

The Eberly Campus Community Center



"However beautiful the strategy, you should occasionally look at the results."
~ Winston Churchill ~

Overview:

Building Existing Conditions

Dehumidification and

Controls Options

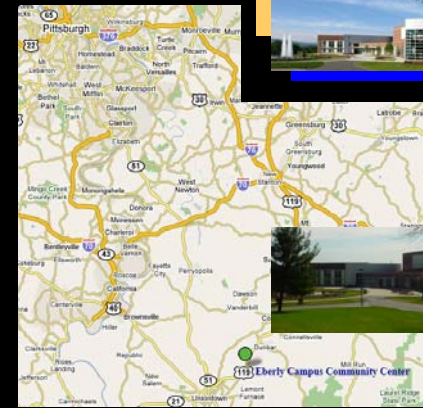
LEED EB Possibilities

Construction, Structural, Electrical

and Acoustical Affects



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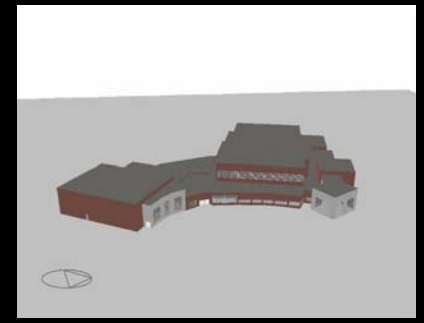
Existing Conditions:

- Unresolved Moisture Problems
- Previous Mold Problems
- Dramatic Underutilization

60% Increase in Building Energy Use
65 MBTU / year Increase
\$11,800 / year Increase

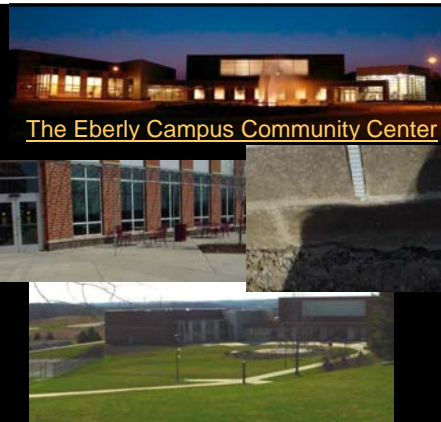
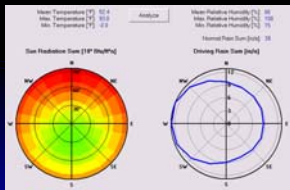


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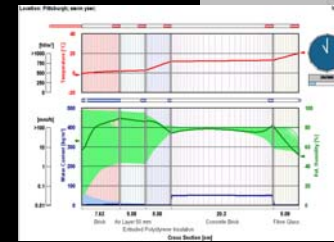
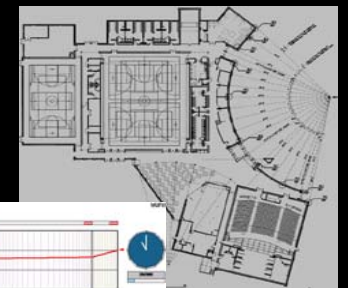


Moisture Analysis:

- Drainage problems at site
- Nonexistent / damaged weep holes
- Insufficient sealant at base of structure
- WUFI Envelope Analysis Program



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Redesign Decisions:

Iterative system of parametric runs in Trane Trace

Desiccant Wheels Savings

Enthalpy Based Economizer

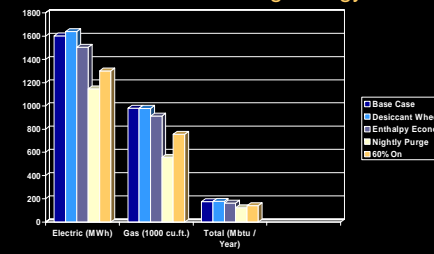
Scheduling Options

Controls Choices



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30% reduction in Building Energy Use



Controls Choices:

Already have DCV with CO₂ Sensors

Add humidistats to all units with desiccant wheels

Emissions and Life Cycle Costs:

About a 30% reduction in emissions

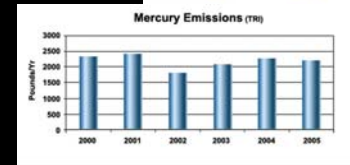
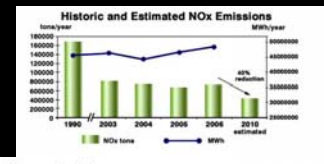
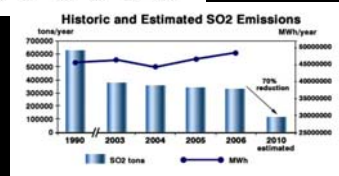
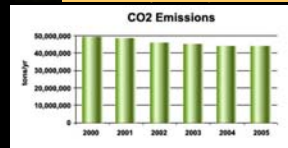
About \$550,000 Initial Renovation Cost

About a 12 year payback period

Component	Typical Analysis (mole %)	Range (mole %)
Methane	94.9	87.0-98.0
Ethane	2.5	1.8-5.1
Propane	0.2	0.1-1.6
iso-Butane	0.03	0.01-0.3
normal-Butane	0.03	0.01-0.3
iso-Pentane	0.01	trace-0.14
normal-Pentane	0.01	trace-0.14
Hexanes plus	0.01	trace-0.08
Nitrogen	1.8	1.2-2.8
Carbon Dioxide	0.7	0.1-1.9
Oxygen	0.02	0.01-0.1
Hydrogen	trace	trace-0.02



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Electrical System Check:

Additional fan power: ~0.5 BHP / AHU

Desiccant Wheel Motor Power:

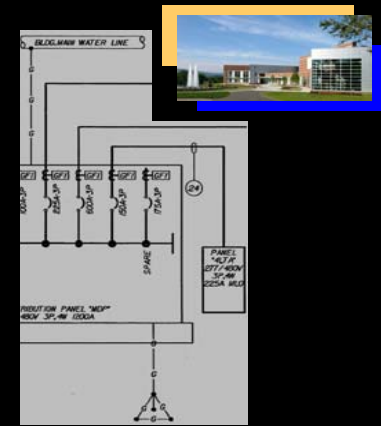
(1/80) BHP / AHU

Grounding Check



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PANEL 4MEC - UPDATED						400/277 VOLT, 3 PHASE, 4 WIRE						225 AMP MLC		
Location / Item	VA	Wire	BRK	Pole	CKT	CKT	Pole	BRK	Wire	VA	Location / Item	VA	Location / Item	
P-C-2 UV-T 162C	1400	12	20	1	3	2	3	20			SPARE			
AHU-9	2518	12	20	3	3	4								
	2518	12			5	6								
	2518	12			7	8					560 MUA-2			
AHU-10	2518	12	20	3	9	10	3	20			560			
	2518	12			11	12					560			
	2518	12			13	14	3	20			2016 EF-2			
AHU-8	5566	8	40	3	15	16					2016			
	5566	8			17	18					2016			
	5566	8			19	20	3	60			10000 XFMR T-5			
SPARE			20	1	21	22					10000			
SPARE			20	1	23	24					10000			
SPARE			20	1	25	26	1	20	12		E31E3-1 ON ROOF			
SPARE			20	1	27	28	1	20	12		E31E3-1 ON ROOF			
SPARE			20	1	29	30	1	20	12		E31E3-1 ON ROOF			
SPACE					31	32					SPACE			
SPACE					33	34					SPACE			
SPACE					35	36					SPACE			
SPACE					37	38					SPACE			
SPACE					39	40					SPACE			
SPACE					41	42					SPACE			
VA 31806											TOTAL VA 72045		VA 40239	
											TOTAL AMP'S 150			



Structural System Check:

Around 20 PSF added per AHU

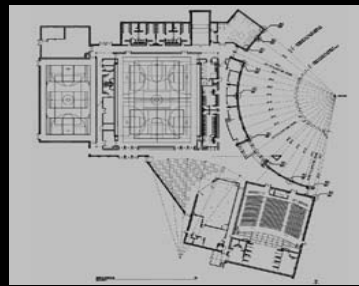
Floor Deck: Ok from manufacturer cut sheets

Beams: Lateral-torsional failure directly under AHU

Redesign: Put stiffener plates at midpoints



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Structural System Check:

Girder: Lateral-torsional failure

Redesign: Stiffener Plate at the midpoint

Steel Pipe Columns: Ok from LRFD Steel Manual

Masonry Bearing Walls: Ok from the

Masonry Designer's Guide

Acoustics Check:

Auditorium reverberation times: Acceptable

Increase in relative humidity:

Decrease the reverb. times of lower frequencies

Increase the reverb. times of higher frequencies



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Acknowledgements

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Burt Hill – Architecture and Engineering

Kirsten Mucci
Mucci Construction – General Contractor



*"Success is relative. It is what we can make of the
mess we have made of things."
~ T.S. Elliot ~*



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Questions or Remarks?

