

MEETING MINUTES
NORTHERN LEHIGH SCHOOL DISTRICT
SLATINGTON ELEMENTARY SCHOOL
ADDITIONS AND RENOVATIONS
MEP PROGRAMMING
NOVEMBER 20, 2009
DEI PROJECT NO. 29000

ATTENDEES:

John Hrizuk
Jeff Bachman
Steve Remaley
Daryl McKeiser
Greg Derr
Gene Hoffman
Rob Malehorn
Chris Xander
Eric Gianelle
Mike Kelly
Doug Taylor

REPRESENTING:

Northern Lehigh School District (NLSLSD)
Northern Lehigh School District (NLSLSD)
Northern Lehigh School District (NLSLSD)
Northern Lehigh School District (NLSLSD)
Northern Lehigh School District (NLSLSD)
Snyder Hoffman Associates (SHA)
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KCBA Architects (KCBA)
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D'Huy Engineering, Inc. (DEI)

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* A copy of the sign-in sheet is attached to the meeting memorandum.

PURPOSE:

The purpose of the meeting was to discuss the proposed mechanical, electrical and plumbing (MEP) systems for the upcoming additions and renovations project.

TECHNOLOGY DISCUSSIONS:

**Action
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**Item
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1. Approximately \$36,000 is currently allocated in the budget for technology equipment. This cost will be further evaluated during future budget updates.
2. District Office and Elementary School Office phone systems -- new PBX system, re-use existing head end and include expandable capacity (conduit).
3. Phone service is provided by Level 3 Communications.
4. Data system -- provide CAT 6E.
5. Include 2 data connections at teaching wall (1 each side).
6. Wireless technology throughout building -- include corridor systems only. Final installation of devices will be by the NLSLSD. Existing wireless devices will be re-used. New will be provided by the NLSLSD where required. All ceiling boxes and wiring is in contract.
7. NLSLSD does not have any specific wiring manufacturer preference.
8. Include new Hubbel racks or similar with 2 switches for data closets. Phasing will not likely permit re-use of existing. NLSLSD prefers fiber from MDF to IDF located at each classroom pod. IDF's will be planned for Administration (shared by DAO and Elementary School administration), Administration on second floor



D'HUY Engineering, Inc.

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By | Item
No. | |
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| | | and second floor computer rooms. (3'-0" x 8'-0" approximate data closet size).
Air condition MDF, vent all other closets. |
| | 9. | MDF closet should be included on emergency power (including air conditioning unit), also include emergency power at IDF closets. |
| | 10. | Single UPS, 30 amp, 110 volt required at each rack. |
| | 11. | Use 12 strand multi-mode wiring between IDF closets. |
| SHA | 12. | NLSD requested a small amplifier in each classroom to address audio through projection. SHA to provide specification section for NLSD review. System to include VGA cables to be pulled to front of teaching wall. Include ceiling mounted projection mounts and power above mount for future installation of projectors (by NLSD). Base bid 34 classrooms (24 classrooms, 6 s.e. and 4 computer rooms). Other rooms to be an alternate bid. |
| | 13. | Provide an audio visual closet in the DAO Board room include data and power. Provide a recording device for public meetings. In addition, a voice amplification system and speakers are required. Also include a method to record video via closed circuit camera in board room. Include as a component to the security system. |
| | 14. | Include a TV jack (cable and electric) on teaching wall. VGA cables will be used. Blocking will be provided in the wall for future TV brackets by NLSD. |
| NLSD | 15. | Include new web-based IP video system (Panasonic preferred WJ-HD316A). SHA requested camera locations for video surveillance. The NLSD is requested to provide the proposed locations. NLSD will require building interior and exterior, no pole mounted. Note: Depending on the number of cameras, some may need to be considered alternate bid. NLSD suggested that SHA contract CSI to further discuss. |
| | 16. | Secure entry vestibule – Provide at both DAO and Elementary School. The Elementary School vestibule exterior door and DAO vestibule door will remain unlocked during the day with all other exterior doors locked. The interior door at both vestibules will be locked and will require remote lock release. An audio device should be provided at each vestibule for communication with receptionists. |
| SHA | 17. | Card access system – Maintain some components and provide an upgrade. SHA to verify condition of equipment. No new cards or badging station required. |
| | 18. | Provide a new clock system, 110 V wireless. DEI suggests vendor test building to ensure coverage of wireless system. |
| | 19. | Replace cable throughout the building. SHA suggested re-using head end equipment in coordination with cable provider (Blue Ridge Cable). |
| SHA | 20. | Re-use existing Honeywell Intrusion System, including motion sensors (currently located in hallways), add motion sensors in other areas of corridors. Coordinate with NLSD. |
| SHA/KCBA | 21. | Investigate relocating the MDF room. The MDF serves all schools on site and shares space with the phone switch. Isolation of the District server room is recommended. KCBA and SHA will further review. |

MECHANICAL DISCUSSIONS:

22. SHA reviewed the proposed HVAC systems comparisons (attached to memorandum). The options were discussed as follows. All proposed systems are major upgrades to the existing and should be considered:



Action By	Item No.
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- a. Ground source heat pump
 - b. Water source heat pump
 - c. Variable air volume – 4 pipe system
23. The options will be further reviewed with the Leadership Team.
24. Existing NLSD building controls are Carrier DDC (other buildings). NLSD suggested bidding Johnson Controls although the NLSD currently installing district-wide Invensys BMS. DEI noted that we must competitively bid the BMS. The NLSD should consider Johnson, (BB) Invensys, Trane, Seimens and others as stand alone alternate bids.
25. Alternate mechanical equipment should be bid.
26. *Post Meeting Note: DEI suggests that the following items be further discussed at the follow-up MEP meeting:*
- 26.1 *Designated mechanical unit for DAO and Elementary School office for summer and evening use.*
 - 26.2 *The proposed boiler type (flex tube or cast iron).*
 - 26.3 *Existing propane tank – services to building.*
 - 26.4 *Hot water heater locations (per classroom POD).*
 - 26.5 *Urinal types (waterless?).*
 - 26.6 *Flush valve type (battery or elect or self charging).*
 - 26.7 *Re-use of copper piping where possible.*
 - 26.8 *Fire service from Shadow Oaks Lane.*
 - 26.9 *Sprinkler system and head type (standard or extended throw).*
 - 26.10 *Roof drain insulation (replace existing).*
 - 26.11 *New emergency generator and systems served.*
 - 26.12 *Add second transformer with vault for phasing requirements.*
 - 26.13 *Location of power and data closets.*
 - 26.14 *Lighting controls (timed delays on corridors, occupancy sensors in classrooms).*
 - 26.15 *Daylight analysis / harvesting (alternate bid item).*
 - 26.16 *Functional performance testing for any equipment planned for re-use (i.e. fire alarm).*
 - 26.17 *Lightning protection (alternate bid item).*
 - 26.18 *Parking lot lighting (alternate bid item).*
 - 26.19 *Proposed fixture types, KCBA to provide fixture cut sheets for review and approval by Owner.*
 - 26.20 *Alternate lamp types for increased energy savings.*

MISCELLANEOUS:

26. KCBA to include note in documents that all roof cutting and patching should be coordinated with Tremco Roofing.

MEETINGS:**KCBA**

27. Another end-user meeting will be scheduled to review mechanical, plumbing and electrical systems KCBA to coordinate with SHA and DEI.

**D'HUY Engineering, Inc.**

Action By	Item No.
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Anyone taking exception to the statements in these Minutes, including omissions, shall notify DEI in writing within three days of receipt.

Respectfully Submitted,
D'Huy Engineering, Inc.



Doug Taylor, Associate AIA, AVS
Senior Project Manager

ATTACHMENT:

Meeting Sign-in sheet
HVAC System Comparison 11/23/09

DISTRIBUTION:

Greg Derr / NLS
Eric Gianelle / KCBA
Mike Kelly / KCBA
Gene Hoffman / SHA

DST/dak
29000/ MM 112009



NORTHERN LEHIGH SCHOOL DISTRICT

SLATINGTON ELEMENTARY SCHOOL

NOVEMBER 20, 2009

PEI PROJECT NO 29000

SIGN-IN SHEET

NAME:

REPRESENTING:

DOUG TAYLOR

DHUN ENGINEERING INC.

John HIRZUK

~~John~~ NLSD.

Jeff Bachman

NLSD Technology

Greg DERR

Dir. SS

ERIC GIANELLE

KCBA

MIKE KELLY

KCBA

Gene Hoffman

Snyder Hoffman Assoc.

Rob Malehorn

Snyder Hoffman Assoc.

CHRIS XANDER

SNYDER HOFFMAN ASSOC.

Steve Romaley

NLSD

Dayl M. Reiss

N.L.S.D.

NORTHERN LEHIGH SCHOOL DISTRICT
SLATINGTON ELEMENTARY SCHOOL

HVAC SYSTEM COMPARISON
NOVEMBER 23, 2009

Snyder Hoffman Associates, Inc.
1005 West Lehigh Street
Bethlehem, PA 18018

SYSTEM DESCRIPTIONS

Geothermal Heat Pump System (GSHP)

A water/anti-freeze fluid is circulated through a 2-pipe loop system to water source heat pump units that absorb heat from or reject heat to the fluid. When an individual heat pump is cooling air, it rejects heat to the loop, and when heating air, it absorbs heat from the loop.

The loop temperature is maintained between temperatures of approximately 30°F. and 100°F. The fluid is circulated through pipes acting as heat exchangers in the ground. The heat exchangers are vertical bore holes that are grouted solid after installation of a U-tube heat exchanger. Approximately 98 "wells" would be required.

Classrooms and similar areas would be served by small heat pump units located in closets or mechanical rooms. Outside ventilation air would be supplied pre-conditioned from heat recovery units with integral water source heat pump compressors.

Large spaces, including the Cafeteria, Auditorium, Gymnasium and similar spaces would be served by heat recovery units with integral water source heat pump compressors.

Water Source Heat Pump System (WSHP)

This system is similar to the geothermal heat pump system, except that the loop temperature is maintained by oil fired boilers and cooling towers with either integral or remote heat exchangers. The loop temperature is maintained within tighter limits (approximately 55°F. to 90°F.), which allows the heat pumps to operate at high efficiencies.

Four Pipe Variable Air Volume System (VAV)

This system has heat supplied by oil-fired boilers and cooling supplied by chillers. The chillers would be air cooled.

Classrooms and similar areas would be served by variable air volume heat recovery units. Each individual classroom would have a fan powered variable air volume box with hot water heating coil located above its ceiling. The air volume would be reduced from maximum to the minimum ventilation requirement prior to energizing reheat. Reheat would be required year round during occupied hours.

Large spaces, including the Cafeteria, Auditorium, Gymnasium, and similar spaces would be served by heat recovery units with hot water and chilled water coils.

ANNUAL ENERGY USE SUMMARY

Electricity (KWH)	<u>GSHP</u>	<u>WSHP</u>	<u>VAV</u>
Lighting & General Power	761,000	761,000	761,000
Heating	293,000	255,000	-----
Cooling	267,000	252,000	258,000
Fans	249,000	249,000	218,000
Pumps	<u>277,000</u>	<u>210,000</u>	<u>135,000</u>
Total Electric	1,847,000	1,727,000	1,372,000
Oil (gallons)			
Heating	-----	23,840	38,000
Propane (gallons)			
Water Heating	3,948	3,948	3,948
Cooking	<u>3,113</u>	<u>3,113</u>	<u>3,113</u>
Total Propane	7,061	7,061	7,061

ANNUAL ESTIMATED ENERGY AND CONSTRUCTION COSTS

<u>SYSTEM</u>	<u>ESTIMATED ENERGY COSTS</u>			<u>TOTAL</u>	<u>ESTIMATED CONSTRUCTION COST</u>
	<u>OIL</u>	<u>PROPANE</u>	<u>ELECTRICAL</u>		
GSHP	0	\$13,063	\$240,110	\$253,173	\$4,280,000
WSHP	\$52,448	\$13,063	\$224,510	\$290,021	\$3,745,000
VAV	\$83,600	\$13,063	\$178,360	\$275,023	\$3,959,000

All systems except VAV require closets for unit installation and additional plumbing for condensate drains. These costs are added to the HVAC construction costs.

GSHP & WSHP require additional electrical distribution. This cost is added to the HVAC construction cost.

*PPL Energy Rate GS-3-Large General Service – 13.0 cents/KWH. This includes an allowance for an increase due to deregulation.

*Oil @ \$2.20/gallon

*Propane @ \$1.85/gallon

Estimated costs based on a building area of 107,000 square feet.

ESTIMATED FIRST YEAR COSTS

<u>SYSTEM</u>	<u>ENERGY</u>	<u>AMORTIZATION*</u>	<u>MAINTENANCE</u>	<u>TOTAL</u>
GSHP	\$253,173	\$373,150	\$32,000	\$658,323
WSHP	\$290,021	\$326,506	\$45,000	\$661,527
VAV	\$275,023	\$345,164	\$47,000	\$667,187

*Amortization based on an interest rate of 6% over 20 years.

PRESENT WORTH ANALYSIS (20 YEARS COSTS)

<u>SYSTEM</u>	<u>ENERGY*</u>	<u>CONSTRUCTION COST</u>	<u>MAINTENANCE**</u>	<u>TOTAL</u>
GSHP	4,577,368	4,280,000	640,000	9,497,368
WSHP	5,243,580	3,745,000	900,000	9,858,580
VAV	4,972,416	3,959,000	940,000	9,871,416

* Assumed to increase at 1% above the rate of inflation (4% inflation assumed).

** Assumed to increase at the rate of inflation.

SYSTEM ADVANTAGES AND DISADVANTAGES

<u>SYSTEM</u>	<u>ADVANTAGES</u>	<u>DISADVANTAGES</u>
GSHP	Good humidity control. Can heat or cool at any time. No visible heat rejection equipment. Lowest energy cost. Lowest life cycle cost.	Shorter equipment life. No economizer cycle. High construction cost. Closets required for units.
WSHP	Good humidity control Lowest construction cost.	Shorter equipment life. No economizer cycle. Cooling tower maintenance. Boiler maintenance. Fuel oil tank. Closets required for units. High energy cost.
VAV	Good humidity control. Has economizer cycle. No closets required for units. Simple systems operation.	Limited ceiling space to install VAV boxes. VAV boxes above ceilings to maintain. Possible VAV box noise in classrooms. Chiller maintenance. Boiler maintenance. Highest life cycle cost.

RECOMMENDATION

The geothermal system has the lowest energy and life cycle cost and should be considered. The water source heat pump system is also a good choice. It also has the highest construction cost. This system does not have visible exterior heat rejection equipment such as cooling towers or chillers. There is a possibility that PPL will be offering incentives beginning in 2010 for geothermal systems, which could result in an incentive of approximately \$65,000. This rebate was not taken into account in the analysis, as it is not yet finally approved. The analysis is based on electricity rates significantly higher than the District is currently paying. Using present rates would have made the geothermal system look better.

Future energy costs are very difficult to predict, and the life cycle cost difference between the systems is a very small percentage. Predicting which system will be less costly in the long run is not completely reliable.

The present construction budget does not include installation of a geothermal system. The additional construction cost for the geothermal system above the water source heat pump system is \$535,000. Straight line payback period is 10.7 years.

If the geothermal system is considered, a test well should be drilled to determine the suitability of the location for a geothermal system and to determine the thermal conductivity of the ground. The cost of the test well would be in the range of \$10,000.

The VAV system is not recommended for this building due to limited clearances for the installation of VAV boxes above ceilings.