COUNTY BOARD AGENDA - STUDY SESSION
RE: Energy Efficiency and Sustainable Maintenance

County of Champaign, Urbana, Illinois
Tuesday, March 26, 2013 – 6:00 p.m.

Lyle Shields Meeting Room, Brookens Administrative Center
1776 East Washington Street, Urbana, Illinois

I. Call To Order

II. Roll Call

III. Approval of Agenda

IV. Smart Energy Design Assistance Center (SEDAC)

V. Illinois Green Business Association (IGBA)

VI. Grant Opportunities - Don Fournier, Research Specialist in Sustainable Planning & Design, U of I

VII. Performance Contracting – Carol Timms

VIII. Other Relevant Materials/Resources

a. County Energy Policy: http://www.co.champaign.il.us/countybd/energypolicy.pdf

b. Scottswood Area Wetland Project: http://www.co.champaign.il.us/countybd/boardreports.htm

c. June 14, 2001 Presentation by Isaksen-Glerum/Smith Group JJR for Development of a Champaign County East Campus Master Plan: http://www.co.champaign.il.us/countybd/boardreports.htm

IX. Public Participation

X. Adjournment

Smart Energy Design Assistance Center
Champaign County Building Energy Efficiency

Ben J. Sliwinski
Building Research Council
School of Architecture
University of Illinois at Urbana-Champaign

Overview

SMART ENERGY DESIGN Assistance Center

- Review of Present Energy Costs per Square Foot
- Energy Efficiency Measures Summary
- Potential for Renewable Technologies

Benchmarking (Is it a Hog?)

SMART ENERGY DESIGN Assistance Center

- Use your energy bills to estimate:
- $/sf per year (quick and dirty use with caution)
  - around $1/sf = good
  - $1 to $2/sf = fair to slightly poor (typical)
  - $2 to $3/sf = probably room for improvement
  - $3/sf and above = oink (unless there is a process)
- kBtu/sf per year – more accurate than dollar metric – can use TargetFinder

ENERGY STAR Target Finder : ENERGY STAR - Microsoft Internet Explorer

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Address http://www.energystar.gov/index.cfm?c=new_bldg_design.bus_target_finder Go Links

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ENERGY STAR

ENVIRONMENTAL LEADERSHIP ADDS VALUE TO YOUR BOTTOM LINE AND CORPORATE REPUTATION

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Guidelines for Energy Management

Tools & Resources
+ Portfolio Manager
+ Target Finder
+ Trainings and Presentations

Find Labeled Buildings

Find Expert Help:
+ Most Active Service & Product Providers
+ Service & Product Provider Directory
+ Directory of Energy Efficiency Programs
+ Find a Professional Engineer

Small Business

Home > Business Improvement > Tools & Resources > New Building Design > ENERGY STAR Target Finder

TARGET FINDER

Enter Target Finder

Save Energy, Money, and Time

+ Determine an annual energy target for your building design
+ Compare energy use from simulations with your target
+ Monitor your design's energy performance as building plans progress
+ Evaluate the cost effectiveness of energy efficiency measures
+ Minimize potential greenhouse gas emissions associated with your building design

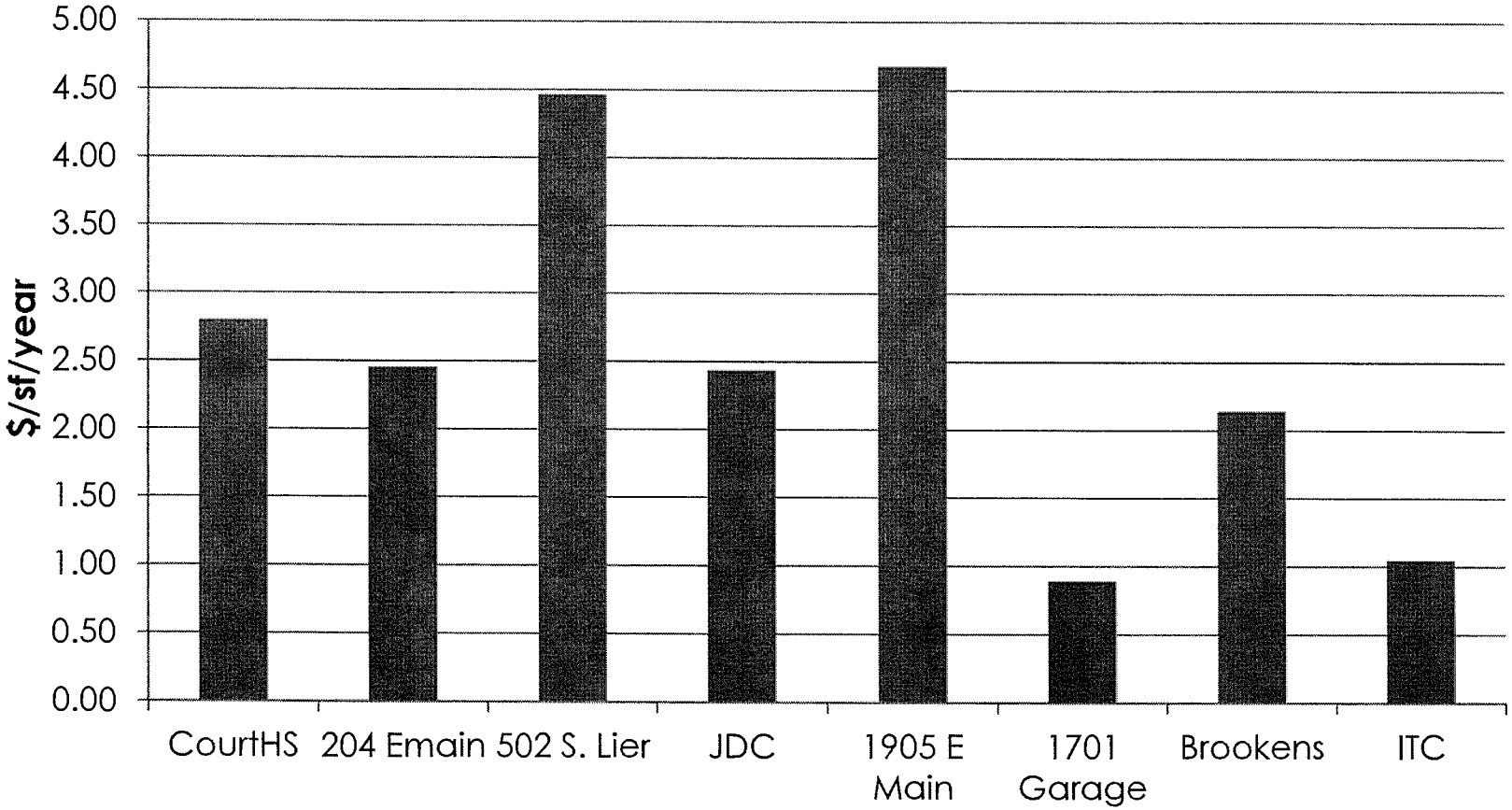
EPA's energy performance target rating uses a 1–100 scale. Lower energy use yields a higher

Benefits & Recognition
Active A&E Firms
Target Finder EPA Rating
Building Design Guidance
News & Resources
Classes & Conferences
NBD Home

Done Internet

Costs per Square Foot

SMART ENERGY DESIGN Assistance Center



Savings Potential

SMART ENERGY DESIGN Assistance Center

- HWS audits were well done but were lenient in assessing performance of buildings.
- We estimate savings of $0.50 per square foot are easily within reach.
- A preliminary set of cost reduction measures has been identified by SEDAC.

Energy Efficiency Opportunities

SMART ENERGY DESIGN Assistance Center

Lighting Measures

- Occupancy sensors for all restrooms and conference rooms.
- Occupancy sensors for selected offices.
- Replace all T12 lighting systems with Super T8 lighting. Use 4 to 3 replacement policy.
- For existing T8s operating 24 hours for security purposes, replace with low wattage T8s.
- LED Exit Signs

HVAC measures

SMART ENERGY DESIGN Assistance Center

- Implement demand control ventilation
- Use boiler and chiller water temperature set-back
- Tune up VAV systems
- Implement thermostat set-back/set-up as appropriate
- Reduce DHW hot water temperatures

Plug Loads

SMART ENERGY DESIGN Assistance Center

- Personal Occupancy Sensors for cubicles and offices
- Computer monitor and cpu energy savings measures
- Energy Star appliances
- Computer server system energy conservation measures.

Water Savings Measures

SMART ENERGY DESIGN Assistance Center

- Faucet Aerators
- Low Flow Shower Heads
- Low Flow Water Closets
- Low Flow Urinals
- Reduced cooling loads reduce cooling tower water usage
- Eliminate once-through cooling systems where possible

Renewables

- Wind, Solar PV, Biomass, and Biodiesel most feasible.
- Solar PV may be applicable to Brookens.
- SEDAC will analyze potential of this technology.
- Suggest adopting 15 year payback or 5 percent IRR threshold for renewables.

To Apply for SEDAC Assistance

SMART ENERGY DESIGN Assistance Center

- Call 1-800-214-7954 or,
- Visit the SEDAC web site at www.sedac.org and download an application.

June 24, 2009

GHR No. 6431

Budget Justification
Brookens Administrative Center
1776 East Washington Street
Urbana, Illinois 61801

Description of Work	Project Cost	Natural Gas Saved Yearly			Electricity Saved Yearly		
		Therms	Dollars	Greenhouse Gases (CO_2, N_20, CO) Not Emitted (LBS)	Kilowatt Hour	Dollars	Greenhouse Gases (CO_2, N_20, CH_4) Not Emitted (LBS)
Remove 22 year old air-cooled 90 and 100 ton chillers and replace with new units having the highest efficiency. The existing units employ ozone-damaging R-22 while the new units would employ ozone friendly R-410a with low global warming potential. Loop the two chillers together and convert to variable chilled water flow for further operational efficiency.	$385,000	—	—		38,239	$3,939	70,322
Remove obsolete cast iron hot water boilers from Pods 200 and 300. Replace with modular condensing type boilers having the highest efficiency possible.	$221,000	4,193	$5,535	49,058	—	—	
Remove obsolete pneumatic temperature control system and replace with digital control system featuring enthalpy-controlled free-cooling cycles, optimal start / stop, demand-controlled ventilation and program control.	$198,000	2,759	$3,642	32,280	130,196	$13,410	239,430

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Budget Justification
Brookens Administrative Center
1776 East Washington Street
Urbana, Illinois 61801

Description of Work	Project Cost	Natural Gas Saved Yearly			Electricity Saved Yearly		
		Therms	Dollars	Greenhouse Gases (CO_2, N_20, CO) Not Emitted (LBS)	Kilowatt Hour	Dollars	Greenhouse Gases (CO_2, N_20, CH_4) Not Emitted (LBS)
Replace 39 year old rooftop air handling units on Pod 200 and 39 year old indoor air handling units in Pod 300. New units to feature well-insulated casings, low leakage dampers, ultra high efficiency motors. DDC controls, cold / hot deck temperature reset and demand controlled ventilation.	$427,000	4,192	$5,534	49,046	195,293	$20,115	359,144
Replace 36 existing metal halide fixtures (295 input watts) in the gym with high efficiency T-5 fluorescent fixtures. Provide state-of-the-art control system incorporating level control and occupancy sensing.	$41,000	—	—		35,354	$3,641	65,016
Replace 10 existing parking and site fixtures (210 input watts) with high efficiency cut-off fixtures utilizing reduced wattage induction lamping (100,00 HR life).	$47,000	—	—		1,314	$135	2,416
Add 30 kilowatt photovoltaic array (solar), grid-tied.	$368,000				37,796	$3,893	69,507

Budget Justification
Brookens Administrative Center
1776 East Washington Street
Urbana, Illinois 61801

Description of Work	Project Cost	Natural Gas Saved Yearly			Electricity Saved Yearly		
		Therms	Dollars	Greenhouse Gases (CO_2, N_20, CO) Not Emitted (LBS)	Kilowatt Hour	Dollars	Greenhouse Gases (CO_2, N_20, CH_4) Not Emitted (LBS)
Convert Pod 100 from gas-fired, DX rooftop equipment to geothermal heating and cooling.	$1,076,000	6,980	$9,224	81,666	(4,448)	($460)	(8,179)
Totals	$2,763,000	18,124	$23,935	212,050	433,744	$44,673	797,656
Construction Materials	$1,030,516						
Construction Labor	$1,030,517						
Reimbursables and Contingencies	$411,159						
Engineering Contract	$291,570						
Total Dollars Saved (Gas and Electric)	$68,608						
Total GHG Not Emitted (Gas and Electric) (lbs)	1,009,706						

JNG/smh

6431 Brookens Summary.JNG.wpd

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc

RE: 6431
Brookens Administrative Center
Replace Chillers with High Efficiency Units

X	Original	08/23/09

date printed: 6/24/09
time printed: 8:14 AM
prepared by: JNG

LINE ITEM NO. AND DESCRIPTION		QTY	UNIT	COST/UNIT	AMOUNT
1.0 demo		1	ls	$7,000.00	$7,000
2.0 new 90 ton chiller (R-410a) and trim		1	ls	$76,000.00	$76,000
3.0 new 100 ton chiller (R-410a) and trim		1	ls	$82,000.00	$82,000
4.0 pads		1	ls	$2,000.00	$2,000
5.0 new chiller pumps, base-mounted		2	ea	$8,000.00	$16,000
6.0 reconfigure chillers into a loop - WAG		1	ls	$20,000.00	$20,000
7.0 chane existing pumps to system pumps and trim impeller		1	ls	$5,000.00	$5,000
8.0 assume conversion to 2-way control in DDC					-$0-
9.0 pipe insulation sub		1	ls	$12,000.00	$12,000
10.0 glycol		1	ls	$4,000.00	$4,000
11.0 test and balance sub		1	ls	$2,000.00	$2,000
12.0 electric work - allow		1	ls	$10,000.00	$10,000
13.0 controls (DDC elsewhere, includes VFD's)		1	ls	$20,000.00	$20,000
	Subtotal				$256,000
14.0 miscellaneous 10%					$25,600
15.0 Construction Cost					$281,600
16.0 Design Contingency		---	---	5.00%	$14,080
	Subtotal				$295,680
17.0 Bid Contingency		---	---	5.00%	$14,784
	Subtotal				$310,464
18.0 Construction Contingency		---	---	10.00%	$31,046
	Subtotal				$341,510
19.0 Reimbursables (Printing, Etc.)		---	---	---	$1,000
	Subtotal				$342,510
20.0 A/E Basic Fee (Group 2 Plus 1.0)				11.13%	$38,121
21.0 A/E Site Observation		---	---	---	$4,000

Contract (actual)	unit cost =	$8.27	per sq ft	$384,632
Contract (rounded)	unit cost =	$8.27	per sq ft	$385,000
smh	project area =	46,530	sq ft	

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc.

RE: 6431
Brookens Administrative Center
Replace Pneumatic Temperature Controls with Digital

X	Original	06/23/09

date printed: 6/24/09
time printed: 8:23 AM
prepared by: JNG

LINE ITEM NO. AND DESCRIPTION		QTY	UNIT	COST/UNIT	AMOUNT
1.0 demo - allow		1	ls	$9,000.00	$9,000
2.0 change pneumatic to DDC Pod 100		23,285	sf	$1.50	$34,898
3.0 change pneumatic to DDC Pod 200		23,625	sf	$0.50	$11,813
4.0 change pneumatic to DDC Pod 300		23,625	sf	$0.50	$11,813
5.0 change pneumatic to DDC Pod 400		23,625	sf	$1.75	$41,344
6.0 vent work dampers - allow for some replacements		1	ls	$8,000.00	$8,000
7.0 change CHW valves to 2-way - allow		4	ea	$3,500.00	$14,000
8.0 pipe insulation - allow		1	ls	$6,000.00	$6,000
9.0 test and balance - allow		1	ls	$8,000.00	$8,000
	Subtotal				$144,866
10.0 miscellaneous 10%					$14,487
11.0 Construction Cost					$159,353
12.0 Design Contingency		---	---	5.00%	$7,968
	Subtotal				$167,321
13.0 Bid Contingency		---	---	5.00%	$8,366
	Subtotal				$175,687
14.0 Construction Contingency		---	---	10.00%	$17,569
	Subtotal				$193,255
15.0 Reimbursables (Printing, Etc.)		---	---	---	$500
	Subtotal				$193,755
16.0 A/E Basic Fee (Group 2 Plus 1.0)				12.00%	$23,251
17.0 A/E Site Observation		---	---	---	$4,000

Contract (actual)	unit cost =	$4.75	per sq ft	$221,006
Contract (rounded)	unit cost =	$4.75	per sq ft	$221,000
smh	project area =	46,530	sq ft	

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc

RE: 6431
Brookens Administrative Center
Replace Boilers with High Efficiency Units

X	Original	06/23/09

date printed: 6/24/09
time printed: 8:15 AM
prepared by: JNG

LINE ITEM NO. AND DESCRIPTION		QTY	UNIT	COST/UNIT	AMOUNT
1.0 demo		2	ea	$3,000.00	$6,000
2.0 new 500 mbh boilers and trim		4	ea	$18,000.00	$72,000
3.0 pads		2	ea	$1,500.00	$3,000
4.0 HW piping		2	ea	$5,000.00	$10,000
5.0 flue / combustion air piping		4	ea	$2,000.00	$8,000
6.0 gas piping		4	ea	$900.00	$3,600
7.0 electrical work		4	ea	$600.00	$2,400
8.0 pipe insulation (subcontract)		2	ea	$3,000.00	$8,000
9.0 building / roof		2	ea	$3,000.00	$6,000
10.0 controls		4	ea	$3,000.00	$12,000
	Subtotal				$129,000
11.0 miscellaneous 10%					$12,900
12.0 Construction Cost					$141,900
13.0 Design Contingency		---	---	5.00%	$7,095
	Subtotal				$148,995
14.0 Bid Contingency		---	---	5.00%	$7,450
	Subtotal				$156,445
15.0 Construction Contingency		---	---	10.00%	$15,644
	Subtotal				$172,089
16.0 Reimbursables (Printing, Etc.)		---	---	---	$1,000
	Subtotal				$173,089
17.0 A/E Basic Fee (Group 2 Plus 1.0)				13.00%	$22,502
18.0 A/E Site Observation		---	---	---	$2,400

Contract (actual)	unit cost =	$4.26	per sq ft	$197,991
Contract (rounded)	unit cost =	$4.26	per sq ft	$198,000
smh	project area =	46,530	sq ft	

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc.

RE: 6431
Brookens Administrative Center
Replace 39 Year Old AHU's (Pod 200 and 300)

X	Original	06/23/09

date printed: 6/24/09
time printed: 8:16 AM
prepared by: JNG

LINE ITEM NO. AND DESCRIPTION		QTY	UNIT	COST/UNIT	AMOUNT
1.0 demo (four units)		1	ls	$14,000.00	$14,000
2.0 new Pod 200 RTU		2	ea	$30,000.00	$60,000
3.0 roof curbs and roof work		2	ea	$5,000.00	$10,000
4.0 duct disconnect / reconnect - allow		17	ea	$1,200.00	$20,400
5.0 new Pod 300 AHU's 12,000 cfm each		2	ea	$24,000.00	$48,000
6.0 duct disconnect / reconnect - allow		12	ea	$1,200.00	$14,400
7.0 electric disconnect / reconnect		4	ea	$1,000.00	$4,000
8.0 DDC - 4 units		4	ea	$8,000.00	$32,000
9.0 DDC - 4 VFD's		4	ea	$5,000.00	$20,000
10.0 DDC - zone controls - allow		29	ea	$1,200.00	$34,800
11.0 pipe disconnect / reconnect - allow		4	ea	$3,000.00	$12,000
12.0 duct insulation subcontract		1	ls	$4,500.00	$4,500
13.0 pipe insulation		1	ls	$4,500.00	$4,500
14.0 test and balance - allow		1	ls	$6,000.00	$6,000
	Subtotal				$284,600
15.0 miscellaneous 10%					$28,460
16.0 Construction Cost					$313,060
17.0 Design Contingency		---	---	5.00%	$15,653
	Subtotal				$328,713
18.0 Bid Contingency		---	---	5.00%	$16,436
	Subtotal				$345,149
19.0 Construction Contingency		---	---	10.00%	$34,515
	Subtotal				$379,664
20.0 Reimbursebles (Printing, Etc.)		---	---	---	$1,000
	Subtotal				$380,664
21.0 A/E Basic Fee (Group 2 Plus 1.0)				10.87%	$41,378
22.0 A/E Site Observation		---	---	---	$5,000

Contract (actual)	unit cost =	$9.18 per sq ft	$427,042
Contract (rounded)	unit cost =	$9.18 per sq ft	$427,000
smh	project area =	46,530 sq ft	

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc

RE: 6431
Brookens
Replace Gym Lighting

X	Original	06/23/09

date printed: 6/24/09
time printed: 8:23 AM
prepared by: TLH

LINE ITEM NO. AND DESCRIPTION		QTY	UNIT	COST/UNIT	AMOUNT
1.0 demo all of above		1	ls	$3,000.00	$3,000
2.0 new gym fixtures		36	ea	$450.00	$16,200
3.0 controls / occupancy sensors		1	ls	$5,000.00	$5,000
4.0 basic materials - allow		1	ls	$3,000.00	$3,000
	Subtotal				$27,200
5.0 miscellaneous 10%					$2,720
6.0 Construction Cost					$29,920
7.0 Design Contingency		---	---	5.00%	$1,496
	Subtotal				$31,416
8.0 Bid Contingency		---	---	5.00%	$1,571
	Subtotal				$32,987
9.0 Construction Contingency		---	---	10.00%	$3,299
	Subtotal				$36,285
10.0 Reimbursables (Printing, Etc.)		---	---	---	$500
	Subtotal				$36,785
11.0 A/E Basic Fee (Group 2 Plus 1.0)				8.00%	$2,943
12.0 A/E Site Observation		---	---	---	$1,500

Contract (actual)	unit cost =	$0.89	per sq ft	$41,228
Contract (rounded)	unit cost =	$0.88	per sq ft	$41,000
smh	project area =	46,530	sq ft	

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc.

RE: 6431
Brookens
Replace Parking Lot Lighting

X	Original	06/23/09

date printed: 6/24/09
time printed: 8:19 AM
prepared by: TLH

LINE ITEM NO. AND DESCRIPTION		QTY	UNIT	COST/UNIT	AMOUNT
1.0 demo all of above		1	ls	$1,000.00	$1,000
2.0 new fixtures with pole and base		10	ea	$2,800.00	$28,000
3.0 basic materials - allow		1	ls	$3,000.00	$3,000
	Subtotal				$32,000
4.0 miscellaneous 10%					$3,200
5.0 Construction Cost					$35,200
6.0 Design Contingency		---	---	5.00%	$1,760
	Subtotal				$36,960
7.0 Bid Contingency		---	---	5.00%	$1,848
	Subtotal				$38,808
8.0 Construction Contingency		---	---	10.00%	$3,881
	Subtotal				$42,689
9.0 Reimbursables (Printing, Etc.)		---	---	---	$500
	Subtotal				$43,189
10.0 A/E Basic Fee (Group 2 Plus 1.0)				8.00%	$3,455
11.0 A/E Site Observation		---	---	---	$800

Contract (actual)	unit cost =	$1.02	per sq ft	$47,444
Contract (rounded)	unit cost =	$1.01	per sq ft	$47,000
smh	project area =	46,530	sq ft	

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc

RE: 6431
Brookens Administrative Center
Add 30 KW Photovoltoic

X	Original	06/23/09

date printed: 6/24/09
time printed: 10:32 AM
prepared by: TLH

LINE ITEM NO. AND DESCRIPTION	QTY	UNIT	COST/UNIT	AMOUNT
1.0 construction cost per SEDAC Study	1	ls	$3,000.00	$300,000
Subtotal				$300,000

2.0 Construction Cost					$300,000
3.0 Design Contingency	---	---			-$0-
Subtotal					$300,000
4.0 Bid Contingency	---	---			-$0-
Subtotal					$300,000
5.0 Construction Contingency	---	---		10.00%	$30,000
Subtotal					$330,000
6.0 Reimbursables (Printing, Etc.)	---	---		---	$1,000
Subtotal					$331,000
7.0 A/E Basic Fee (Group 2 Plus 1.0)				10.00%	$33,100
8.0 A/E Site Observation	---	---		---	$4,000

Contract (actual)	unit cost =	$7.91	per sq ft	$368,100
Contract (rounded)	unit cost =	$7.91	per sq ft	$368,000
smh	project area =	46,530	sq ft	

OPINION OF PROBABLE COST

GHR Engineers & Associates, Inc.

RE: 6431
Brookens Administrative Center
Convert Pod 100 to Geothermal

X	Original	06/23/09

date printed: 6/24/09
time printed: 11:12 AM
prepared by: TLH

LINE ITEM NO. AND DESCRIPTION		QTY	UNIT	COST/UNIT	AMOUNT
1.0 construction cost		25,000	sf	$32.00	$800,000
	Subtotal				$800,000
2.0 Construction Cost					$800,000
3.0 Design Contingency		---	---	5.00%	$40,000
	Subtotal				$840,000
4.0 Bid Contingency		---	---	5.00%	$42,000
	Subtotal				$882,000
5.0 Construction Contingency		---	---	10.00%	$88,200
	Subtotal				$970,200
6.0 Reimbursables (Printing, Etc.)		---	---	---	$1,000
	Subtotal				$971,200
7.0 A/E Basic Fee (Group 2 Plus 1.0)				10.00%	$97,120
8.0 A/E Site Observation		---	---	---	$8,000

Contract (actual)	unit cost =	$23.13	per sq ft	$1,076,320
Contract (rounded)	unit cost =	$23.12	per sq ft	$1,076,000
smh	project area =	46,530	sq ft	