

Neighborhood Schools Committee Meeting
7:30 p.m. Wednesday, Jan. 13, 2010

The Neighborhood Schools Committee meeting was convened at 7:30 p.m. in the board room of the Pottstown School District administration building. Present were committee members Valerie Harris and Nat White and chairman Tom Hylton. Also present were members of the Executive Team, Barry Angstadt, and board members Polly Weand, Michele Pargeon, Vice President Dennis Wausnock and President Rick Huss, and members of the public.

Members of the committee reviewed a discussion paper concerning the issues surrounding the need to upgrade Pottstown's five neighborhood elementary schools. The discussion paper is attached (Attachment 1) and made part of these minutes.

One issue required the immediate attention of the committee: the need to replace the windows at the Edgewood and Rupert elementary schools. If an architect is hired in early February to design the replacement windows, it should be possible to install the windows in late summer early fall of 2010. The Pottstown School District has a limited-time opportunity to seek special bonds using federal stimulus funds. Deadline for applying is April 1, 2010.

Therefore, the committee voted unanimously to recommend to the full school board that the board authorize at its Jan. 21 meeting the administration to seek Requests for Proposals from architects to design and oversee the installation of replacement windows at the Edgewood and Rupert elementary schools. The motion is attached (Attachment 2) and made part of these minutes.

When the review of the discussion paper was completed, committee members discussed with other board members and members of the public the three main elements of the discussion paper:

1. Replacing the windows at Edgewood and Rupert schools.
2. Installing geothermal heating and cooling systems at all five elementary schools.
3. Making Edgewood compliant with the Americans with Disabilities Act.

Assistant Superintendent Reed Lindley suggested adding a goal of having among the most instructionally supportive spaces of Pennsylvania's public schools.

Concerns were expressed about the cost of the improvements, assuring that schools remain healthy and safe, and assuring that asbestos would not be released during any construction work taking place.

The meeting was adjourned at 9 p.m.

Tom Hylton, chairman

Neighborhood Schools Committee Meeting
7:30 p.m. Tuesday, Jan. 19, 2010

The Neighborhood Schools Committee meeting was convened at 7:30 p.m. in the conference room of the Pottstown School District administration building. Present were committee members Valerie Harris and Nat White and chairman Tom Hylton. Also present were members of the Executive Team, Barry Angstadt, John Armato, and board members Polly Weand, Michele Pargeon, and Bob Hartman, and members of the public.

The purpose of the meeting was to hear a presentation from David Anstrand about geothermal heating and cooling systems. Anstrand is the retired district architect and head of facilities for the Manheim Township School District in Lancaster County. Manheim was the first district in Pennsylvania to install geothermal heat pumps in a school. The first system was installed the district's two Neffs elementary schools in 1995 (originally built in 1929 and 1940) and subsequently in its 1928 Brecht Elementary School and 1936 Schaeffer Elementary School.

Geothermal heat pumps rely on the moderate temperatures found underground. By sinking wells, the system can withdraw heat from the earth during the winter or pump heat back into the earth in the summer, thus providing both heating and air conditioning. A closed loop system is created with water circulating from the wells to the schools and back, with heat pumps blowing either warm or cool air into the classrooms through ceiling ducts, as needed.

Once the system was installed, energy consumption per square foot was considerably lower in the Neffs schools than any other school in the district. The advantages of the system include:

1. Lower energy consumption than conventional boiler systems.
2. Reduced maintenance costs over conventional boiler systems.
3. Seamlessly switching from heating to air conditioning.
4. Indoor air quality is maintained.
5. No fuel tanks.
6. The system is quiet.

After his presentation, Anstrand answered questions from board members, administrators, and members of the public. A pdf of Anstrand's presentation is attached (Attachment 3) and made part of these minutes.

The meeting was adjourned at 9 p.m.

Tom Hylton, chairman

ATTACHMENT 1
Neighborhood Schools Committee Meeting
7:30 p.m. Wednesday, Jan 13, 2010
Discussion Paper

BACKGROUND

1. Pottstown has the 11th highest taxes of Pennsylvania's 500 school districts.
2. Pottstown's tax base is declining and a consultant for the borough predicts it will continue to decline for at least five more years.
3. The district faces a five-fold increase in payments to the state pension system in the next few years.
4. Energy costs are expected to increase substantially in the coming years for both electricity and fossil fuels.
4. Pottstown School District renovated and enlarged its high school and middle school ten years ago. The district still has \$34 million in outstanding bonds for those projects, which will take 18 years to completely pay off.
5. Pottstown has five elementary schools and 23 modular classrooms, ten of which were installed just last year. The elementary school enrollment has remained relatively stable for the last 20 years.
6. In October 2008, Crabtree Rohrbaugh Architects estimated that fully renovating Pottstown's elementary schools would cost from \$39 million (keep and expand three schools with larger class sizes) to \$53 million (renovate four existing schools and build a new Rupert Elementary School).
7. The Pottstown School District has a limited-time opportunity to seek special bonds (zero interest to 1.5 percent, plus some costs) through the state Qualified School Construction Bond program, using federal stimulus funds. Pottstown is one of 116 school districts eligible for this funding. Eighty percent of the districts are not eligible for funding. The grant process is competitive, and funding priority will be for sustainable school (energy saving) projects and those designed to reduce class size in the early grades.

Deadline for applying is April 1, 2010. The funds must be spent within three years.

LANDMARK DESIGN ASSOCIATES SURVEY

Ellis Schmidlapp from Landmark Design Associates has visited the elementary schools with Barry Angstadt, reviewed previous architectural studies, and concluded:

1. All five schools are structurally sound. All have good roofs. Three have fairly new, energy-efficient windows. Rupert and Edgewood need energy-saving replacement windows.
2. The heating and mechanical systems at all five schools are inefficient and approaching the end of their useful life.
3. None of the schools is ADA compliant, although Edgewood is closer to compliance than the others because it is a one-floor building.

GOAL SETTING

The Neighborhood Schools Committee will ask the school board to consider adopting the following goals:

1. Have among the most cost-effective school facilities in Pennsylvania.
2. Have among the most energy-efficient school facilities in Pennsylvania.
3. Have among the most environmentally responsible school facilities in Pennsylvania.
4. Have among the most child- and family-friendly school facilities in Pennsylvania.

PROPOSALS

1. Replacement windows.
 - A. Replacing the windows at Edgewood and Rupert schools will save energy, thus paying for themselves over time. They will enhance the appearance of the schools and improve the learning environment.
 - B. If the school board selects an architect at its Feb. 4 meeting, it should be possible to install high quality, energy efficient windows at Edgewood and Rupert by late summer/early fall of 2010.
 - C. Even if the school district were to decide to sell Edgewood and/or Rupert sometime in the future, replacement windows will be needed. It makes economic sense to replace them now.

Motion to recommend for board action at its Jan. 21 meeting to put out Requests for Proposals to architects for the design and installation of replacement windows at Edgewood and Rupert in the summer/fall of 2010.

2. Making Edgewood ADA compliant
 - A. The school board may want to consider making Edgewood ADA compliant, so at least one school would meet ADA standards. ADA compliance would mean making at least one lavatory ADA accessible and may mean the replacement of doors and frames.
3. Geo-thermal systems installation
 - A. Geo-thermal energy systems to replace the existing boiler-and-radiator systems could be installed simultaneously in all five elementary schools in the spring and summer of 2011. The well fields needed for the systems could be drilled in the spring of 2011 and the inside work could be completed in the summer of 2011. Geo-thermal provides both heating and air conditioning.
 - B. In the long run, geo-thermal is by far the most cost-effective and energy-efficient heating and cooling system, especially as energy costs rise.

These systems may well pay for themselves within the life of the bonds.

Geo-thermal will be explained in detail at the Neighborhood School Committee's Jan. 19 meeting. At that meeting, David Anstrand, retired director of facilities for the Manheim Township School District in Lancaster County, will describe the installation and operation of geo-thermal systems at three historic elementary schools – Neffs, Brecht, and Schaeffer.

Manheim Township School District was the first in Pennsylvania to install geo-thermal system in an existing school building (1995). The district has had more than 10 years experience operating the systems.

- C. At the same time ductwork for the systems is installed in the ceilings, wiring for technology could also be installed. After the systems are installed, new acoustic ceilings can be installed.
4. Energy-efficient light fixtures
- A. After the new ceilings are installed, energy efficient light fixtures could be installed that will pay for themselves well within the time frame of the bonds.

Cost estimates

New windows at Edgewood and Rupert	\$400,000
ADA compliance at Edgewood (worse case, if all doors and frames need to be replaced)	\$150,000
Geo-thermal systems at all five schools, including new wiring for technology and ceiling replacements, \$5 million to \$6 million	\$6,000,000
Energy efficient light fixtures (all nine buildings, not just the elementary schools)	\$400,000
20 percent for design and contingencies	\$1,390,000
TOTAL	\$8,340,000

POINTS TO CONSIDER

1. Rather than spend \$39 million to \$50 million, these proposals will provide a quality learning environment and energy-efficient buildings for years to come at a fraction of the cost.
2. Seven of the nine members of the Pottstown School Board pledged when running for election to practice fiscal responsibility and to preserve our system of neighborhood schools. These proposals demonstrate that preserving our neighborhood schools is by far the most cost-effective way to provide a quality educational environment for our children.
3. Because all of the work to be done is considered maintenance under the code, we can avoid code issues.
4. Installing geo-thermal does not preclude expanding any building at a later time. It will simply be necessary to plan carefully to ensure any future building expansion does not go over a well field.
5. None of this work involves closing a school or relocating students.

SPACE ISSUES

The Neighborhood Schools Committee will address issues regarding the need for space to replace the modulars at its meetings in February.

TIME FRAME

In order to apply for federal stimulus zero- to low-interest bond money by April 1, the Neighborhood Schools Committee anticipates submitting a report covering all pertinent issues to the school board no later than the first week of March.

ATTACHMENT 2

Motion to seek Requests for Proposals from architects for replacement windows at Edgewood and Rupert Elementary Schools.

The Neighborhood Schools Committee recommends the district seek requests for proposals from architects to provide the services necessary for specifying and bidding replacement windows at all existing and historic window openings at the Edgewood and Rupert Elementary Schools. The district desires replacement windows with high energy performance, low long term maintenance characteristics, and ones which are architecturally compatible with the schools' original designs. At Rupert, windows are to be designed for the historic masonry openings. Requestors will be sought starting on Friday, Jan. 22, with a deadline for responses no later than 4 p.m. Tuesday, Feb. 2.

ATTACHMENT 3

Neff Schools and the Geothermal Heat Pump Solution

A presentation for:

Neighborhood Schools Committee
Pottstown School District

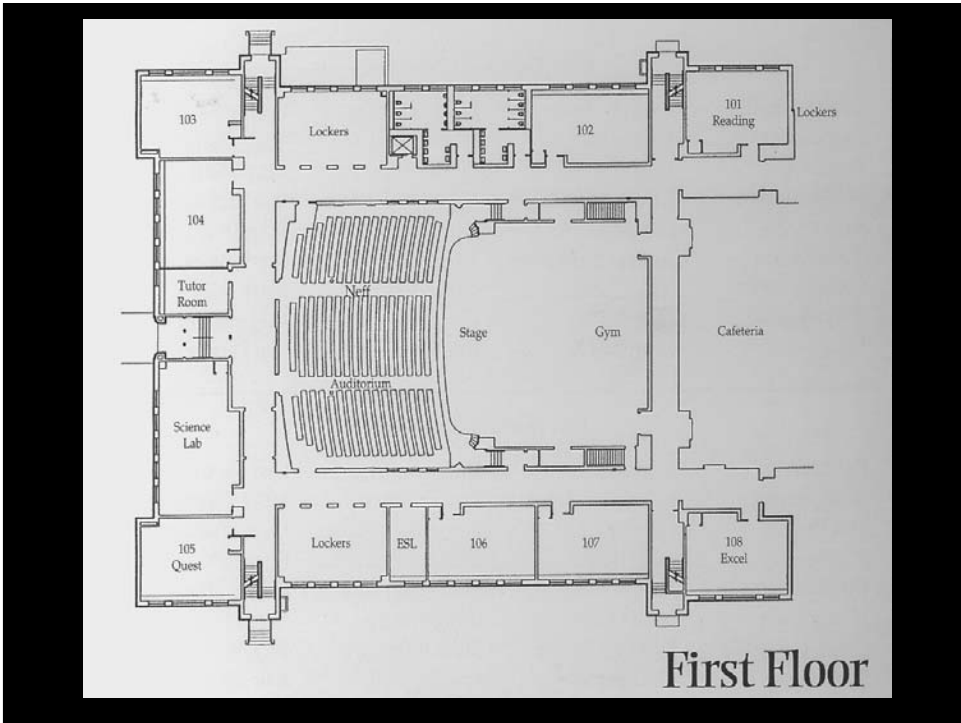
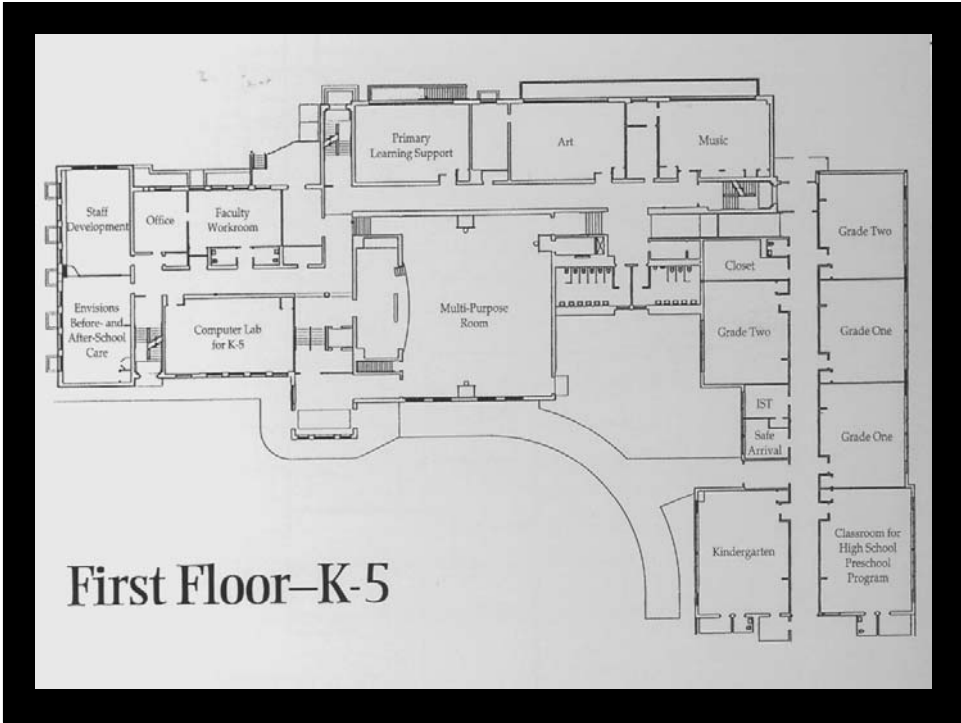
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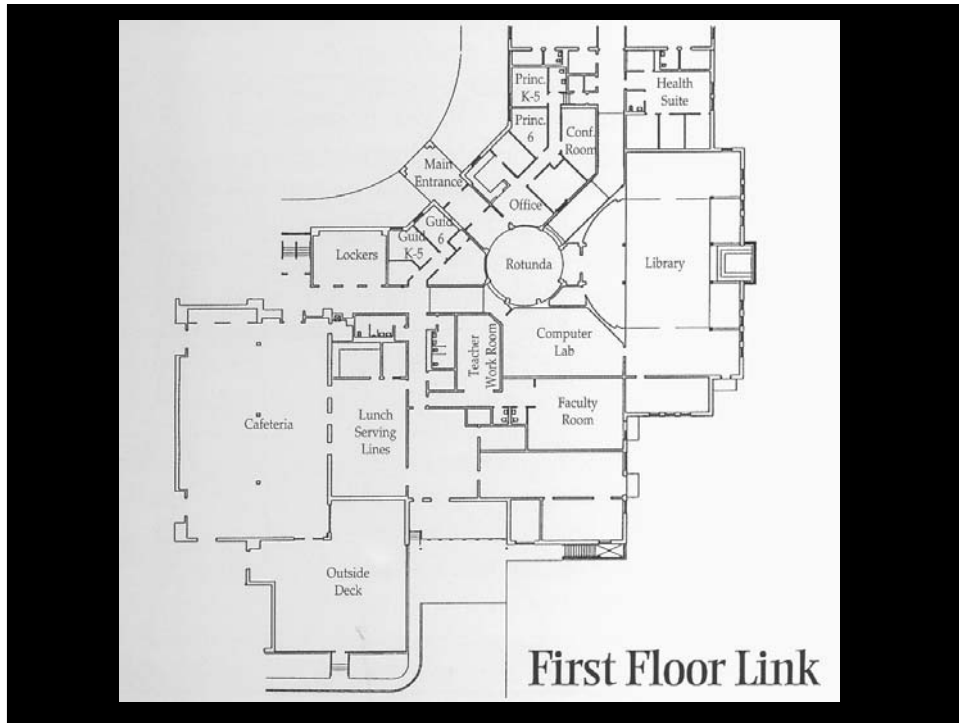
David E. Anstrand, RA, REFP
January 19, 2010



6th Grade School...Connector...K-5 School



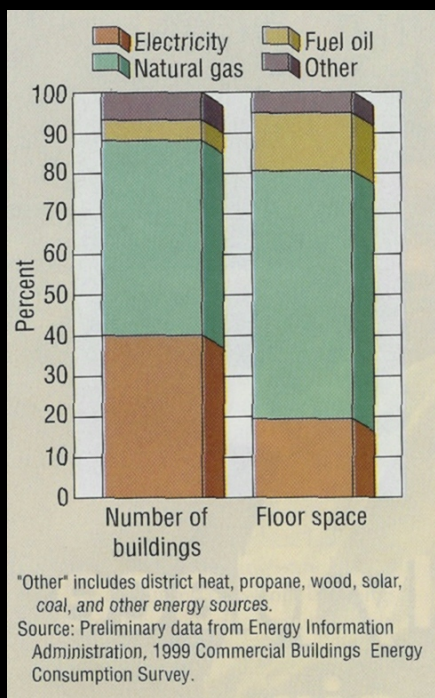




John Henry Neff Schools

- 148,560 sf
- Serves as a 300 student K-5 and a 400 student 6th grade
- Two existing buildings were joined by a new "connector"
- Connector houses common facilities
- Completed in 1996





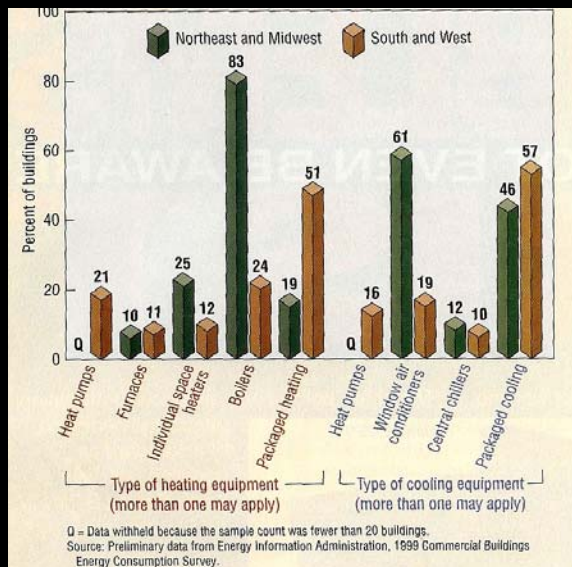
K-12 Heating Energy Source

...and Natural Gas prices have gone from what to what during the last year?

...on average \$6.61/1000cf last year to \$11.34/1000cf this year, a **72%** increase

Source: Exxon Mobil 2005 4th Quarter Report

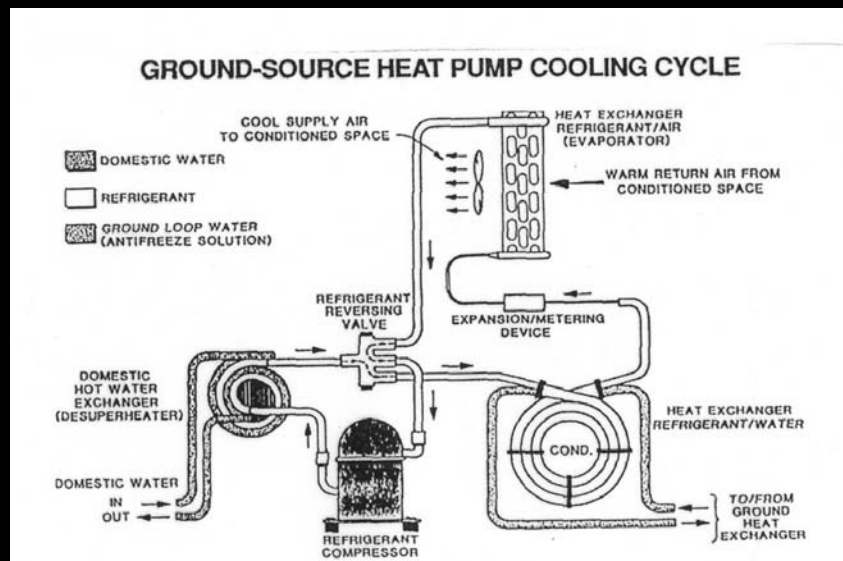
K-12 Buildings Heating and Cooling Systems



Water to Air Heat Pump



The Magic Box



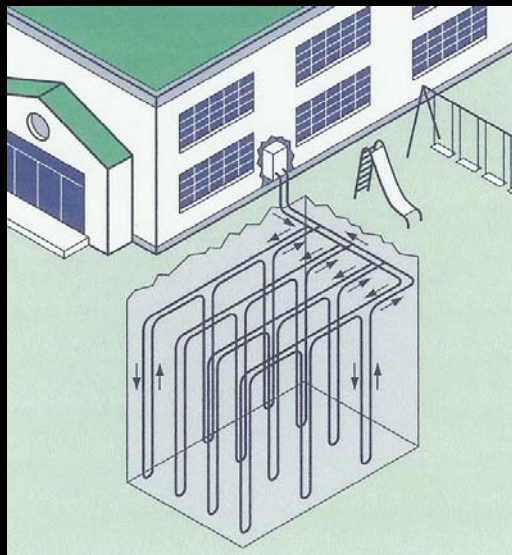


Geo Source well field. 140, 277 feet deep, bore holes organized into 20, seven bore hole circuits. The bore holes are on 15' centers.



Circuits enter and leave the building under the snowy patch.

Well Field Diagram



Supply and return manifolds to and from the well field.
Both are located on the same wall of the pump room.



Valves to “partition” the well field



2-50 hp pumps to circulate building loop/well field water, only one operates at a time.

Variable frequency drive is used to control pump motor power.



Loop Pump Control

Loop water pumps are controlled by a variable frequency drive saving energy by varying the pump horse power from 15 hp to 50 hp

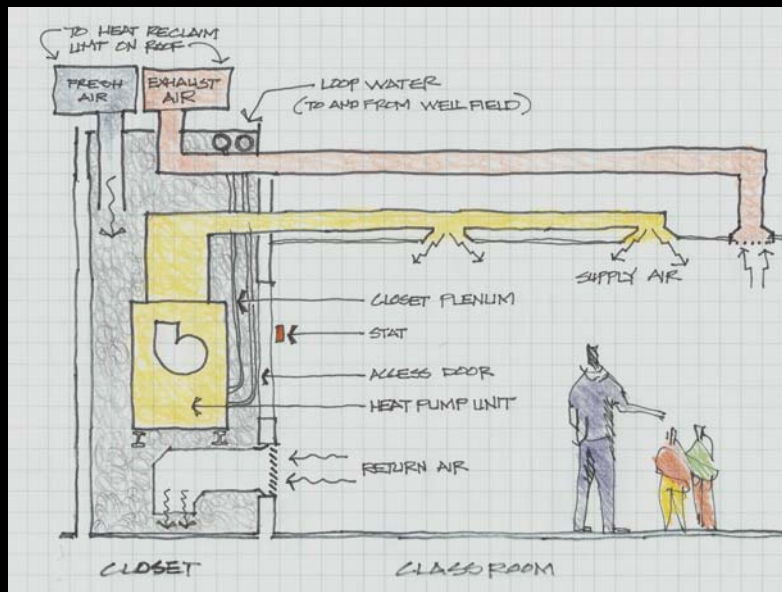


Heat Pump Closet

- Plenum
- Acoustically Treated
- Easy Access
- Ease of Servicing Components



Classroom HVAC System

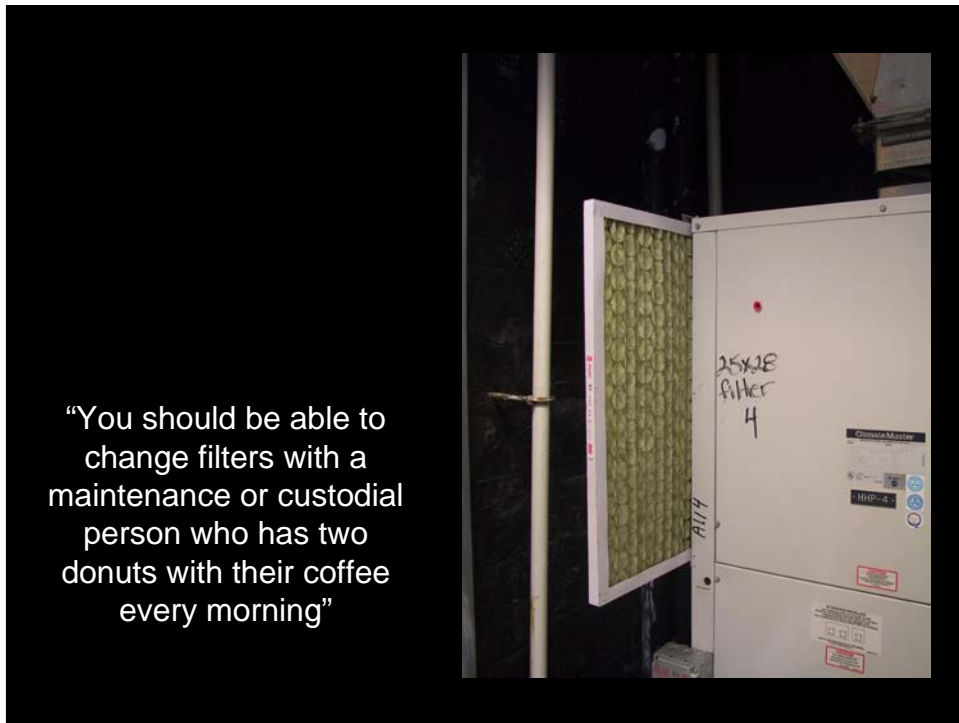


Simple tempered air distribution – small duct run and two diffusers per 900 sf classroom



Exhaust air to heat reclaim unit. Fresh air from heat reclaim unit to the heat pump closet. System was designed to meet ASHREA 62-89

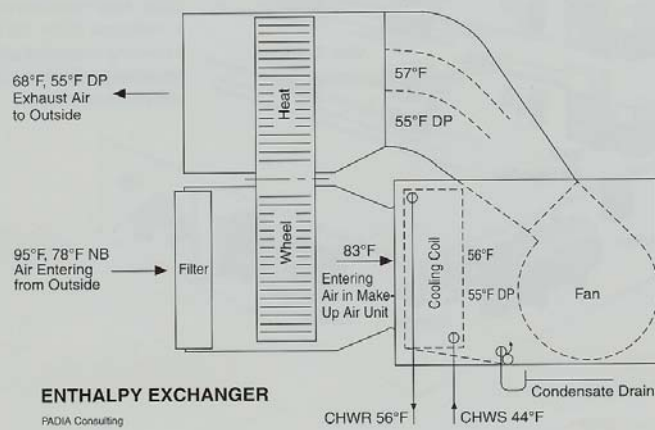




Desiccant wheel heat recover unit. Four roof mounted and this interior unit were used.



Heat Reclaim Unit



Neff Cafeteria



Three water to water heat pumps used to supply hot or chilled water to a conventional air handler supplying air to the cafeteria one level above.





Central DDC controller
and incoming /
outgoing loop
temperature meter



Initial Research

- Electric utility company presentation at a school business officials' workshop
- Visit to Austin Independent School District
- Feasibility Study prepared by the project engineering consultant
- Visit to a heat pump manufacturer's plant in Waco, Texas
- Visit to Father McGivney High School outside of Toronto, Canada
- **Informed the Board of School Directors every step of the way.....no surprises!**
- Entered into a partnership agreement with our electric utility company

Feasibility Study to Compare Systems

- Standard four-pipe system with air cooled chiller and gas-fired boilers.
- Four-pipe system using direct-fired gas absorption chiller/heater.
- Geothermal heat pumps
- Closed loop water source heat pumps with gas-fired boilers and cooling tower.

8 Evaluation Criteria

- First cost
- Operational cost
- Maintenance cost
- Life cycle cost
- Environmental Impacts
- Operation and Maintainability
(comfort, control, flexibility and simplicity)
- Site and building impact
- Performance history

Board Accepted Our Mechanical Engineer's Recommendation

"... With the criteria and assumptions incorporated in this study and the recognition of inherent risk involved in an emerging technology, the recommendation is made to base the heating and cooling system around a high efficiency ground coupled heat pump system."

What is a High Efficiency System?

- High efficiency water source heat pumps
- Variable frequency pump drive controls
- Partitioned well field
- Direct Digital Control
- Air to air heat recovery

How well does it work?

- Reduced maintenance during the past nine years.
- Seamlessly switches from heating to cooling (and visa versa).
- Indoor air quality is maintained.
- Individual control in each classroom (10 degree range)
- No in-ground fuel tank or outside cooling tower.
- Reduced requirements of central mechanical room space.
- The system is quiet.

Construction Costs

• General Construction	5,583,540
• HVAC	1,725,268
• Well Field	308,000
• Plumbing	737,400
• Electrical	1,275,500
• Technology	72,018
• Total	9,801,726

HVAC + Well field = \$ 13.69/s.f.

Note: 1995 Costs

Additional Considerations

- More extensive mechanical system electrical distribution
- Individual heat pump closet for each classroom/space (costs of door, frame, hardware, etc.)

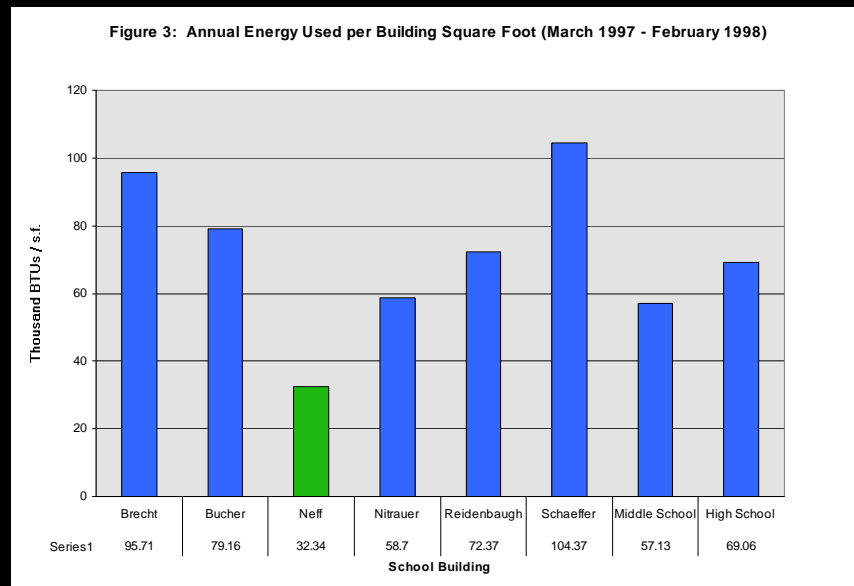


Figure 4: Comparison of MTSD Annual Total Energy Costs Per Square Foot (March 1997 - February 1998)

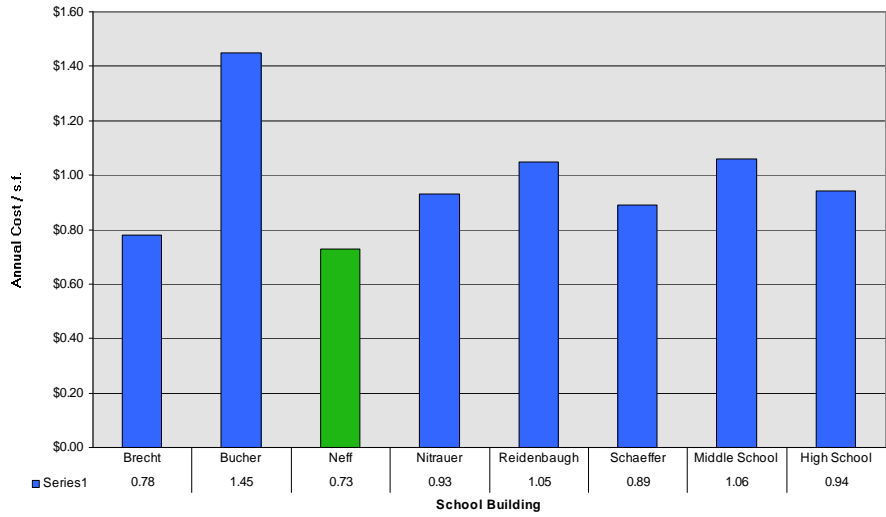


Figure 5: Annual Total Energy Costs Adjusted to Neff Electrical Rates (March 1997 - February 1998)

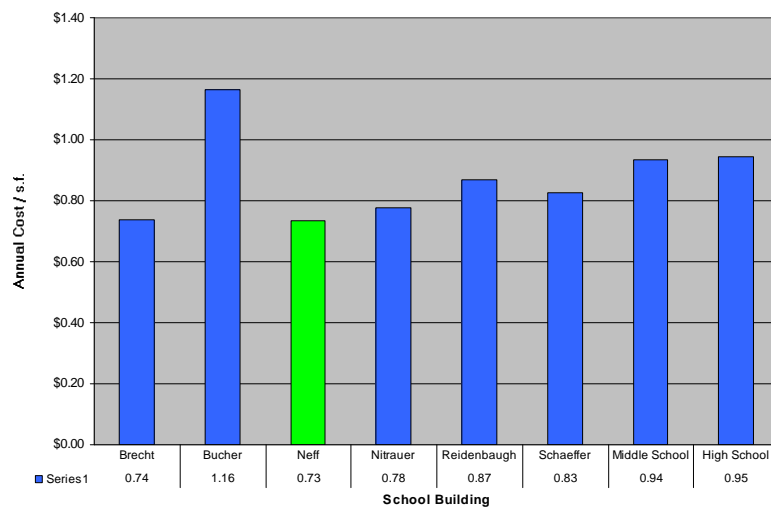
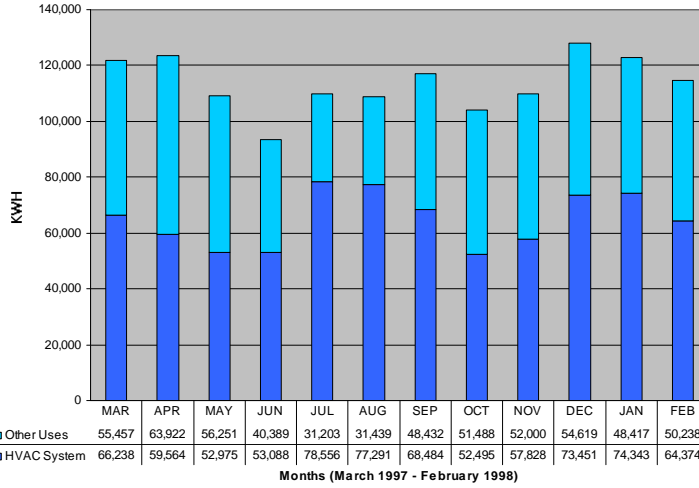


Figure 1: Neff HVAC Energy Use Compared to Total Electrical Energy



Questions?

