University of Idaho

NIATT

Sustainable Transportation
On Campus and in the Community

Proceedings from the 2005 Conference

Sustainable Energy Research Laboratory and Transit Facility

By

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Workshop Track 2: September 22~23, 2005

Our Common Charge:
Sustainable Transportation on Campus and in the Community

Recent global events have brought into sharp focus our nation's transportation system and the energy system that underlies it. Conflict overseas and natural disasters in the U.S. have spotlighted our dependence upon foreign oil; the vulnerability of the Gulf Coast to environmental impacts; the implications of our resource dependence and land use investments in war-torn and hurricane-prone areas; issues of security and transportation with regards to emergency evacuation strategies; and the social inequities pertaining to access to resources. We are compelled to ask: Can our tightly-woven transportation-land use-energy-environmental system be sustained over the long run?

We can and should continue to examine the issues of technology, resource use and the role of education in fostering a system of sustainable transportation both locally and nationally. One chapter in this process took place in September, 2005 on the University of Idaho campus where 200 interested individuals from the community and the university addressed topics relating to sustainable transportation; including campus and local transportation, research facilities, educational programs, land use and sustainable development, and alternative fuels. These issues have relevance for universities, local communities, and the national landscape.

Many important insights emerged from the two day conference:

- ***The creation of a sustainable, multi-modal transportation system in Moscow, Idaho that links the University of Idaho to the greater community is possible through a cooperative approach between entities.*** In Workshop Track 1, national transportation experts outlined steps toward a positive shift from single occupancy vehicle dependence to a multi-modal sustainable and equitable transportation system developed in cooperation between local governments and universities.

- ***The University of Idaho has the opportunity to be a leader in research, and a model for the application of renewable energy sources.*** In Workshop Track 2, University of Idaho Architecture students facilitated a design charette, which yielded several designs for a sustainable energy lab and transit facility on campus.

- ***Student involvement is essential in the discussion of sustainable transportation.*** In Workshop Track 3, participants discussed how service learning projects can provide both university students and faculty with a more effective way to collaborate with community leaders in addressing land use and environmental issues, and engender a sense of stewardship in future generations.

- ***Community values must be brought into the discussion of land use and transportation.*** In Workshop Track 4, experts in the field of transportation helped participants identify community values, and then translate those values into attributes that the transportation system should have.

- ***Rising petroleum fuel prices and the increasing need for a decentralized fuel source make the time ripe for research and development of alternative fuels, such as Biodiesel.*** In Workshop Track 5, a group discussion took place about the advantages and impediments to producing feedstocks, to creating a Biodiesel fuel production facility, and to creating a market for the fuels on the Palouse.

The time is right for the university to embrace a spirit of community and interdisciplinary cooperation, in order to address today's transportation, energy, and environmental problems. UI President Tim White's signature on the Talloires Declaration, a commitment to environmental sustainability in higher education, behooves faculty, students, and staff to seek innovative solutions for common problems facing the university, and inevitably, the community as a whole.

Former Mayor Comstock and current Mayor Chaney both came to the conference, and affirmed the positive relationship that exists between the city and the university, as well as our common challenges. I trust that we can accept the charge to face these challenges together.

Michael Kyte

Michael Kyte
Director, National Institute of Advanced Transportation Technology
University of Idaho

WORKSHOP TRACK 2:

Sustainable Energy Research Laboratory and Transit Facility

Eva Matsuzaki of Matsuzaki Architects in Vancouver, British Columbia

Highlights from her Keynote Speech

- **The health of the individual, community and planet are all interconnected.**
- **The average person uses 90 gallons of potable water per day.**
- **When designing buildings, put a priority on health and ecology.**

Matt St. Clair Sustainability Director for the University of California, Berkeley

Highlights from his Keynote Speech

- **Key to sustainable movement is student involvement. They are the "conscience" of the campus.**
- **Must campaign for a campus-wide paradigm shift, including within administration.**
- **People want to do the right thing. Must empower them to do it.**

Introduction

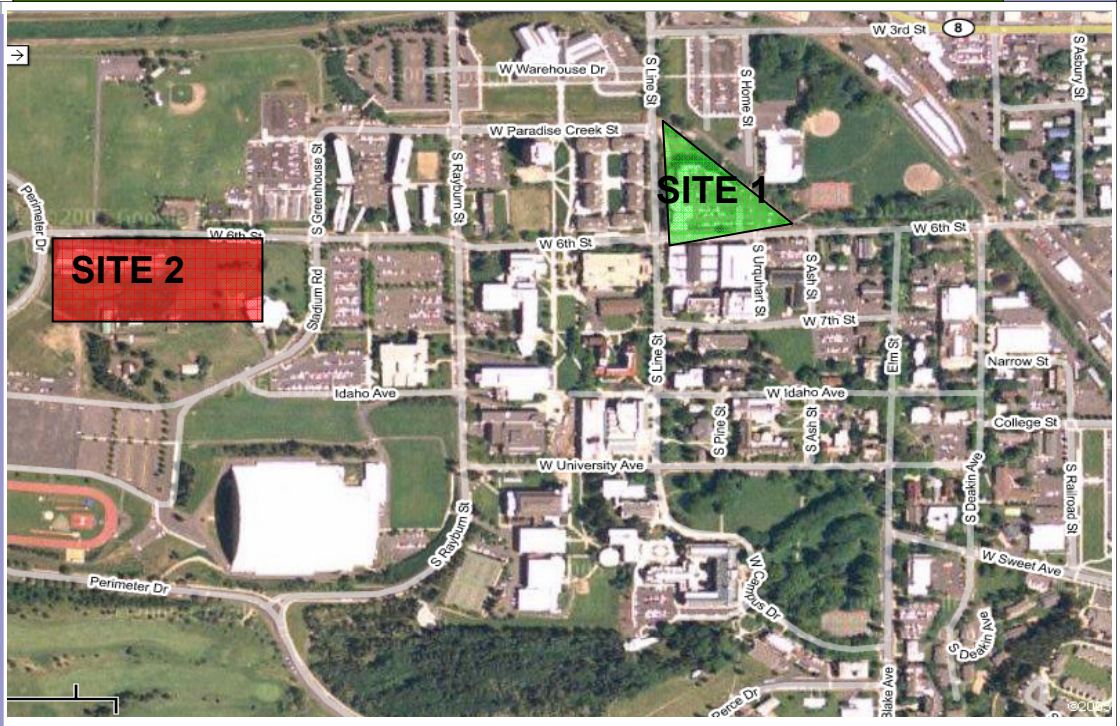
At the conference, Sustainable Transportation on Campus and in the Community, held at the University of Idaho in September of 2005, people met to explore the possibility of creating an energy lab and transit facility on campus which conducted research on renewable energy, and which was a model of sustainable engineering and architecture itself. Workshop Track 2: Sustainable Energy Research Laboratory and Transit Facility was facilitated by Bruce Haglund, Professor of Architecture at the University of Idaho, Donald Blackketter, Professor and Chair of the Department of Mechanical Engineering at the University of Idaho, Architect Eva Matsuzaki of Matsuzaki Architects in Vancouver, British Columbia, and Matt St. Clair, Sustainability Director for the University of California, Berkeley. Students from Haglund's Sustainable Architecture studio led teams that included an assortment of community professionals with an interest in developing a "green" building on campus which would house the researchers engaged in pursuing the campus clean vehicle and fuels program as well as the consolidated community transit offices and maintenance garage. The workshop was divided into five teams, Yellow, Red, Blue, Purple and Green, consisting of students and community members. Each team was assigned one of two potential sites for the facility . Each group toured the sites during the workshop, to assess the possibilities and limitations. Then the groups used this information and parameters set by the facilitators in a design charette to create an architectural model of their proposed building, which had to meet sustainable building design criteria.

Five teams participated in a design charette during the two-day workshop.

Dr. Bruce Haglund, Professor of Graduate Studies in Architecture at the University of Idaho

Dr. Don Blackketter Professor and Chair of the Department of Mechanical Engineering at the University of Idaho

(Photo courtesy of the UI Website)



"Green Lab" location: two sites were examined for feasibility and constraints.

Specifications

The specifications used by the design teams not only required that the building meet certain design criteria, but also that it would be feasible for the university to fund and maintain. An additional consideration was that because the facility would also serve as a garage, ventilation issues had to be addressed in the design.

Typically, green buildings are classified as such because they are made of recycled or recyclable materials, have low economic impact, and are water and energy efficient. Feasibility for university funding and maintenance would set the building's price tag at 10 million dollars. Workshop participants also felt it was important for the facility to set a precedent for green buildings on campus by providing maximum human comfort and aesthetics, including green spaces and day lighting. Participants were given this set of specifications at the workshop:

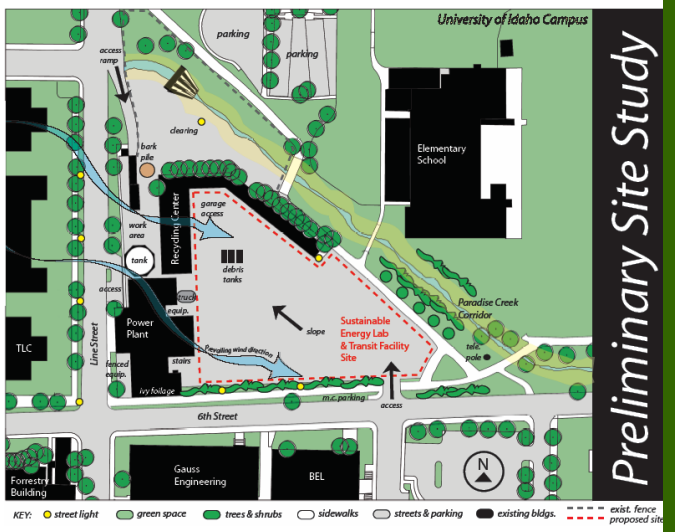
- 40,000 sq ft total size
- 10 - Transit Staff Offices
- 1 - Transit Director Office
- 5 - 30' x 50' Garages for Maintenance (Must be 15' Clearance)
- Parking for Transit Vehicles (fenced outside area)
- 10-20 - Grad Student and Faculty Offices
- 10 – Second Floor Labs

Guiding Principles:

- Access
- Health & Safety
- Individual Responsibility
- Integrated Planning
- Pollution Prevention
- Efficient Land and Resource Use
- Economic Efficiency

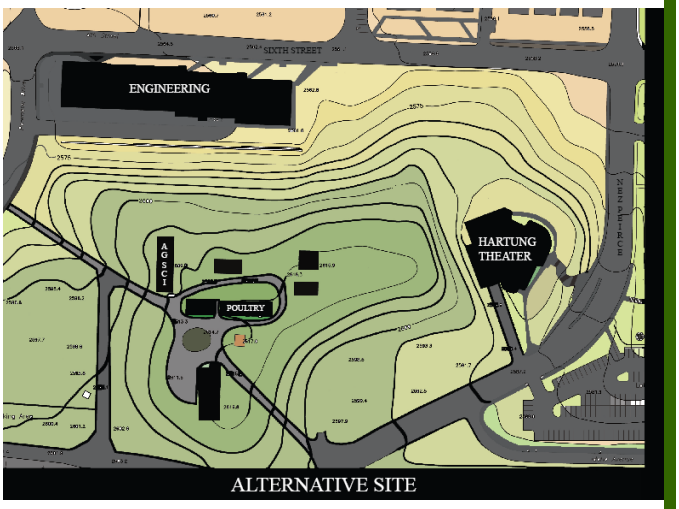
Constraints: Site 1

Site 1 is located next to the steam plant on the corner of 6th and Line Street adjacent to Paradise Creek. The site currently functions as a gravel parking lot. The steam plant shades the site at some periods of the day. Paradise Creek restricts construction to the south side of Paradise Path. The recycling center blocks transportation access from the street.



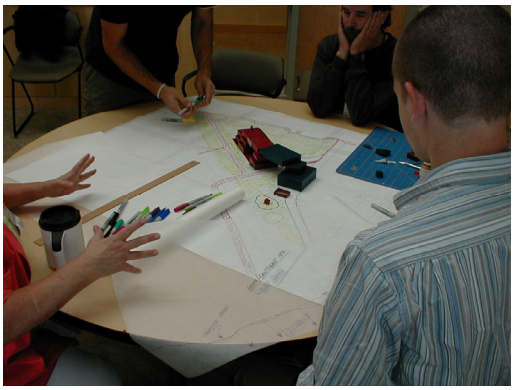
Constraints: Site 2

Site 2 is located next to the Martin lab on the West side of campus. The biggest constraint for site two is the significant slope of the land that would require extensive excavation.



Purple Team: Site 1

Architecture student leaders: Chad Turner, Andrew Yoder, Pam Overholtzer
Participants: Richard Nagy, Resource Conservation Manager, Facilities Management, University of Idaho and John Dugan, Graduate Student, University of Idaho



Plans by Purple Team, Richard Nagy in the background.

Purple Team member Richard Brown had once been an employee at the steam plant, and told the rest of the team how many hundreds of gallons of potable water are wasted there every day. The team's solution to the steam plant problem was to integrate the steam plant into the design plans, to harvest the steam energy and also make it an interesting design element. Using the steam plant, they decided they could put in a closed loop heating system. Water from the steam plant, which is already heated, could go through the building, and then into a cooling tower before being returned to Paradise Creek. The team decided to rework Paradise Creek around the site because it had been "overchannelized." The design of the building would have a "showroom" quality to display the technology of the steam plant and the facility. They also decided to step back one of the garages so that it would be sub-surface. That way, the sub-level garage would still get daylight, and they could landscape the space on top of it.

Green Team: Site 1

Architecture student leaders: Timothy Pulley, Katie Ridge, Rebecca Stephens
Participants: Karen Den Braven, Director, Center for Clean Vehicle Technology, University of Idaho, Chad Forsan, Valley Transit

Plans by Green Team. Left, Katie Ridge, Right, Rebecca Stephens

The Green Team chose to eliminate the Recycling Center to fully utilize the entire site. The team talked a lot about acoustics in the planning process, concerned that noise from the transit vehicles might be disruptive for classes and research in the rooms above. They developed a radiant heat floor to move heat through the building, and a central atrium used for common areas to maximize daylight.
The team worked in several sustainable design elements to make the facility meet the criteria for a "green" building, including:

- **Solar tubes for daylighting**
- **Recycled building materials**
- **Bioswales**
- **Thermal zoning for each unit**
- **Green roof**

They also thought of creating ceiling tracks in the garages to lift heavy objects for research. It was important to the team to have a green space on the site, which would blend in with the natural surroundings of Paradise Creek.

Red Team: Site 1

Architecture student leaders: Charles Baxter, Jeffry Burchard, Troy Charlesworth, Lacey Megorden
Participants: Marty Sorenson, Manager, Idaho National Laboratory
Matt St. Clair, Sustainability Director, University of California, Berkeley

The Red Team started out by brainstorming what the most important elements of the building were going to be. They decided that restoring Paradise Creek and surrounding environment was the most important idea to keep in mind while developing plans for the facility, followed by an iconic design concept. They decided to use a rainwater collection system for water in the building. Team members liked the idea of putting the offices where those inside could see children playing at West Park Elementary down below. They also emphasized keeping the internal workings of the building visible- a reminder of the integration of building design and the research that would take place there.

Plans by Red Team. Clockwise from left, Troy Charlesworth, Matt St. Clair, Jeffry Burchard, Lacey Megorden, Charles Baxter.

"We'll have the offices here. They'll be making decisions about the future of sustainability and they'll look down and see school children on the playground."
-Jeffry Burchard, Architecture graduate student.

Yellow Team: Site 2

Architecture student leaders: Matthew Holste, Jared Peterson, Adam Janak
Participants: Rob Briggs, Architect
Eric Delmell, Assistant Professor of Architecture, University of Idaho

The Yellow Team decided to use a green roof to compensate for excavating the hill they would have to build on. They had the idea of using an innovative wastewater treatment system called the Living Machine on a series of terraced areas on the site.

Plans by Yellow Team. From left, Matthew Holste, Eric Delmell, Rob Briggs

According to the Findhorn Ecovillage[1] website:

"In the Living Machine ® system, anaerobically treated sewage arrives in a greenhouse containing a series of tanks. These contain species which break down the sewage naturally as it moves through the tanks. In many systems, fish and plants are being produced, which can then be sold. Living Machines mirror processes that occur in the natural world, but do so more intensively. At the end of the series of tanks, the resulting water is pure enough to discharge directly into the sea or to be recycled. The technology is not only capable of meeting tough new sewage outflow standards, but uses no chemicals, and has a relatively inexpensive capital cost attached."

1) http://www.ecovillagefindhorn.com/biological/index.php

Team members also emphasized the need to avoid having a façade of garage doors, so they moved the offices to the front, and placed the garages facing the hillside. To fit the building in the small amount of flat land Site 2 provides, the team decided to put the classrooms over the garages.

"When you go into the building, you'll realize the environmental qualities of the building."
- Jared Peterson, Architecture graduate student.

Blue Team: Site 2

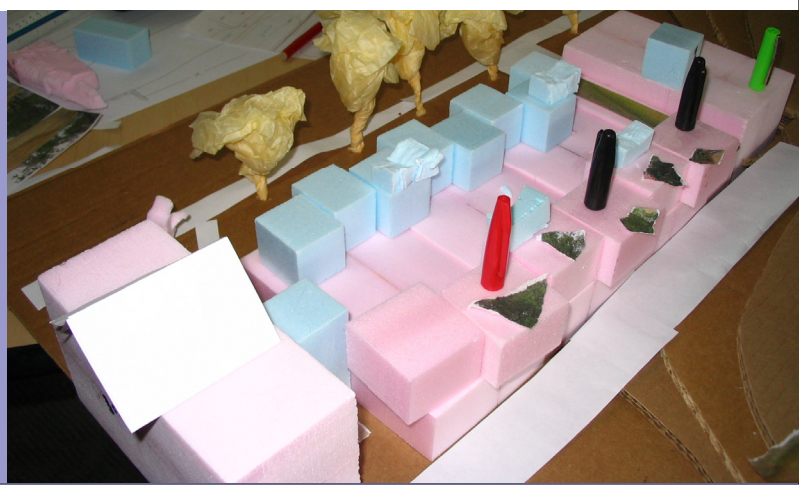
Architecture student leaders: Samuel Gregg, Jessica Friend, Brant Hauser
Participants: Brian Dickens, Science and Technology Specialist, Idaho Dept. of Commerce
Larry Pankopf, Director, Architectural and Engineering Services, University of Idaho

Plans by Blue Team. Left, Samuel Gregg, Right, Eva Matsuzaki.

The Blue Team had to "pare down the project" to fit it on the limited building space of Site 2. They decided to use one large bus bay and one large bus barn. The ventilation system would be a series of stacks on top of the labs. A fundamental circular spine and office spine made it so the team could orient the building to the site and move on to talk about sustainable aspects.

They left the trees on the site to make it more natural and inviting, plus added a roof garden. These elements provided a lot of social space around the building, and connected it to the Agricultural Science building with a courtyard by way if a series of swales. This connection to the existing buildings was crucial, because the team decided to use the classrooms at the Agricultural Science building instead of making more classrooms at the site.

"We're celebrating these stacks. From five hundred yards away you can see they are poetic and artfully done."
-Sam Gregg, Architecture graduate student.



Conclusions

Track 2 students presented their findings to all the attendees of the conference on the last day. Their summary included some of the best features from the team designs for the two sites.

Site 1 solutions were as follows:

- Minimal Vehicle Access through the site.
- Alternative Paving Methods.
- Xeriscape.
- Minimal Site Impact
- Entrance to the Campus
- Pedestrian Friendly Green Roof
- Through Garages
- Revitalization of Paradise Creek
- Office views on the North side
- Access through building
- Bus Stop – Bicycle Parking – PV Roof
- Slab Heating/Cooling
- Harnessing existing energy from power plant.

Site 2 Solutions were as follows:

- Building Extension
- Friendly Streetscape
- Minimal Site Impact
- Clerestory Atrium
- Cooling Towers
- Existing Access
- Terraced Green Roofs.
- Inviting Streetscape.
- Site Awareness
- Terraced Green Roofs
- Access Tunnel

Recommended Reading

Regenerative Design for Sustainable Development
by John Tillman Lyle
Paperback - 352 pages 1 edition (October 25, 1996)
John Wiley & Sons; ISBN: 0471178438

Ecological Design
by Sim Van Der Ryn
Paperback - 200 pages (December 1995)
Island Pr; ISBN: 1559633891

A Green Vitruvius
by Owen Lewis et al
Paperback - 176 pages (June 1999)
James & James; ISBN: 1-873936-94-X

Ecological Literacy : Education and the Transition to a Postmodern World (SUNY Series in Constructive Postmodern Thought)
by David W. Orr
Paperback - 210 pages (January 1992)
State Univ of New York Pr; ISBN: 0791408744

Daylighting for Sustainable Design (McGraw-Hill Professional Engineering Series)
by Mary Guzowski
Hardcover - 448 pages (October 11, 1999)
McGraw Hill Text; ISBN: 0070254397

Early morning sunlight shines on Building Site 1

We appreciate the support of these conference sponsors!

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