Backpacks: QuarterVac®

The first vacuum ever produced by ProTeam is still a favorite of many Jan/San professionals. The light weight versatility and compact construction of the QuarterVac is perfect for operators cleaning smaller commercial buildings, hotels, churches, apartments or individual businesses.

Includes: 1 1/2" static-dissipating vacuum hose, 50' extension cord, and two Intercept Micro Filters®.

Warranty: Carries an unmatched 3/3/3/Life warranty – 3 years on parts, labor and motor and life on the molded body parts.

COMPARE + | FIND SALES REP + | BUY FILTERS +

Watts: 896 W
Weight: 9 lbs.
Decibels: 68 dB
Airflow: 115 CFM
Static Lift: 65 in.
Amps: 7.9 A
Intercept Micro Filter: 496 sq. in. / 6 qt.
Four Level Filtration: 791 sq. in

Standard Configuration:

101245 QuarterVac w/Attachment Kit B (101336)

Kit#: 101336
Kit includes: 17" Crevice Tool, 3" Dust Brush w/ Reducer, 5" Upholstery Tool, 56" Two-Piece Two-Bend Aluminum Wand w/Button Lock, 14" E-Z Glide Floor Tool w/Nylon Brush

Vacuums

Hipstyles: TailVac®

Our lightest vacuum available, the TailVac is a preferred tool of professional maid services across the country. This unit is powerful for tough jobs and perfect for quick cleaning or detail jobs. Plus, you can wear it around your waist, carry it by the heavy duty handle or sling it over your shoulder for easy maneuverability.

Includes: 3' to 1' stretch vacuum hose, a 50' extension cord, convertible 3-way belt system and two Micro Intercept Filters®.

Warranty: Carries an unmatched 3/3/3/Life warranty – 3 years on parts, labor and motor and life on the molded body parts.

COMPARE + | FIND SALES REP + | BUY FILTERS +

Watts: 788 W
Weight: 8 lbs.
Decibels: 65 dB
Airflow: 112 CFM
Static Lift: 63 in.
Amps: 6.6 A
Intercept Micro Filter: 496 sq. in. / 6 qt.
Four Level Filtration: 781 sq. in.

Standard Configuration:

Item #: 098-SRXP15

Windsor® Sensor XP Upright Vacuum - 15"

The Sensor is the only vacuum to offer superior upright vacuuming technology that protects itself from operator neglect.
-2-stage, 1.6 hp, 1200 watt, 90" waterlift, 105 cfm airflow
-99.97% at 0.3 microns, 76"[2] filtration area
-120 volt, 60 cycle

Features

- Ultra-light handle weight increases operator comfort and productivity
- On-board tools and extension wand make Sensor XP the perfect detail cleaning machine
- Automatic Vacuuming System automatically adjusts brush height for peak efficiency on any surface without stopping to make adjustments
- Electronic control system warns operator if bag is full or brush is jammed
- Motor turns off to prevent damage if warnings are ignored
- CRI Green Label Patented
- Triple lined bag filters out dust and dirt
- Off-set Air Quality MicroFilter™ provides increased vacuuming performance
- Final exhaust filter catches motor exhaust particles

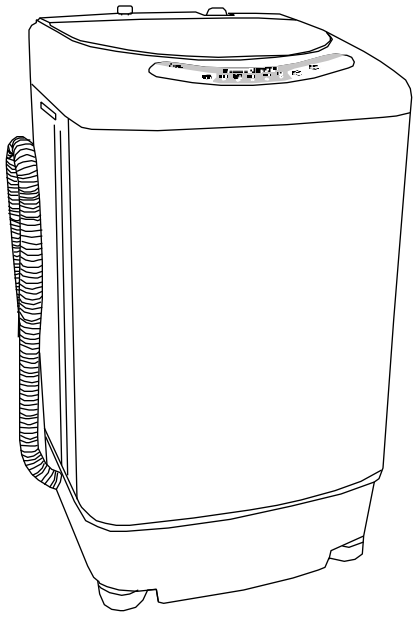
Specifications

Housing: Injection molded, high-impact ABS plastic
Brush Drive: Non-slip toothed belt, enclosed, electronic safety clutch and speed control
Brush Speed: 5400 brush contacts per minute, 2700 rpm
Brush Servo Motor: Automatically sets brush height, electronic sensor
Dust Bag: Triple layer bag with 323"[3] enclosed, top-loading
Wheels: 2.5" diameter rubberized
Cable: 40' 18/3 SJT, double insulated
Sound Level: 70 dBA at operator
Tools: On board crevice and upholstery tools, optional dusting brush and clip (part #109 and #5352WS)
Approvals: CRI Indoor Air Quality Testing Program
Patents: 5028245, 4955106, 5056175
Warranty: Windsor Three Year Protection Plan
Weight: 18 lbs with cable - 16 lbs without cable
Handle Weight: 1.5 lbs

Haier®

What The World Comes Home To™

Portable Electronic Washer



Lave-Linge Électronique Mobile

Lavarropas Eléctrico portátil

User Manual- ***Model #***

Guide de l'Utilisateur- ***Modèle #***

Manual del Usuario- ***Modelo #***

HLP21E

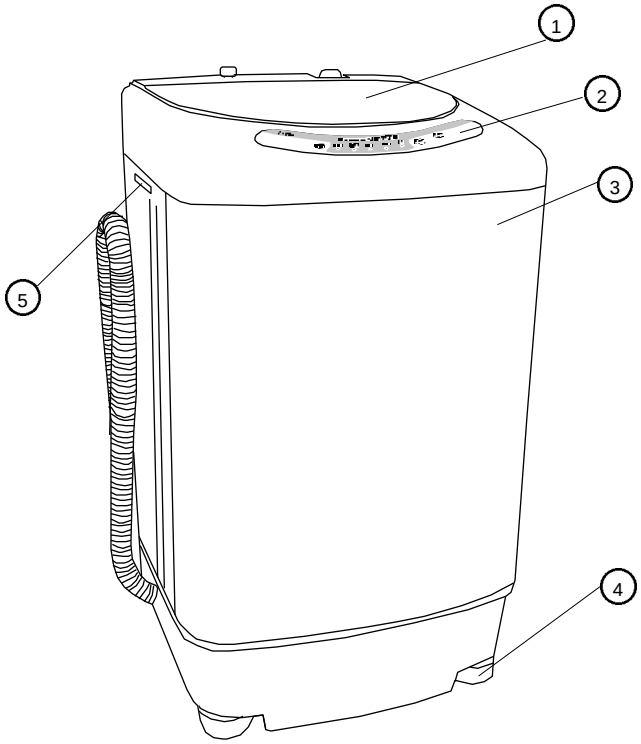
IMPORTANT SAFETY INSTRUCTIONS

Warning – *To reduce the risk of fire, electric shock, or injury to persons when using your appliance, follow basic precautions, including the following:*

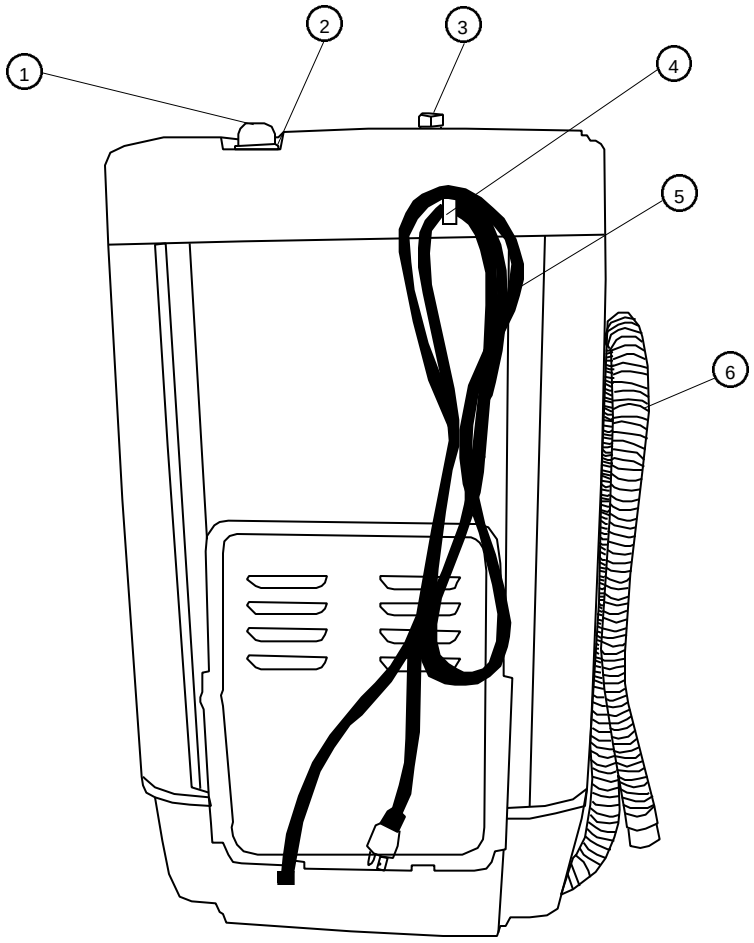
1. **Read all instructions before using the appliance.**
2. Use this appliance only for its intended purpose as described in this use and care guide.
3. Use only detergents or softeners as recommended for use in this manual and keep them out of the reach of children.
4. This appliance must be properly installed in accordance with the installation instructions before it is used.
5. Never unplug your appliance by pulling on the power cord. Always grasp the plug firmly and pull straight out from the outlet.
6. Replace immediately any worn power cords, loose plugs and power outlets.
7. Unplug your appliance before cleaning or before making any repairs.
8. If your old appliance is not being used, we recommend that you remove the door. This will reduce the possibility of danger to children.
9. Do not operate your appliance in the presence of explosive fumes.
10. Do not use this appliance to wash clothes that have been soaked, spotted or washed in gasoline, dry cleaning solvents or any other explosive or flammable substances that may ignite and explode.
11. Clothes or rags used to clean flammable or explosive materials should not be washed in this appliance until all traces of this material have been removed.
12. Do not add or mix any flammable or explosive substances to the wash.
13. Do not try to remove clothes while the tub is moving. Allow it to come to a complete stop before reaching in.
14. The appliance's loading door must be closed when the tub is spinning.
15. Do not operate your appliance when parts are missing or broken.
16. Do not use this appliance for commercial uses.
17. Do not operate this appliance unless all enclosure panels are properly in place.
18. Do not tamper with controls.
19. To reduce the risk of injury, do not allow children to play in or on the appliance. Close supervision of children is necessary when the appliance is used near children.
20. This appliance must be connected to a proper electrical outlet with the correct electrical supply.

OPERATING INSTRUCTIONS

Parts and Features



1. Top Lid
2. Control Panel
3. Washer Cabinet
4. Front Leveling Leg
5. Cabinet Handle (located on both sides of the washer)



1. Water Inlet Valve
2. Water Absorption Cushion
3. Water Level Selector
4. Power Cord Holder Clip
5. Power Cord (115 Volt / 60 Hz)
6. Drain Hose

- Pre-treat all stains and heavily soiled areas for best results.
- Do not overload your washer.
- Close the door properly after loading the clothes.
- When loading wet items, keep water level high enough to keep the unit in balance and to allow clothing to float easily in the water.

Proper Use of Detergent

- Fill water in the tub at the "Low" water level.
- Add the detergent.
- Load the washer.
- Select the water level.

Note: The amount of detergent used depends on the size of the load, the water type (hard or soft) and whether the clothes are heavily soiled or lightly soiled. Besides the performance of the washing machine, the quality of the detergent also affects the wash result. For best results, use low sudsing detergents only. Refer to the detergent manufacturer's recommended amount for usage.

Proper Use of Bleach

Refer to the bleach manufacturer's chart for the recommended use of liquid bleach. Dilute the bleach and add it to the water before putting clothes into the washtub.

Warning! Be careful not to spill undiluted bleach onto the washer cabinet or onto clothing. It is a strong chemical that may damage your clothes and the finish of the washer if not properly diluted.

Lint Filter and Water Filter

- The Lint filter is located inside the washer drum. A small nylon bag collects lint and residue from clothes during the wash cycle.

  Note: Do not wash your clothes without the filter in its compartment inside the tub.

- You must clean the filter after every load for the best results. Push down the tab in the filter to remove. Clean and slide the filter back in place.

- There is also a filter in the water inlet valve. This prevents foreign particles in the water from entering the washer. Clean this at least once a month.

Selecting the Wash Cycle

- Press the "Program Select" button for your desired wash cycle. Choose between 7 options.
- The total time includes the normal water inlet time and drain time. The total washing time may be affected by the water inlet pressure and water level.
- The spin time is the time from the intermittent running to the finishing of the cycle.
- In the "Power Wash" program, the first soak is approximately 20 minutes, pre-wash is approximately 8 minutes. Clothes are soaked again for approximately 5 minutes. The washing, rinsing and spinning will then be completed. The wash time includes the pre-wash time.
- In the "Quick" program select wash, rinse and spin are set automatically. No procedure can be selected after setting.

Note: When you turn the power ON, the machine will set the standard wash program to the wash/rinse/spin position.

Program Select	Wash Program	Application
Power On	Wash, Rinse & Spin	Normal Wash
Press Once	Wash	No Spin or Rinse
Press Twice	Wash & Rinse	No Spin
Press Three Times	Rinse & Spin	No Wash
Press Four Times	Spin	No Wash or Rinse
Press Five Times	Power Wash, Wash, Rinse, Spin	For heavily soiled and very dirty clothes
Press Six Times	Quick, Wash, Rinse, Spin	For a quick speed wash

Microfiber Cleaning

Increase productivity and enhance the environment at the same time - Microfiber mops and rags can replace cotton.

- Much lighter
- Clean more thoroughly
- Absorb more dirt and liquid
- Use less water and chemical
- Pick-up fine dust particles and leave no lint behind
- Can be laundered and reused over and over again

Proper cleaning procedures with microfiber will eliminate cross-contamination, reduce workman's compensation claims, save time, save on chemical usage, reduce water usage and save money.

m i · c r o · f i · b e r - An extremely fine synthetic fiber that can be woven into textiles with the texture and drape of natural-fiber cloth but with enhanced washability, breathability, absorbency and dirt attraction.

MICROFIBER				
310360	Cloth	12" x 12"	Blue	EA
423002	Cloth Microfiber Knitted		Blue	PK
423003	Cloth Microfiber Knitted		Red	PK
423004	Cloth Microfiber Knitted		Green	PK
490171	Chamois	16" x 16"	Tan	EA
120103	Mop Healthcare	12"	Blue	EA
120225	Mop Microfiber	18"	Blue	EA
120105	Mop Healthcare	18"	Blue	EA
120227	Mop Microfiber	24"	Blue	EA
120101	Mop Healthcare	24"	Blue	EA
120113	Mop Healthcare	40"	Blue	EA
141004	Holder	18"		EA
141002	Holder	24"		EA
141005	Holder	40"		EA
310005	Handle Telescopic			EA

INNOVATIONS IN UPGRADES, O & M CREDIT 1.2
EDUCATION & OUTREACH PROGRAM

1. LEED-EB template
2. Narrative of outreach and education throughout the LEED-EB process.
3. Outreach flyer made for one of the E2 building occupant meetings.
4. PowerPoint presentation of student intern's involvement in the LEED process given as a lecture to a UCSC class.
5. E2 LEED-EB Case Study PowerPoint presentation presented at the AASHE Conference in November of 2008.
6. Photos of community tree planting outreach program at UCSC.

(Responsible Party)

I, Louise Huttinger , submit the following innovation credit proposal for additional environmental benefits achieved beyond those already addressed by LEED-EB Rating System. The following documentation has been provided:

Credit Title:

E2 LEED-EB Education and Outreach Program

I have attached the following documentation to support the credit proposal:

☒ A description of the strategy and/or achievement.

☒ The additional environmental benefits delivered over the performance period.

☒ The performance metrics used to document the additional environmental benefits delivered.

Project Name: Engineering 2 LEED EB Submittal

Credit: IUOM Credit 1.2 (1 point possible): Innovation in Upgrades, Operations and Maintenance

Points Documented: 1

READY TO SAVE THIS TEMPLATE TO LEED-ONLINE? Please enter your first name, last name and today's date below, followed by your LEED-Online Username and Password Associated with the Project listed above to confirm submission of this template.

Louise	Huttinger	2009-02-13	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

To: USGBC LEED-EB Application Review Committee
Re: ID Credit 2: Education and Outreach Program Innovation Credit

The UCSC Green Operations Group spent much time and effort on educating our campus about our first LEED project, the Engineering 2 building. From the get go, Jim Dunne (Project Manager) wanted to use this project as an educational and training tool by hiring a student for the entire LEED-EB process. Throughout the first year, the intern, Louise Huttinger, reported back to her Chancellors Undergraduate Internship Program class with a series of talks and presentations about the benefits of Green Building at UCSC and the progress of the E2 LEED submittal.

In the fall of 2008, Jim and Louise were asked to speak at the Association for Advancement of Sustainability in Higher Education (AASHE) Conference in Raleigh, North Carolina entitled "Greening Operations & Maintenance: Implementing LEED for Existing Buildings in a Campus Setting". The presentation educated other campuses on the benefits of LEED-EB and gave a case study of the E2 Project. PDFs of both educational programs are attached.

Throughout the LEED process we sought building occupant input through community meetings. The Green Operations Group wanted to educate the occupants on the benefits of green building and also the importance of personal sustainable habits and choices. In addition to these outreach efforts, the UCSC Tree Crew (who replanted Redwoods from the construction site) have tree planting days with children of the Santa Cruz community.

ENGINEERING 2 A GREEN BUILDING?

E2 OCCUPANT INFORMATIONAL MEETING

The UCSC Physical Plant cordially invites all E2 building occupants to an informational meeting about the greening of their workplace. E2 will be the first building at UCSC to be LEED-EB-certified as a green building by the US Green Building Council.

Help us develop sustainable building practices that are user-friendly and efficient.

·Improved Recycling Program

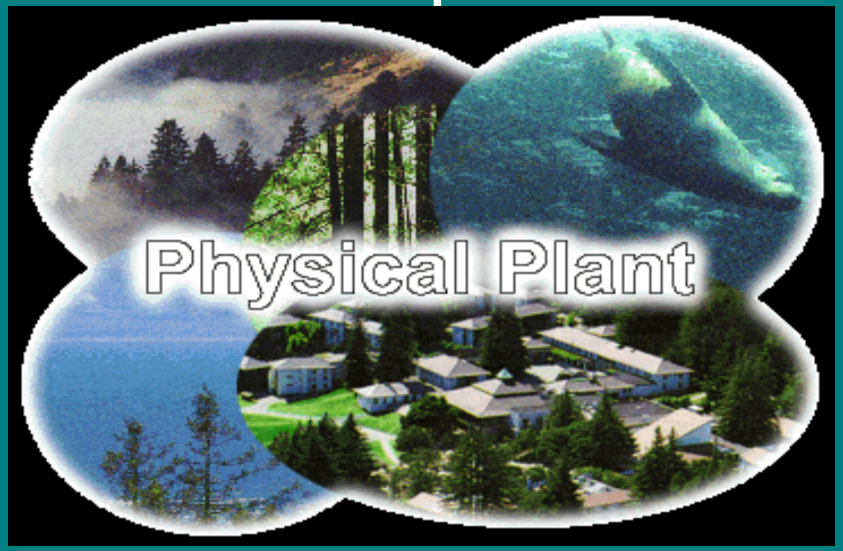
·Green Cleaning

·Sustainable Purchasing

Come learn, contribute and enjoy some free food!

CUIP INTERNSHIP: GREEN OPERATIONS GROUP

The Green Operations Group is comprised of Physical Plant employees charged with improving the efficiency of operating the campus.



Project Overview & Goals

- Recomission and retrofit the Engineering 2 building through a points-based rating system called LEED (Leadership in Energy and Environmental Design)

- Through this US Green Building Council (USGBC) certification, Engineering 2 will significantly:
  - Reduce energy consumption
  - Improve water efficiency
  - Decrease waste stream by improving occupant recycling
  - Improve indoor environmental quality

UC Policy Sustainable Practices

The UC Policy requires all UC Campuses to begin adopting sustainable operations and maintenance practices and submit one pilot building for LEED-EB certification by July 2008.

WHO AM I?

- 3rd year College 8 student
- Major: Environmental Studies
- Minor: Sociology
- Previously worked with the UCSC Student Environmental Center

ENGINEERING 2

The Engineering 2 building has been selected for the UCSC LEED-EB pilot.

E2 is comprised of class rooms, offices, and research labs.

Building Location: Science Hill

Date Constructed: October 22, 2004

Predominant Use: Lab / Research
Floors or Levels: 6 Floors

Number of Spaces: 308 Spaces
Assignable Area: 87,860 SF

Outside Gross: 152,077 SF

LEED-EB

LEED for Existing Buildings is a tool for the ongoing operations and maintenance of existing buildings.
The rating system identifies and rewards current best practices and provides an outline for building's to use less energy, water and natural resources; improve the indoor environment; and uncover operating inefficiencies.

- Divided into five main categories:
  - Sustainable Sites
  - Energy and Atmosphere
  - Water Efficiency
  - Materials and Resources
  - Indoor Environmental Quality.

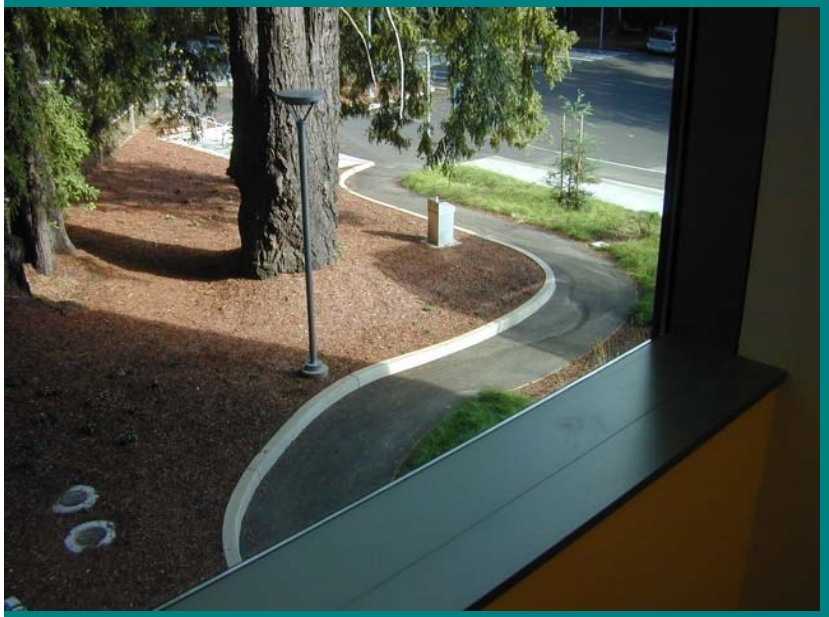
Credits and Points

- In each category there are a certain number of points awarded through different credits
- LEED CERTIFICATION LEVELS:
  - Certified (26-32 points)
  - Silver (33-38 points)
  - Gold (39-51 points)
  - Platinum (52-69 points)

- The Goal of the E2 Building LEED-EB submittal to is to accomplish as many points as possible through this rating system to achieve the highest standard of green building certification as possible.

Sustainable Sites

- Erosion and sediment control
- Green Site- Native Plants
- Protect and Restore Open Space
- Storm Water Management
- Heat Island Reduction



- Access to alternative transportation
  - -bus, bike, carpooling
  - Light pollution reduction

Water Efficiency

- Implement strategies and technologies that reduce the amount of potable water consumed in E2.
- Water Efficient Landscaping: Installing a irrigation meter
- Water Use Reduction- 20% from calculated baseline
  - Low flow fixtures etc

Energy & Atmosphere

- Monitoring Based Commissioning (MBCx)

UCSC has hired Enovity, an energy engineer consultant, to conduct the E2 MBCx. Through this conditioning, operational savings have already been identified

  - Annual Energy Savings: $192,312
  - Annual kwh Savings: 901,984
  - Annual Natural Gas Savings:92,722 therms

- **Optimize Energy Performance**
- **On-site or Off-site Renewable Energy**
- **Ozone Protection/ Emissions Reporting**

Materials and Resource

- Choosing the materials brought into the building with reductions in environmental impacts in mind
- Managing the materials that leave the building as waste to minimize land filling or incineration of these materials.
  - Improving occupant recycling
  - Use of recycled materials
  - Non-toxic cleaning supplies, paints etc.

Indoor Environmental Quality

- Ventilation effectiveness, moisture management, and control of contaminates.
- Outside air introduction- increased ventilation
- Co2 Monitoring
- Indoor chemical pollutant source control (use of filters)
- Controllability of systems: light, air, temp
- Day lighting of spaces – 50%
- Indoor Integrated Pest Management

My Role as a Team Member

- Organize groups and document meetings.
- Resource to members for the LEED-website and template completion.
- Responsible for 10 credits in different areas of the rating system

SS Credits

- **Credit 3.2: Alt Trans: Bicycle Storage and Changing Rooms**
  - Reduce pollution and land development impacts from automobile use
  - Requires bicycle storage and changing rooms with showers for the greater of 1% of the building occupants or 125% of peak demand for these facilities
  - Bike Rack Audit during performance period
  - Survey of bike users in building
- **Credit 3.4: Alt Trans: Carpooling & Telecommuting**
  - Reduce pollution and land development impacts from single-occupancy vehicle use.
  - Provide preferred parking and implement/document programs and policies for car pools or van pools capable of serving 5% of the building occupants.
  - Conduct parking lot audit to find out how many spaces are for carpools.
  - Summary from daily or weekly reports on carpool and vanpool usage

Water Efficiency: PreReq1: Minimum Water Efficiency

- Calculate water use baseline that includes all plumbing fixtures required for building occupancy

Flush Fixture	Daily Uses per Occupant	Flow Rate [GPF]	Duration [Flush]	Auto Conrols [Yes or No]	Occupant Users per Fixture Type	Daily Water Use per Gender [gal]
EPACT Equivalent Water Closet						
Male	1	1.6	1	N/A	234	374.4
Female	3	1.6	1	N/A	234	1,123.2
Non-water Urinal						
Male	2	0	1	N/A	234	0
Female	0	0	1	N/A	234	0

Male		0	1	N/A		0
Female		0	1	N/A		0

Male		0	1	N/A		0
Female		0	1	N/A		0

Male		0	1	N/A		0
Female		0	1	N/A		0

Flow Fixture	Daily Uses per Occupant	Flow Rate [GPM]	Duration [sec]	Auto Conrols [Yes or No]	Occupant Users per Fixture Type	Daily Water Use per Occupant [gal]
Ultra Low-Flow Lavatory	3	0.5	15	No	468	175.5
EPACT Equivalent Kitchen Sink	1	2.2	15	No	468	257.4
EPACT Equivalent Shower	0.1	2.5	300		468	0
----		0	0			0
----		0	0			0
----		0	0			0
----		0	0			0
----		0	0			0

Total Daily Uses by All Occupants	3,322.8
Total Daily Volume [kgal]	1.93
Annual Work Days	260
Total Annual Volume Demanded [kgal]	501.8
Graywater or Stormwater Reuse Volume [kgal]	
Potable Annual Volume [kgal]	501.8

M&R: PreReq 1.1: Waste Management Policy and Waste Stream Audit

- Establish minimum source reduction and recycling program elements and quantify current waste stream production volume.
- Conduct waste stream audit for 1 week to establish a current building baseline that identifies types of waste making up the waste stream audit. Audit should determine the amount for paper, glass, plastics, cardboard, and metals in the waste stream.

Credit 5.1-5.3: Occupant Recycling

- Facilitate the reduction of waste and toxins generated by building occupants by implementing an improved recycling policy
- Program addresses the separation, collection and storage of materials.
- Perform 2nd waste stream audit after the performance period to calculate the improvement:
  - Recycle 30% of total waste stream – 1 point
  - Recycle 40% of total waste stream- 2 points
  - Recycle 50% of total waste stream- 3 points

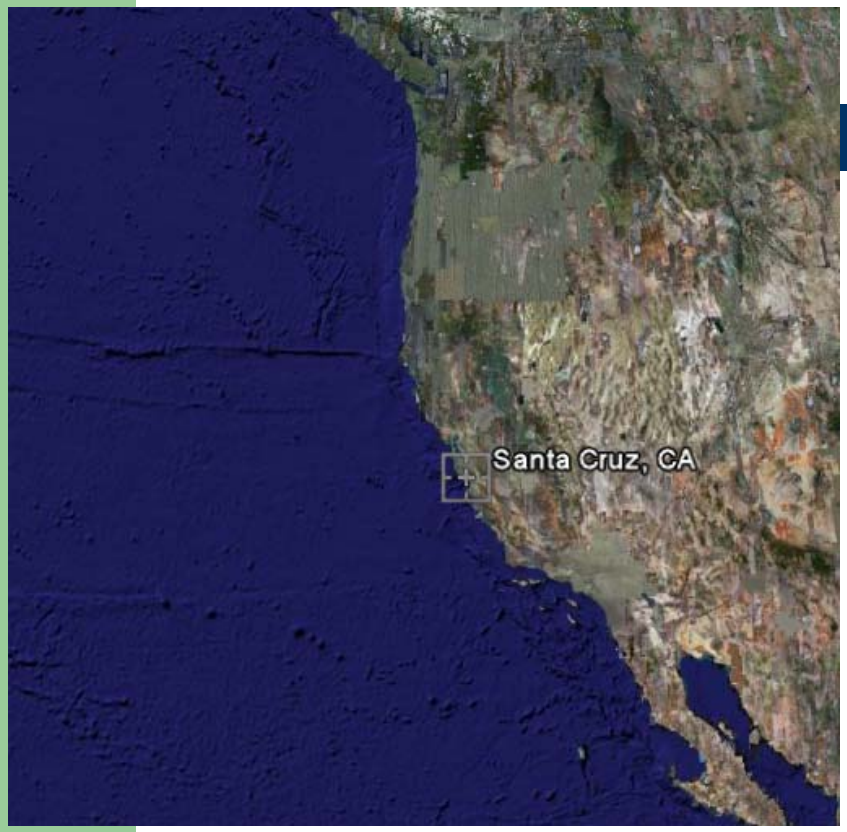
LEED Benefits- Impact on the UCSC Community

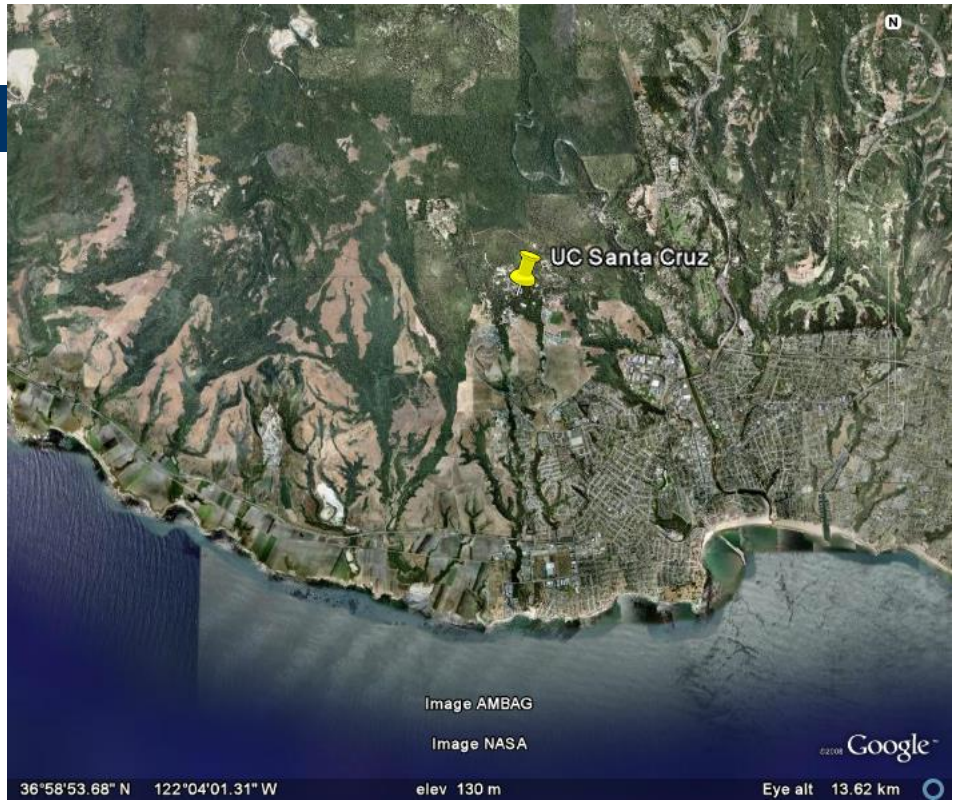
- Helps managers solve building problems.
- Improves building performance, and maintains and improves this performance over time.
- Reduces costs associated with building operations. ($192,000 annually from just energy costs)
- Reduces environmental impacts
- Creates healthier and more productive student and employee workspaces.
- Provides public recognition for leadership in sustainability.

University of California, Santa Cruz

Engineering 2 Building
LEED-EB Project

University of California, Santa Cruz





UCSC is situated on a 2000 acre site in the Santa Cruz Mountains with 500 acres of developed land, 1500 acres of redwood forests and open meadows. The campus is 3 miles from the Pacific ocean, and 75 miles south of San Francisco.

Average temperatures range from 43-64 (winter) and 53-71 degrees in summer.

Engineering 2 Building

89,000 ASF, 152,000 GSF

3% classrooms, 15% academic offices, 60% dry research labs, 15% administrative office, 7% misc.

Initial engineering analysis found a potential annual energy savings of $190,000.

What is LEED for Existing Buildings?

LEED-EB is a diagnostic tool for the ongoing operations and maintenance of existing buildings. This points-based rating system identifies and rewards current best practices and provides an outline for building's to use less energy, water and natural resources; improve the indoor environment; and uncover operating inefficiencies.

LEED-EB is divided into five main categories:

- Sustainable Sites
- Energy and Atmosphere
- Water Efficiency
- Materials and Resources
- Indoor Environmental Quality.

Overview of E2 LEED-EB Project

LEED-EB V. 2.0 RATING SYSTEM

Points submitted: 43

Time scale of project:12 months

Project team:

- Project manager
- Energy manager
- HVAC supt.
- Recycling coordinator
- Custodial supt.
- Plumbing supervisor
- Arborist/Irrigation supt.
- Student Intern
- Commissioning supervisor

Project costs: $1.00/MGSF

Key to Project Success

- Project Manager
- Assigning Roles
- Regular Meetings
- Server Based Data Spreadsheet

Sustainable Sites		update:
Prereq 1	**Erosion & Sedimentation Control**	Erosion spec from campus standards in text, doc SSPR1erosionspec.doc, doc, nees to be cleaned to generic format.
Prereq 2	**Age of Building**	Louise submitted into LEED, via text
Credit 1.1	**Plan for Green Site & Building Exterior Management** - 4 specific actions	Jim cleaned up and submitted Rogers document. Waiting to mark complete for quarterly inspection.
Credit 1.2	**Plan for Green Site & Building Exterior Management** - 8 specific actions	see 1.1
	High Development Density Building & Area	
Credit 3.1	**Alternative Transportation** - Public Transportation Access	
Credit 3.2	**Alternative Transportation** - Bicycle Storage & Changing Rooms	Louise submitted into LEED, via text
Credit 3.3	**Alternative Transportation** - Alternative Fuel Vehicles	
Credit 3.4	**Alternative Transportation** - Car Pooling & Telecommuting	Louise tosend in Week, Sept 10.
Credit 4.1	**Reduced Site Disturbance** - Protect or Restore Open Space (50% of site area)	Roger submitted template to LEED 11-5-07.
Credit 4.2	**Reduced Site Disturbance** - Protect or Restore Open Space (75% of site area)	
Credit 5.1	**Stormwater Management** - 25% Rate and Quantity Reduction	see 5.1
Credit 5.2	**Stormwater Management** - 50% Rate and Quantity Reduction	Roger submitted SScedit 5.1 & 5.2-
Credit 6.1	**Heat Island Reduction** - Non-Roof	
Credit 6.2	**Heat Island Reduction** - Roof	Ready to submit. Craig Russo to do a roof inspection.
Credit 7	**Light Pollution Reduction**	Light Tress Pass TBD end of project.,
Water Efficiency		
Prereq 1	**Minimum Water Efficiency**	Louise to update. * Patrick to provide meter data
Prereq 2	**Discharge Water Compliance**	JD has doc from EH&S, DB, UCSC not NPDES
Credit 1.1	**Water Efficient Landscaping** - Reduce Potable Water Use by 50%	JD submitted to LEED 8-27-08
Credit 1.2	**Water Efficient Landscaping** - Reduce Potable Water Use by 95%	
Credit 2	**Innovative Wastewater Technologies**	Calc say we cannot get this one
Credit 3.1	**Water Use Reduction** - 10% Reduction	Louise to submit Sept. 10
Credit 3.2	**Water Use Reduction** - 20% Reduction	Louise to submit Sept. 10
Energy & Atmosphere		
Prereq 1	**Existing Building Commissioning**	Jim signed letter stating comissioning is underway. Enovity to sign letter stating compliance.

Insights on how to choose a building for a LEED-EB pilot project

- Be familiar with LEED Rating System
- Know the HAVAC/Energy Management
- Determine scope of metering
- Preliminary cost assessment

How to successfully engage the wide-array of campus stakeholders needed to implement a LEED-EB project

-Make contact with building occupants and building managers to review impacts and expectations of the project.

Stakeholders: academic divisions in building, purchasing,physical plant staff (custodial, recycling, irrigation, grounds, HVAC, plumbing, energy services, and commissioning)

-Conduct building open house meetings to exchange ideas on improving building performance and reducing waste stream.

Involving students in LEED-EB Project

- Hire students throughout the LEED certification project.
- Data gathering, waste stream audits, plumbing fixture retrofits, and re-lamping.
- Provides job experience with LEED and an excellent learning opportunity.

How to use LEED-EB projects to initiate campus-wide changes.

- Changing one building policy positively effects other campus buildings.
- Centralized campus wide processes makes it easy to implement many requirements of LEED-EB to all academic buildings

Initiating Campus Wide Changes: Green Cleaning

- Changing out conventional chemicals to green cleaning solutions in custodial shop stores allows for a campus wide change in cleaning processes.

GREEN SEAL CERTIFIED

Improved Building Performance

- 69% reduction in irrigation water use
- 70% reduction in potable water
- 100% energy is offset renewable energy purchases
- 33% Waste diversion

Project Conclusions

- Fostering a culture of sustainability
- Individual building certifications are time and money intensive.
- Volume certification

UCSC COMMUNITY TREE PLANTING

Local school children planting oakes.

Area re-planting, once occupied by Giant Heritage Oak which died due to decay.

Direct seed acorn planting technique. Tube prevents deer predation and accumulates CO2 to stimulate growth. Rocks deter burrowing animals and suppresses weeds.

INNOVATIONS IN UPGRADES, O & M CREDIT 1.3
EXEMPLARY PERFORMANCE IN EA CREDIT 2.1-2.4, ONSITE AND OFFSITE RENEWABLE ENERGY

1. LEED-EB template
2. For all other documentation, please see EA Credit 2.1-2.4
3. UCSC Press Release: EPA names UC Santa Cruz 6th largest purchaser of 'green power' for a second year in a row.

(Responsible Party)

I, Louise Huttinger , submit the following innovation credit proposal for additional environmental benefits achieved beyond those already addressed by LEED-EB Rating System. The following documentation has been provided:

Credit Title:

Exemplary Performance in EA Credit 2: Onsite and Offsite Renewable Energy

I have attached the following documentation to support the credit proposal:

☒ A description of the strategy and/or achievement.

☒ The additional environmental benefits delivered over the performance period.

☒ The performance metrics used to document the additional environmental benefits delivered.

Project Name: Engineering 2 LEED EB Submittal

Credit: IUOM Credit 1.3 (1 point possible): Innovation in Upgrades, Operations and Maintenance

Points Documented: 1

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Louise	Huttinger	2008-10-10	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password

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May 5, 2008

Contact: Jennifer McNulty (831) 459-2495; jmcnulty@ucsc.edu

EPA names UC Santa Cruz sixth-largest campus purchaser of 'green power' for second year in a row

For the second year in a row, the U.S. Environmental Protection Agency has identified the University of California, Santa Cruz, as the sixth-largest campus purchaser of "green power" in the country.

"This ranking underscores UCSC's commitment to reducing our carbon footprint," said UCSC Chancellor George R. Blumenthal. "We're leading the way and helping to build the market for renewable electricity so others will follow."

Blumenthal, hailing the recent release of UCSC's 2007 Campus Sustainability Assessment, said he wants UCSC to be a leader in sustainability and "green" initiatives.

The EPA rankings are available online.

UCSC's leadership as a consumer of renewable power was made possible by students who voted in May 2006 to pay a tuition increase of $3 per quarter to fund the purchase of clean, sustainable energy in the form of renewable energy certificates (RECs). As a result of that student initiative, UCSC buys enough RECs to offset 100 percent of the electricity that powers the campus.

UCSC contracts with Sterling Planet to purchase RECs generated by wind, solar, geothermal, hydropower, biomass, and landfill gas. Green power produces less carbon dioxide (a greenhouse gas linked to global climate change) than conventional sources of electricity, which include coal-fired power plants.

According to the EPA's listing of 2007-08 College & University Green Power Champions, UCSC purchased 57 million kilowatt hours (kWh) of green energy in the form of RECs during the 2007-08 academic year. To participate in the challenge, schools must buy at least 10 million kilowatt-hours of green power.

The campus is also working to reduce overall demand by retrofitting equipment, adopting energy-efficient building designs, and developing on-site sources of renewable power, said Ilse Kolbus, director of the UCSC Physical Plant.

Learn more about UCSC's sustainability efforts online.

INNOVATIONS IN UPGRADES, O & M CREDIT 1.4
CAR SHARING PROGRAM ON CAMPUS- ZIPCARS

1. Description of car sharing program at UCSC
2. Information on UCSC ZipCars

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PHYSICAL PLANT

SANTA CRUZ, CALIFORNIA 95064

ID Credit 1.1-Zip Car Program

The University of California, Santa Cruz, and Zipcar, North America's largest on-campus car-sharing service, have formed a joint partnership to provide Zipcars to campus faculty, staff, and students, as well as community residents, as an environmentally friendly alternative to the costs and hassles of keeping a car on campus. The partnership continues UCSC's commitment to provide sustainable transportation options that decrease the parking demand on campus and reduce traffic impacts on the community.

The program will provide seven self-service Zipcars--three Toyota Prius Hybrids, two Honda Elements, a Mazda 3 and a Toyota Matrix—cars will be available for use 24 hours a day, seven days a week. The cars will be located on the main campus at the OPERS parking lot by the East Field House and at the upper College 8 parking lot, as well as off campus at UCSC's 2300 Delaware Avenue site and downtown to serve the University Town Center at Cathcart and Cedar Streets.

The program complements UCSC's existing alternative transportation program and will allow students the mobility they need to travel off campus for shopping, errands, and recreation without the need to bring their personal cars to the area. Car sharing also gives Transportation Services the opportunity to introduce the Santa Cruz community to another viable, sustainable transportation program.

Each Zipcar typically replaces up to 20 personally owned vehicles, reducing the need for additional parking spaces and replacing older vehicles with new ones that have more stringent pollution controls. Zipcar members tend to drive significantly less, resulting in less congestion and fewer greenhouse gas emissions.

The Zipcar program was in place during the E2 LEED performance period. This alternative transportation program is exceeding expectations. I feel this program meets the scope for an innovation point .

Jim Dunne
E2 LEED Project Manager
Associate Director- UCSC Physical Plant

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find cars

check rates

join now

get a zipcard

Organizations

How it works
Is It For Me?
FAQs

Home

Site Settings

Your Organization:
uc santa cruz students

Your City:
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Type of Driving:
personal driving

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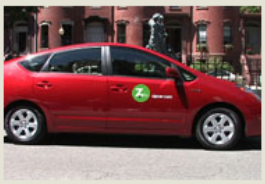

Wheels when you want them.™

You only need to be 18+ to join. Members age 18-20 can use the Zipcars that live on the UCSC campus. Members age 21+ also have access to thousands of Zipcars all around San Francisco, Atlanta, Boston, Chicago, London, New York, Philadelphia, Pittsburgh, Portland, Seattle, Toronto, Vancouver and Washington DC.

You'll also get **$35 in free driving** to use your first month! Join today:

- I'm a **UCSC student** and I'd like to join Zipcar for personal driving.
- I'm **UCSC faculty or staff** and I'd like to join Zipcar for personal driving.
- I'd like to join my department's existing Zipcar account for business use.
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INNOVATIONS IN UPGRADES, O & M, CREDIT 2: LEED ACCREDITED PROFESSIONAL

1. LEED-EB template

(Responsible Party)

I, Louise Huttinger , declare that the following principal participant of the project team has successfully completed the LEED Accredited Professional exam:

Full Name:	James Sherman
Title:	Work Management- Building Commissioner
Company:	University of California Santa Cruz
Street Address:	1156 High Street
City:	Santa Cruz
Project State/Providence*(US & Canada Only)*	California
Project Country	United States
Postal Code:	95064
Telephone Number:	(831) 459-4128
Email Address:	jsherman@ucsc.edu

Project Name: Engineering 2 LEED EB Submittal

Credit: IUOM Credit 2 (1 point possible): LEED Accredited Professional Points Documented: 1

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Louise	Huttinger	2008-10-03	lhutting@ucsc.edu	
First Name	Last Name	Date	Username (Email Address)	Password