

Greenprints Charrette: Southface Energy Institute New Building

This report is a summary of the *High Performance Buildings Charrette* Conducted at the Greenprints Conference on February 21-22, 2002

**Funding and coordination provided by:
Southface Energy Institute
National Renewable Energy Laboratory
US Department of Energy**

Final Report prepared by Design Harmony, Inc.
In cooperation with:
NREL and BuildingGreen

High Performance Buildings Charrette: Final Report



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- Charrette Agenda
- Project Information (Program and Drawings)
- LEED Matrix for Southface New Building
- LEED Version 2.0
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EXECUTIVE SUMMARY

Southface Energy Institute, a leader in energy and environmentally conscious educational efforts, hosted their annual Greenprints Conference in Atlanta, Georgia at the end of February 2002. One of the conference highlights was a one-day High Performance Buildings Charrette (an intensive and focused brainstorming session involving a wide variety of experts) for their new institute building addition. Early in their design process, Southface conveyed that energy and environmental considerations were critical; in fact, one of Southface's project goals was to be a net-zero energy user. The charrette focused on that net zero energy target as well as other goals highlighted by the use of the nationally recognized LEED Green Building Rating System.

The main goal was to identify realistic and cost-effective sustainable measures that the new Southface facility could implement, and the charrette provided an effective means to engage numerous conference participants in a hands-on effort to attain it. In planning the charrette, Southface identified the US Department of Energy and the National Renewable Energy Laboratory as partners. They helped fund and assist in the charrette process and documentation. Ongoing relationships with these partners and with the diverse and knowledgeable charrette participants will not only aid Southface reach the stated energy and environmental commitments, but remain beneficial long after this project has been established as a leader in the field.

The charrette proved to be an effective method for collecting viable high performance building ideas and strategies for the New Building Addition to the existing Southface Energy Institute facility. Many of the ideas and strategies addressed environmental excellence and high performance concepts found in the LEED Green Building Rating System. Approximately 55 individuals participated in the high performance buildings charrette. They came from a wide variety of backgrounds and fields: Southface employees, architects, engineers, government employees, green building consultants, university staff members, builders, and public & private company representatives. Six breakout groups were created and all participants were assigned to one of these groups; each group was tasked to design a "net zero" energy addition to Southface and brainstorm ideas and strategies to meet a LEED Platinum level for the addition.



Greenprints Charrette participants listening to Southface speakers

National experts in "integrated design", LEED, and energy efficiency helped to facilitate the charrette while representatives from Southface provided information on the project program, site, and goals. The charrette participants shared their creative thoughts and ideas, questioned original project assumptions, and ultimately came up with innovative solutions and strategies for a high performance new Southface addition.

The ultimate goals of this charrette were to:

1. Inform and educate charrette participants about energy and environmental implications of designing and constructing a new addition for the Southface Institute, while clarifying the term “integrated approach”, so that they could effectively use the LEED Green Building System to help define a high performance building.
2. Identify economically viable and doable strategies that Southface could implement in their New Building and, in doing so, attain a high LEED rating and, perhaps, “go beyond” the rating.
3. Establish a database of outside contacts and interested parties that could provide potential champions for the project.
4. Document the charrette both as a training tool for future high performance charrettes and also as a source of information to assist Southface with their new facility’s “next steps”.
5. Use the new addition to initiate a benchmark for environmental excellence in design and construction on a commercial level as the existing Southface structure has done for the residential level; outline energy and environmental initiatives that will establish Southface as a model for other similar facilities.



Dr. Paul Torcellini, NREL, and Mike Chapman, AIA, NAVFAC, discuss high performance strategies identified by charrette participants



LEED Green Rating System used as a reference and a “starting point”

Throughout the High Performance Buildings Charrette, the overall large group of charrette participants and the smaller “break-out” groups all reviewed the LEED Green Building Rating System points. The participants determined that out of a potential 69 point system, the New Southface Building target should be 52 + points; thereby attaining a **PLATINUM** achievement level in the rating system. More in-depth review and research are needed on some potential points, while other selected points are indeed “very doable”. The charrette participants used LEED as a resource and discussed ways to “go beyond” LEED. (See the Southface LEED matrix in the Appendix).

With their commercial addition, Southface is embarking on a new level of education not only for its visitors and staff, but also for a much larger “community”.

IMMEDIATE NEXT STEPS

1. Benefit from Charrette Ideas

- Review input and ideas from the charrette; when beneficial, contact charrette team members for further input. Provide copies of the charrette report and charrette drawings/ideas to the Southface addition's future design team.
- Review and revisit goals established during the charrette and create a schedule for attaining these goals and other targets.
- Identify champions and partners for the ideas and strategies noted during the charrette; identify gaps in knowledge required to implement specific charrette ideas.

2. Set up a project sustainability research schedule; identify and collect tools & resources

- Acquire more in-depth information on targeted LEED points. Add comments and potential costs/savings to the Southface LEED matrix (See Appendix).
- Assign specific people the responsibility for information & resource collection for potential high performance efforts; set up an overall schedule defining when research will be completed and decisions made.
- Collect tools and resources that will assist in achieving the LEED points identified at the greening charrette (Suggestions: LEED V.2 Reference Guide, Best practice high performance specifications, case study information – See Southface Resources and web site listings in the Appendix).



Greenprints Charrette participants from around the country provided a wealth of high performance knowledge

3. Continue to make this project an educational endeavor

- Create a videotape- documenting not only the project, but also the process.
- Document “Request for Proposal” and A+E selection criteria.
- Determine how to coordinate classroom education/training with the built facility.
- Document the “Lessons Learned” throughout this project in order to teach others; share information from this project with others; set up a network for conveying the sustainable design knowledge effectively
- Consider being a case study on the US DOE High Performance website; review its case study template. The information requested will actually assist the design team throughout the design and construction process. (See web address on the Southface Resources listing in the Appendix)

CHARRETTE PROCESS

Southface Energy Institute, in planning for the new commercial addition to their existing “residential” educational facility, sought a net zero energy user facility as well as a one that would address energy efficiency and sustainable initiatives using the nationally recognized green building rating system, LEED. To help catalyze their focus, they sought partnerships with the US Department of Energy and the National Renewable Energy Laboratory to initiate a “High Performance Buildings Charrette”. (A charrette is a sustained, intensive brainstorming session in consideration of a project, topic or problem.) High profile Greening Charrettes formally began in the early 1990’s with the successful “Greening of the White House”. Since that initial charrette, numerous others (such as the those for the National Park Service, the Pentagon, Habitat for Humanity, and other public and private groups) have been successfully undertaken to improve design and construction endeavors throughout the United States.

For the Southface New Building High Performance Buildings Charrette, approximately 55 participants from various backgrounds assembled at the 2002 Greenprints Conference in Atlanta, Georgia for the one-day event. The charrette participants worked both in a single large body and as six focused working groups. Their goal: to identify realistic and cost-effective “high performance” opportunities and objectives that would not only improve the project’s efficiency levels but also satisfy the requirements of the LEED Green Building Rating System.



Charrette participants engage in a “hands-on” approach to high performance design

Throughout the daylong charrette, a mixed format prevailed; presentations to the participants about project programming, site considerations, and sustainability topics were linked to breakout work sessions. At these sessions, the participants worked toward the formulation of specific sustainability opportunities and recommendations for the design of the new facility.

THURSDAY (February 21, 2002)

A one-hour evening gathering prior to the charrette provided participants with a chance to get acquainted and to hear Dennis Creech, one of the originators of the Southface Energy Institute, deliver a brief overview of the project program, site, and goals. Dennis added a critical insight to the charrette endeavor, reminding participants that Southface Institute has had a long history of commitment to high performance buildings and a passion for educating others about this critical topic.

During this evening gathering, Dr. Paul Torcellini of the National Renewable Energy Laboratory gave a short PowerPoint presentation that gave a “kick-start” to the charrette brainstorming. His presentation centered on the discussion of “value” and, in particular, the value of high performance buildings. Rounding up the evening, Gail Lindsey, FAIA, overall facilitator for the Southface charrette, added logistical instructions and assigned the participants to their breakout groups for the next day.



PowerPoint presentation on the “value” of high performance design and construction

FRIDAY (February 22, 2002)

Dennis Creech and Mike Barchik of Southface Institute started the Charrette on Friday morning with a more in-depth look at the existing Southface Institute building and discussed the need for a commercial addition to the current “residential” teaching facility. Energy and environmental goals and targets were also covered (such as the structure being a net zero energy user.) Southface also raised the concept of “Regenesis” or “closed loop/cradle to cradle” non-waste for their new facility.



Mike Barchik and Dennis Creech present Southface project program, site, and overall goals

Dru Crawley, US DOE and Paul Torcellini, NREL as funders and supporters of this charrette made introductory remarks and welcomed Southface as a partner in high performance building efforts. Short introductions of the participants and logistics followed.

Next came a viewing of the 20-minute video, “Growing Smart – The Chesapeake Bay Foundation Merrill Center”, about the first LEED Platinum building. The video set the stage for the charrette by showcasing sustainable initiatives and challenging the group to commit to sustainability and its implementation at a Platinum level.

After the video, Gail Lindsey addressed the participants about the expectations for this high performance charrette. Gail voiced the desire to have tangible benchmarks and goals and to format the charrette in a manner that would allow others to easily learn from this experience.

Immediately following the video, the charrette participants were assigned to one of the six breakout working groups and were asked to review the LEED rating system checklist to determine which points/credits were appropriate for this specific Southface project. After approximately an hour, the participants reassembled as a large group and discussed their findings. The overwhelming consensus was that this project, with Southface as an innovative leader in energy and environmental concerns with “in-house” expertise, should strive for at least 52 points out of the possible 69 points, thus achieving a Platinum LEED rating.

Once the targeted LEED points were selected, the charrette participants went back to work in their assigned breakout groups. (Each breakout group was made up of 8-9 participants from varied disciplines and “high performance” knowledge levels.) The break-out groups were then asked to begin designing and creating their solutions to the project based on the LEED strategies as well as innovative and “beyond LEED” initiatives. This activity took the remainder of the day until the late afternoon presentations from each group. (Box lunches allowed the participants to have a working lunch and enjoy a period for “cross-pollination” of ideas and strategies.)



Large group discussion and consensus on the LEED rating system credits and points

At 3:30 in the afternoon, each group was asked to appoint a speaker or several speakers to relay their findings, insights, and strategies. These presentations generated good discussions and fruitful exchanges. Several participants had previously voiced skepticism that much could be accomplished in a one-day charrette but after the six work group presentations, several of those skeptics had been “converted” and expressed that they were both amazed and impressed. The participants voiced their support and approval for the endeavor and its results. A striking discovery- the original assumed location for the new Southface addition was questioned by several work groups and an alternative location warranted a closer look after the charrette input.

Closing comments were given by participants, facilitators, and Southface staff; many felt the charrette identified opportunities that were doable, attainable, made good business sense AND could be integral to a long-range vision of high performance design and education at Southface Institute. By the conclusion of the High Performance Buildings Charrette, participants felt that with continued research, consistent reviews, teamwork, and partnerships, most targets set in this charrette could be attained.

The charrette ended in time to transport the charrette drawings/boards to the Southface Institute for the Friday night Greenprints reception. During the reception, the charrette work was exhibited and presentations were made to other conference attendees – spreading these ideas and insights to a wider audience and welcoming their input and feedback.

FACILITATORS

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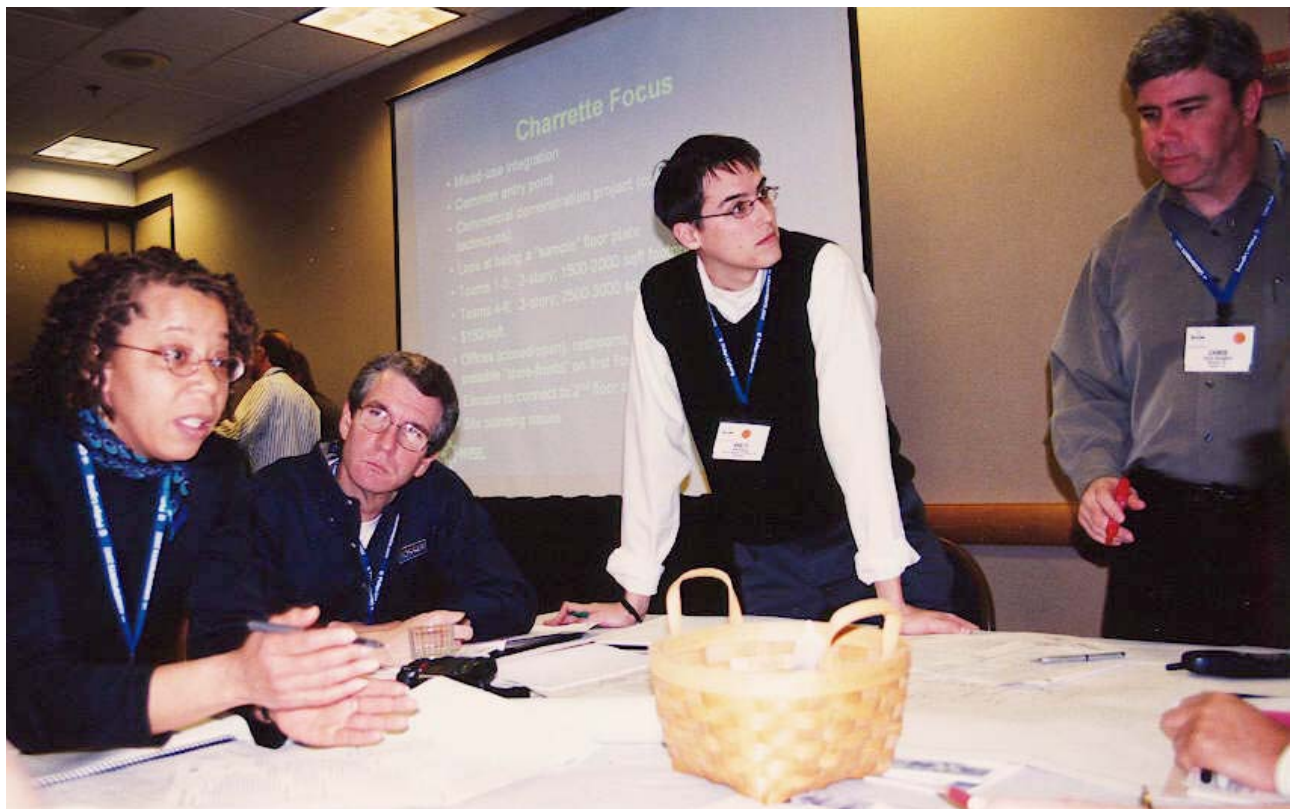
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CHARRETTE FOCUS -- PROJECT INFORMATION

PROJECT CONSIDERATIONS: Southface New Building

- Mixed-use integration
- Common entry point between existing Southface structure and new building
- Commercial Demonstration project
- Sample floor plates:
Breakout work groups 1-3: Design a 2 story 1,500 - 2,000 sq. ft. new building
Breakout work groups 4-6: Design a 3 story 2,500 - 3,000 sq. ft. new building
- Design for \$150. per sq. ft. cost
- Spaces to design for: Offices (closed/open), restrooms, connector spaces, conference/educational spaces, and storage (possible storefronts on first floor)
- Elevator to connect to existing second level
- Site planning issues



Charrette Focus Issues were presented to the six breakout groups as overall project considerations to take into account while they designed energy and environmental strategies for the new building.

GROUP 1

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Group 1 Team members

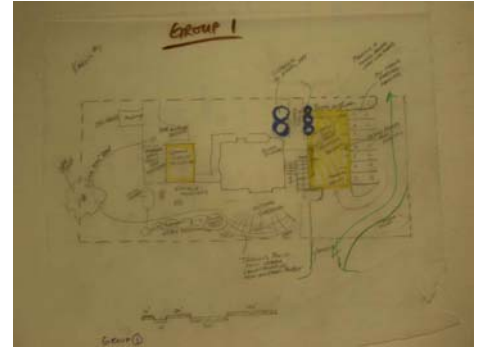
Participants in this breakout group came up with numerous individual concepts and high performance ideas while sharing their findings collectively.

GROUP ONE -- HIGHLIGHTS

High Performance Ideas and Strategies from Group 1:

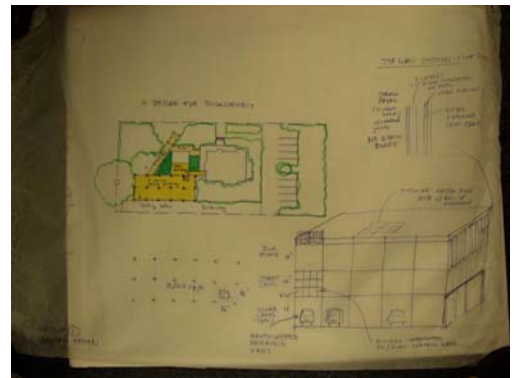
Concept A:

- Build to the east of the existing structure
- Retain existing new garage
- Entry between new and existing buildings
- Cisterns as visual art
- PV trellis to shade parking
- Outdoor classroom area
- Urban trellis from urban deconstruction
- Edible landscaping, fruit trees, and permaculture



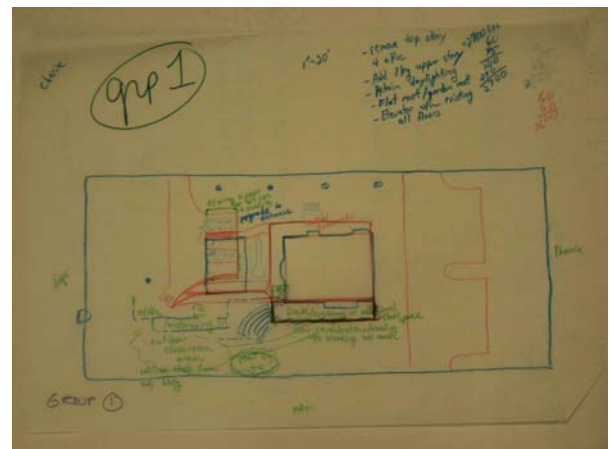
Concept B:

- Design for future disassembly
- New building placed at rear of property
- 2,560 sq. ft. of three levels
- Lower level for vehicles
- 16' x 16' grid of building integrated PV
- Glass curtain wall
- Modular green/vegetated roof
- Visible water catchment and treatment system



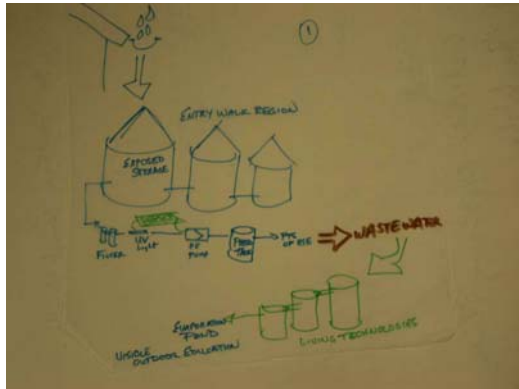
Concept C:

- Build addition on top of existing structure:
- Remove top story and attic of existing structure
- Add one large 2,700 sq. ft. upper story
- Retain daylight
- Use flat roof as a roof garden
- Install elevator within existing structure to access all floors
- Accessible parking
- Solar considerations – shading on West and South
- PV shading on south
- Shade from existing building in the rear



Additional ideas:

- Nature trail
- Pervious pavers for parking area
- Composting toilets
- Living Technologies waste system
- PVs for shade and visual education



Above: Group 1 participants engage Mike Barchik in a discussion about the project goals

Left: Sketch of a potential water collection and treatment system for the new Southface project



Group 1 participants work individually on their concepts while brainstorming together throughout the process

Final Reporting Out from Group 1:



Karlis Viceps presents the concepts and ideas generated by Group 1 participants

GROUP 2

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Group 2 Team Members

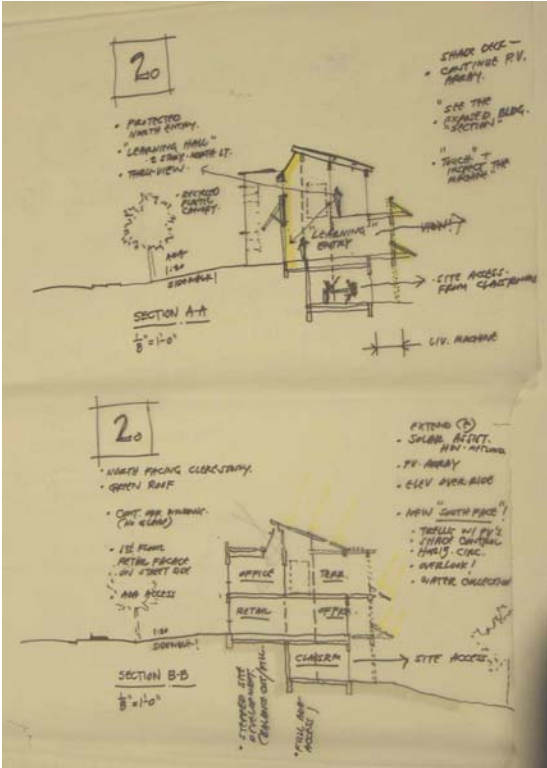
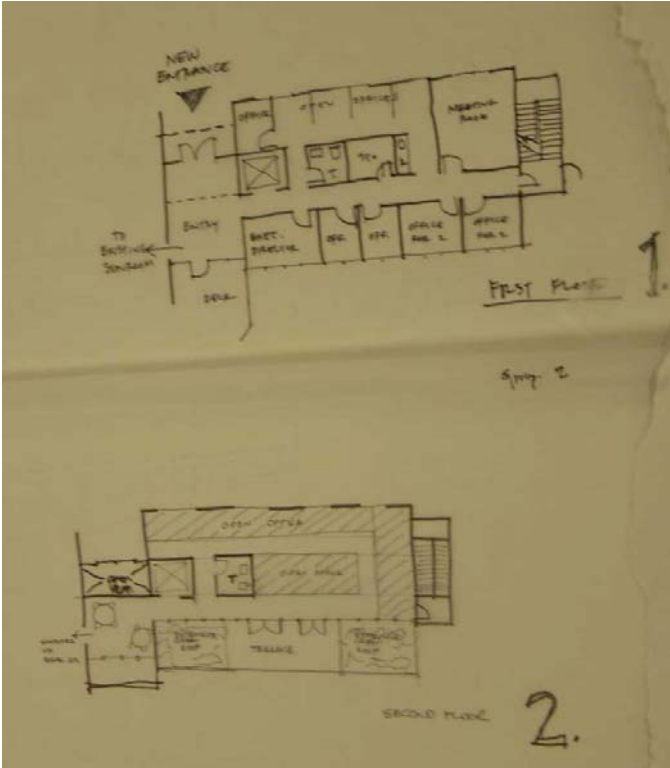
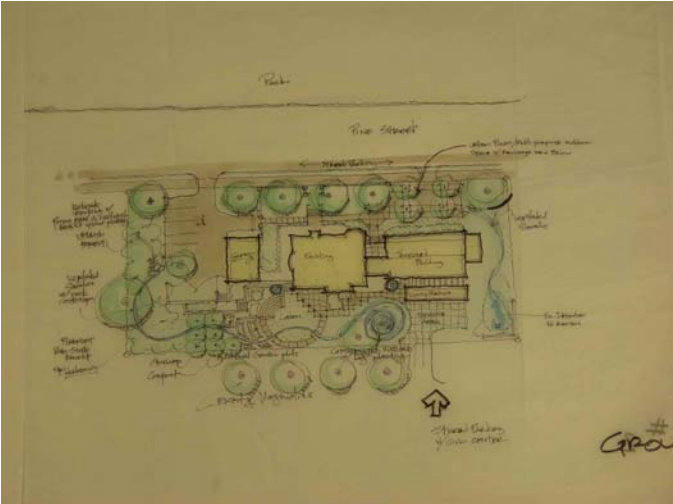
Participants in this breakout group came up with general project goals then collectively worked on one overall site and building concept with elevations, floor plans, and details.

GROUP TWO -- HIGHLIGHTS

High Performance Ideas and Strategies from Group 2:

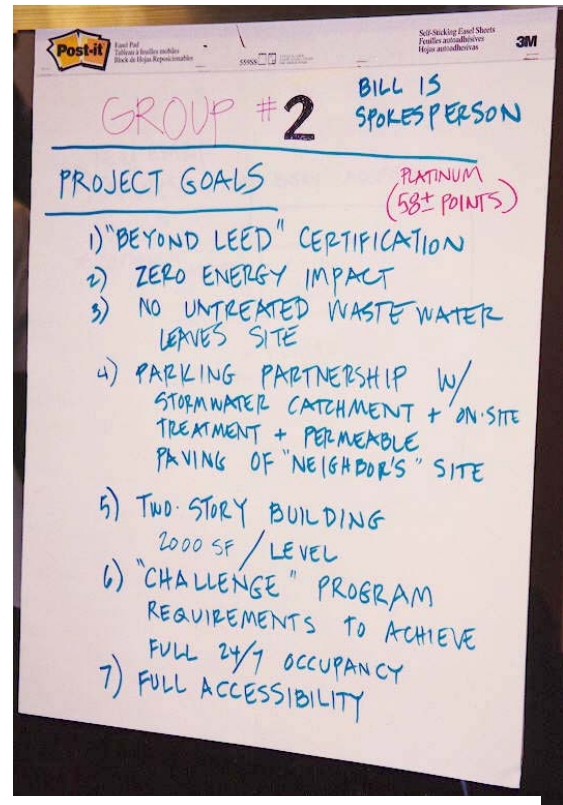
Overall Project Goals:

- Go beyond LEED Green Building Rating System Certification
- “Net-zero” Energy Impact
- No untreated wastewater to leave the site
- Establish parking partnership with stormwater catchment, on-site treatment, and permeable paving
- Create a two-story building
- Challenge existing program to develop a 24/7 usable facility
- Provide for full ADA accessibility



Project ideas and strategies:

- Keep existing structures in place as they are; reuse garage
- Add new building to east of existing structure
- Living machine to be added to the rear of the new structure
- New service area to rear of proposed living machine
- Multi-purpose outdoor urban plaza
- Vegetated swales with rock outcroppings
- Street parking
- Relocate existing parking to west of garage
- Use porous paving for parking area
- Create an orchard area with fruit trees
- Designate an outdoor composting area
- Shade new building deck with continuous PV array
- Protect North “common” entry
- Create a entry “learning hall” with two story north light
- First floor to have retain façade on street side
- Full ADA accessibility
- Site access from lower level classroom



Group 2 overall project goals



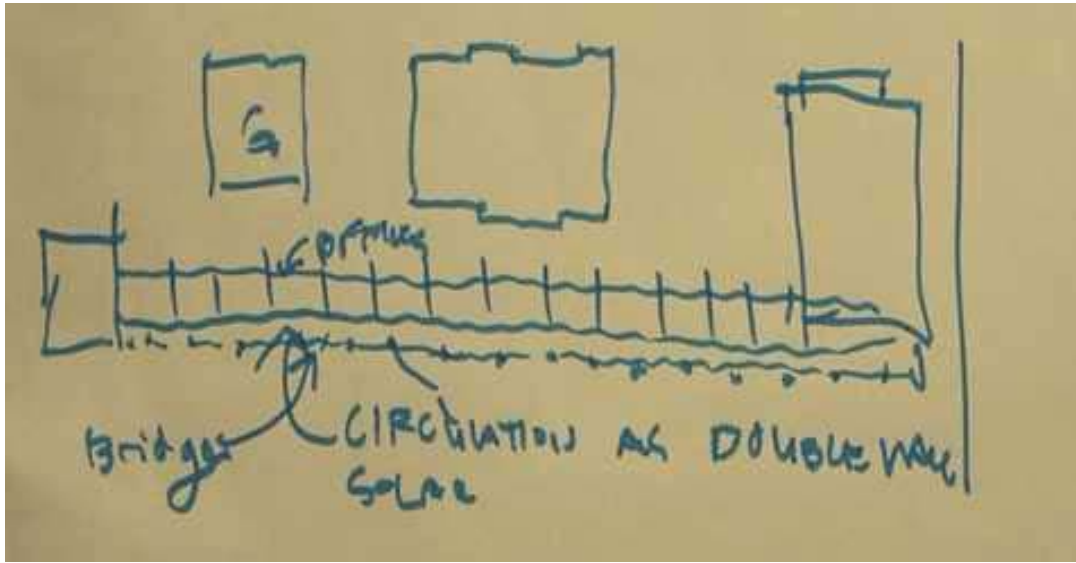
Group 2 team members work collectively on their project ideas

MAIN concept:

New “South Face”

- Second floor terrace
- Trellis with PV
- Shade control
- Horizontal circulation
- Overlook
- Water collection

Final Reporting Out from Group 2:



Reporting out by members of Group 2 highlighting their new Southface building to the east of the existing structure

GROUP 3

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Group 3 Team Members

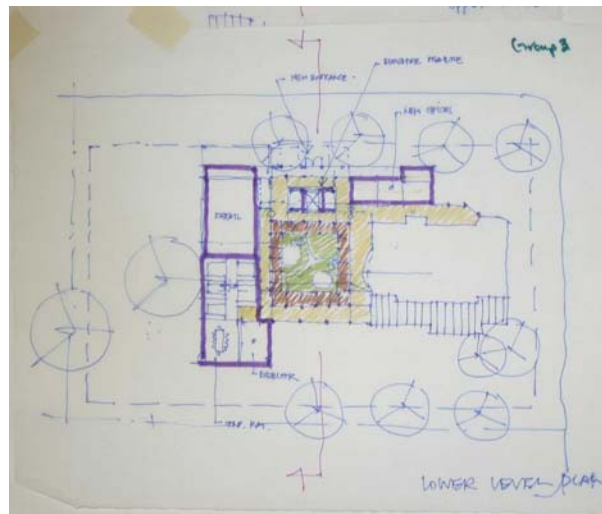
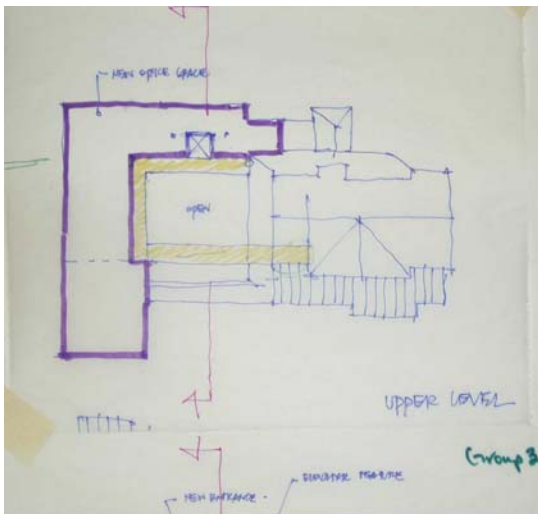
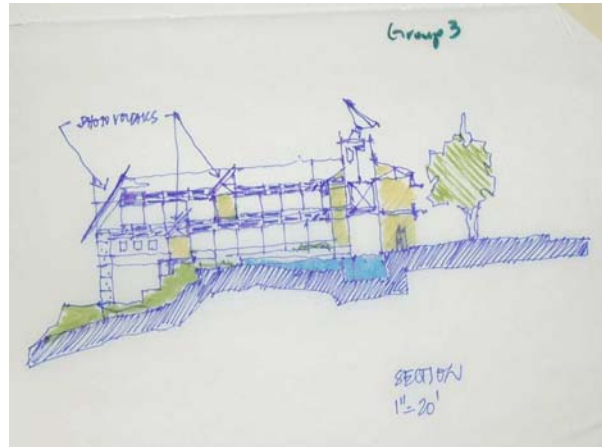
This breakout group showcased a zero energy use elevator, a central garden courtyard and a new building connected to the existing by the courtyard space.

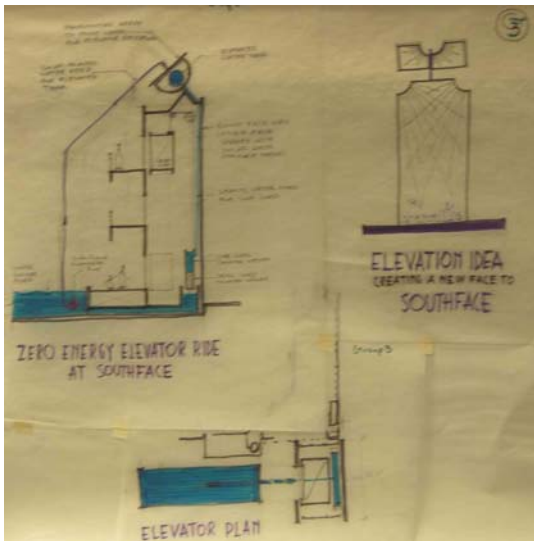
GROUP THREE -- HIGHLIGHTS

High Performance Ideas and Strategies from Group 3:

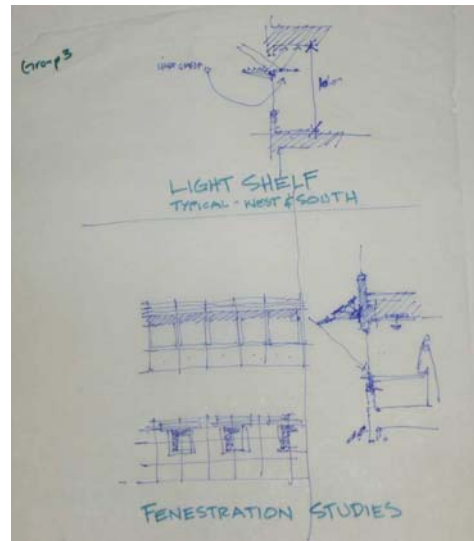
“Creating a new face to Southface”

- Relocated existing garage and built new structure in its place
- Totally new street front entrance
- New retail to one side of entry and office space in front of existing Southface structure
- Zero energy elevator as building attraction and ride at new entrance
- Central inner courtyard
- Circulation around inner courtyard
- Direct view to inner courtyard from entrance and elevator
- New office space on upper level
- Lightshelves typical on South and West elevations
- PVs as prominent exterior architectural elements
- Offices, Conference room, and director’s office towards rear of structure
- Inner office walls of rice paper (recyclable, lightweight, flexible, and natural)





Zero energy elevator sketches

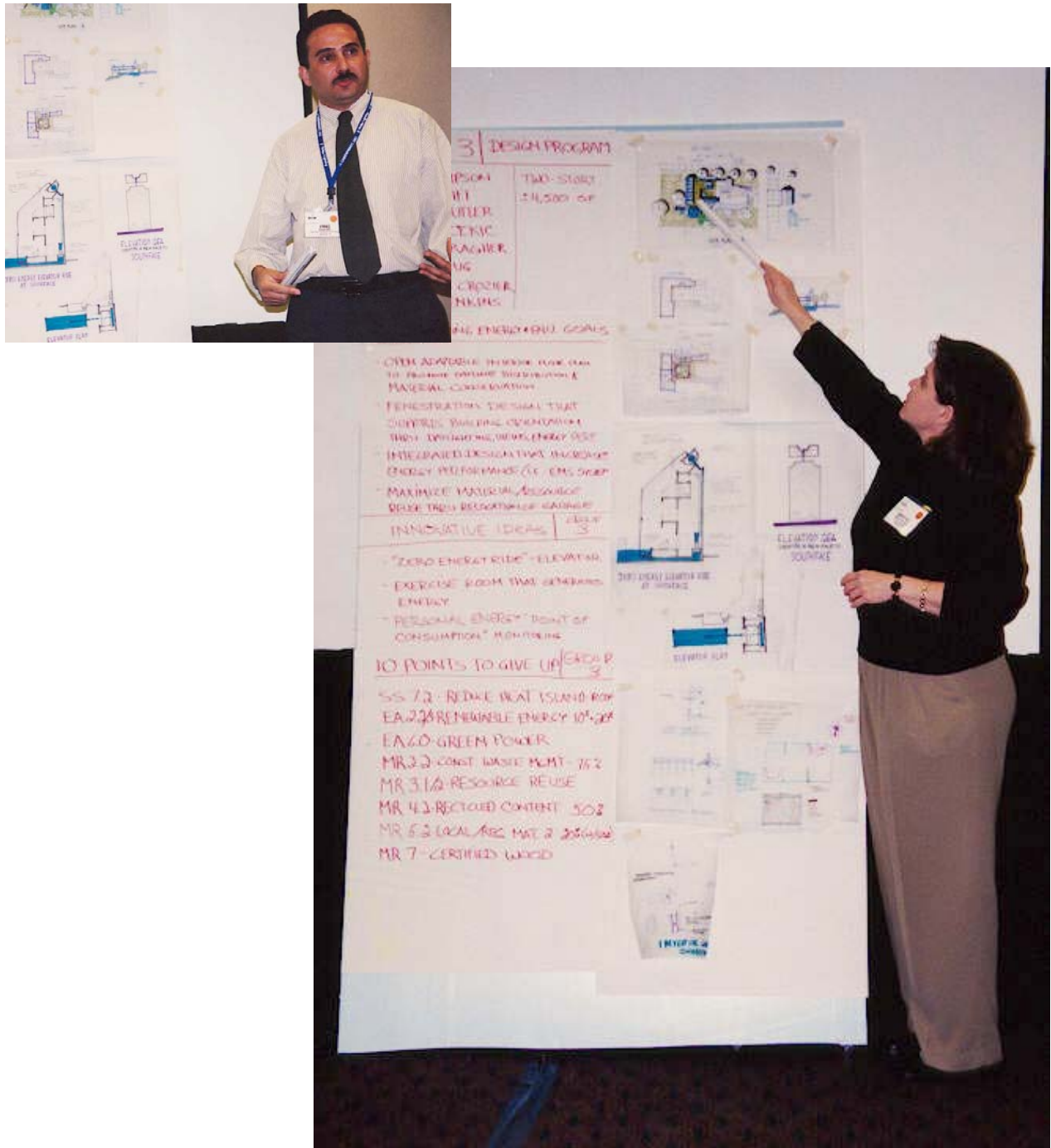


Light shelf and fenestration studies



Group 3 participants work together on their central courtyard concept

Final Reporting Out from Group 3:



Emad Afifi and Mary Pat Crozier report back to the larger charrette group on their Group 4 ideas: A new front façade (a new face to Southface”), a zero energy elevator, and a central courtyard.

GROUP 4

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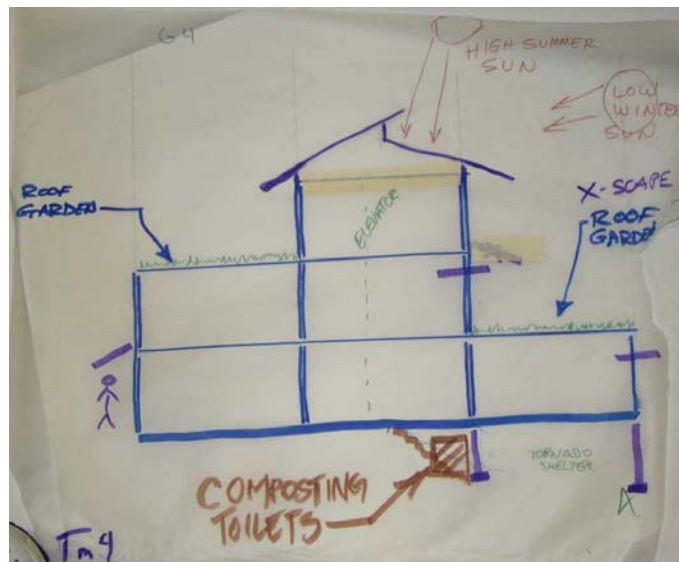
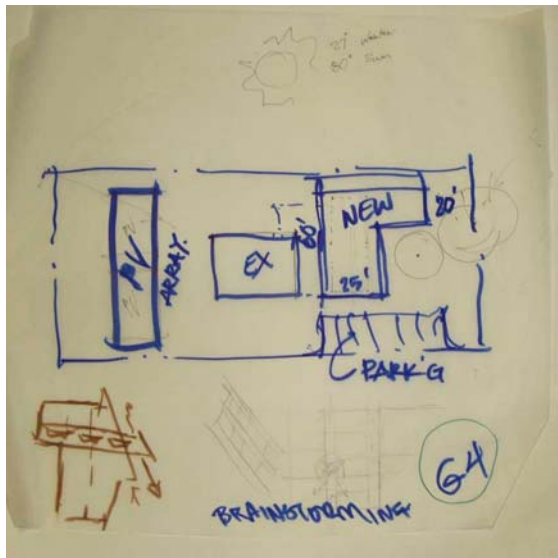
Group 4 Team Members with Robert Korbet, one of the charrette facilitators.

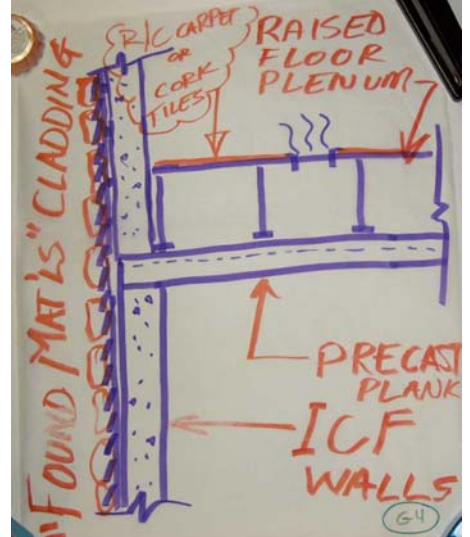
Participants of Group 4 located the new commercial building with first floor street level retail/storefront office space west of the existing Southface structure (removing the existing garage) and added a large PV array above the existing parking area.

GROUP FOUR -- HIGHLIGHTS

High Performance Ideas and Strategies from Group 4:

- New common front entry with second story glazed walkway between existing building and new addition
- New L-shaped commercial building in place of existing garage
- Storefront/retail/offices on first floor street level for new building
- Roof gardens/roof plaza
- Composting toilets and earth tubes
- PV array located above existing parking area
- Found materials as exterior cladding for new building
- IFC walls, raised floor plenum, structural paralam trusses, and recycled carpet or cork tiles for flooring



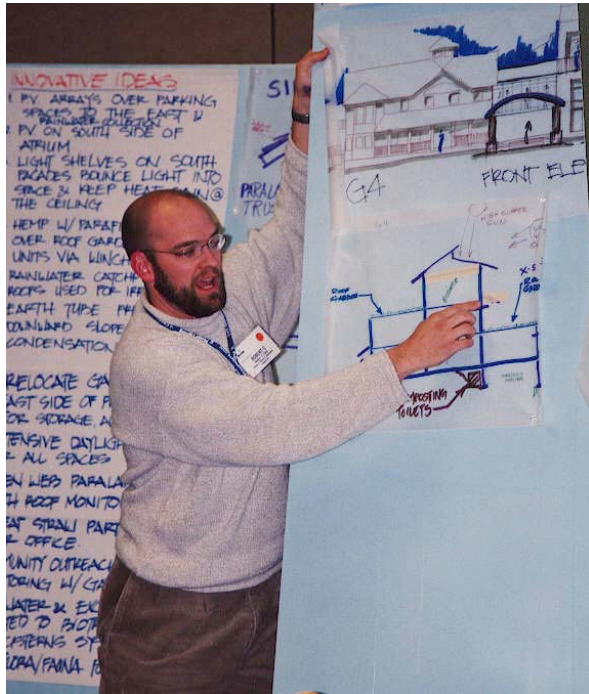


Participants of Group 4 developed high performance building strategies and design details.



Group 4 participants work as a whole to create their site and building concepts.

Final Reporting Out from Group 4:



Group 4 team members report back to larger charrette audience on their ideas and innovations.

GROUP 5

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Group 5 Team Members

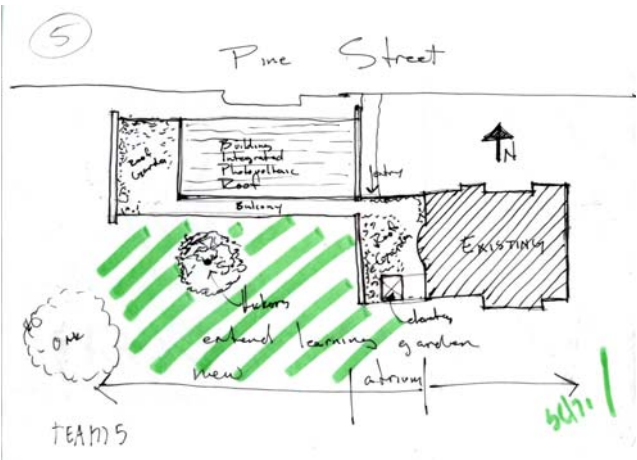
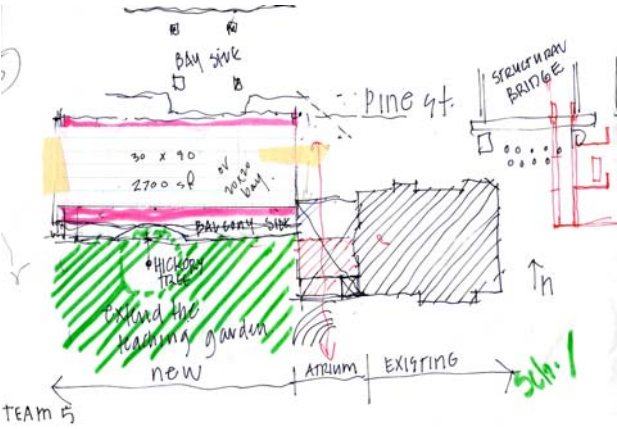
Group 5 team members worked collectively on two schemes; scheme one removed the existing Southface garage and located the new building in its place while the second scheme built the new commercial structure over the existing parking lot.

GROUP FIVE -- HIGHLIGHTS

High Performance Ideas and Strategies from Group 5:

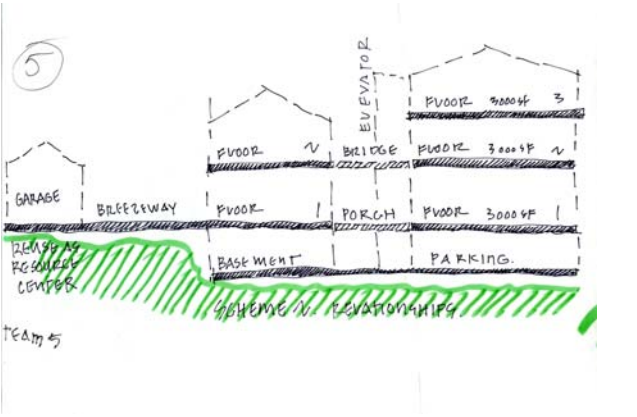
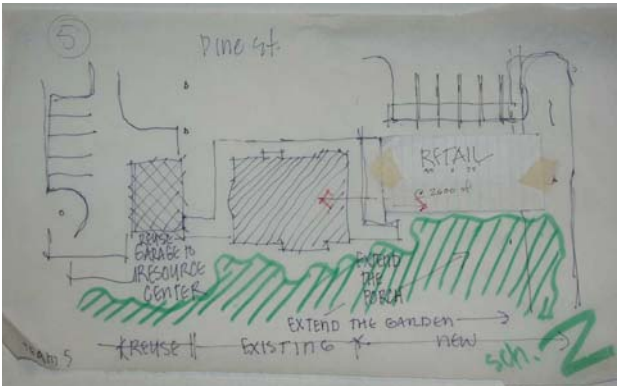
Scheme 1:

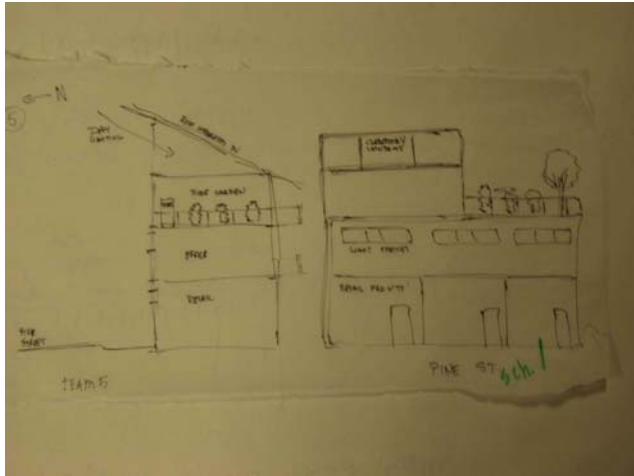
- Remove existing garage and locate new building in its place and close to Pine Street
- New building to have roof integrated PV and roof garden
- Entry connector to two buildings to have garden atrium and elevator
- New building to have clerestory windows, and light shelves
- Structural bridge/balcony between the two structures
- Extend porch and existing teaching garden



Scheme 2:

- New building located above existing parking lot
- New building to have retail on first floor street level
- New building to be three levels with parking below (2,700 –3,00 sq. ft. per level)
- Existing Southface garage to be reused as Resource Center
- New elevator to access all floors of new and exiting structures



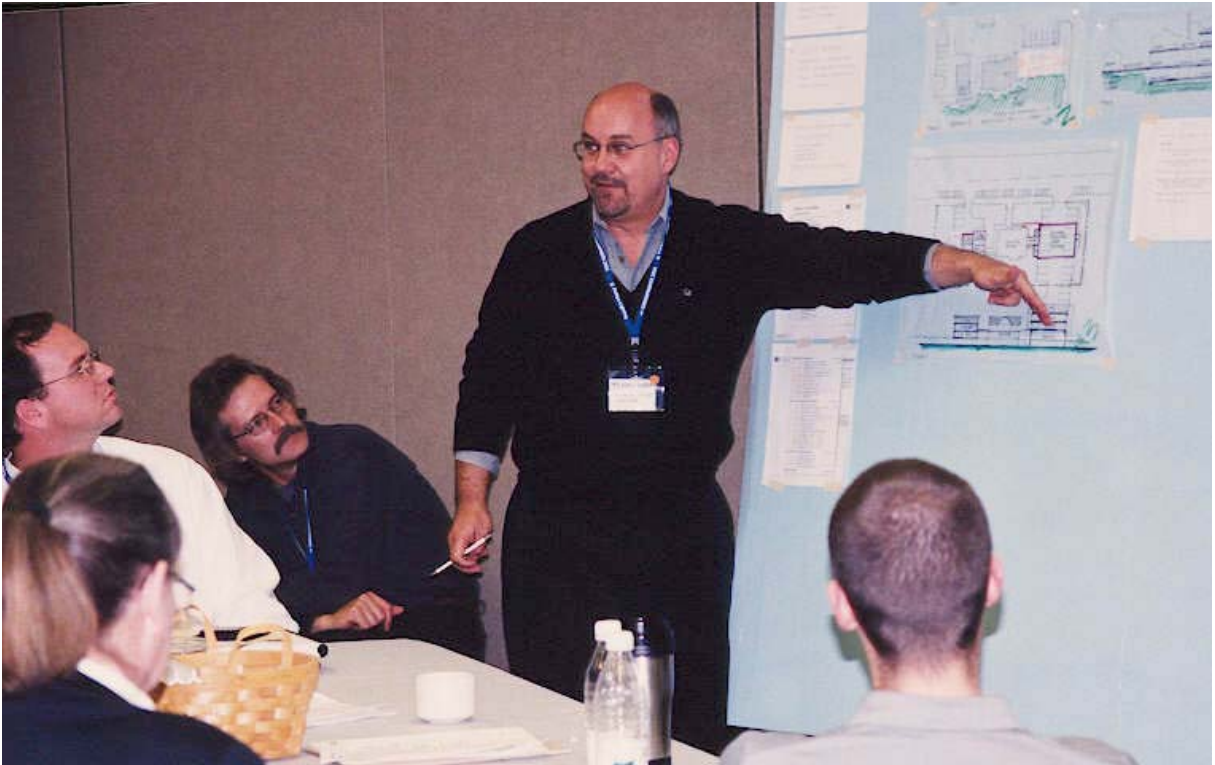


Group 5 participants sketch project elevations, strategies, and details



Participants of breakout Group 5 brainstorm their two distinct schemes and refer to the LEED Reference Guide

Final Reporting Out from Group 5:



Terry Osborn, Diana Tracey, and other Group 5 members explain their two distinct concepts for the new Southface building

GROUP 6

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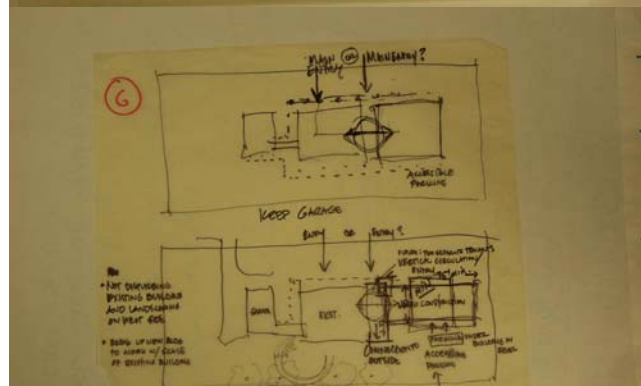
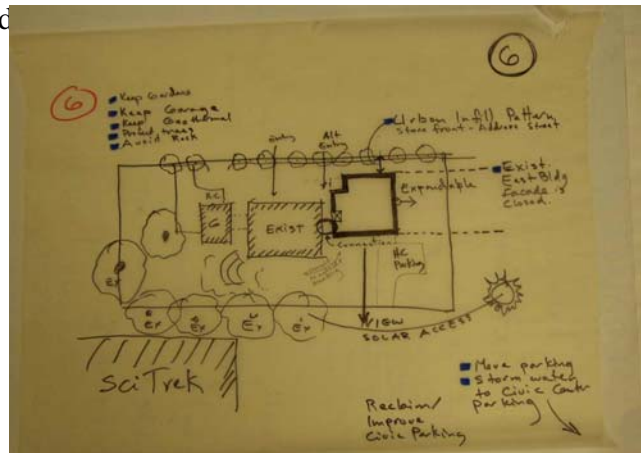
Group 6 Team Members

Group 6 team members located their new Southface commercial building to the east of the existing building working with an “urban infill” concept.

GROUP SIX -- HIGHLIGHTS

High Performance Ideas and Strategies from Group 6:

- New building does not disturb existing build of the property
- Keep existing gardens and protect existing trees; add street trees along Pine Street; keep geothermal
- Locate new building on east side of existing Southface structure
- New commercial building to be three levels (basement plus two levels above); each level to be approximately 950-1,000 sq. ft.
- Use existing entry to Southface; add entry courtyard between the two structures and allow for secondary entrance from courtyard into new building
- Create a glass enclosed bridge between the two structures with open structural stairs ; install biotreatment water cisterns accessible from stair landings
- New building as urban infill; address street front as commercial building
- New structure to have PV array, daylighting, light shelves, and roof garden



Section and elevation perspective drawings of the new commercial Southface structure by Group 6

Group 6 participants brainstorm together on overall site plan and floor plans

Final Reporting Out from Group 6:



Clayton Preston presents the ideas and strategies Group 6 explored for the new Southface building

APPENDIX

Charrette Agenda
Project Information (Program and Drawings)
LEED Matrix for Southface New Building
LEED Version 2.0
LEED V.2 Documentation Requirements
Other Green Resources List & Sustainable Websites and Videos



Thanks to everyone – the Southface Institute and staff as well as the other organizers, facilitators, sponsors, and energetic participants for making this High Performance Building Charrette a fun and productive event!