

September 6, 2012

Project No. C17764.00

Mr. Tim King
Assistant Town Administrator
Town of Wellfleet
300 Main Street
Wellfleet, MA 02667

**Re: The Wellfleet Public Library
Task 1 Report: System Review, Evaluation, and Schematic Design**

Dear Mr. King:

Coastal Engineering Company reviewed the 1987 renovation plans and conducted on-site reviews of all existing HVAC equipment, distribution systems, and controls. Accordingly, below are our observations and recommendations based on our site visits and review of the 1987 renovation drawings.

Observations

The existing HVAC system consists of five (5) ducted split system units with a direct expansion (DX) cooling coil and a hot water heating coil. Ridged copper piping is used as the conduit for the discontinued "ozone depleting" R-22 refrigerant piping between the outdoor Air Cooled Condenser Units (ACCU's) and the indoor ducted Air Handler Units (AHU's). Copper piping is used as the conduit for the hot water piping between the boiler and the 3-way control valves of the hot water heating coil. Below is a list of the five (5) existing systems, the areas they serve and location of the indoor units (see attached 1987 existing HVAC floor plan for reference to the existing unit locations):

AHU-1A & ACCU-1A Main Entrance/Circulation/Open Area, (AHU-1A located above Women's Room)
AHU-1B & ACCU-1B Open Area/Stacks, (AHU-1B located in Basement)
AHU-2 & ACCU-2 Children's area, (AHU-2 located above Staff Kitchen)
AHU-3 & ACCU-3 Meeting Room, (AHU-3 located above Men's Room)
AHU-4 & ACCU-4 Video Area/Back Offices, (AHU-4 located in Video Area crawl space)

The above units are controlled with wall mounted analog thermostats, wall mounted override countdown timer switches and analog programmable time clocks.

An oil fired hot water boiler and primary/secondary pumps are located in the basement mechanical equipment room (MER). A domestic hot water heater is also located in the basement MER. Hot water convectors are used for heating in the Men's and Woman's rooms.

Most of the existing HVAC equipment was installed at the time of the 1987 renovation approximately 25 years ago. The following equipment has been replaced since then: ACCU-4 manufactured in 2005 approximately 7-years ago, the HW pumps installed in 2007 approximately 5-years ago and the domestic HW heater installed in 2003 approximately 9-years ago.

Recommendations

All existing HVAC units, with the exception of the outdoor condenser ACCU-4, are at or near the end of their useful service life and should be replaced. The boiler is nearing the end of its useful life and is recommended to be replaced at this time with a more efficient oil fired boiler, along with the primary and secondary HW pumps, expansion tank, air separator and all related HW piping specialties located inside the mechanical equipment room. The 3-Way HW control valves, actuators and controls are nearing the end of their service life and are recommended to be replaced. All controls are recommended to be replaced.

The proposed units have been sized to accommodate for the potential future expansion including two additions, per the preliminary architectural sketch received on August 17, 2012. The proposed future addition will provide additional interior space on the west side of the building, adding a new reading room, a new storage space adjacent to the existing meeting room, and a new arts and crafts area adjacent to the existing children's area.

Below is our list of recommendations for the HVAC system replacement and energy savings:

Air Conditioning Units

1. Remove and replace all five existing ducted split system HVAC units including ACCU-4, which will not be compatible with the more environmentally friendly, non-ozone depleting R-410A refrigerant. Remove and provide new refrigerant piping between new ACCU's and AHU's, as the refrigerant piping will not be compatible with the R-410A refrigerant. Replacing the existing split system units with the units specified is projected to significantly reduce energy consumption.

Forced Air Hot Water Heating System and Distribution Piping

2. Remove the existing 3-way HW heating control valves and actuators and replace with new 2-way HW heating control valves and actuators for each of the five (5) HVAC units. The internal HW heating coils for AHU-1A and AHU-1B shall be replaced with the new internal cabinet mounted HW heating coils. The smaller duct mounted HW heating coils used with AHU-2, AHU-3 and AHU-4 shall be cleaned and re-used. The existing copper HW piping shall remain with the exception of the return loop piping from the discarded 3-way valves.

Hot Water Heating Boiler System, Pumps and HW Control Valves

3. Remove and replace the HW boiler, HW pumps, expansion tank, air separator and HW piping specialties in mechanical equipment room. Provide new energy efficient oil fired boiler and variable frequency drive (VFD) controlled HW pumps. The new VFD pumps and 2-way HW valves are projected to reduce electrical energy consumption by over 30%. The new Boiler shall be provided with outdoor temperature reset control for additional oil energy savings.

Domestic HW System

4. Remove existing potable HW heater and provide new indirect domestic HW storage tank.

Ductwork Distribution

5. Provide volume dampers in all branch ductwork to reduce air outlet noise and allow for proper air balancing of system.
6. For Meeting room, provide new supply air grilles and volume dampers to mitigate noise issues.
7. For Conference/Reading Room remove branch ductwork above ceiling and replace with adequately-sized new branch ductwork and a larger ceiling diffuser for added cubic feet per minute (CFM) as indicated on plans.
8. Balance all air devices as per individual CFM's specified on plans.
9. Provide complete professional cleaning of all existing to remain; ductwork, sound attenuators and air devices.

Condensate Issue in Basement/Crawlspace

10. Provide new condensate pump for AHU-1B (basement) and AHU-4 (crawlspace).

Energy Saving; Exterior Envelope, Lighting, and Incentives

11. Air sealing, weatherization and adding insulation shall be perused to tighten the exterior building envelope and provide additional insulation where needed. It is recommended to follow up with Cape Light Compact to provide an energy audit and possibly weatherization and insulation incentives and services.
12. The general lighting has been recently retrofitted, within the last 5-years, to use energy efficient light fixtures and de-lamping of the existing fixtures. At this time a lighting retrofit may not be a cost effective energy saving measure.
13. Energy efficient incentives will be applicable for the proposed air conditioning units, boiler, and variable frequency drive (VFD) HW pumps.

Upon your approval of these recommendations, we will proceed with Task 2 to develop design plans and specifications as per the approved recommendations.

Please feel free to contact me with any questions.

Very truly yours,

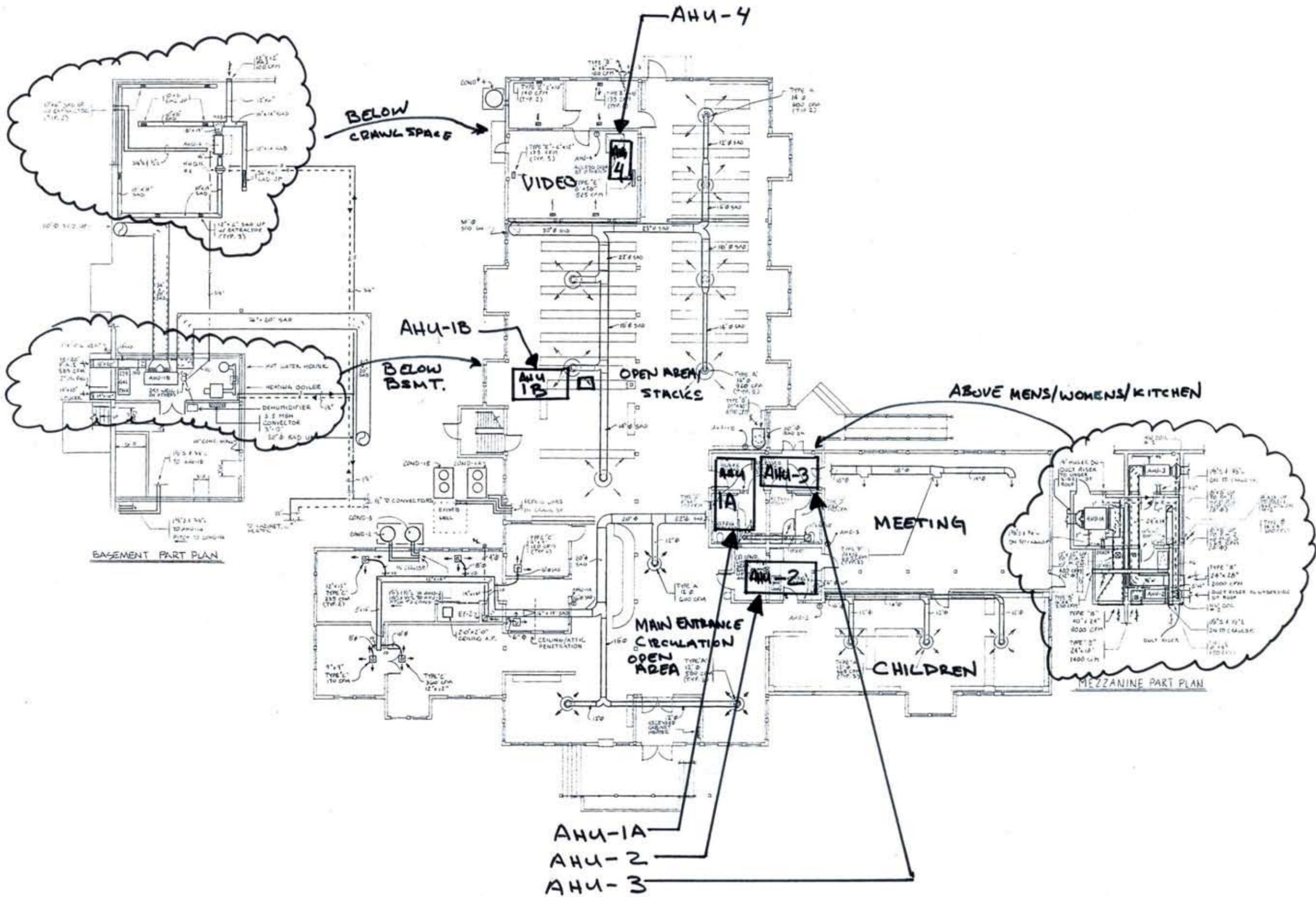
COASTAL ENGINEERING CO., INC.



Richard J. Lorenzotti, P.E., C.E.M., LEED AP

RJL/dlb

Attachment: 1987 Floor Plan HVAC, Sheet H-1



WELFLEET
PUBLIC LIBRARY

West Main Street Wellfleet, Ma

EAC

STEPHEN HALE, ARCHT.
& ASSOC.
3 EVERETT STREET
JANUARY PLAN, WARE 2012
TEL: 822-8888

FLOOR PLAN
HVAC

Scale: 1/8" = 1'-0"
Date: 10-7-87

H-1