



**COUNTY OF SAN MATEO**  
**Inter-Departmental Correspondence**

**Board of Supervisors**

**DATE:** May 31, 2001

**BOARD MEETING DATE:** June 5, 2001

**TO:** Honorable Board of Supervisors  
**FROM:** Rose Jacobs Gibson, Fourth District Supervisor *RJG*  
**SUBJECT:** Final Report on \$175,000 IWMB Grant

**Recommendation**

Accept the final reports on the expenditure of \$175,000 California Integrated Waste Management Board demonstration sustainable or green building practices grant.

Alignment. Vision commitment 10: leaders work together across boundaries to preserve and enhance our quality of life; and goal 14. important natural resources are preserved and enhanced through environmental stewardship.

**Background**

The California Integrated Waste Management Board (IWMB) made a grant of \$175,000 to the County of San Mateo to develop a recommended model sustainable or green building practices policy for the County. The purpose of the grant was to fund demonstration projects in the areas of landscaping, new construction, remodeling, demolition and land-clearing debris.

A "Sustainable County of San Mateo Resource Efficiency Team" with representation from participating county department was established to complete and inventory of the County's current recycling and sustainable building practices and identify methods to increase the use of green building and reduce the waste stream. The Team reviewed and ranked the demonstration projects for funding; and set the evaluation standards on environmental, health and or economic benefits of the project and ability to demonstrate the value of sustainable building practices in the County of San Mateo.

Department of Public Works agreed to act as the fiscal agent to facilitate the payment and claiming for the IWMB grant

Public Works offered a *Green Building Workshop* to better educate potential grant applicants and other key county facility and project personnel on green building principles and how they can be incorporated into building, facilities and park projects, renovations and remodels. Consultant David Mogavero covered a wide range of building possibility based on his expertise in the areas of ecological building and planning, urban design, environmental planning, multifamily housing and town centers.

#### Summary of the Demonstration Projects

The following five projects were funded:

1 Flood Park Playground	\$25,000
2. Memorial Park Sewer Pipe Replacement	\$75,345
3 OurPlace Child Care Center Playground Structure	\$54,482
4. Elkus Youth Ranch Footpath/Bridge Projects	\$19,173
5 Green Building Workshop	\$ 1,000
Total	\$175,000

These projects employed several green building practices and materials, including:

- recycled tires to resurface and improve safety on park playground,
- recycled cotton pipe that was installed by threading to burst existing deteriorated pipe which avoided damaging retrenching,
- replace childcare facility playground apparatus with a system made from 95% recycled content materials and ensured the playground structure meets safety standards, and
- recycled content gardening materials salvaged from deconstruction

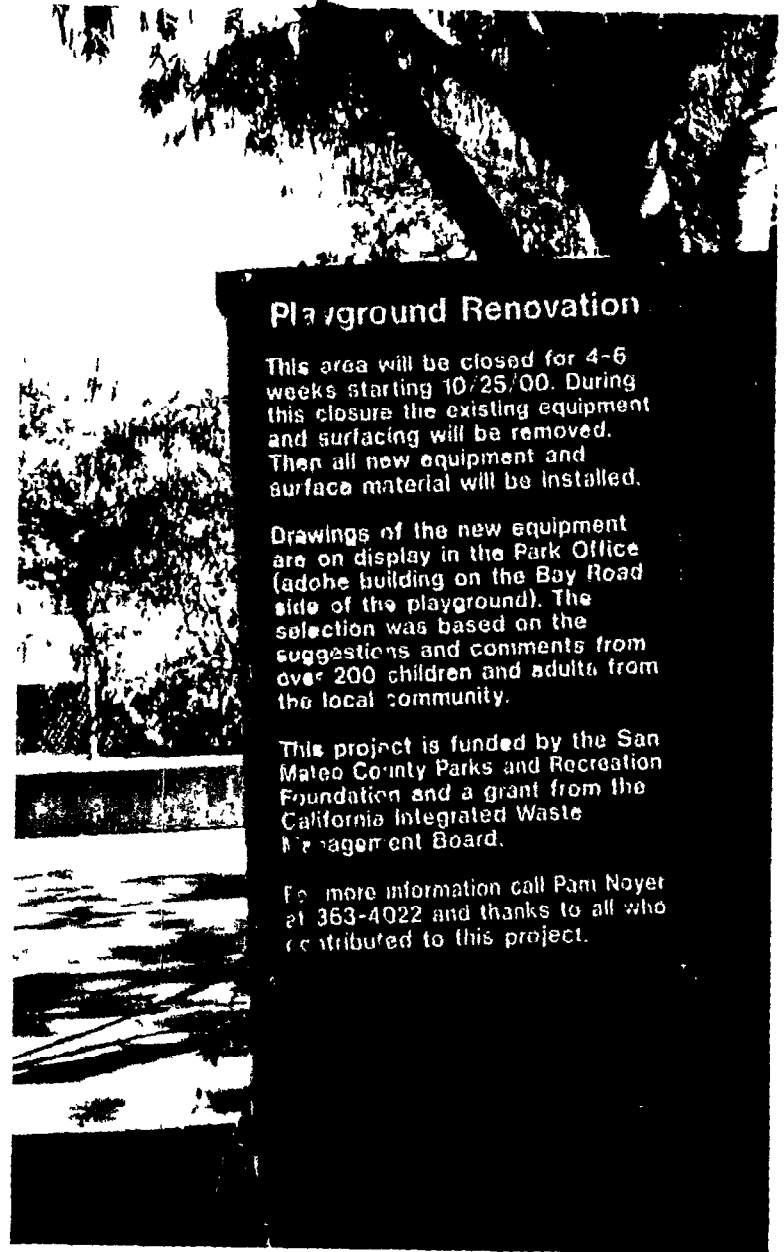
#### Comment

Combined, these projects serve to demonstrate the value, need and application of green building principals and practices in county government projects

Attached please find more detailed information on each of the above projects

<p>1).  <b>PROJECT: FLOOD PARK PLAYGROUND</b></p>
<p><b>Grant Claim Amount: \$25,000</b></p>
<p><u>Project Description</u>  Resurface playground area and install new equipment  <b>See Attachment 1a – <u>Request for Proposal, Flood County Park Playground Improvements</u></b></p>
<p><u>Materials Used and Level of Recycled Content</u>  Buffings – 85% California recycled tires  Playground Structures  Walls – 100% recycled high density polyethylene  Panels/Bridges/Ladders – Steel is 90% recycled (50% recycled steel scrap, 40% internal scrap and customer returns, 10% pig iron)  <b>See Attachment 1b – Product Information</b></p>
<p><u>Receipts Included</u>  <b>See Attachment 1c - Kevin O’Keefe Co – (10/31/2000) \$23,500.00 (3 copies)</b>  <b>1d - Kevin O’Keefe Co – (1/05/2001) \$72,679.04 (3 copies)</b></p>

Flood Park Pictures



## Playground Renovation

This area will be closed for 4-6 weeks starting 10/25/00. During this closure the existing equipment and surfacing will be removed. Then all new equipment and surface material will be installed.

Drawings of the new equipment are on display in the Park Office (adobe building on the Bay Road side of the playground). The selection was based on the suggestions and comments from over 200 children and adults from the local community.

This project is funded by the San Mateo County Parks and Recreation Foundation and a grant from the California Integrated Waste Management Board.

For more information call Pam Noyer at 363-4022 and thanks to all who contributed to this project.

2).

**PROJECT: MEMORIAL PARK SANITARY SEWER PIPE REPLACEMENT**

**Grant Claim Amount: \$75,345**

Project Description

Replace 2,950 linear feet of sanitary sewer pipe using recycled cotton pipe installed by threading to burst existing deteriorated pipe

Materials Used and Level of Recycled Content

100% recycled (HDPE) SDR 17 PE3408 pipe

**See Attachment 2a – Specifications**

**2b – Photographs of Project**

Receipts Included

**See Attachment 2c- Lindstrom Co. - \$63,000 – (11/02/2000)Three (3) Copies**

**See Attachment 2d- Lindstrom Co. - \$63,240.48 – (04/10/2001)Three (3) Copies**

# Excerpt - Project Specifications

2(a)

The Engineer shall approve all bypassing systems. Approval of the bypass system by the Engineer shall in no way be construed as relieving the Contractor of any responsibility under this contract as related to protection of the interests of the County and the general public. Contractor shall be equipped with tools, equipment and materials to contain, clean up and dispose of any sewage contamination during bypass operations that meet the requirements of all regulating agencies.

Under no circumstances will the dumping of raw sewage on the Park's roads, storm drains or any location other than an approved sewer, be allowed.



## 101.02 MATERIAL

### Polyethylene Pipe

Polyethylene pipe and fittings shall be High Density Polyethylene (HDPE) SDR 17 PE3408. **The pipe material shall be 100% recycled content, rated at 95% of new virgin high molecular weight polyethylene**, specified under ASTM D3350 as having a cell classification of PE345434C. Manhole adapter rings shall conform to recommendations of manufacturer of HDPE pipe supplied.

## 101.03 EXECUTION

### 1. Fitting And Joint

Pipe shall be butt welded in accordance with ASTM D 2657-67. The joints shall be leak proof thermal butt joints. All fusing shall be done using tools recommended by the pipe supplier and approved by the Engineer. The fusing machine shall have hydraulic pressure control for fusing two pipe ends together. The ends of pipe shall be electrically heated and thermostatically controlled and shall contain a temperature gauge for

3).

**PROJECT: COUNTY CHILDCARE CENTER PLAYGROUND STRUCTURE**

**Grant Claim Amount: \$54,481.64**

Project Description

Replace existing playground apparatus with a playground system made from 95% recycled materials that meet current safety standards

**See Attachment 3a – Proposal to Replace Wooden Playground Structures**

Materials Used and Level of Recycled Content

95% recycled materials

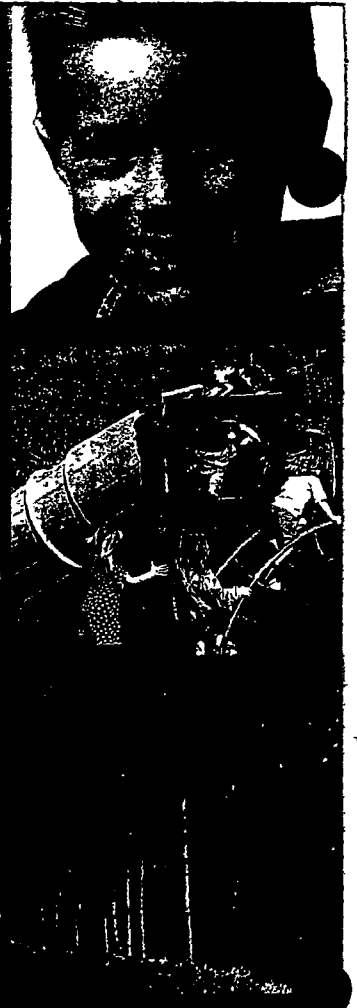
**See Attachment 3b – Product Information, Landscape Structures, Inc.**

Receipts Included

**See Attachment 3c- Ross Recreation Equipment Co. - \$54,481.64**

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# kids. quality. environment.



**OUR LEADERSHIP SETS NEW ENVIRONMENTAL STANDARDS FOR THE PLAYGROUND INDUSTRY**

When Landscape Structures earned ISO 14001 certification for its commitment to protecting the environment and preserving natural resources, we joined a very select group. Fewer than 200 other U.S. companies have met the voluntary but strict ISO 14001 standards.

Landscape Structures is proud to be the first and the only playground manufacturer to achieve this certification.

When you care about kids as much as we do, it's only natural that you take the long view. The future, after all, is their future.

**LANDSCAPE  
STRUCTURES INC**



Printed on  
recycled paper

More than an honor. A path to the future.

Besides recognizing our accomplishments the standards guide our efforts to achieve our future goals. Currently, we're reducing scrap and eliminating — or minimizing — all hazardous wastes. Some of our efforts include:

- Using less water (and minimizing the need for special handling of waste water) by installing a new waste water treatment system on our paint line.
- Reclaiming the vast majority of our powdercoat paint by installing a new paint booth
- Reducing our use of paper by using electronic communications

Such changes exemplify our environmental policy which stresses our commitment to 'enhancing the quality of children's lives by providing quality play environments protecting the environment and being responsible in the use of our natural resources'

Ultimately, ISO 14001 certification is one more result of the commitment to quality that has earned Landscape Structures ISO 9001 and 9002 certification for our manufacturing processes

#755-0011

Contact Landscape Structures by calling 1-888-4-FUN-LSI or visit our web site at [www.playlsi.com](http://www.playlsi.com)



# We're Closing the Loop!

## Recycled/Reclaimed materials Used in LSI Products

Material Used	Common Products Affected	% Used	Recyclable*	% Pre-Consumer	% Post-Consumer	Total Recycled
Aluminum	Playstructure Posts, Superscoop Buckets, Steering Wheel, Spring Riders, Trackrides	100%	Yes	90-100%	0%	90-100%
Aluminum Die Castings	Post Caps, Clamps	100%	Yes	0%	90%	90%
Steel Tubing	PVC Coated Tubing, Vertical Ladders, Roller-slide Rollers	100%	Yes	0%	100%	100%
Steel Sheet and Plate	Decks, Ramps, Brackets, Flanges	100%	Yes	20-30%	0-30%	20-30%
Steel Wire	Wire Barriers, Wire tunnels	100%	Yes	0%	100%	100%
Recycled Plastic	Plastic benches, Peak Roof, PV Strip, Plastic Decks and Walls	100%	Yes	0%	100%	100%
Injection Molded Plastic	Bottom Post Caps, Dowel Pins	100%	Yes	0%	100%	100%
Rotationally Molded Plastic	Slides, Roofs, and Hoods	100%	Yes	0%	0%	0%
Compression Molded Plastic	Activity Panels, Handholds	100%	Yes	0%	0%	0%
Blow Molded Plastic	TuffTimbers	100%	Yes	0%	0%	0%
Rubber	TuffTurf Tiles, PlayTurf	83-94%	Yes	0%	100%	83-94%
Cardboard Boxes		99%	Yes	0-25%	0-25%	0-25%
Packaging Peanuts		100%	Biodegradable			

Landscape Structures Inc. is committed to "closing the loop" by using materials with the highest recycled/reclaimed content possible without jeopardizing the quality and durability of our products.

\* Where facilities exist

**LANDSCAPE  
STRUCTURES INC**

755-0055

# Recycled Materials For Play Equipment

Responsible recycling involves more than picking up reclaimable trash and shipping it out of town. It also means closing the recycling loop by using products made of recycled materials. For communities such behavior isn't just politically correct—it ultimately pays off in reduced disposal costs for solid waste.

On the playground, using equipment made from recycled materials educates children and their parents on the benefits of recycling.

## *Let the buyer be aware*

The hardest part of buying recycled products is learning how to tell the good from the bad. You can't assume that every manufacturer is using recycled materials responsibly—but by asking the right questions, you can be sure that you're making a responsible buying decision for your constituents.

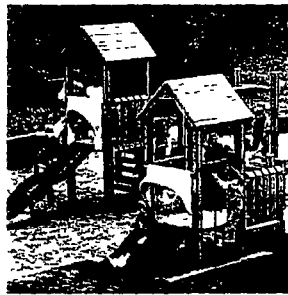
## *Is it really recycled?*

Recycled products typically contain one or more of the following materials:

■ *Post-consumer waste* consists of the cans, bottles, and other materials that a community's residents throw away. Such material is considered desirable because it otherwise would end up in a landfill.

■ *Recovered material* is equally desirable. This consists of reusable material that a municipality or sanitation contractor has separated from appliances and other solid waste.

■ *Reclaimed factory scrap*, such as aluminum tubing and steel trimmings, can be used to supplement consumer waste and recovered material. Using manufacturing scrap in recycled products



*"The hardest part of buying recycled products is learning how to tell the good from the bad."*

is important because it diverts such material from the solid-waste stream.

## *Don't skip on metal*

Recycling of steel and aluminum has become commonplace. Every year more than 60 million tons of steel is recycled in the United States, and 66% of all U.S. steel consists of recycled material. Aluminum products have an average recycled content of 25%, but they may contain an even higher percentage. For example, the posts used in PlayBooster® PlayVenture® and PlayShaper® equipment are made from 100% recycled aluminum.

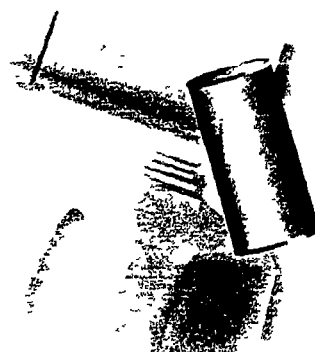
When buying equipment that uses metal structural components, look for quality features such as:

- *Heavy-gauge* posts, decks, and railings
- *Galvanized and coated steel tubing*, which resists corrosion better than galvanized pipe
- *Protective surface treatments*, such as TenderTuff® (polyvinyl chloride) or polyester powder coating

## *Be picky about plastics*

Today, plastic is widely used in play systems—not just for attachments like slides and tunnels, but also for basic structural components.

Unfortunately, there are few industry standards for recycled plastic, a generic term that can mean just about anything.



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STRUCTURES INC**

High-density polyethylene (HDPE) and low-density polyethylene (LDPE) are the most commonly used plastics in outdoor play equipment. Let's take a look at the various grades that are available.

■ *Purified fractional-melt HDPE* is typically made from milk and detergent bottles. It consists of a single high-density polyethylene resin that has been ground into flakes and washed to remove food residue, waste and adhesives. Only then is the plastic used for molding or extruding. This high-quality recycled plastic is used to make Landscape Structures PlayVenture post inserts and to make the plastic lumber found in Landscape's recycled decks, walls and slat-type roofs.

■ *Multiple-melt flow HDPE/LDPE* is a rung down on the durability ladder. It contains two grades of plastic, including the nonstructural plastic used in bags and films. If the HDPE and LDPE are not purified, cavities of up to 10 mm in diameter may be formed during processing. Oils from foods or adhesives can cause deterioration and eventual fracturing of the plastic.

■ *Composites* typically include 50% LDPE and 50% sawdust or other secondary fiber. Because the wood fiber is organic and absorbs moisture, composites are vulnerable to moisture deterioration, termite damage and failure at low temperatures.

■ *Commingled* plastic is a mixture of different resins in percentages that may vary from batch to batch. Durability is always suspect since chemical additives are dispersed unevenly through resins with different properties. And because the resins in the mixture expand and contract at different rates, internal stresses can cause warping as temperatures rise or fall.

#### *Additives*

Pigments, UV stabilizers and other chemicals are used to color plastic, impart structural strength and improve durability. In quality products, additives can represent half the cost of recycled plastic material—which is another reason why cheap plastics are unlikely to survive the stresses of play, weather and solar radiation.

#### *Extrusion vs. molding*

The two basic techniques used to form plastic are continuous extrusion (which results in lengths of product that can be cut to size) and closed molding (such as roto-molding or injection molding processes which produce individual products by heating the resin in a mold). Both methods have their place, but extrusion is preferred when making plastic lumber, such as that used in PlayVenture decks, walls and post inserts.

The benefits of continuous extrusion include a more consistent finish, the ability to form a product of any length and fewer voids for more consistent strength. High-quality foamed extrusion has a rigid skin over a fine, consistent cellular core—a design that maximizes strength while reducing weight.

#### *The bottom line: value vs. price*

In plastics, as in so many other products, you get what you pay for. Saving a few thousand dollars up front can lead to high maintenance and replacement costs in a painfully short time.

#### *Ask your play equipment manufacturer for details*

Manufacturers offering recycled play equipment should be able to tell you the types and sources of all the materials used in their products. You may also want to ask about the company's own recycling practices.

Landscape Structures has a very active internal recycling program involving everything from metal shavings to paper products. Even our packaging is earth-friendly, such as recyclable cartons made from recycled paper products and biodegradable packing peanuts.

For a detailed list of the recycled and reclaimed materials used in Landscape Structures products, see your local representative.



**LANDSCAPE  
STRUCTURES INC.**

*Commitment counts... Excellence shows.*

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4).

**PROJECT: ELKUS YOUTH RANCH ENVIRONMENTAL GATEWAY  
BRIDGE AND FOOTPATH**

**Grant Claim Amount: \$19,173.36**

Project Description

Complete an important part of Dean Trail by preparing a path of approximately 1000 feet, install field fencing and replace the 25 year old bridge over the creek with a new crossing

**See Attachment 4a- Proposal (8 pages)**

Materials Used and Level of Recycled Content

Trex Timber was used for the bridge and the rails Leftover Trex Timber was used to construct benches

Recycled base rock was used when available

Recycled Wood Chips were donated by Asplundh Tree Experts, Timberland, and Gorilla Tree Service

Fencing, posts, t-posts, and cement were salvaged or came from leftover supplies from other projects Once these were used up, some new ones were purchased The cement possibly had recycled content but they were unable to verify this

Solar lights were purchased at Costco The brand is Malibu

Planters were purchased from Price Enterprises These are made from old pickle barrels  
[www.priceisgood.com](http://www.priceisgood.com)

Tables were bought from BARCO and are made of 100% Recycled Plastic

Broken concrete was used for erosion control

Local compost and horse manure was used

Shredded tire ground cover was purchased from Bay Area Tire Recycling and is used under the picnic tables (Perma-turf)

Other products are shown in the pictures In some cases, the items above are not invoiced as part of the grant (but are part of the project) because of the deadline They continue to develop the path, which is the entry point for all their walks and classes, and will be planting native plants when the season is appropriate They are also continuing to develop their curriculum and revise flyers to add on information about the path and the recycled content Signs will be added to educate and will be made of recycled or salvaged materials, including the metal brackets, which are being made from old door kickplates

**See Attachment 4b – Product Information**

**4c - Photographs**

Receipts Included

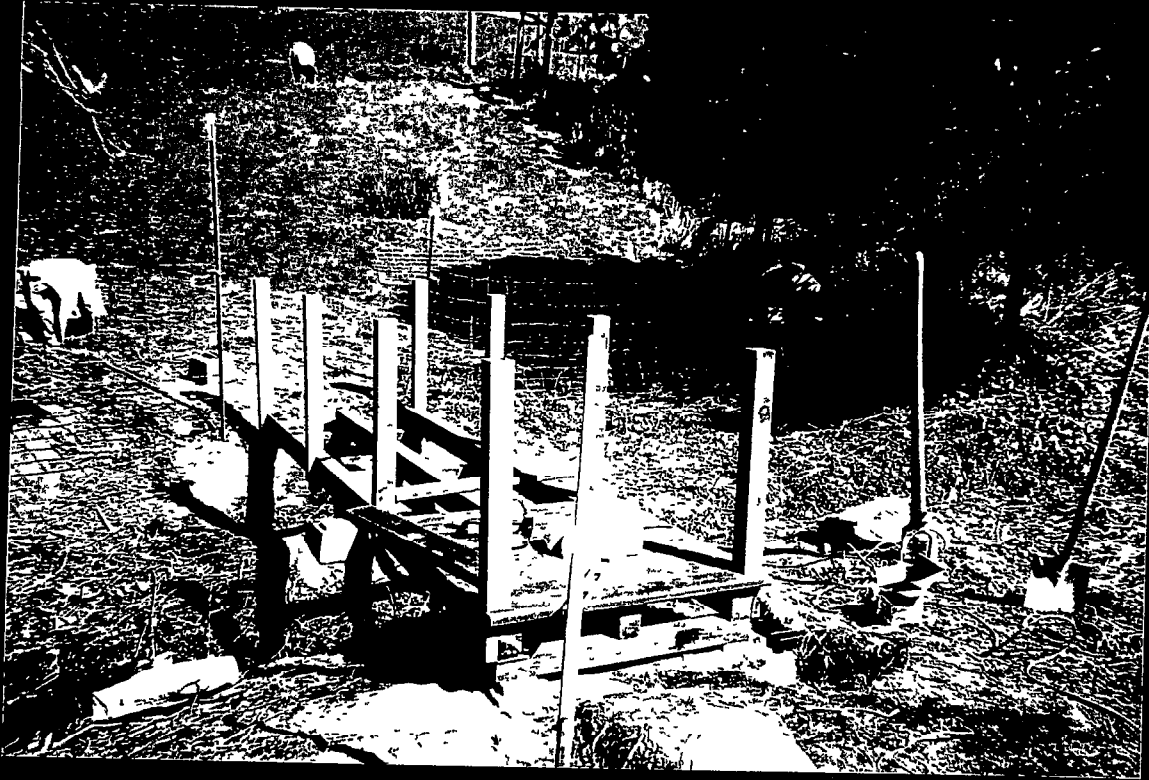
**See Attachment 4d**



"Footpath to our future"



New foundation in place



Salvaged lumber was used  
for garden projects



Reuse



San Mateo County  
Honor Camp



25 year old bridge



Rebuilt with recycle lumber





# Erosion Control area #1



80# concrete sacks ...

Rebar ...

Willow trees Planted



filled with broken recycled

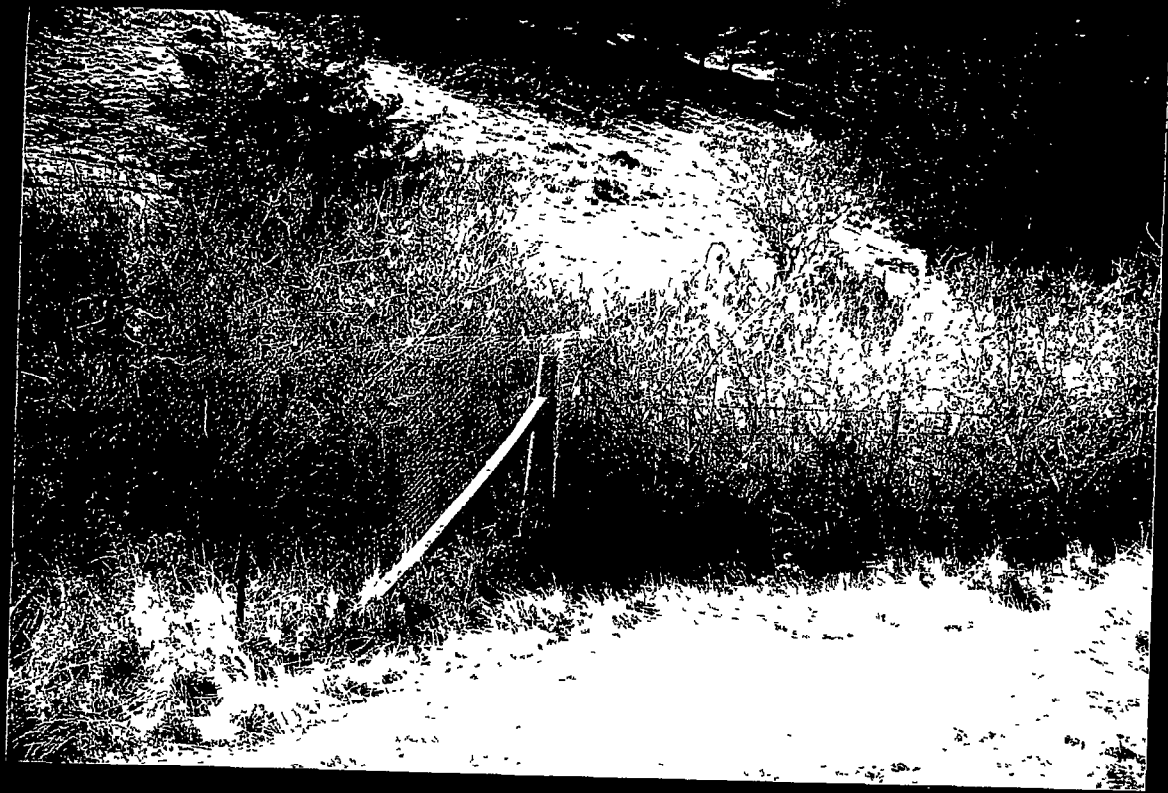
Area # 2



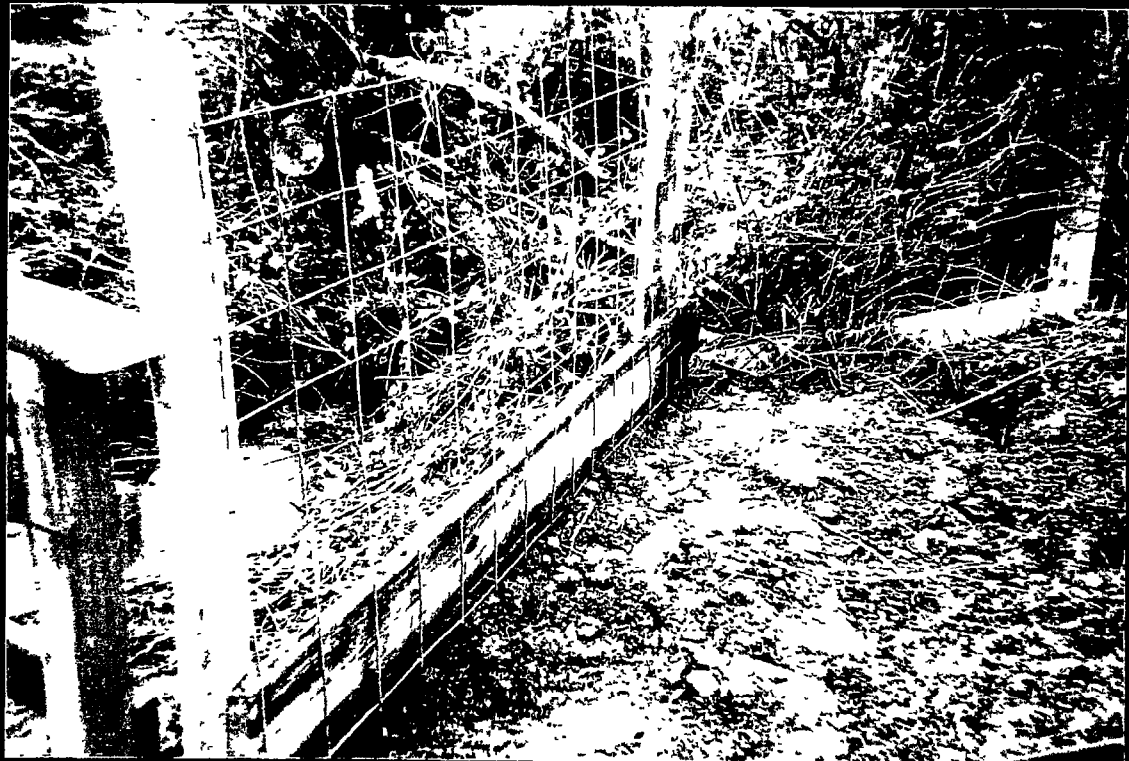
to be  
completed  
in June

Area # 3





*Recycled materials*



*Reuse*

300 feet - drip system



recycled wood chips

native plants - shrubs



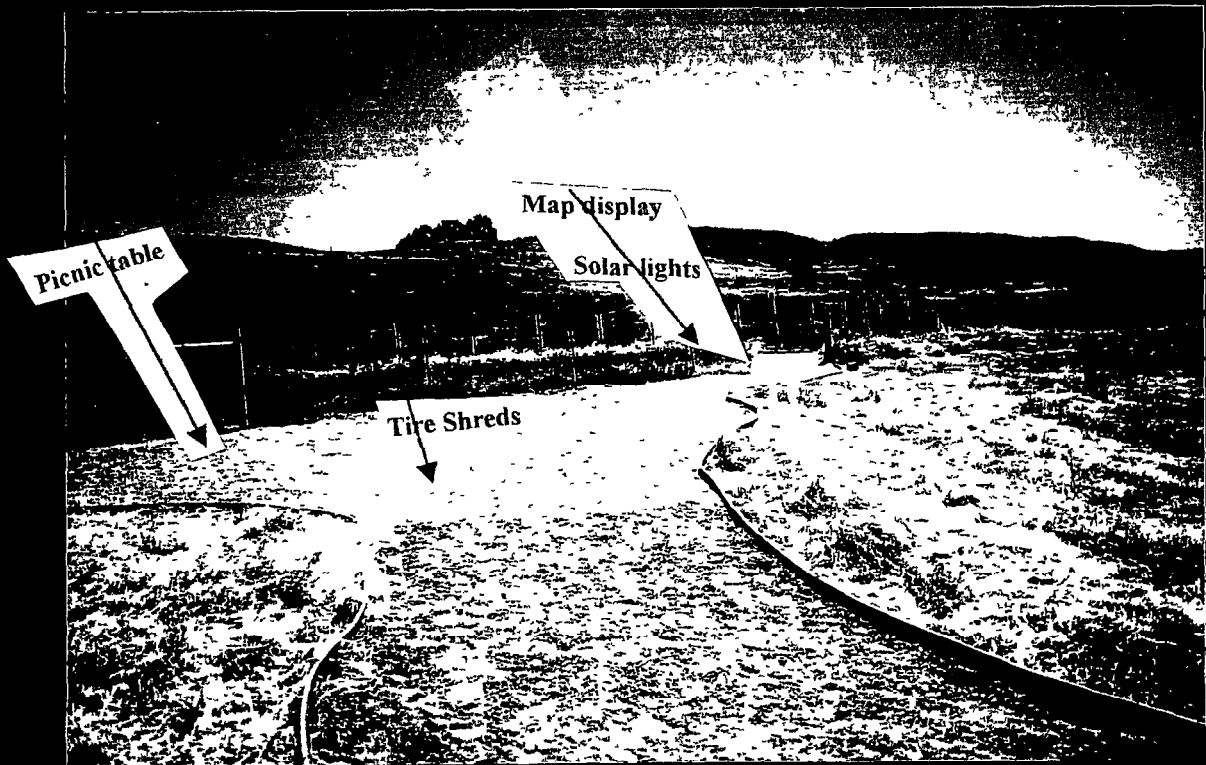
recycled "pickle" barrels cut in  
half used for smaller plants

Working on Per plot - completed by October

Before



After



additional funds from Green Building Grant

# Recycled materials



Plastic recycled material picnic tables



Tire shreds (steel free)  
ground cover



5).

**PROJECT: GREEN BUILDING WORKSHOP AND PRESENTATION**

**Grant Claim Amount: \$1,000**

Project Description

Green Building Workshop to educate potential grant candidates and other key facility and project personnel on Green Building principles and how they can be incorporated into our building and park projects, renovations and remodels

See Attachment 5a- **Green Building Presentation Announcement**

**5b- Green Building Presentation Outline**

Receipts Included

**5c- Mogaverno Notestine Associates - \$1,000 - Three (3) Copies**





COUNTY OF SAN MATEO  
RECYCLEWORKS

# Green Building

- What is green building and how does it relate to our projects?
- How can we incorporate green building practices into our building and parks projects, renovations and remodels or even in simple purchases?
- What does green building have to do with staff performance and productivity?
- If we are simply buying new furniture or new carpeting, does this apply to us?
- Why is San Mateo County interested in developing green building practices?

## **Mandatory Pre-proposal Meeting and Green Building Presentation**

**December 8, 2000**

**Room 501, 455 County Center**

**11:30-2:00, lunch is included!**

**Please RSVP! (email [jboone@co.sanmateo.ca.us](mailto:jboone@co.sanmateo.ca.us) or call 599-1433)**

A slide presentation by David Mogavero will cover the wide range of green building possibilities and how to incorporate these principles into our building and park projects, renovations and remodels. The presentation will be followed by a discussion on green building practices—as detailed as you want. There will also be an opportunity to ask about our grant funding and to answer questions specific to your project.

David Mogavero is the senior principal of Mogavero Notestine Associates, an architectural, planning, and development services firm in Sacramento, California. The firm is involved in a wide variety of projects for public and private clients on the West Coast and has been honored with numerous awards for excellence in both planning and design.

Mr. Mogavero has special expertise in the areas of ecological building and planning, urban design, environmental planning, multifamily housing, and town centers. Mr. Mogavero has actively lectured, written and has been an aggressive advocate for infill and higher density neighborhoods, pedestrian-friendly environments and transit-oriented development. Through his professional and advocacy activities, he has facilitated the widespread adoption of these principles in many projects and communities.

Remember **RSVP** to Jill at [jboone@co.sanmateo.ca.us](mailto:jboone@co.sanmateo.ca.us) or 599-1433.

The building-related aspect of this conference is focused very much upon the materials and systems that we construct buildings from, and the environmental implications of their gathering, manufacture, transport and ultimate recyclability. The purpose of this presentation is to provide a broad overview of the nature of green building issues and its connection to the building of public facilities and urban planning.

The presentation will use a variety of specific examples to illustrate the principles

In our firm's long history with green building, one of my most gratifying realizations has been that green also allows us to do a better job with the most essential reasons for us to build.

1. To make people comfortable.
2. To support human endeavors.
3. To connect people with the spirit of life and to nurture inspiration and creativity in their various endeavors.
4. To support positive interactions between people, their community, and their environment.

Within this context, we are mechanics; getting the job done. Our focus here today is minimizing the resources we utilize in constructing and operating buildings.

I'd like to run through the scope of issues we must concern ourselves with when constructing green buildings

1. Location, Location, Location. Where you construct a building is the most important determinant of resource consumption. A few simple rules are.
  - Build at transit
  - Mix uses in the same place
  - Build as dense as the market will allow
  - Construct as little automobile parking as possible
  - Locating public facilities

The most energy efficient, green-material building flunks the most important part of the green test if it is constructed out in the middle of nowhere.

2. Recycle existing buildings...don't build a new one if existing ones are available
3. Minimize demolition activities and recycle on-site first, and off-site second, as many residual materials from demolition activities as possible

4. Design forms and shapes in a manner that maximizes productivity of the occupants of the buildings and provides them a lifeful refreshing environment
5. Maximize the possibility for people to have choices about connections with others or privacy.
6. Minimize energy consumption with the most passive systems possible.
7. Control and purify the pollutants that enter the water cycle on site.
8. Design buildings in a manner that minimizes their long-term obsolescence.
  - Use flexibility
9. Utilize materials and construction systems that:
  - Minimize impact from mining and harvesting.
  - Minimize toxic bi-products from manufacturing.
  - Minimize energy consumption in manufacturing.
  - Minimize waste from manufacturing.
  - Maximize the use of recyclable materials
  - Minimize transportation needs.
  - Age gracefully and minimize maintenance and replacement.
10. Avoid material systems that have toxic implications for occupants.
11. Utilize construction processes that minimize the amount of non-recyclable by-products and controls the flow of pollutants off of the site.



**COUNTY OF SAN MATEO**  
**Inter-Departmental Correspondence**

**Board of Supervisors**

**DATE:** May 31, 2001

**BOARD MEETING DATE:** June 5, 2001

**TO:** Honorable Board of Supervisors  
**FROM:** Rose Jacobs Gibson, District Four Supervisor *RJG*  
**SUBJECT:** Establish a Subcommittee to Develop a Green Building Policy

**Recommendation**

Create a subcommittee to develop a comprehensive Green Building Policy

Alignment. Vision goal 14. Important natural resources are preserve and enhanced through environmental stewardship; and goal 20 Government decisions are the result of careful consideration of future impact, rather than temporary relief or immediate gain

**Background**

August 1999, the County of San Mateo was awarded a \$175,000 grant from the California Integrated Waste Management Board (IWMB) to develop a model sustainable or Green Building practices policy for the County through funding demonstration projects. The purpose of the demonstration grant was to illustrate and educate county government to the value of Green Building practices including landscaping, new construction, remodeling, demolition and land-clearing debris. That experience would then serve as the basis for the development of a Green Building Policy for the County.

Additionally, in December 2000, this Board adopted an Environmental Purchasing Policy that includes purchasing requirements for recycled-content and non-toxic alternatives

**Discussion**

Increased energy costs and legislation such as the California Integrated Waste Management Act (AB939) has focused increasing attention on waste from construction and has fueled a broad interest in designing 'greener' buildings. Both the State of California and the Federal Government have taken steps to require that their new buildings are green. The Board has recognized that sustainability and resource conservation are critical considerations in making policy for the County today and for its future

Green Building design would support the visioning goals as it includes the objectives of energy efficiency, water conservation, improved indoor air quality, community sensitivity, resource conservation, and have the least environmental impacts. Additionally, it would address issues such as access to public or alternative transportation, use of recycled content building materials, natural lighting and ventilation, site options, stormwater management, renewable energy sources, and recycling of construction and demolition waste

A Board subcommittee would provide an appropriate forum to work more closely with the community and County officials to develop a responsive Green Building Policy or Sustainable Building Policy. Such a policy would include building system commissioning and performance standards, such as 20% below June 2001 Title 24 Energy Standards and 60-75% diversion of construction and demolition debris. It is argued that an effective policy would allow design team flexibility in how to achieve high performance standards and would be primarily performance based rather than prescriptive.

Moreover, the policy would also include strong water and energy conservation performance standards.

As Green Building has steadily gained favor and momentum the performance-based Leadership in Energy and Environmental Design (LEED) Green Building rating system has emerged as a nationally recognized standard. The process of developing a green building policy for San Mateo County would borrow and benefit from this body of experience. For a comprehensive list of Green Building issues based on LEED, please see attachment A.

**Fiscal Impact**

No fiscal impact is anticipated to develop the Green Building Policy.

## **Attachment A**

Leadership in Energy and Environmental Design (LEED) is a national rating system for Green Buildings, which many jurisdictions have adopted as part of their Green Building policies. This list of all LEED prerequisites and optional credits also serves as a good list of Green Building objectives and issues

### **Sustainable Sites**

- Prerequisite.
  - Meets local soil erosion standards with a locally approved sedimentation and erosion control plan; and
- Credits are given for alternative transportation, brownfield development, light pollution reduction, site selection, urban redevelopment, reduced site disturbance, stormwater management, and landscape/exterior design to reduce heat islands.

### **Water Efficiency**

- No prerequisites for water; and
- Credits are given for water-efficient landscaping, innovative wastewater technologies, and water use reduction

### **Energy and Atmosphere**

- Prerequisites:
  - Must comply with departmental building commissioning (see included article)
  - Must comply with Title 24 energy requirements (and most Green Buildings use sophisticated energy modeling to bring energy consumption down to 20-50% below Title 24)
  - Us no CFC-based refrigerants in HVAC (heating, ventilation, air conditioning) and refrigeration systems
- Credits are given for optimal energy performance, renewable energy, additional commissioning, elimination of HCFCs and HFCs, measurement and verification, and green power.

### **Materials and Resources**

- Prerequisite
  - Provide an easy accessible dedicated area, servicing the entire building, for the collection and storage of materials for recycling including paper, glass, plastics and metals, and
- Credits are given for building reuse, construction waste management, resource reuse, recycled content, local/regional materials, rapidly renewable materials, certified wood

## **Indoor Environmental Quality (IEQ)**

- Prerequisites:
  - Meet minimum requirements of ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality plus addenda (In California, we use Title 24 instead of ASHRAE standards)
  - Zero exposure of non-smokers to ETS (environmental tobacco smoke), and
- Credits are given for CO2 monitoring, increased ventilation effectiveness, construction IAQ management plan, low-emitting materials, indoor chemical and pollutant source control, controllability of systems, thermal comfort, and daylight and views

## Projects

### Integrated Design: Learning from Building to Building

When the Pennsylvania Department of Environmental Protection (DEP) got involved with the design and construction of a building it was slated to lease as its Southcentral Regional Office Building (SCROB), DEP determined to make it a "Green Technology Model Project." With support from The Heinz Endowments, Alan Barak of the Penn Energy Project assembled a green team to assist with the design of the 78,000 ft<sup>2</sup> (7,250 m<sup>2</sup>) building. The results, documented in an outstanding half-hour video (see *EBN* Vol. 8, No. 6 for review), were good enough for a Bronze rating under the U.S. Green Building Council's LEED™ Pilot Program. Design highlights included

- location on a brownfield site
- ozone-safe cooling with a gas-fired absorption chiller
- raised-floor air distribution
- desiccant wheel energy and moisture recovery
- split task/ambient lighting for a connected load of 0.85 W/ft<sup>2</sup> (9.1 W/m<sup>2</sup>)
- environmentally sensitive material choices

- construction cost of only \$78/ft<sup>2</sup> (\$840/m<sup>2</sup>), low for any office building in this market

Actual performance of the SCROB, after it was occupied in May 1998, has not quite lived up to expectations. The engineer was concerned about sizing the chiller too tightly to the projected load and, since absorption chillers are only available in limited sizes, ended up specifying one twice as large as necessary. This caused inefficiencies in operations (absorption chillers are particularly sensitive to performance losses from frequent on-off cycling) and freezing of the salts. Only cavity-fill insulation was used in the steel-framed exterior walls, resulting in thermal bridging and lower performance. And the lightshelves were not modeled properly, which led to glare problems from direct sunlight reaching workstations and required retrofitting a less-than-optimal fix.

While many of these shortcomings are being addressed proactively by building management, they are indicative of a suboptimal process, in which the green team provided direction to the design-build firm but was

not involved closely enough during implementation of those ideas. Fortunately, DEP persisted in recommending a sustainable design approach for its next building, and architect John Boecker and energy consultant Marcus Sheffer got another opportunity.

For the design of the 36,000 ft<sup>2</sup> (3,350 m<sup>2</sup>) Cambria Office Building in Ebensburg, Pennsylvania, the entire team worked more closely together. Even with everyone in the same room, however, old habits persisted and there was a tendency for discussions to become fragmented. This fragmentation was happening, according to Boecker, during one session on locating mechanical systems, which consist of ground-source heat pumps and underfloor air distribution. One group was struggling with locating duct runs to and from the proposed penthouse air-handling systems, while others were working on other issues with the system.

At some point, both Boecker and Sheffer realized that the process had broken down, and they asked the mechanical engineer where the optimal location for the air handlers would be. After recovering from his surprise at being asked such a question by the architect, mechanical engineer John Manning proposed that they be on the first floor, with one in

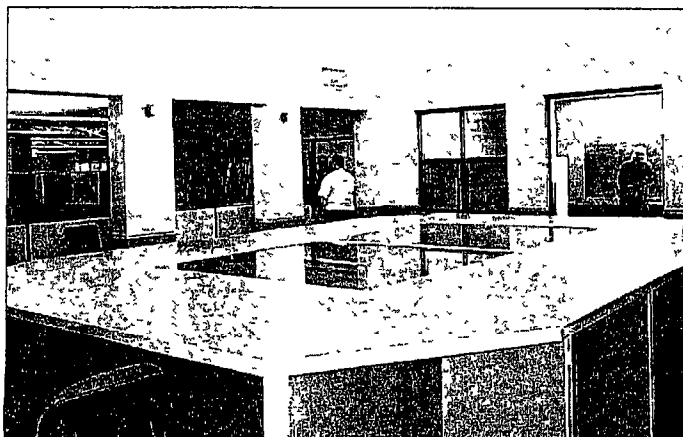


Photo courtesy of Pennsylvania Department of Environmental Protection

This skylight table in Cambria receives abundant daylight from above and passes some to the first floor lobby through its glass top.

### Comparison of Energy Requirements and Costs

	Typical <sup>(1)</sup>	SCROB modeled	Cambria modeled	Cambria actual <sup>(2)</sup>
<b>TOTAL ENERGY</b> (s te)				
Btu/ft <sup>2</sup>	87 400	83 700	23,500	6 162
MJ/m <sup>2</sup>	993	951	274	70
<b>ELECTRICITY</b>				
kWh/ft <sup>2</sup>	14.20	14.88	6.05	1.80
kWh/m <sup>2</sup>	152.69	160.00	65.00	19.35
<b>NATURAL GAS</b>				
Btu/ft <sup>2</sup>	35 000	33 088	1 232	0
MJ/m <sup>2</sup>	398	376	14	0
<b>COST</b>				
\$/ft <sup>2</sup>	\$1.71	\$1.18	\$0.54	\$0.18
\$/m <sup>2</sup>	\$18.39	\$12.69	\$5.81	\$1.94

1 Based on Energy Information Administration data for Commercial Office Buildings in the Northeastern U.S.

2 Annual projections based on utility bills for the first five months of operation (November 2000 through March 2001)—low data reliability! Occupancy at about 50% of design level (65 people vs. 130).



each wing. The team then studied this idea long enough to overcome the conventional wisdom that first-floor space is too valuable for air handlers, and discovered that they could enlarge the floor plate slightly to accommodate them with a net savings of \$40,000 in construction costs. This solution not only greatly increased air distribution efficiency but also improved the daylighting design, which had been hampered by the penthouse.

Similarly, when the designers first proposed an upgrade to triple-glazed, double low-e windows from Visionwall, the developer balked at the \$15,000 increase in cost. He was won over, however, when it was demonstrated that this upgrade allowed elimination of the perimeter

heating zone for a savings of \$15,000, downsizing of the heat pumps for another \$10,000 savings, and a \$5,000 gain in leasable space due to the smaller equipment and ducts.

With improved lighting design and daylighting, the connected lighting load at Cambria is 0.65 W/ft<sup>2</sup> (7.0 W/m<sup>2</sup>). Insulated concrete forms from Reward

Wall eliminate thermal bridging in the exterior walls. Water conservation measures include the use of waterless urinals and simple push-rod automatic faucet controls. Boecker discovered that with these controls they could use a single automatic mixing valve for a gang of lavatories, which allows just a single supply line to each, saving on installation and maintenance expense. Cambria's construction came in at \$88/ft<sup>2</sup> (\$946/m<sup>2</sup>), with an additional \$10/ft<sup>2</sup> (\$108/m<sup>2</sup>) for sitework.

Comparing the two buildings, Boecker says, "Almost everything we did at Cambria is at a higher level." The project has not yet been certified by LEED, but the designers are hoping for a Gold rating. Perhaps most remarkably, preliminary utility data is showing performance significantly better than predicted. Since it was occupied in September 2000, Cambria seems to be using energy at the amazingly low rate of 62,300 kWh per year, or less than \$0.18/ft<sup>2</sup> (\$1.94/m<sup>2</sup>), not including any contribution from the photovoltaic system. This performance is about 90% better than a typical base case. The building has not yet been through a cooling season, and monitoring is still being debugged, so these numbers are far from final.

The Cambria project includes a 14.3 kW PV system, consisting of panels

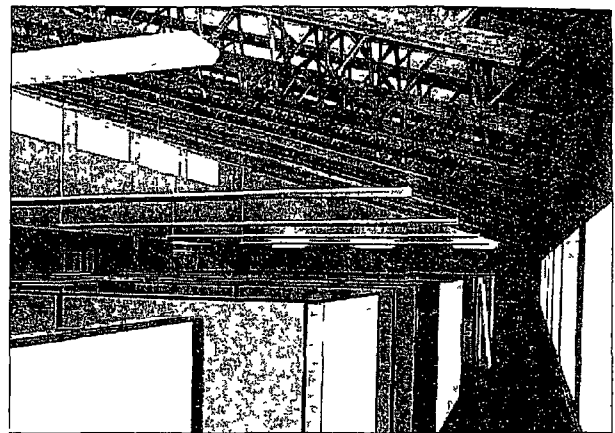


Photo courtesy of Pennsylvania Dept. of Environmental Protection  
Exposed roof trusses add visual interest in Cambria's second floor office area, where daylight is provided by clerestory windows.

#### Design Team for SCROB:

Architect: The Kostecky Group

Project Architect: John A. Boecker, AIA

Administrative Architect:

Kulp Boecker Architects, P.C.

Design-Build Contractor/Owner:

909 Partners, Tiger Development

Green Consultants (supported by:

The Heinz Endowments)

Carnegie Mellon Center for Building

Performance and Diagnostics, Steve

Lee, AIA Penn Energy Projects

Members of 7 Group

Mechanical Engineer, Design-Builder:

G.R. Sponaugle & Sons, Inc.

Electrical Engineer, Design-Builder:

Edwin L. Heim Company

Civil Engineer:

Hoover Engineering Services, Inc.

#### Design Team for DEP Cambria:

Architect: Kulp Boecker Architects, P.C.

Project Architect: John A. Boecker, AIA

Administrative Architect:

L. Robert Kimball & Associates

Design-Build Contractor/Owner:

Miller Bros. Construction, Inc.

Green Consultants: 7 Group

Energy Consultant:

Energy Opportunities, Marcus B. Sheffer

Mechanical Engineer:

Phoenix Geothermal Services, John D.

Manning, PE

Electrical Engineer, Design-Builder:

I. Ray Zimmerman

Civil Engineer:

WJP Engineers, Edward E. Davis, Sr., PE

on the roof and on stand-alone tracking devices. At current usage rates, this system is projected to supply about 44% of the building's power. The electricity supplier, Green Mountain Energy Co. (GME), buys all of the output from this system (at a premium rate, because solar power is a small but critical part of its green electricity mix), so technically none is used by the facility. The DEP, in turn, buys its electricity from GME, which includes PV-generated power from this and other facilities in its mix. Even though, contractually, the PV system's output is delivered to GME and other power is purchased, DEP does not pay distribution fees on this power (in Pennsylvania's deregulated market, users pay for distribution separately from supply). Taken together, the revenue from electricity sales and the avoided distribution charges add up to about \$8,630 per year for the State, according to Sheffer. If current estimates hold up, this solar contribution will exceed the facility's entire energy bill! - NM

#### For more information:

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- Sample -

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### Sustainable Building Policy

#### 6.9 Sustainable Building

##### 6.9.1 Purpose

The purpose of a Citywide policy on sustainable building is to demonstrate the City's commitment to environmental economic and social stewardship to yield cost savings to the City taxpayers through reduced operating costs to provide healthy work environments for staff and visitors and to contribute to the City's goals of protecting conserving and enhancing the region's environmental resources. Additionally the City helps to set a community standard of sustainable building.

##### 6.9.2 Organizations Affected

All City departments and offices and their contractors responsible for financing, planning designing developing constructing and managing City-owned facilities and buildings.

##### 6.9.3 Definitions

###### Sustainable Building

Sustainable building integrates building materials and methods that promote environmental quality economic vitality and social benefit through the design construction and operation of the built environment Sustainable building merges sound environmentally responsible practices into one discipline that looks at the environmental economic and social effects of a building or built project as a whole Sustainable design encompasses the following broad topics efficient management of energy and water resources management of material resources and waste protection of environmental quality protection of health and indoor environmental quality reinforcement of natural systems and integrating the design approach

###### Life Cycle Cost Analysis

An inclusive approach to costing a program facility or group of facilities that encompasses planning design construction operation and maintenance over the useful life of the facilities and finally any decommissioning or disassembly costs Life Cycle Cost Analysis looks at the net present value of design options as investments The goal is to achieve the highest most cost-effective environmental performance possible over the life of the project

###### LEED Rating System

LEED stands for Leadership in Energy and Environmental Design and is a voluntary consensus-based market-driven green building rating system. It is based on existing proven technology and evaluates environmental performance from a whole building perspective. LEED is a self-certifying system designed for rating new and existing commercial, institutional, and multi-family residential buildings. It contains prerequisites and credits in five categories: Sustainable Site Planning, Improving Energy Efficiency, Conserving Materials and Resources, Embracing Indoor Environmental Quality, and Safeguarding Water. There are four rating levels: Bronze, Silver, Gold, and Platinum.

#### **6.9.4 Policy**

It shall be the policy of the City of Seattle to finance, plan, design, construct, manage, renovate, maintain, and decommission its facilities and buildings to be sustainable. This applies to new construction and major remodels in which the total project square footage meets the criteria given. The US Green Building Council's LEED (Leadership in Energy and Environmental Design) rating system and accompanying Reference Guide shall be used as a design and measurement tool to determine what constitutes sustainable building by national standards. All facilities and buildings over 5,000 gross square feet of occupied space shall meet a minimum LEED Silver rating.

Design and project management teams are encouraged to meet higher LEED rating levels. A Mayor's Award for achieving a higher rating will be awarded. (See also *Energy and Water Conservation Policy* and *Landscape and Grounds Management Policy*.)

#### **6.9.5 Procedures and Responsibilities**

The Directors of all City Departments whose responsibilities include planning, designing, constructing, or renovating City-owned facilities shall be responsible for ensuring that facilities and buildings comply with 6.9.4.

The City's Office of Sustainability & Environment (OSE) shall be responsible for coordinating any educational, technical, and financial resources available to City departments that support and promote sustainable design and construction of City facilities. The City's OSE shall be responsible for annually evaluating and reporting to the Oversight Panel how well applicable City construction projects meet the goal of sustainability.

The Office of Sustainability & Environment shall establish the minimum number of credits required in each of the LEED categories so that projects shall demonstrate performance in all categories.

The City's interdepartmental Green Building Team, under the OSE, shall be responsible for reviewing and updating the City portion of the LEED reference manual annually, for helping provide technical expertise on specific sustainable building issues on a case-by-case basis, and coordinating LEED training programs.

#### **6.9.6 Budgeting and Financing**

All capital construction which falls under this policy will be expected to budget to meet at minimum the LEED Silver rating. Budget planning and life cycle cost analysis to achieve a higher rating of gold or platinum is encouraged.

#### **6.9.7 Training**

City capital project managers currently managing or likely to manage projects which fit the criteria in 6.9.4 will be responsible to attend introductory LEED training and annual follow-up training. LEED training will be coordinated through the Office of Sustainability & Environment and/or other sponsoring departments.

### 6.9.8 References

City of Seattle Sustainable Building Action Plan  
Seattle's Solid Waste Plan On the Path to Sustainability  
USGBC LEED Reference Manual  
Seattle Energy Code

Lucia Athens  
Chair Green Building Team  
Seattle Public Utilities Resource Conservation  
684-4643

#### Home

*Julie Tobin (206-615-0817)*  
*Last Updated: 12/06/00*

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