REQUEST FOR QUALIFICATIONS

CITY OF QUINCY, MASSACHUSETTS
PURCHASING DEPARTMENT
1305 HANCOCK ST., QUINCY, MA 02169

Invites sealed bids/proposals for furnishing and delivering to the City of Quincy:

ENGINEERING SERVICES FOR THE REPLACEMENT & CONVERSION OF THE HEATING & HOT WATER SYESTEM AND BUILDING CONTROLS AT THE BERNAZANNI ELEM. SCHOOL

DEADLINE: "DECEMBER 5, 2014 @ 11:00 A.M."

Public Buildings Department, acting on behalf of the City of Quincy, MA, under M.G.L. c. 7C is seeking a full package of **"Engineering Services for the replacement and conversion of the heating and hot water system and building controls at the Bernazanni Elementary School** at 701 Furnace Brook Parkway". The City intends to replace the original oil-fired, steam boilers, domestic hot water tank and unit ventilators, and install high-efficiency gas-fired equipment including new unit ventilators. A schematic design has been prepared and the City now seeks design work and bidding documents, as well as construction oversight and contract administration services. **There will be an on site non mandatory site visit November 24, 2014 @ 3:00 p.m.**

The City intends for the design work to be completed within 10 weeks from award of contract and Construction to be completed by September 29, 2015, under M.G.L. c. 149. The cost of services, including fees and expenses, shall not exceed $100,000. The deadline for the submittal of RFQ is December 5, 2014 at 11:00 AM.

Detailed specifications are available on-line at the City of Quincy's website, www.quincyma.gov and also available at the office of the Purchasing Agent, Quincy City Hall, 1305 Hancock Street, Quincy, Massachusetts, 02169, between the hours of 8:30 AM and 4:30 PM

RFQ's will be received at the office of the Purchasing Agent until the time and date stated above, at which time and date they will be opened and registered. Late Proposals, delivered by mail or in person, will be rejected.

All questions regarding this bid should be directed to Kathryn R. Hobin, Purchasing Agent through fax: 617-376-1074 and email: khobin@quincyma.gov and cc: to kimtrillcott@quincyma.gov Questions will be accepted until November 28, 2014 at 4:00 p.m.

Proposals must be in a sealed envelope/box (1 original & 3 copies). Submittals must be identified on the outer envelope: **"REQUEST FOR QUALIFICATIONS-ENGINEERING SERVICE BERNAZANNI SCHOOL".**

If applicable, Bids/RFQ's shall be in accordance with Chapter 7, Chapter 149 of the M.G.L. as amended. M.G.L. Chapter 39, § 39A, 39B and 39F-R. M.G.L. Chapter 149, § 26, 27, 29, 35 and 44A-44M. and 810 CMR 9.00 & CMR 10.00, Chapter 7 §38A1/2 – O.

The right is reserved to reject any or all RFQ's or to accept any part of an RFQ or the one deemed best for the City, and waive any informalities in the bidding, if it is in the best interest of the City to do so.

Thomas P. Koch, MAYOR

Kathryn R. Hobin, C.P.O.

LEGAL: NOVEMBER 13, 2014
LEGAL: NOVEMBER 19, 2014

REQ#: S120514
CENTRAL REGISTER

DEPT. CHARGED: PUBLIC BUILDINGS

CITY OF QUINCY
Purchasing Department
1305 Hancock Street, Quincy, MA 02169

Phone: 376-1060
Fax: 376-1074

TAX COMPLIANCE CERTIFICATE

MASS. GENERAL LAWS, CH. 62C, S: 49A(b)

I hereby certify that pursuant to MGL Chapter 62c, section 49a, I have complied with all laws of the Commonwealth of Massachusetts relating to taxes, reporting of employees and contractors, and withholding of child support. This is being signed under the pains and penalties of perjury.

(1) Individual Contractor _____
(Contractor's Name and Signature)

Social Security Number _____

(2) Corporation, Association or Partnership _____
(Contractor's Name)

Federal Tax ID Number, or Social Security Number _____

By: _____
(Authorized Signature)

CERTIFICATE OF NON – COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union committee, club, or other organization, entity, or group of individuals.

_____
(Name of person signing bid or proposal)
(Please print)

_____
(Signature required)

_____
(Name of business)

CITY OF QUINCY
Purchasing Department
1305 Hancock Street, Quincy, MA 02169

Phone: (617) 376-1060

Fax: (617) 376-1074

SIGNATURE AUTHORIZATION

At a duly authorized meeting of the Board of Directors of the

_____
(NAME OF CORPORATION)

held on _____, at which all the Directors were present or waived notice, it was
(DATE)

VOTED, that:

_____ _____
(NAME) (OFFICER)

of this company, be and he/she hereby is authorized to execute Contracts and Bonds in the name and behalf of said Company, and affix its Corporate Seal thereto, and such execution of any Contract or obligation in this Company's name on its behalf by such _____ under seal of the Company, shall be valid
(OFFICER)

and binding upon this Company. It was further voted that the City of Quincy may rely on such authorization of future Contracts until notified to the contrary.

A true copy,

ATTEST: _____
(CLERK'S SIGNATURE)

PLACE OF BUSINESS: _____

DATE OF THIS CONTRACT: _____

I hereby certify that I am the Clerk of the:

_____ that _____ is the
(COMPANY) (NAME)

duly elected _____ of said Company, and that the above VOTE has not been
(TITLE)

amended or rescinded and remains in full force and effect as of the date of this Contract.

_____ **CORPORATE SEAL**

INDEMNITY AGREEMENT

In consideration of the award of Contract No._____.

by the City of Quincy, hereinafter referred to as INDEMNITEE, to the CONTRACTOR/BIDDER:

_____.

hereinafter referred to as INDEMNITOR, and for other good and valuable consideration, said INDEMNITOR agrees to hold INDEMNITEE, City of Quincy, and its various department and employees harmless from any and all liability, loss or damage that INDEMNITEE may suffer as the result of claims, demands, costs, including attorneys fees, or judgement or other actions against it by reason of any and all work done by or on behalf of the INDEMNITOR in connection with the above-referenced contract.

INDEMNITOR,

_____.
By Duly Authorized Agent

Date:_____.

City of Quincy, Massachusetts

Thomas P. Koch, Mayor

Request for Qualifications
Designer Services

Bernazzani Elementary School

Proposals due December 5, 2014 @ 11:00 am
Late Proposals Shall be Rejected

Please Deliver Response/ Submission and Required Copies to:

Kathryn Hobin, Chief Procurement Officer
City of Quincy
Quincy City Hall
1305 Hancock Street
Quincy, MA 02169

The City of Quincy reserves the right to reject all responses/submissions

Request for Qualifications
Bernazzani Elementary School
701 Furnace Brook Parkway
Quincy, Massachusetts

A. Introduction

Issued in accordance with Massachusetts General Law chapter 7C sections 44-57, this Request for Qualifications (RFQ) sets forth the procedures and requirements to be employed by the City of Quincy ("City") in the selection of Mechanical, Electrical and Plumbing (MEP) design consultant ("Consultant") to prepare plans and documents to assist in the planning for mechanical system updates at the Bernazzani Elementary School. Work will include the design and engineering services needed to complete design specifications pertaining to such updates, support the selection of the construction contractor by the City, provide construction oversight, and collaborating with an independent commissioning agent to be secured by the City to ensure that the project, as built, conforms with the design. The construction work procurement will require filed sub-bids.

All proposed work shall transition recommendations from a report issued by Norian/Siani Engineering, Inc on October 14, 2014.

Activities will commence upon selection of a Consultant and issuance of a notice to proceed.

The selected Consultant shall have ten weeks from execution of a contract for services to complete the required Construction Documents in full. The City's intention is to select its construction contractor and complete all construction activity, including closeout and full commissioning by the end of September 2015.

Consultants must provide a fee proposal for the work described herein and complete the Fee Proposal Form, Attachment B. The cost of services, including fees and expenses, shall not exceed $100,000.

The Chief Procurement Officer shall appoint a Committee who will evaluate all timely proposals. The Committee shall make a recommendation for award of a contract to the Chief Procurement Officer.

A non-mandatory briefing session and site walk shall be held on November 24, 2014 at 3:00 p.m. at the Bernazzani Elementary School located at 701 Furnace Brook Parkway.

All questions regarding this Request for Qualifications should be directed in writing to Kathryn Hobin, Chief Procurement Officer via facsimile to 617-376-1074 and/or email to khobin@quincyma.gov with a copy to kimtrillcott@quincyma.gov Questions will be accepted until November 28, 2014 @ 4:00 p.m.

The City of Quincy reserves the right to rejects all responses/ submissions/proposals.

Throughout this document, the terms "Request for Qualifications" and "Request for Designer Services" may be used interchangeably. For the purposes of this document and the submissions in response hereto, the terms shall be deemed to be synonymous.

B. Project Area

The project area will include the Bernazzani Elementary School main mechanical and electrical areas, piping distribution corridors, mechanical end-devices in classrooms and other areas to the extent needed, and the building management system. The project includes conversion of the heating fuel from oil to natural gas and from a steam based system to hot water. The school is located at 701 Furnace Brook Parkway, Quincy, Massachusetts.

C. Project Objectives

See **Attachment A** hereto for Scope of Services

The Bernazzani Elementary School was constructed in two parts. The original building, constructed in 1955, is single story, includes administrative offices, classrooms, small auditorium, and has 27,000 square feet of floor space. Attached to the southwest end of the building is a single story addition built in 1996 that provides a full gymnasium and four classrooms and provides another 8,120 square feet of floor space. The original steam heating and ventilating (H&V) systems dating to 1955 are still in place. Heating is fueled by oil. A newer gas-fired system heats the 1996 addition.

The proposed project is being driven by the following needs and opportunities, identified in the Norian/Siani study:

1. Conversion to natural gas from oil can save approximately 50% in energy cost and reduce carbon emissions by approximately 68 Tons/year.
2. The project will result in an approximately 17% increase in combustion efficiency because the new modern low temperature hot water system is inherently more efficient than the existing steam system.
3. The systems in the original building are beyond their expected lifespan and are having more frequent problems and incurring increasing maintenance and repair costs.
4. Maintaining two separate boiler plants (as is presently the case with the original building and the addition) is more costly, and both plants are less efficient than a modern system.

The City's objective through the project is to replace the original steam mechanical systems and update building controls as follows:

- Remove oil-fired boiler plant and ancillary equipment and replace with new high efficiency gas-fired hot water boilers (2), pumping systems and new distribution piping throughout the school.
- Remove steam-fired unit ventilators, H&V systems and radiators and replace with hydronic units.
- Employ direct digital control devices throughout the school with complete discontinuance of pneumatic end devices.
- All new equipment shall meet efficiency requirements to qualify for incentives being offered by National Grid. For example, condensing boilers, DDC controls with demand ventilation controls, variable speed drives on pumps and fan motors, PE and EC motors as applicable.
- The new mechanical and control systems will be thoroughly commissioning

Attachment A further details the objectives of the City in obtaining the services of the selected Consultant, which would enable the City to plan for the desired mechanical and controls updates of the building.

D. Qualifications of the Consultant

Four (4) copies of the submission in response to this Request for Qualifications including the Fee Proposal Form, Attachment B, must be furnished to the City of Quincy Chief Procurement Officer, Kathryn Hobin for review by the selection committee to be appointed by her. The submission in response to this Request for Qualifications shall be sealed in an envelope, which envelope is to be addressed to said Chief Procurement Office at the address detailed below.

1. The identity of the individual, partnership or corporation applying for contract award. If the applicant is a partnership or joint venture, the proposal should specify who will act as the lead consultant for purposes of assuming contractual responsibility. If the Consultant intends to sub-contract any work required in the scope of services, the sub-contractor must be identified.

2. A description of the Consultant's team by name, including the name of individuals to be assigned to this project who are employed by or contracted to any business entity on the team, with a summary of each individual's and entities' qualifications statement, including academic and professional work experience attesting to it's capacity to properly, professionally and fully perform the work detailed in this Request for Qualifications. Resumes are required for all project personnel. Include a description of the Consultant's team's experience as it relates to mechanical, electrical and controls upgrades for time-sensitive projects, and projects assuming occupied school and that will require minimal other renovation that would normally grant access to work areas.

3. A description of the Consultant's approach to this project: methodology, demonstrated understanding of the City's needs, and the Consultant's expectations of assistance and services from the City of Quincy.

4. Consultants must meet the following minimum criteria:

   a. Massachusetts professional mechanical and electrical engineering licenses
   b. Ten or more years experience designing mechanical and electrical installations
   c. Ten or more years designing direct digital control system installations

5. A client reference list, with names, addresses, and telephone numbers of clients for whom the Consultant has performed similar HVAC updates in school properties.

6. Any other information deemed relevant to the project, and which the Consultant believes will further the competitiveness of the submission, including work samples from similar completed projects.

7. Completed Fee Proposal Form, Attachment B.

8. Evidence of the required insurances.

9. All information pertaining to the Consultant so as to allow the selection committee to review the submission using the Selection Criteria set forth in Section F hereof.

Any submission that fails to include all of the above information will be rejected as unresponsive, and will not be afforded a complete review by the evaluation committee.

E. Selection Criteria

The selection process will include an evaluation procedure based on the criteria identified below. Finalists may be required to appear for an interview.

- Training/educational background appropriate to the project as described in the Request for

Qualifications of all project personnel, including professional experience above and beyond the minimum qualifications.

- Depth of experience with similar time and access sensitive school projects.
- Identity and qualifications of all project personnel.
- Strength and credibility of client references.
- Demonstrated understanding of the tasks to be performed and deliverables to be created.
- Demonstrated familiarity with buildings of similar construction, period and function.
- Completeness of submission.
- Current workload and ability to undertake the contract based upon the number and scope of projects for which the Consultant is currently under contract.
- Geographical proximity of the Consultant to the project site or willingness of the Consultant to make site visits.
- Familiarity with the building and/or area.
- Desirability of approach to project.
- Excellence of communication skills.
- Willingness and availability to participate in community outreach as determined to be necessary by the City.
- Familiarity with National Grid energy efficiency incentive programs
- Interview, if conducted
- Additional criteria that the selection committee considers relevant to the project.

F. Comparative Evaluation Criteria

Comparative Evaluation Criteria will be applied uniformly to all proposals. Each criterion shall be rated as follows:

1) "**Unacceptable**" 0 points - submission does not address the elements of this criterion

2) "**Not Advantageous**" 1 point - submission does not fully meet the evaluation criterion or leaves a question or issue not fully addressed

3) "**Advantageous**" 2 points - submission meets evaluation standard for the criterion

4) "**Highly Advantageous**" 3 points - submission excels on the specific criterion,

to include:

1: Training/Educational Background

Training/educational background appropriate to the project as described in the Request for Qualifications of all project personnel, including professional experience above and beyond the minimum qualifications

Points	Rating	Description
0	Unacceptable	The proposal indicates evidence of training or educational background in discipline necessary to complete this project of less than a bachelor degree.
1	Not Advantageous	The proposal indicates evidence of training or educational background in discipline necessary to complete this project of only a bachelor degree.
2	Advantageous	The proposal indicates evidence of training or educational background in a discipline necessary to complete this project of a bachelor degree and five or more years actual experience in one or more area of expertise in consulting necessary to complete this project.
3	Highly Advantageous	The proposal indicates evidence of training or educational background in a discipline necessary to complete this project of a master's degree in one or more area of expertise in consulting necessary to complete this project and five or more years actual experience.

2: Experience

Depth of experience with similar projects, and prior experience with other school mechanical system replacement projects of all project personnel, including professional experience above and beyond the minimum qualifications outlined in this RFQ.

Points	Rating	Description
0	Unacceptable	The proposal indicates no evidence of experience with similar projects.
1	Not Advantageous	The proposal indicates evidence of experience with similar projects of between one and eight years.
2	Advantageous	The proposal indicates evidence of experience with similar projects of between nine and fifteen years.

Points	Rating	Description
3	Highly Advantageous	The proposal indicates evidence of experience with similar projects of more than fifteen years.

3: References

Strength and credibility of client references.

Points	Rating	Description
0	Unacceptable	The proposal indicates no strong and credible client references with contact information.
1	Not Advantageous	The proposal indicates less than five strong and credible client references with contact information.
2	Advantageous	The proposal indicates six to ten strong and credible client references with contact information.
3	Highly Advantageous	The proposal indicates eleven or more strong and credible client references with contact information

4: Qualifications

Professional qualifications of the Consultant and all project personnel, including professional experience above and beyond the minimum qualifications outlined in the Request for Qualifications.

Points	Rating	Description
0	Unacceptable	The proposal fails to indicate a well-established firm/applicant, with proximity or availability of staff to complete work. The proposal provides no evidence that the firm/applicant is large enough and diverse enough to expedite all work within the City's schedule.
1	Not Advantageous	The proposal fails to provide either evidence of a well-established firm/applicant, with proximity or availability of staff to complete work. The proposal provides insufficient evidence that the firm/applicant is either large enough or diverse enough to expedite all work within the City's schedule.
2	Advantageous	The proposal provides a history of the firm/applicant, with proximity or availability of staff to complete work. The proposal provides adequate evidence that the firm/applicant is large enough and/or diverse enough to expedite all work within the City's schedule.

Points	Rating	Description
3	Highly Advantageous	The proposal provides a detailed history of the firm/applicant indicating a well-established firm/applicant, with proximity and availability of staff to complete work. The proposal provides evidence that the firm/applicant is both large enough and diverse enough to expedite all work within the City's schedule.

5: Understanding Scope of Work

Desirability of approach to project, and demonstrated understanding of mechanical and controls replacement services on time-sensitive projects, and projects assuming occupied school without other concurrent renovations that would otherwise allow for greater access to work areas.

Points	Rating	Description
0	Unacceptable	The proposal indicates inadequate review or understanding of the required Scope of Work.
1	Not Advantageous	The proposal indicates incomplete review or a vague understanding of the required Scope of Work.
2	Advantageous	The proposal indicates sufficient review and understanding of the required Scope of Work, and documents the firm/applicant's proposed approach.
3	Highly Advantageous	The proposal indicates a thorough review and full understanding of the required Scope of Work, and proposes a clear and comprehensive approach.

6: Quality of Past Work

Prior successful experience with municipalities providing consulting services for similar cities and towns. Quality of past consulting services as evidenced by sample submissions, lists of awards won for similar work.

Points	Rating	Description
0	Unacceptable	None of the sample submissions submitted by the firm/applicant are clear and complete and/or have relevance to the services being solicited under the RFQ.
1	Not Advantageous	One or two of the sample submissions submitted by the firm/applicant are unclear, incomplete, or have little relevance to the services being solicited under the RFQ.
2	Advantageous	All of the sample submissions submitted by the firm/applicant are written clearly and fully cover the relevant subject matter, having clear relevance to the services being solicited under the RFQ.

3	Highly Advantageous	All sample submissions are written clearly, fully cover the relevant subject matter, and also excel with respect to quality, graphics, formats, and/or writing style.

7: Communication and Presentation

Excellence of communication and graphic skills.

Points	Rating	Description
0	Unacceptable	The written and graphic response submitted by the firm/applicant is both unclear and incomplete.
1	Not Advantageous	The written and graphic response submitted by the firm/applicant is either unclear or incomplete.
2	Advantageous	The written and graphic response submitted by the firm/applicant is clear and complete, and fully covers the relevant subject matter.
3	Highly Advantageous	The written and graphic response submitted by the firm/applicant is clear and complete, fully covers the relevant subject matter, and excels with respect to graphics, formats, and/or writing style.

8: Familiarity with Area

Familiarity with the Bernazzani Elementary School and Ability to begin work on an immediate basis.

Points	Rating	Description
0	Unacceptable	The applicant has provided no evidence of familiarity with the area or for availability to begin work and/or ability to ensure project completion.
1	Not Advantageous	The applicant has indicated a vague familiarity with the area or incomplete timeline for availability and/or project completion.
2	Advantageous	The applicant has provided adequate evidence of familiarity with the area, immediate availability and a proposed timeline for project completion.
3	Highly Advantageous	The applicant has provided evidence of familiarity with the area and of immediate availability and has proposed a timeline for project completion, which is ambitious and timely in nature.

G. Project Fee

The City of Quincy has estimated the fee to be no more than $100,000 for the Scope of Services described herein. As such the fee detailed on the required Fee Proposal Form shall not exceed $100,000.

Submissions must include a completed Attachment B: Fee Proposal Form. Project fee must be provided for the work as described in the form. Fee shown shall include all costs and expenses (copying, mileage, photographs, etc.) to complete the scope of work defined in Attachment A and the entire Request for Qualifications.

The selection committee will select the most overall advantageous proposal.

H. Withdrawals

Respondents may only withdraw a submission when the request to do so is received in writing by the Chief Procurement Officer prior to the time and date of the proposed opening.

I. Waiver/Cure of Minor Informalities, Errors or Omissions

The City reserves the right to waive or permit the cure of minor informalities, errors or omissions prior to the selection of a Respondent, and to conduct discussions with any qualified Respondent and to take any measures with respect to this Request for Qualifications in any manner necessary to serve the best interest of the City.

J. Rejection of Submissions, Modification of Request for Qualifications

The City reserves the right to reject any and all responses if it determines, within its sole discretion, that it is in the City's best interest to do so. This Request for Qualifications does not commit the City to select any Respondent, award any contract, pay any costs in preparing a submission, or procure a contract for any services. The City also reserves the right to cancel or modify this Request for Qualifications in part or in its entirety, or to change the Request for Qualification guidelines. A Respondent may not alter the Request for Qualifications or its components.

K. Submissions

Submissions should be addressed to:

KATHRYN HOBIN, CHIEF PROCUREMENT OFFICER
CITY OF QUINCY
1305 Hancock Street, Quincy, MA 02169

The final date for submission of proposals is **11:00 a.m.** on **December 5, 2014**

All questions regarding this Request for Qualifications should be directed in writing to Kathryn Hobin, Chief Procurement Officer via facsimile to 617-376-1074 and/or email to khobin@quincyma.gov with a copy to kimtrillcott@quincyma.gov Questions will be accepted until November 28, 2014 @ 4:00 p.m.

If you have printed out this bid from the City of Quincy Website it is your responsibility to check for addenda (at www.quincyma.gov) before you turn in your proposal. The City of Quincy will not be responsible any bids received omitting addenda acknowledgement.

Request for Qualifications

Attachment A
Scope of Services and Additional Terms and Conditions

Bernazzani Elementary School
Furnace Brook Parkway ~ Quincy, Massachusetts

Engineering Design Services Scope of Work

The City of Quincy, acting through the Office of the Mayor and its Public Buildings Department, desires to replace the mechanical system at the Bernazzani Elementary School. This request for qualifications seeks responses from those individuals or firms qualified and competent to provide the design and engineering services needed to develop a replacement program as outlined herein and in the attached Norian/Siani Engineering, Inc. report. The selected Consultant shall prepare such design submittals as are necessary or desirable for the City to plan for, finalize the design of, and fund the proposed work.

The attached Norian/Siani reported dated October 14, 2014 outlines two mechanical replacement paths for the Bernazzani Elementary School. The option that is of interest to the City is "System-1: Unit Ventilators". This project includes replacement of the boiler plant, piping system, H&V units and classroom UVs to be replaced with new hydronic units with direct digital controls. The project descriptions and equipment selections in the report are conceptual and will require appropriate engineering services and analysis to verify and expand upon information contained therein, including but not limited to the following:

- It shall be incumbent upon the Consultant to verify that all necessary components have been adequately addressed, the proposed system design is compliant with all applicable State and local codes and that necessary components and/or subsystems have not been omitted from the Norian/Siani report.
- The Consultant shall make site visits to the work site to identify existing conditions that may impact the work for Installations, rigging clearances, maintenance access, etc.
- Engineering analyses shall include, but not be limited to, calculating heating loads for zones within the school as currently configured and/or taking into consideration any future renovation plans the City may have in order to support the sizing of the system components including, but not limited to, the boilers, distribution piping, pumps and air handling systems. Consultant shall submit calculations for review.
- The Consultant shall coordinate planning for and check installation of new gas piping by the utility.
- The Consultant shall verify that the existing electrical system is adequate for any increase in load that may result from the installation and shall specify all electrical modification / updates needed for the school's project.
- The Consultant shall verify condition and functional capability of any existing control components that will remain in service as part of the HVAC renovation.
- The Consultant shall prepare an itemized estimate of the project construction cost, including all labor and materials and covering all phases and elements of the project.
- The Consultant shall prepare full bid documents including plans and specifications sufficient to provide bidders all necessary information for a complete and informed bid. The construction bid documents shall be prepared with the understanding that construction will be procured with filed sub-bids. The Consultant will work with the City's Purchasing Agent to insure that all legal requirements are met and that all applicable bid laws are met.

- The Consultant shall provide all services required to accomplish the solicitation of bids including printing, and delivering of bid documents to Purchasing Department at Quincy for distribution to potential bidders.
- The Consultant shall be present at the pre-bid meeting and walk-throughs and bid openings if deemed necessary. After the Purchasing Agent officially opens the bids and reviews all submissions for their eligibility, responsiveness and responsibility, the Consultant will check bidders' references as set forth on the Eligibility and Update Statements, and will submit substantiating paperwork for record. The Consultant will receive a copy of the official bid tally sheet from the Purchasing agent and will be required to provide a detailed spreadsheet incorporating tally sheet information and all additional information gathered on the bidders to City for review along with recommendation. Original Bids are to remain with the purchasing agent.

The engineering design documents (mechanical and electrical) shall be stamped by Massachusetts professional engineer(s) and shall include, but not be limited to the following:

Mechanical

- Boiler room demolition and construction plans including P&ID diagram.
- Boiler room venting plans, elevations, details showing gas train, penetrations, combustion make-up air systems.
- Piping riser diagram
- Floor plans showing demolition of piping, H&V and UVs
- Floor plans for new equipment installations including piping, H&Vs, UVs, ductwork, radiation, etc. Drawings shall include piping arrangement details for H&V and UVs.
- Detail for UV installation showing any required interior/exterior building modifications required to fit new equipment, including notes on finish details
- Equipment schedules.
- Mechanical specifications
- Cut sheets for all new mechanical equipment

Electrical

- Boiler room demolition and construction plans
- Floor and roof plans showing demolition and construction of new equipment
- Update or creation of new building one-line diagram
- Electrical specifications
- Cut sheets for all new electrical equipment

Controls

- Communication riser diagram
- Wiring diagrams for each controller / major equipment
- Sequence of operations
- Points list for each device
- Electrical specifications
- Cut sheets for all new electrical equipment

The Consultant shall provide design and construction affidavits as required as well as plan to attend relevant progress meetings. The Consultant shall also provide construction review site visits and reports during construction and commissioning. Consultant shall assist in the preparation of a punch list of items that need to be completed or corrected prior to final completion of the construction.

The Consultant shall, at no additional charge, correct errors and omissions and clarify ambiguities that may become evident following delivery of the construction documents. The City intends to engage an independent owner's agent to review and critique design submittals prior to acceptance. The City also intends to engage an independent commissioning agent with whom the Consultant shall coordinate planning and execution of commissioning tasks.

Consultant shall prepare record drawings of the work installed. Record drawings shall be prepared from contractors marked up drawings and construction / post construction visits.

Deliverables:

Deliverables shall be completed and submitted at the following intervals:

- Progress Construction Documents (50% Complete Submittal), including cost estimates and heating load calculations
- Progress Construction Documents (95% Complete Submittal Subject to Final Review by Owner), including updated construction cost estimate
- Construction documents (100% Complete Submittal Ready for Construction) – signed and stamped by Massachusetts Registered Professional Engineer(s), as appropriate.
- As-Built documents (revisions to the 100% submission for completed construction details/revisions)

Request for Qualifications

Attachment B
Fee Proposal Form

Bernazzani Elementary School
701 Furnace Brook Parkway ~ Quincy, Massachusetts

The undersigned hereby submits a price proposal to perform the services outlined in this Request for Qualifications issued by the City of Quincy pertaining to design and engineering services needed to complete a mechanical and controls upgrade of the Bernazzani Elementary School as more fully described in this Request for Qualifications.

Total fee proposal, including professional fees and expenses shall not exceed $100,000. The City of Quincy reserves the right to negotiate the fee of the selected Consultant not to exceed $100,000.

Contract term will commence upon selection of a Consultant and execution of a contract for services.

The selected Consultant shall have ten weeks from execution of a contract for services to complete the required Construction Documents in full as follows:

- Submit 50% design drawings and backup calculations: 5 weeks
- City review period: 1 week
- Submit 95% design drawings and specifications: 2 weeks
- City review period: 1 week
- Submit 100% Construction Documents: 1 week

The Consultant hereby pledges to deliver the complete scope of services detailed in the Request for Qualification, for the rates and charges shown below:

Estimated hours and cost to complete the work herein:

Activity	**Person-Hours**	**Fee**
Design Services		
Bid and Contractor Selection Support		
Construction Oversight		
Commissioning Support		
Progress Meetings		
Project Management		
Expenses		
Total		

The parties may later agree to expand the Scope of Services to be provided by the Consultant upon completion of the Scope as herein outlined. Any additions or extensions of the contract will be the subject of future monetary negotiations based on the pricing listed below.

PROFESSIONAL SERVICES, Hourly Rates:

1._____
Project Manager

2._____
Licensed Consultant

3._____
Project Consultant

4._____
Administrative

CONSULTANT INFORMATION

Company Name: _____ Contact Name: _____

Street Address: _____ Signature: _____

City/State/Zip: _____ Title: _____

Telephone: _____ Fax: _____ Date: _____

E-Mail Address: _____

Bidder acknowledges receipt of _____ Addendum (a).

_____
(Signature)

CONTRACT FOR PROFESSIONAL SERVICES

THIS CONTRACT made this _____ day of _____, 2014, by and between the City of Quincy, hereinafter called the "City" and _____, doing business as _____(entity type) located at _____, hereinafter called the "Consultant".

WITNESSETH, that the City and the Consultant, for consideration hereinafter stated, agree as follows:

ARTICLE 1 – THE CONTRACT SUM

The City shall pay the Consultant in current funds for the performance of the work the contract sum not to exceed _____ according to the payment terms detailed in the City's Request for Proposals attached hereto and incorporated by reference herein.

ARTICLE 2 – SCOPE OF WORK

The Consultant shall perform all the work specified in the City's Request for Qualifications relative to the mechanical system upgrades of the Bernazzani Elementary School and in the Consultant's proposal dated _____, each of which are attached hereto and by this reference incorporated herein.

ARTICLE 3 – TIME OF PERFORMANCE

The Consultant shall commence work under this CONTRACT upon formal acceptance of the contract by the City. All services shall be performed within ten weeks of the formal acceptance of this contract.

ARTICLE 4 – CONTRACT AMENDMENTS

All amendments, change orders or any changes to the provisions specified in this contract can only occur when mutually agreed upon by the City and the Consultant. Further, such amendments, change orders or changes shall be in writing and signed by officials with authority to bind the awarding authority. Additionally, all amendments, change orders and changes shall be approved by the Chief Financial Officer prior to execution by the awarding authority. No amendment, change order or change to the contract provisions shall be made until after the written execution of the amendment, change order or change to the contract by both parties. All amendments, change orders and changes to the contract shall be in accordance with M.G.L. Chapter 30B, Section 13, M.G.L. Chapter 7, § 38A ½ O, and all other Massachusetts Laws and City Ordinances.

ARTICLE 5 – INSURANCE REQUIREMENTS

The Consultant hereby agrees to indemnify and save harmless, the City, its officers, agents and employees, from and against any and all claims arising out of the negligent acts, errors or omissions, property damage, and bodily injury of the Consultant.

The consultant will, at its own expense, maintain and keep in force all insurance required by law for its employees; including Disability, Worker's Compensation, Unemployment, and public liability insurance, at least as herein after set forth so as to protect it and the municipality from claims for personal injury and property damage for the duration of the project.

A comprehensive general liability insurance policy with the following limits of coverage: Bodily Injury, One Million Dollars ($1,000,000.00) each occurrence, Property Damage, Five Hundred Thousand Dollars ($500,000.00) each occurrence and One Million Dollars ($1,000,000.00) aggregate of all claims per occurrence, naming City of Quincy additionally insured.

The insurance shall be issued by an insurer who is licensed and authorized to do business in the Commonwealth of Massachusetts.

The Consultant shall maintain insurance satisfactory to the municipality covering any and all property damage, or bodily harm which may be suffered by reason of neglect of the consultant, its employees or agents during the execution of the project.

ARTICLE 6 – PAYMENT TERMS

The City agrees to pay the consultant upon satisfactory completion according to the payment terms detailed in the City's Request for Qualifications.

ARTICLE 7 – CONTRACT DOCUMENTS

The following, together with this document form the CONTRACT and all are as fully a part of this contract as if physically attached to the contract or repeated herein.

1. This Contract;
2. Amendments, change orders or other changes mutually agreed upon as above;
3. The City's Request for Qualifications;
4. The Consultant's submission in response to the Request for Qualifications;
5. All required certifications;
6. Certificate of corporate vote, if applicable;

ARTICLE 8 – CONTRACT TERMINATION

The City may suspend or terminate this contract by providing the Consultant with ten (10) days written notice for reasons outlined as follows:

1. Failure of the Consultant, for any reason, to fulfill in a timely and proper manner its obligations under this contract.
2. Violation of any of the provisions of the contract by the Consultant.
3. A determination by the City that the Consultant has engaged in fraud, waste, mismanagement, misuse of the funds, or criminal activity with any funds provided by the Contract.

ARTICLE 9 – INDEMNIFICATION

The Consultant shall comply with the requirements of all applicable laws, rules and regulations in connection with the services of the Consultant, and shall exonerate, indemnify and hold harmless the City's officers, agents, and all employees from said requirements and local taxes and contributions imposed or required under the Social Security, Worker's Compensation and Income Tax Laws. Further, the Consultant shall exonerate, indemnify and hold harmless the City with respect to any claim , damages, expenses, or attorney's fees arising from or in connection with the Consultant's negligent performance of the work performed under this contract. This shall not be construed as a limitation of the Consultant's liability under the contract or as otherwise provided by law.

ARTICLE 10 – APPLICABLE LAWS, REGULATIONS

The Consultant agrees to comply with other applicable laws, regulations or ordinances affecting the successful completion of this contract. Such laws, regulations, or ordinances included by are not limited to: Prevailing Wage laws, if applicable, Responsible Employer law or Ordinance and Non-discrimination laws.

The Consultant shall comply with all applicable laws, ordinances, rules, regulations, and orders pertaining to the protection of work, property, persons and employees.

ARTICLE 11 – ASSIGNMENT SUBJECT TO APPROVAL

No rights or liabilities under the contract shall be assigned or subcontracted without the express written approval of the City.

ARTICLE 12 – TAX COMPLIANCE
The Seller certifies under penalties of perjury that it has filed all state sales tax returns, paid all state taxes and is otherwise in compliance with the laws of the Commonwealth of Massachusetts relating to taxes.

ARTICLE 13 – NON-COLLUSION CERTIFICATION
The Seller certifies under penalties of perjury that this proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the work "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

ARTICLE 14 – SEVERABILITY
If any term or provision of this contract or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of the contract, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable shall not be affected thereby and each term and provision of this contract shall be valid and enforced to the fullest extend permitted by law.

ARTICLE 15 – ENTIRE AGREEMENT
This contract represents the entire agreement of the City and the Consultant with respect to the services as defined in the Request for Qualifications and the Consultant's submission and supersedes any prior agreements, understandings and representations, whether written or oral.

IN WITNESS WHEREOF, the parties hereto have caused this contract to be executed in quintuplicate (5) original copies on the day and year first above written.

FOR THE CITY OF QUINCY

By: _____
Thomas P. Koch, Mayor

_____
Gary Cunniff, Department Head

APPROVED AS TO FORM:

_____
James S. Timmins, City Solicitor

_____
Kathryn R. Hobin, CPO

Certification is herewith given that funds are available for the payments required by the terms of this CONTRACT.

_____
Mark Cavanagh, Director Municipal Finance

The foregoing draft contract is included for illustrative purposes and should not be deemed to be the final draft.

NORIAN / SIANI ENGINEERING, INC.
43 Bradford Street, Concord, MA 01742 • Tel: 781-398-2250

October 14, 2014

Shelly Dein, Energy and Sustainability Director
City of Quincy
Public Buildings Department
58 Saville Avenue
Quincy, MA 02169

RE: BERNAZZANI ELEMENTARY SCHOOL; QUINCY, MA
HEATING AND VENTILATING SYSTEM REPLACEMENT &
GAS CONVERSION STUDY

Dear Shelly,

Thank you for your and Dave's help plus helpful guided tour and stream of information. There are challenges and opportunities ahead. Given the long term nature of the school our recommendations primarily follow the logic of lowest life cycle cost over 20+ years. We expect the school to still be serving the community as it does now and benefit from lowest costs over the very long term. The building is clearly well maintained and the new windows have made a big difference in providing comfort and energy efficiency.

The Bernazzani Elementary School has been constructed in two parts. The original building was constructed in 1955, is single story, includes administrative offices, classrooms, small auditorium and has 27,000 SqFt of floor space. Attached to the southwest end of the building is a single story addition built in 1996 that provides a full gymnasium and four classrooms and provides another 8,120 SqFt of floor space. The original steam heating and ventilating (H&V) systems are still in place in the original building and need replacement.

EXECUTIVE SUMMARY

Quincy Schools clearly understands the need to update the building heating and ventilating system for the following set of primary reasons:

1. Conversion to gas from oil for the original building will save approximately 50% in energy cost; see attached spread sheet titled: Operating Cost and Emissions Comparison.
2. It will also reduce carbon emissions from the school by approximately 68 Tons/year; see attached spread sheet titled: Operating Cost and Emissions Comparison.
3. Steam systems are inherently less efficient than modern low temperature hot water systems; roughly 17% increase in combustion efficiency.
4. The systems in the original building are and past expected lifespan and are therefore incurring more frequent problems and related costs.
5. Maintaining two separate boiler plants (as is currently the case) is more costly and both boiler plants are less efficient than a modern system.

Two system approaches were examined. Both system approaches remove the existing steam system in its entirety and replace it with a new gas fired boiler system plus forced hot water piping system. The new hot water system would be tied into the small existing forced hot water system currently serving the Gym addition making a single integrated system. The costs also include joining the control systems into a single system with web access.

The following table displays estimated installed cost for the two systems under consideration, fuel costs for the existing and proposed systems assuming today's oil and gas costs and the last column in the table displays fuel cost savings. See attached spread sheets for most of the analytical information used to prepare this report.

SYSTEM	INSTALLED COST ($)	SYSTEM FUEL COST ($/Year)	SYSTEM FUEL COST **SAVINGS** ($/Year)
Existing system	N/A	$52,586/Year	N/A
System-1: Unit Ventilators	$1,173,500	$27,044/Year	$25,542/Year
System-2: Roof Mount ERV's	$1,468,200	$23,701/Year	$28,885/Year

System-2: Roof mounted ERV's, is a much more costly approach than System-1: Replace Unit Ventilators. The additional annual savings of only approximately $3,300 does not justify the large additional construction cost.

We recommend using System Option-1.

SYSTEM OPTIONS

Quincy personnel have requested and we recommend the replacement heating system approach outlined below. With regard to the ventilation system two approaches are appropriate to consider. This report examines the costs and benefit for these two ventilation system approaches and assumes that the heating system design is similar in both of these 'system' options. After describing the common heating system approach below we define the two different ventilation systems and then the recommendation for H&V system controls.

Recommended Heating System

The system described below is the same for both Sytem-1 and System-2. All new systems should be specified to meet or exceed stretch code requirements.

An increased natural gas service must be installed and the outside buried oil tank must be removed. The new gas service will include a new meter and be piped from the meter into the existing boiler room.

The recommended heating system approach is to use two (or possibly three) condensing mode gas fired boilers to replace the heating now provided by the existing pair of steam boilers plus the four gas fired boilers in the Gym addition. The new boilers would be located within the existing steam boiler room after demo and removal of the existing equipment and piping in the boiler room. Prior to any demo, asbestos abatement will be required as there appears to be asbestos pipe insulation and likely further asbestos in the cast iron sectional steam boilers.

The existing steam boilers have output capacity of roughly 2,500,000 BTU/Hr each or 5 million BTU/Hr total, which is essentially twice what is required by the existing condition. The System-1 approach would require new boiler plant output capacity of roughly 2,750,000 BTU/Hr in total for both boilers. This is approximately 120% of required worst case ("design load") heating needs for the sum of thermal envelope heat loss and heat required to warm the required outside air supply. Note that this added 20% is on top of the 20% safety factor we use on the initial calculated design loads; see attached spread sheet titled: Heat Loss.

This sizing strategy provides sufficient boiler plant output to keep the building from freezing on the worst day with only one boiler running. At roughly 36 degrees F outdoor temperature the building could be maintained at 70 degrees F.

The System-2 approach that uses an energy recovery ventilator (ERV), would require smaller output capacity of roughly 2,200,000 BTU/Hr in total for both boilers.

All existing steam and condensate piping serving the original building that is exposed to view would be removed and concealed piping would be abandoned in place. All classroom unit ventilators, steam coils in the air handlers serving the media area, and steam convectors would also be demolished.

The new boiler system will take up far less room than the existing boilers and equipment. In fact, if desired the new boiler pant can fit within the existing newer and smaller boiler room located in the gym addition. However this would require additional gas piping and related cost compared to using the existing steam system boiler room.

A new forced hot water (Hydronic) piping system would be installed to serve both the original building and the gym addition. Piping would connect the new boiler room to the small boiler room in the Gym addition. The same central hydronic piping system would also serve all new system heating terminal units in all areas and provide heating for the ventilation systems.

System-1: Unit Ventilators (UV's)

Replace existing steam unit ventilators (UV's) in the original building with new hydronic UV's. The unit ventilators provide both heating and fresh air ventilation to the classrooms. The four classrooms in the addition also use unit ventilators but of the modern type and are controlled using digital temperature and ventilation controls. Ventilation air is controlled using real time sensing of the CO2 levels in the classroom. When the set point limit (likely 800-900 ppm) is exceeded the UV begins to open its outside air damper and modulates the position to achieve appropriate indoor air quality. Digital thermostat control of temperature is also provided. This approach is very energy conserving and we do recommend it for the new UV's that would be specified. The new UV's would be piped to the new hydronic heating piping system. The UV's in the Gym addition classrooms would remain in place. The air handling units (AHU's) now in place serving the gym are in good condition and are properly controlled. The AHU's serving the

auditorium space are original from 1955 and can be replaced with new AHU's that have hydronic heating coils and all new dampers and controls.

System-2: Roof Mount ERV's

With this ventilation approach a pair of Energy Recovery Ventilators (ERV's) would be mounted on the roof and serve the classrooms through a set of ducts mounted both externally on the roof and within the building. This approach is much more difficult and costly to install than using the UV approach in System-1. However, it does offer greater energy efficiency for the fact that the ERV's do transfer (recover) roughly 60% of the heating energy in the exhaust air stream as it leaves the building transferring it to the incoming fresh outside air; (eg: when its 6 degrees F outside using an ERV results in warming the incoming fresh air up to 48 degrees F without requiring any additional energy consumption). Using a hydronic heating coil the design would then warm the incoming fresh air up to 70 degrees (adjustable) so that the fresh air supply entering each room poses no additional heating requirement for the heating terminal units installed in the room to provide basic space heating to make up for heat lost through the thermal envelope (walls, windows and roof).

This more energy efficient system for providing ventilation to the spaces takes the place of the outside air connections and damper controls that would be part of the UV's identified in the System-1 approach above. For System-2, instead of replacing the UV's with similar modern units, the old UV's would be removed and in their place we recommend simple cabinet fan coils. The units include a sheet metal enclosure that is significantly smaller than the existing UV's. Within the cabinet are a fan, a hydronic heating coil and a control valve that let's hot water flow through the coil or not depending upon call for heat.

With the existing UV's removed the existing hole in the exterior wall now used for outside air connection would be blanked off and insulated. It is likely that as a matter of architectural aesthetics and practicality additional cabinetry that matches the existing would be installed to take up the space left when the old large UV's are removed and the new smaller cabinet fan coils are installed.

The ERV's, mounted to the roof each have two fan & motor pairs. One for moving incoming outside air into the building and one for moving an equal amount of exhaust air out of the building. Both supply and exhaust ducts would likely run through the open web joists within the classrooms and diffusers and grilles in the ducts would supply the fresh air to the classroom and exhaust stale air. Proper design and location of these ducts, diffusers and grilles is required to obtain the best indoor air quality (IAQ) benefit from the ventilation system.

The use of externally mounted and heavily insulated ducts on the roof is a requirement caused by the difficult reality of the existing architecture which was not designed with enough interior space for a set of ducts to run from beneath a roof mounted ERV unit and down the hallway ceilings as would be done in a new construction project that uses this strategy. Unfortunately this not only costs a good deal more but the added heat loss of the exterior ducts reduces the energy savings.

Controls

Again with concurrence from Quincy personnel, we recommend the use of a new Direct Digital Control (DDC) system to provide control of all H&V systems. Sometimes called a Building Automation System (BAS) or an Energy Management System (EMS) this approach uses a web connected computer approach to providing robust H&V control. The DDC provides refined and

flexible temperature, ventilation and schedule control which can be used over time to optimize settings to provide comfort and reduces energy consumption. All new thermostats, fan motor controls and more would be controlled by a single integrated DDC system.

The gym addition H& V systems use a Honeywell XL-10 control system that is similar to the more modern DDC system recommended but now outdated. The new DDC system would be able to incorporate some of the existing controls in the Gym addition but many controls would have to be replaced. Existing wiring can be reused. Including this work is required provide a single integrated DDC system for all school HVAC.

DESIGN DETAILS

Piping

Piping for the new hydronic system can be steel, copper or Aquatherm rigid plastic piping with fusion welded joints.

New stretch code level pipe insulation would be included and we urge that all pipe hangers be sized to go around the insulation and not contact the piping directly in order to reduce conductive heat loss. We also recommend that valves, air separator, pump bodies and other system elements be thoroughly insulated.

Pumping

A variable speed pumping strategy should be used so as to conserve on electrical pumping costs. Variable speed pumps should be specified along with modulating 2-way hydronic valves that will provide better temperature control. As the valves at each unit ventilator or air handler modulate, the variable speed pump will speed up or slow down to accommodate the changing flow rate requirements.

Air Handling Units

The Gym air handling units (AHU's) are close to 20 years old and require a thorough cleaning including the coils. Dampers, actuators, and controls need service and we assume replacement of some components will be needed. The original building AHU's serving the Media and stage area can be replaced or rebuilt. A thorough duct cleaning is required for either approach. For a rebuild a new hydronic coil is required for replacement of the existing steam coil, all actuators and the blower motors should be replaced, and some additional components will no doubt be needed. Cost for a rebuild is likely lower than newer units and the existing units are built of heavier gauge materials. Closer inspection is required to decide which option to go with.

Unit Ventilators

New unit ventilators will replace the existing UV's in the older building. They need to be selected based on best geometric fit and an acceptable quality standard. Further investigation is needed during design to make this important decision. Energy efficient fan motors will payback well within lifespan. Controls must be able to provide full DDC control of all functions including CO2 classroom monitoring and OA control.

Glycol Antifreeze

The existing forced hot water system serving the Gym addition uses glycol antifreeze to protect the circulating water from freezing in the case of outside air leaking through the outside air

dampers and coming in contact with the hydronic coils in AHU's and/or UV's. The new system should similarly use anti-freeze for freeze protection. The two options include A) Glycol for the entire hydronic system, and B) Two heat exchangers that would transfer heat from boiler system water to the glycol loops, one to serve the entire Gym wing and one to serve the AHU's in the Media area.

Radiation
Steam convectors and radiators currently are in place to provide small amounts of heat in areas such as offices, entries, and hallways. These steam heated units should be removed and new hydronic radiators or convectors put in their place.

Air Filtration
Attention to specifying good filters for UV's and AHU's will help improve and maintain better indoor air quality.

Air Conditioning
At the time of specifying the replacement H&V system consideration can be given to adding A/C to specific areas if desired.

Fan Motors
For new UV's, ERV's, cabinet fan coils, and AHU's the fan motors should be specified to be as efficient as possible. New ECM motors will help reduce power costs for moving air.

Electrical
The new H&V system work will require power for new equipment and for all but the ERV's existing power circuits are likely adequate.

RECOMMENDATION

We recommend implementation of System-1: Replace Unit Ventilators.

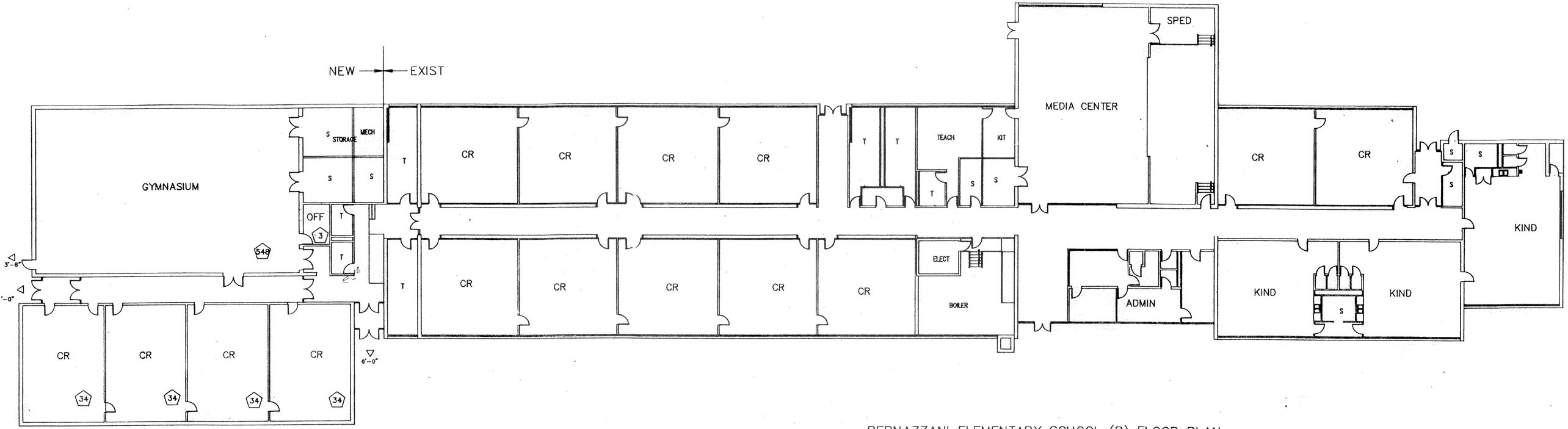
System-2: Roof mounted ERV's, is a much more costly approach than System-1: Replace Unit Ventilators. The additional annual savings of only approximately $3,300 does not justify the large additional construction cost.

Please contact me if you have any questions.

Sincerely,
for Norian/Siani Engineering, Inc.

Sergio Siani

Sergio Siani
SFS/klk



BERNAZZANI ELEMENTARY SCHOOL (B) FLOOR PLAN

ADDITION TOTAL OCCUPANCY = 687
EGGRESS REQUIRED (OCC X 0.15") = 103" or 8'-7"
EGGRESS PROVIDED =15'-6"

NORIAN/SIANI ENGINEERING, INC
43 Bradford Street, 3rd Floor, Concord, MA 01742-2972 Tel: (781) 398-2250, Fax: (781) 398-2280

Project: **Bernazanni Elementary School**
Date: **9/26/2014**

Operating Cost and Emissions Comparison

System Type	Fuel Cost: Fuel	BTU / Unit	$/UNIT	System Efficiency [5]	Total BTU/Yr Required	Fuel units Required	Cost $/Year	% Difference	Emissions [4]: CO2 [1] lbs	SO2 [2] lbs	NOx [3] lbs	GWP [8] lbs
EXISTING CONDITION - Steam Boiler on Older Building Section, Gas Fired Boiler for newer addition												
Standard Efficiency Oil Fired, Steam	Oil, No. 2	138,700 / gal	$3.28	75%	1,418,224,147	13,633	$44,717.86	-	293,120	1,935.956	245	293,322
Standard Efficiency Gas Forced Hot Water (FHW)	Natural Gas	100,000 / therm	$1.43	78%	429,173,931	5,502	$7,868.19	-	64,420	0.330	83	67,938
				Total BTU =	1,847,398,078	Total Cost =	$52,586.05	0.0%	357,540	1,936	328	361,260
System Approach I - Replace Unit Ventilators, New Hydronic System - Base Bid (RECOMMENDED)												
High Efficiency Gas Forced Hot Water (FHW) Boiler	Natural Gas	100,000 / therm	$1.43	92% [9]	1,739,878,078 [9]	18,912	$27,043.76	-48.6%	221,418	1.135	284	233,510
							$25,542.29					
System Approach II - ERV Makeup Air & Hydronic Convectors												
High Efficiency Gas Forced Hot Water (FHW) Boiler	Natural Gas	100,000 / therm	$1.43	92%	1,296,112,366	14,088	$20,146.09	-	164,944	0.845	211	173,952
Roof Top Unit ERV, Hydronic Reheat	Natural Gas	100,000 / therm	$1.43	92%	228,725,712	2,486	$3,555.19	-	29,108	0.149	37	30,697
				Total BTU =	1,524,838,078 [10]	Total Cost =	$23,701.29	-54.9%	194,052	0.994	249	204,649
							$28,884.76					

Ventilation Requirements:

Assume140 Days of Occupancy durring heating season, building occupied from 8AM - 4PM (8 Hrs per day), with average OA Temp of 20 degF and indoor air temp of 72 degF. IMC 2009 requires 12,000 CFM of ventilation for the building.

Annual Ventilation BTUs = (140 Days Occupied)*(8 Hrs/Day)*(72 degF - 32 degF)*(12,000 CFM)*(1.085)

Annual Ventilation BTUs = 537,600,000 Btus

[1] **Carbon Dioxide (CO2)** is released when fossil fuels (e.g., Coal, Oil and Natural Gas) are burned. Carbon Dioxide, a greenhouse gas, is a major contributor to global warming.

[2] **Sulfur Dioxide (SO2)** is formed when fuels containing sulfur are burned, primarily coal and oil. Major health effects associated with SO2 include asthma, respiratory illness and aggravation of existing cardiovascular disease. SO2 combines with water and oxygen in the atmosphere to form acid rain, which raises the acid level of lakes and streams and accelerates the decay of buildings and monuments.

[3] **Nitrogen Oxides (NOx)** form when fossil fuels are burned at high temperatures. They contribute to acid rain and ground-level ozone (smog), and may cause respiratory illness in children with frequent high level exposure. NOx also contribute to oxygen deprivation of lakes and coastal waters which is destructive to fish and other animal life.

[4] **Emissions** are estimated using Emissions Factors and Energy Prices, April 2004 by Leonardo Academy, Inc.. See: www.cleanerandgreener.org

[5] **System efficiency** is a critical factor in comparing fuel costs. Efficiencies shown above are seasonal not steady state.

[6] **Air Source Heat Pumps** in Boston achieve lower than manufacturer's ratings. This value is based on HSPF corrected for weather in Boston, MA.

[7] **Ground water source heat pump efficiency** is expressed in COP. A SEER of 19 = a COP of 5.57 or a listed System Efficiency of 557% .

[8] **Global Warming Potential (GWP)** is a measure of how much a mass of each specific gas contributes to global warming. This scale is based on CO2 which has a GWP of 1.0. N2O has a GWP of 296, meaning that

[9] Includes added 20% energy savings due to the use of Demand Limit Ventilation Control with the Unit Ventilator units.

[10] Includes added ERV efficiency of 60% for the make-up air portion of the building load calculations and enables reduction in heating required.

Date: 9/26/2014
Job: Bernazzani School, Quincy
Client: Quincy Schools

BERNAZZANI SCHOOL - DESIGN HEAT LOSS

		8" CMU with insul core & Brick =	3.30	R-Value
		2x6 with R-19, steel stud, No T-break & Brick =	12.70	R-Value
		8" CMU & Brick =	2.45	R-Value
		Window Panel =	4.35	R-Value
Above Grade DsgnDelta =	66 Deg			
Infilt =	0.4 ACH	Glass R Value =	2.78	R-Value
Slab Loss =	15% of shell UA	Roof R Value =	28.00	R-Value
Demand Limit Control Ventilation Heat Reduction =	20%			

Room	Sq.Ft. Fl.Area SqFt	Average Height Feet	Wall-1……. Net Area	R	Wall-2……. Net Area	R	Wall-3……. Net Area	R	Panel Net Area	R	Glass & Door-- Area	R	Roof---------- Area	R	Heat Loss - UA Shell	UA Slab Loss	Ventilation - - - - - - - - - - Infilt	Shell & Infil	CFM	BTUH	TOTAL BTUH	TOTAL BUTH PLUS 20%	Heat-loss w/ Safety BTUH Building PLUS 20%	BTUH Ventilation PLUS 20%
															BTU / Deg F. - Hr									
Original Building																IMC09 Ventilation Required =			8,615					
Classrooms West Wing	13,894	11.0	9061	3.3		12.7	4,367	2.5	60.0	4.3	1,113	2.8	13,894	28.0	5,438.9	815.8	1,100	7,355.1	4,182	238,459	723,899	868,679	582,527	286,151
Media +	6,064	12.0	4381	3.3		12.7	3,682	2.5	65.5	4.3	449	2.8	6,064	28.0	3,223.7	483.6	524	4,231.2	2,022	115,295	394,554	473,465	335,111	138,354
Classrooms East Wing	7,007	11.0	5225	3.3		12.7	2,791	2.5	84.5	4.3	636	2.8	7,007	28.0	3,221.3	483.2	555	4,259.4	2,411	137,507	418,628	502,353	337,345	165,008
	26,965		18,667		0		10,840		210		2,198		26,965						SUBTOTAL HEAT LOSS =		1,537,081	1,844,497	1,254,983	589,514
Gym Addition																IMC09 Ventilation Required =			3,385					
Gym	3,969	12.0	2,632	3.3	1,170	12.7		2.5		4.3	0	2.8	3,969	28.0	1,031.5	154.7	342.9	1,529.1	2,575	146,834	247,754	297,305	121,104	176,201
Other Rooms	4,155	11.0	828	3.3	3,178	12.7		2.5		4.3	342	2.8	4,155	28.0	772.7	115.9	329.1	1,217.6	810	46,192	126,556	151,867	96,437	55,431
	8,124		3,460		4,348		0		0		342		8,124						SECOND FLOOR SUBTOTAL HEAT LOSS =		374,310	449,172	217,541	231,631
																			TOTAL HEAT LOSS =			**2,293,669**	1,472,523	821,146

Date: 9/26/2014
Job: Bernazzani School, Quincy
Client: Quincy Schools

BERNAZZANI SCHOOL - DESIGN HEAT LOSS

			8" CMU with insul core & Brick =	3.30	R-Value
			2x6 with R-19, steel stud, No T-break & Brick =	12.70	R-Value
			8" CMU & Brick =	2.45	R-Value
			Window Panel =	4.35	R-Value
Above Grade DsgnDelta =	66	Deg			
Infilt =	0.4	ACH	Glass R Value =	2.78	R-Value
Slab Loss =	15%	of shell UA	Roof R Value =	28.00	R-Value
ERV Efficiency =	65%				

Room	Sq.Ft. Fl.Area SqFt	Average Height Feet	Wall-1……. Net Area	R	Wall-2……. Net Area	R	Wall-3……. Net Area	R	Panel Net Area	R	Glass & Door-- Area	R	Roof------------- Area	R	Heat Loss - - - UA Shell (BTU / Deg F. - Hr)	UA Slab Loss	Infilt	Shell & Infil	Ventilation - - - CFM	BTUH	TOTAL BTUH	TOTAL BUTH PLUS 20%	Heat-loss w/ Safety BTUH Building PLUS 20%	Ventilation PLUS 20%
Original Building																		IMC09 Ventilation Required =	8,615					
Classrooms West Wing	13,894	11.0	9061	3.3		12.7	4,367	2.5	60.0	4.3	1,113	2.8	13,894	28.0	5,438.9	815.8	1,100	7,355.1	4,182	193,748	679,188	815,025	582,527	232,498
Media +	6,064	12.0	4381	3.3		12.7	3,682	2.5	65.5	4.3	449	2.8	6,064	28.0	3,223.7	483.6	524	4,231.2	2,022	93,677	372,936	447,524	335,111	112,413
Classrooms East Wing	7,007	11.0	5225	3.3		12.7	2,791	2.5	84.5	4.3	636	2.8	7,007	28.0	3,221.3	483.2	555	4,259.4	2,411	111,724	392,845	471,414	337,345	134,069
	26,965		18,667		0		10,840		210		2,198		26,965						SUBTOTAL HEAT LOSS =		1,444,969	1,733,963	1,254,983	478,980
Gym Addition																		IMC09 Ventilation Required =	3,385					
Gym	3,969	12.0	2,632	3.3	1,170	12.7		2.5		4.3	0	2.8	3,969	28.0	1,031.5	154.7	342.9	1,529.1	2,575	119,302	220,223	264,267	121,104	143,163
Other Rooms	4,155	11.0	828	3.3	3,178	12.7		2.5		4.3	342	2.8	4,155	28.0	772.7	115.9	329.1	1,217.6	810	37,531	117,895	141,474	96,437	45,038
	8,124		3,460		4,348		0		0		342		8,124						SECOND FLOOR SUBTOTAL HEAT LOSS =		338,118	405,741	217,541	188,201
																					TOTAL HEAT LOSS =	**2,139,704**	1,472,523	667,181

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Bernazzani School
Quincy Schools

Construction Cost Estimates - Heating and Ventilating Systems Upgrade

System Approach I - Replace Unit Ventilators, New Hydronic System - Base Bid

October 14, 2014

			Cost/Unit			
	Item	qty	Material	Labor	Total M & L	Total Cost
1	**SELECTIVE DEMOLTION**					
2	UV's	14		$225	$225	$3,150
3	CC	14		$100	$100	$1,400
4	piping (ft)	500		$2	$2	$750
5	AHU steam coils	2		$500	$500	$1,000
6	steam equipment, recievers	2		$400	$400	$800
7	DHW tanks	1		$800	$800	$800
8	exhaust fans	3		$400	$400	$1,200
9	Underground Storage Tank Removal (Site Work & Disposal)	1			$20,000	$20,000
10						
11	**ASBESTOS ABATEMENT**					
12	Full Containment Boiler Room(s)	1	$5,000	$250	$5,250	$5,250
13	pipe insulation (LN FT)	100		$50	$50	$5,000
14	project monitoring/air testing (days)	4	$250	$650	$900	$3,600
15						
16	**HVAC**					
17	Media Center AHU Dampers & Motor Actuator	2	$2,000	$1,500	$3,500	$7,000
18	Gym AHU Motor Actuator	2	$1,700	$800	$2,500	$5,000
19	Gym AHU Duct Cleaning	2	$0	$878	$878	$1,756
20	UV horizontal	14	$3,800	$1,320	$5,120	$71,680
21	CC	14	$500	$240	$740	$10,360
22	AHU coils	2	$1,500	$960	$2,460	$4,920

	Item	qty	Cost/Unit Material	Labor	Total M & L	Total Cost
23	exhaust fans	3	$2,000	$480	$2,480	$7,440
24						
25	**boilers**					
26	2.75 MMBtu Total Boiler Plant Output	2	$50,000	$9,600	$59,600	$119,200
27	Boiler pumps	2	$1,200	$960	$2,160	$4,320
28	venting and combustion air	70	$200	$60	$260	$18,200
29	concrete wall penetrations	2	$200	$960	$1,160	$2,320
30	equipment pad	1	$200	$960	$1,160	$1,160
31	gas piping 3"	50	$13	$22	$35	$1,730
32	electrical connections	3	$500	$960	$1,460	$4,380
33	DHW Tank	1	$8,000	$0	$8,000	$8,000
34						
35	**piping and insulation (ft)**					
36	3"	40	$13	$22	$35	$1,384
37	pipe insulation 2"	40	$8	$11	$19	$752
38	2-1/2" steel, welded	484	$11	$20	$31	$15,198
39	pipe insulation 2-1/2"	484	$7	$10	$17	$8,034
40	2" steel, threaded	214	$16	$14	$30	$6,506
41	pipe insulation 2"	214	$4	$5	$9	$1,883
42	1-1/2" and 1-1/4" copper type L, soldered	440	$16	$11	$27	$11,792
43	pipe insulation 1-1/2"	440	$3	$5	$8	$3,432
44	1"	700	$9	$8	$17	$12,180
45	pipe insulation 1"	700	$2	$5	$7	$4,760
46	pipe fittings/valves (=/- 10% LF)	188	$50	$22	$72	$13,522
47	coring for pipe penetrations	6	$50	$120	$170	$1,020
48	pumps P1	2	$12,000	$1,020	$13,020	$26,040
49	suction diffuer	2	$900	$384	$1,284	$2,568
50	flex connection	2	$400	$96	$496	$992
51	triple duty	2	$1,100	$360	$1,460	$2,920
52	VFD-1 for pumps P-1	2	$2,200	$600	$2,800	$5,600
53	Starters	2	$200	$120	$320	$640
54	air separator	1	$3,000	$600	$3,600	$3,600
55	chemical shot	1	$500	$600	$1,100	$1,100
56	expansion tanks	3	$1,500	$96	$1,596	$4,788
57	3" Y-Strainer	1	$400	$480	$880	$880
58						

	Item	qty	Cost/Unit Material	Labor	Total M & L	Total Cost
59	**DDC CONTROLS**					
60	UV's - CO2 transmitters & Thermostats	14	$700	$792	$1,492	$20,888
61	CC's - Thermostats	7	$700	$792	$1,492	$10,444
62	2-way valves, iso and balancing valves (CC, CUH & BB & Rads)	30	$500	$960	$1,460	$43,800
63	damper actuators	2	$300	$480	$780	$1,560
64	DDC Infrastructure (Wiring, Conduit, Controls)	1	$20,000	$20,000	$40,000	$40,000
65						
66	**ELECTRICAL**					
67	equipment connections (basemount pumps)	2	$800	$960	$1,760	$3,520
68	equipment connections (inline pumps)	4	$400	$600	$1,000	$4,000
69	equipment connections (UVs)	14	$50	$216	$266	$3,724
70	equipment connections (EFs)	3	$75	$216	$291	$873
71						
72	**General Construction**					
73	Cutting, Patching & Painting	1	$2,000	$6,000	$8,000	$8,000
74	UV Cabinetry Patching & Painting	14	$300	$1,800	$2,100	$29,400
75	UV Cabinetry Patching (Sheet Metal)	14	$800	$400	$1,200	$16,800
76					**sub total**	$623,015
77	General Conditions				10%	$62,302
78	Design				10%	$68,532
79	Overhead and Profit				20%	$150,770
80	Design Contingency				15%	$135,693
81					**total**	**$1,040,311**

82

83	**with city index adjustment**		
84	**Boston**	**112.8%**	**$1,173,471**

85

86 **System Approach I - Replace Unit Ventilators, New Hydronic System - Base Bid**

87 **October 14, 2014**

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Construction Cost Estimates - Heating and Ventilating Systems Upgrade

System Approach II - ERV Makeup Air & Hydronic Convectors

October 14, 2014

			Cost/Unit			
	Item	qty	Material	Labor	Total M & L	Total Cost
1	**SELECTIVE DEMOLTION**					
2	UV's	14		$225	$225	$3,150
3	CC	14		$100	$100	$1,400
4	piping (ft)	500		$2	$2	$750
5	AHU steam coils	2		$500	$500	$1,000
6	steam equipment, recievers	2		$400	$400	$800
7	DHW tanks	1		$800	$800	$800
8	exhaust fans	3		$400	$400	$1,200
9	Underground Storage Tank Removal (Site Work & Disposal)	1			$20,000	$20,000
10						
11	**ASBESTOS ABATEMENT**					
12	Full Containment Boiler Room(s)	1	$5,000	$250	$5,250	$5,250
13	pipe insulation (LN FT)	100		$50	$50	$5,000
14	project monitoring/air testing (days)	4	$250	$650	$900	$3,600
15						
16	**HVAC**					
17	Media Center AHU Dampers & Motor Actuator	2	$2,000	$1,500	$3,500	$7,000
18	Gym AHU Motor Actuator	2	$1,700	$800	$2,500	$5,000
19	Gym AHU Duct Cleaning	2	$0	$878	$878	$1,756
20	ERVs	3	$26,000	$745	$26,745	$80,235
21	Cabinet Fan Coil	28	$1,500	$240	$1,740	$48,720
22	AHU coils	2	$1,500	$960	$2,460	$4,920

	Item	qty	Cost/Unit Material	Labor	Total M & L	Total Cost
23	ductwork interior (lbs)	1,300	$1	$3	$3	$4,030
24	ductwork insulation interior (ft)	800	$2	$5	$7	$5,600
25	ductwork exterior (lbs)	4,550	$2	$2	$4	$18,200
26	ductwork insulation exterior (ft)	2,800	$2	$5	$7	$19,600
27	grilles	28	$1,500	$960	$2,460	$68,880
28						
29	**boilers**					
30	2.2 MMBtu Total Boiler Plant Output	2	$44,000	$9,600	$53,600	$107,200
31	Boiler pumps	2	$1,200	$960	$2,160	$4,320
32	venting and combustion air	70	$100	$60	$160	$11,200
33	concrete wall penetrations	2	$200	$960	$1,160	$2,320
34	equipment pad	1	$200	$960	$1,160	$1,160
35	gas piping 3"	50	$13	$22	$35	$1,730
36	electrical connections	3	$500	$0	$500	$1,500
37	DHW Tank	1	$8,000	$0	$8,000	$8,000
38						
39	**piping and insulation (ft)**					
40	2-1/2" steel, welded	40	$11	$20	$31	$1,256
41	pipe insulation 2-1/2"	40	$7	$10	$17	$664
42	2" steel, threaded	150	$16	$14	$30	$4,560
43	pipe insulation 2"	150	$4	$5	$9	$1,320
44	1-1/2" and 1-1/4" copper type L, soldered	350	$16	$11	$27	$9,380
45	pipe insulation 1-1/2"	350	$3	$5	$8	$2,730
46	1"	640	$9	$8	$17	$11,136
47	pipe insulation 1"	640	$2	$5	$7	$4,352
48	3/4"	700	$7	$8	$15	$10,780
49	pipe insulation 3/4"	700	$2	$40	$42	$29,400
50	pipe fittings/valves (=/- 10% LF)	188	$50	$22	$72	$13,536
51	coring for pipe penetrations	6	$50	$120	$170	$1,020
52	pumps P1	2	$12,000	$1,020	$13,020	$26,040
53	suction diffuer	2	$900	$384	$1,284	$2,568
54	flex connection	2	$400	$96	$496	$992
55	triple duty	2	$1,100	$360	$1,460	$2,920
56	VFD-1 for pumps P-1	2	$2,200	$600	$2,800	$5,600
57	Starters	2	$200	$120	$320	$640
58	air separator	1	$3,000	$600	$3,600	$3,600

	Item	qty	Cost/Unit Material	Labor	Total M & L	Total Cost
59	chemical shot	1	$500	$600	$1,100	$1,100
60	expansion tanks	3	$1,500	$96	$1,596	$4,788
61	3" Y-Strainer	1	$400	$480	$880	$880
62						
63	**DDC CONTROLS**					
64	CC's - Thermostats	21	$500	$792	$1,292	$27,132
65	2-way valves, iso and balancing valves (CC, CUH & BB & Rads)	30	$500	$960	$1,460	$43,800
66	ERV Controls	3	$1,500	$1,440	$2,940	$8,820
67	damper actuators	2	$300	$480	$780	$1,560
68	DDC Infrastructure (Wiring, Conduit, Controls)	1	$20,000	$20,000	$40,000	$40,000
69						
70	**ELECTRICAL**					
71	equipment connections (basemount pumps)	2	$800	$960	$1,760	$3,520
72	equipment connections (inline pumps)	4	$400	$600	$1,000	$4,000
73	equipment connections (ERVs)	3	$50	$216	$266	$798
74	equipment connections (EFs)	3	$75	$216	$291	$873
75						
76	**General Construction**					
77	Patching & Painting	1	$2,000	$6,000	$8,000	$8,000
	UV Cabinetry Patching & Painting	14	$600	$1,200	$1,800	$25,200
78	UV Cabinetry Patching (Sheet Metal)	14	$1,300	$1,000	$2,300	$32,200
79					**sub total**	$779,486
80	General Conditions				10%	$77,949
81	Design				10%	$85,743
82	Overhead and Profit				20%	$188,636
83	Design Contingency				15%	$169,772
84					**total**	**$1,301,586**

85

86 **with city index adjustment**

87 **Boston 112.8% $1,468,189**

88

89 **System Approach II - ERV Makeup Air & Hydronic Convectors**

90 **October 14, 2014**