OFFICE OF THE PURCHASING AGENT

TOWN OF ARLINGTON
730 Massachusetts Avenue
Arlington, MA 02476

Telephone (781) 316-3003
Fax (781) 316-3019

DATE: August 30, 2012

TO ALL BIDDERS

BID NO. 12-38

SUBJECT: Architectural Design Services-AHS Administration Offices

ADDENDUM NO. 1

TO WHOM IT MAY CONCERN:

With reference to the bid request relative to the above subject, please note the following:

BID SUBMISSION DEADLINE POSTPONED FROM SEPT. 6, 2012 @ 1:00 P.M. TO SEPT. 12, 2012 @ 1:00 P.M.

A SITE VISIT WILL BE HELD ON WEDNESDAY SEPTEMBER 5, 2012 AT 12:00 P.M. AT THE ARLINGTON HIGH SCHOOL, 869 MASSACHUSETTS AVE., ARLINGTON, MA. ALL INTERESTED BIDDERS WILL MEET ON THE STEPS AT THE MAIN ENTRANCE.

ATTACHED STUDY BY TUROWSKI2 ARCHITECTURE, INC..

BIDDER MUST ACKNOWLEDGE ADDENDUM WITH SUBMISSION

All other terms, conditions and specifications remain unchanged.

Very truly yours,

Town of Arlington

Domenic R. Lanzillotti
Purchasing Officer

HVAC UPGRADES AND OFFICE REORGANIZATION STUDY

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INTRODUCTION

Background

In February of 2012 the Arlington Superintendent's office asked T2 Architecture to perform a space analysis and HVAC systems study of their 6th Floor Offices. The purpose of the study was to establish a cost for 1) upgrading the HVAC and cooling system, 2) providing additional private offices and conferencing space, and 3) improving acoustic, temperature control and other issues associated with the partial renovation that had occurred sometime in the past. An additional concern was to lower the costs associated with cooling the space, and to accomplish the space changes over the summer of 2012.

Midway through the project it became apparent that the project was a candidate for a Green Communities Grant. An efficiency analysis was performed for the proposed air conditioning system.

Project Team

Superintendent's Office:	Superintendent Kathleen Bodie
Special Education Office:	Special Education Interim Director Kathleen Lockyer
Facilities Department:	Mark Miano
T2 Architecture:	Bonne DeSousa
Garcia Galuska DeSousa:	Dominick Puniello

On March 9 of 2012, T2 Architecture and Garcia Galuska DeSousa visited the site for the purpose of documenting existing conditions and discussing office space needs with affected personnel. On March 13 layout options were discussed with the Superintendent and staff. On March 21 Preliminary Scope, Schedule and costs were discussed with the Superintendent, Special Needs Director and Director of Facilities.

EXECUTIVE SUMMARY

Please see Summary of Probable Cost for detailed summary of Options and Costs.

Priority 1 Work: Office and Ventilation Upgrades

The sixth floor can easily accommodate additional private offices and conferencing spaces. Ventilation upgrades are necessary to complete that work. Construction costs for reorganization and ventilation upgrades, but excluding air conditioning is estimated between $99,700 and 186,700 including general requirements. The cost range depends on selected options for new lighting, partition glazing and whether some work (Carpet, lighting, painting, furniture installation and office related electrical) is self-performed by Arlington Facilities to realize cost savings.

Climate control and energy efficiency should be addressed at the same time as plan changes. All new systems will result in increased energy efficiency for those systems that are replaced. Replacing window air conditioners with a split ductless system will result in the best overall energy savings, but this cannot be achieved without improving the ventilation system through a replacement roof-top unit and extending the ducts to individual offices. Therefore ventilation is Priority 1 Work.

The totality of the work identified above is Level 2 Alteration for Code Building Code Purposes. As such, code related upgrades will be limited to the spaces and systems that are impacted by the work. It is recommended, however, that the existing conditions sprinklers in the corridors be reviewed with the Building Inspector. Upgrade to corridor sprinklers can be completed as a separate project or at the same time for an estimated cost of $19,800.

The total estimated construction cost of Priority 1 work, including a 10% design and estimating contingency is 206,500 if all work is performed by a General Contractor. This cost excludes design and project management costs.

Priority 2 Work : Air Conditioning

The construction costs for Priority 2, including general requirements and design and estimating contingency of 10% is $163,700. This cost excludes design and project management costs.

Priority 3 Work: Other efficiency measures

The construction costs for Priority 3, including heat recovery, DDC Controls and fin-tube modifications (additional zones and Valves) plus general requirements and design and estimating contingency of 10% is $66,000. This cost excludes design and project management costs.

Project Costs

Project Costs (design, project management, reimbursables, and construction contingency are typically estimated at 25%- 30% of construction costs . 25% of the entire project cost is %95,000. 30% of the entire construction cost is $104,000.

EXISTNG CONDITIONS OVERVIEW - ARCHITECTURE

Overview

Arlington High School, 869 Massachusetts Avenue, is a masonry structure of located near the center of the Town of Arlington at 869 Massachusetts Avenue. The building was completely renovated in 1978. Since then renovations have been incremental and performed on an as needed basis. Arlington School Department offices occupy the 6th floor of Arlington High School in the northeastern wing, 4 stories above the nearest at grade exit. The 6th floor has a total of 14,006 gross square feet. The office areas comprise 8,792 net square feet. The areas considered for reorganization comprise 3573 net square feet.

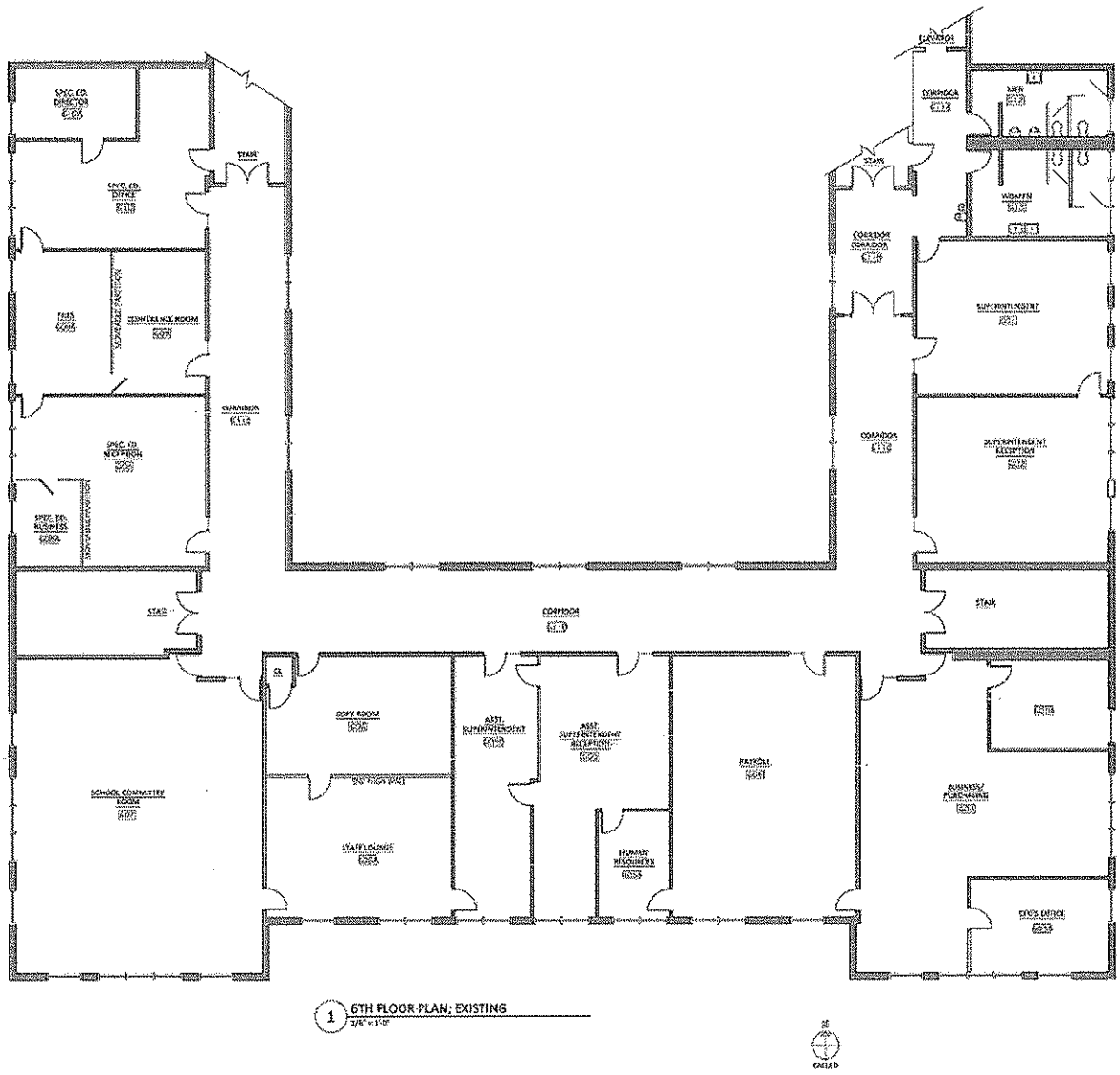
Occupancy

The District Offices are an accessory use to the school, which is classified as Building Type E., Educational use. The 6th floor is served by an elevator (retrofitted) and has four stairs. While this level was originally planned for classroom occupancy, there is currently no classroom use and there has not been classroom use for some time.

The original floor plans show 12 classroom spaces on the 6th floor. For classroom use the occupancy would have been approximately 300. Today the space is regularly occupied by a staff of 24. Occasionally School Committee meetings will bring 50-60 people to the 6th floor.

Modifications

It is not clear whether 12 classrooms were built in 1978, but at some point prior to the School Department occupying the space, two large rooms of 1,490 square feet were created by combining two classrooms at each of the southwest and northwest corner of the building. Currently one of these larger rooms houses School Committee Meeting Room. The other houses the School Department Business Office. Two other former classroom spaces were also subdivided into smaller areas with gypsum wallboard partitions in order to better house the School department functions of private offices, copy room and staff lounge. Reception, Payroll and administrative staff for Human Resources/ Assistant Superintendent Offices are housed in open offices. The Special Education office, whose staff has grown over the years occupies three classrooms on the northeast side of the building. Electrical and data outlets were installed in the different locations of the converted classrooms to meet the needs of workstations, telephones, computers, office equipment and staff lounge needs. Air conditioners were installed in the existing "classrooms" and newly subdivided spaces. New electrical service was brought to the 6th floor for the express purpose of meeting air conditioning needs. The School Committee Meeting Room received ventilation upgrades. The toilet rooms have been partially renovated.



Existing Floor Plan: 14,006 GSF

Building Code

The offices are an accessory use to a Building Type E. The building is has an automatic sprinkler system. Proposed work will be governed by the provisions of the International Existing Building Code (IEBC 2009) The work is characterized as Level 2 Alterations.

All new work will be executed to current code requirements, all existing fire ratings will be maintained or upgraded to current code. The Work Area does not include toilet rooms and no upgrades are required in those rooms.

SPACE NEEDS SUMMARY

Overview

The Arlington School Department offices occupy former classrooms on the 6th floor of Arlington High School. These classrooms were converted to office use over time through ad hoc installation of partitions as well as the addition of electric, telephone and data outlets as needs arose. The purpose of the space planning study is to supplement the planning to correct ventilation, cooling lighting and acoustical inadequacies in the current office space with a plan for additional office and conferencing space so that all offices can operate more efficiently and with the appropriate levels of privacy control.

It is a goal of the School Department to minimize costs associated with the revisions. The School will be renovated in upcoming years and it is not certain that the offices will continue to occupy the 6th floor.

Summary of Space Needs

A list of current and proposed spaces and staff assignments discussed at the walk through is on the following pages.

Furniture

The summary does not address specific furnishing requirements at this time. We understand School Department Staff will be reusing furniture. Furniture requirements will be discussed in the context of the proposed plan. In general the following assumptions about furniture have been made:

1. Workstations include a desk with "return", one or two filing cabinets, and one or two book shelves.
2. Reception or general offices require additional space for common files, worktables and printers or faxes.
3. All offices for Human Resources Director, Assistant Superintendent, Grant Writer, Special Education Director and Special Education Assistant Director will need a small conference table with three or 4 chairs

Office or Suite	Room Name/ No. (per T2 Plans)	Occupancy Existing	Occupancy Proposed	Notes	Overview of Issues
Superintendent's Suite	Reception 602	3	No Change	area=630 sf	HVAC, Fire Protection?
	Office 601	1 + 20 visitor	No Change	area=580 sf	HVAC Fire Protection?
Business Suite					
	Reception/ Administrative 603	6	No Change	area=1034 sf	HVAC, Lighting, Acoustics, Fire Protection
	CFO 603B	1	No Change	area=253 sf	"
	Purchasing 603A	1	No Change	area=206 sf	"
Payroll	Payroll 604	5	No change		
Assistant Superintendent Suite	Reception 605	2	3	area=532 sf	Reorganize Space/furniture, HVAC, Fire Protection, Electric, Lighting, Acoustics, Data, Telephone
	Human Resources Director 605A	1+ 4	No Change	area=150 sf Add wall mounted Storage	
	Assistant Superintendent 605 A	2+5	1 +4	area=414 sf Subdivide existing space	
	New Space: Conference 605 B		12	10 – 12 seats	
	New Office: Grants 605C		1+4	Subdivide Staff lounge; Access through Asst. Superintendent	
Staff Work/ Lounge	Staff lounge 606A	8+	No Change	area=515 sf Reorganize furniture for smaller space	
	Copy Room 606	4+	No Change	area=416 sf	
School Committee	School Committee 607	50	No Change	area=1491 sf	HVAC

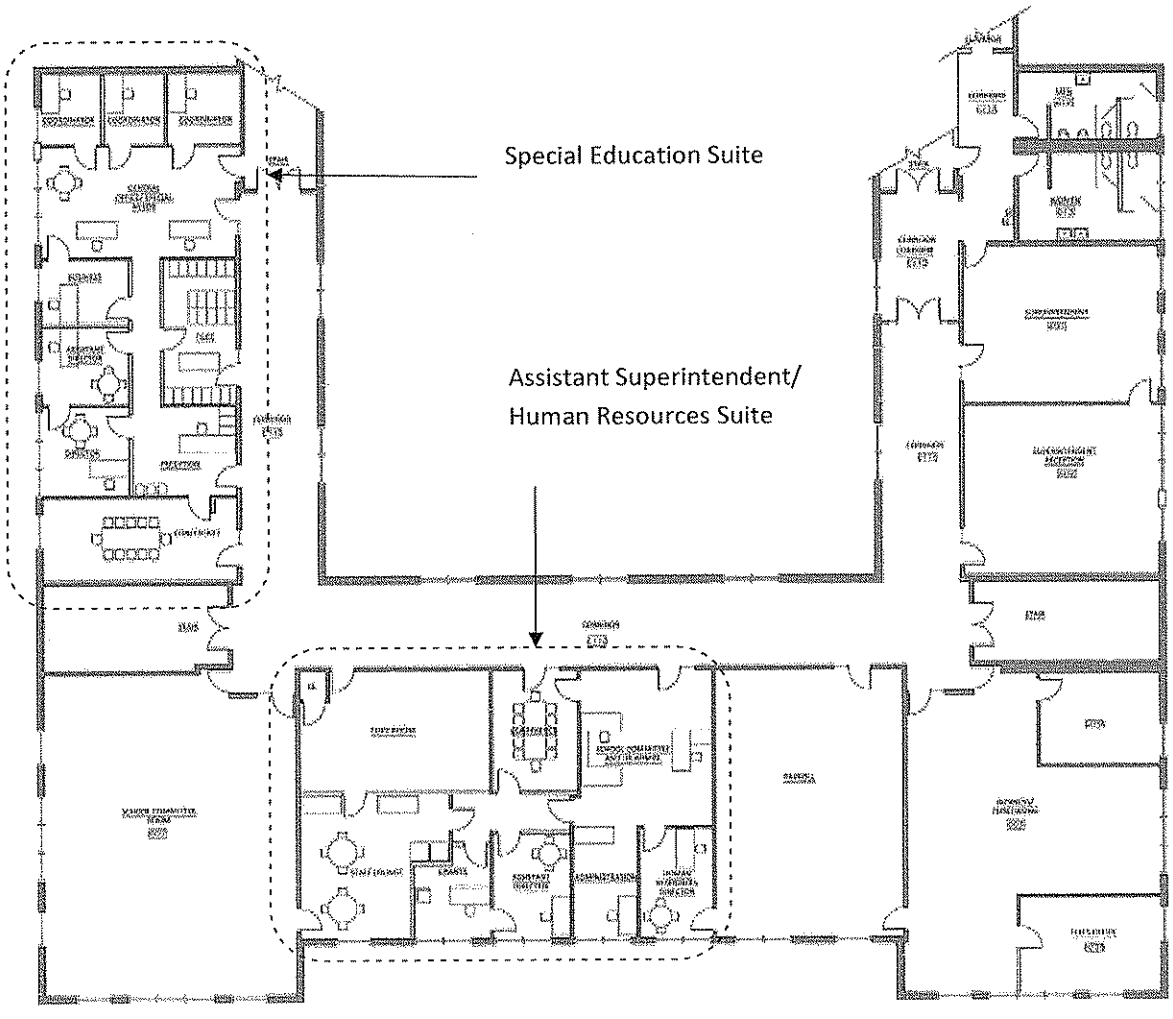
Special Education Suite	Reception/ General Office 608	3+	1	area= 530 sf Relocate 2 Workstations to be near 3 Coordinators	Reorganize Space/furniture, HVAC, Lighting, Acoustics, Electric, Telephone, Data
	Business Office 608A	1	1	area= 110 sf	
	Conference 609	12 +1 work station	12	area= 270 sf Move workstation to New Office for Out of District Coordinator	
	Files 609A			area= 260 sf Secure (17) 4 drawer, (7) 5 drawer + work table	
	Special Education General Office 610	2	2	area= 512 sf Relocate Elem. Coordinator and Asst. Dir. To new offices. Move 2 Admin Assistants To Office near Coordinators	
	Directors Office 610A	1+4	1+4	area= 170 sf	
	New Office: Elementary Coordinator		1		
	New Office: Secondary Coordinator		1		
	New Office: Assistant Director		1		
	New Office : Out of District Coord.		1		
	TOTAL Special Needs **Exist Offices:** **9 personnel (1 off site);** **1 private office 1 semi private office 2 general office spaces, 1 conference** ***Proposed Offices:*** *9 personnel;* *6 private offices* *1 general office at Coordinators (2 workstations)* ***1 reception/office space, (1 workstation)*** ***1 Conference***				

PROPOSED OFFICE LAYOUT

Proposed plan

The proposed project will:

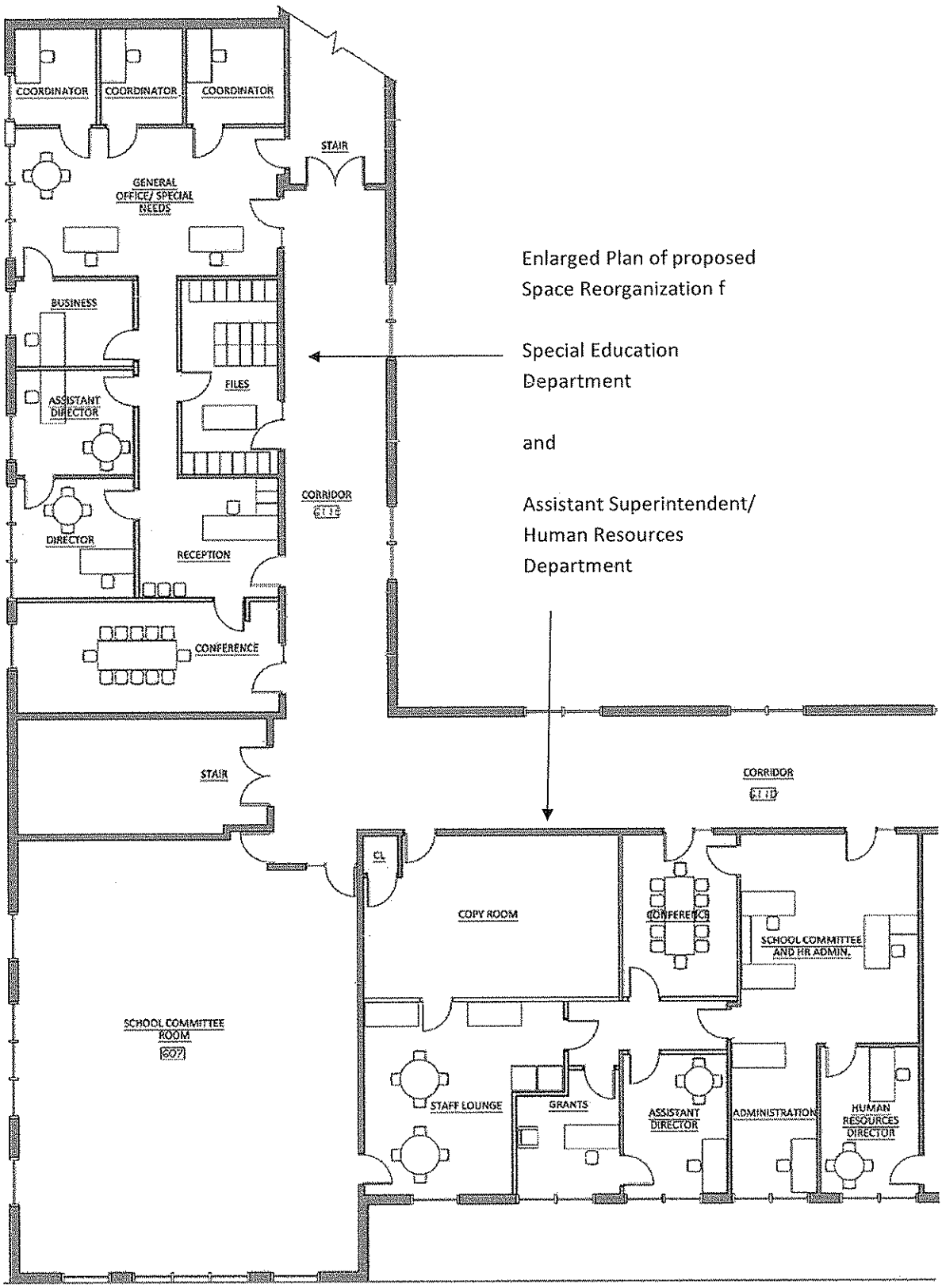
- reconfigure 3,669 net square feet.
- add doors.
- extend or replace the ventilation and air-conditioning systems.
- make modifications to lighting and electrical and heating in existing offices to remain.



2 6TH FLOOR PLAN: PROPOSED

Arlington School Department
6th Floor AHS

HVAC Upgrades
and Office Reorganization Study



Enlarged Plan of proposed Space Reorganization f

Special Education Department

and

Assistant Superintendent/ Human Resources Department

EXISTING CONDITONS and RECOMMENDATIONS - MEP/FP

Background

The attached Mechanical, Electrical, Plumbing and Fire Protection Reports are based on site review, review of building plans from 1978, and information provided by the Facilities Director.

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Arlington School District Offices
Arlington, MA
Existing Conditions Systems Report
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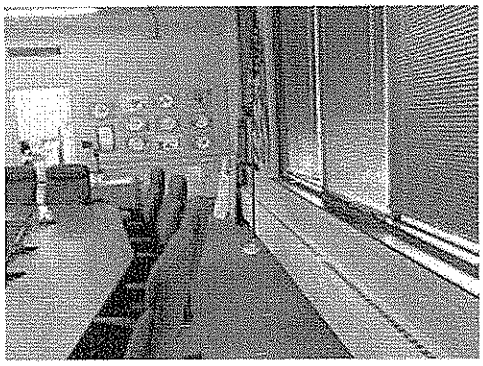
HVAC - Heating, Ventilation and Air Conditioning:

Heating Systems:

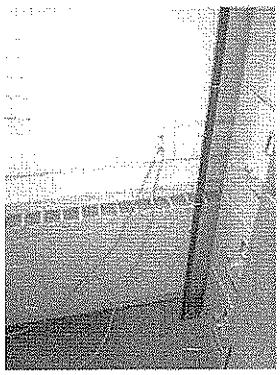
The administration offices are typically heated by perimeter hot water radiation that is generally located below windows at the perimeter exterior walls.

The majority of fin tube radiation appears to be in good to fair condition. In general the radiation enclosures appear to have finishes in good condition, however some segments are damaged and should be repaired.

The radiation heating is controlled by pneumatic control valves and wall mounted thermostats. Thermostats should be relocated in some areas as part of the renovation project to provide improved thermal comfort control in offices areas that were previously sub-divided or will be divided as part of the renovation project. In some offices, partition walls were added to divide rooms and the fin tube radiation and control thermostats were not modified. Therefore some fin tube sections served multiple offices.



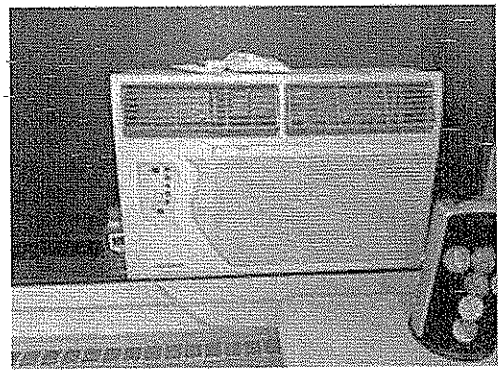
Example of Fin Tube Radiation Heating

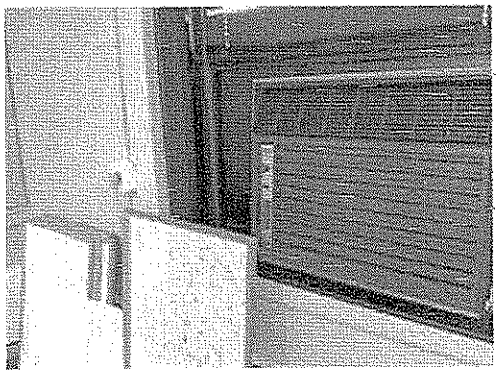


Example of Fin Tube radiation serving multiple offices

Air Conditioning System:

Air Conditioning is provided to the majority of offices by window type air conditioning units. The majority of window AC units appear to be of an older variety and have low energy efficiency in comparison to high efficiency systems that are commercially available. In addition window AC units are noisy during operation.

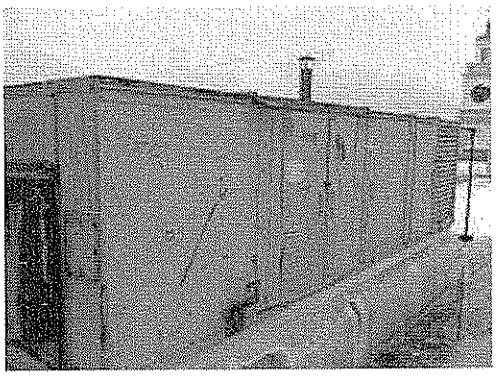




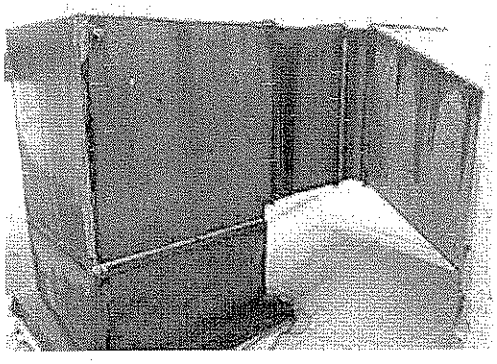
Typical Window AC units

Building Ventilation:

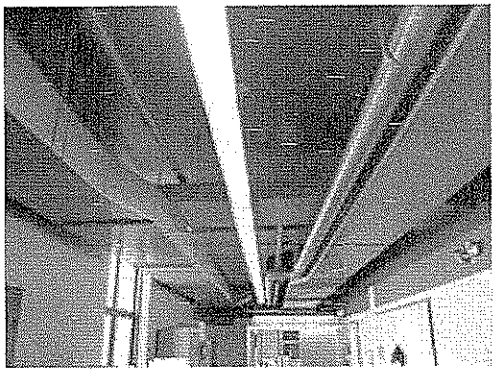
The building is primarily ventilated through the use of rooftop air handling unit. The rooftop unit was installed in the 1970s and the unit and associated roof mounted ductwork are in poor condition. The unit was manufactured by Jackson Church Co. The unit was originally designed and installed to provide ventilation for classrooms; therefore the existing unit has a higher airflow capacity than required for the current office occupancy. Due to the unit being oversized, there are many temperature control complaints related to the operation of this unit. To address this issue, the building operator staff has had to turn this unit on and off during select periods of the day. The majority of the ventilation air ductwork mains are located in the main corridor. Branch ductwork is typically routed from the mains to the offices, and typically terminates in a sidewall register. The ventilation system was not modified when new office partitions were added; therefore ventilation air is not currently ducted to each individual office.



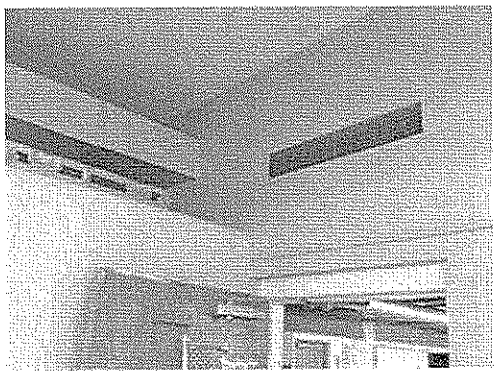
Exiting rooftop Air Handling Unit



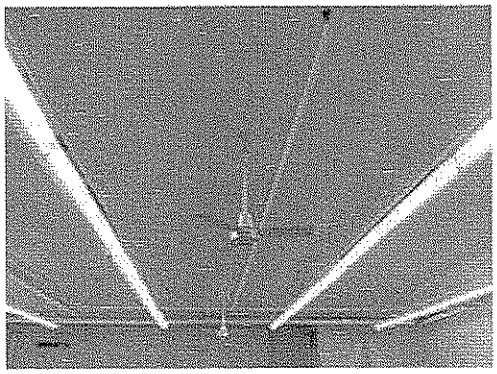
Existing roof ventilation ductwork



Corridor – Ventilation Ductwork



Ventilation Register in Office (typ.)



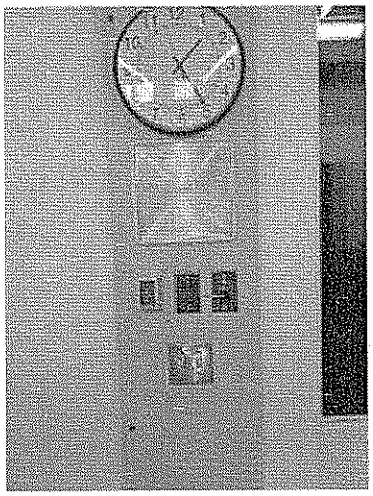
Ceiling Fan in Office

Some offices have ceiling mounted de-stratification paddle fans installed.

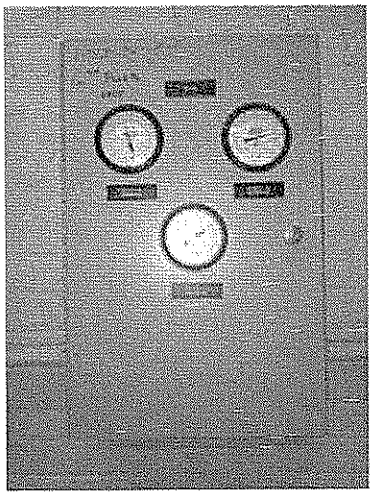
The sixth floor restrooms are ventilated by an exhaust air system consisting of exhaust ductwork connected to roof mounted exhaust fan thru a galvanized sheet metal ductwork distribution system. The roof mounted exhaust air fan that serves the building toilet exhaust air appears to have been originally installed equipment. Therefore the fan is likely over 30 years old, past its expected service life and in need of replacement

Automatic Temperature Controls:

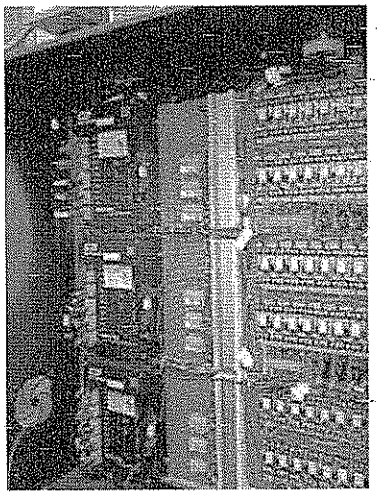
The building is controlled by a combination pneumatic automatic temperature control system, which was installed in the 1970s, and a building direct digital/electronic control energy management (EMS) system that was installed in the early 1990s. The administration office heating system is controlled by pneumatic wall mounted temperature sensors and hot water control valves. The sixth floor a dedicated hot water heating pump and ventilation air handling unit are both controlled by pneumatic control panels which are integrate into the building energy management system.



Thermostat (left, typ.)



Hot Water Pump Control Panel



EMS System Panel

Recommendations:

The following HVAC system recommendations are based on our site visit observations.

Note: Priority 1 items are of highest priority, followed by Priority 1A and Priority 2.

Heating System –

Priority 1 – In order to minimize project cost is recommended that the existing hot water perimeter radiation heating system is re-used as part of the renovation project. Ideally fin tube radiation should be modified in some office areas that have previously been sub-divided or will be sub divided as part of the planned renovation. This modification would involve installing additional zone control valves and hot water branch piping and valves in order to create additional zones.

Priority 2: It is recommended that the existing pneumatic control valves are replace with new DDC control type thermostats which are controlled by a new DDC control panel. The new DDC control panel would be integrated into the existing Building energy management system

Air Conditioning System – It is recommended that the existing window air conditioning units be replaced with a new high efficiency air conditioning system.

Ventilation System – It is recommended that a new rooftop unit is installed to replace the existing rooftop heating and ventilation unit. The new rooftop should be provided with supply fan equipped with variable speed drive, steam hot water heating coil, and packaged DDC controls capable of being integrated into the Building Energy Management system.

ATC Control System – It is recommended that new DDC type packaged controls be provided for the proposed new rooftop unit and new high efficiency Variable Refrigerant Flow (VRF) system. New packaged DDC controls should be integrated into the existing Building energy management system.

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HVAC Cost Summary:

Priority 1:	
Heating System – Additional Zones & Thermostat Relocation	$15,000
Ventilation System – Replace Rooftop Air Handling Unit (incl. Electrical)	$35,000
Ventilation System – Modify Ventilation Ductwork	$15,000
Air Conditioning System – Replace majority of Window AC units	$70,000
Total Priority 1	*$135,000*
Priority 1 Alternate:	
Ventilation System – Replace Rooftop AHU with new Energy Recovery AHU*	$40,000
Air Conditioning System – Replace all additional Window AC units with new AC System**	$40,000
Total Priority 1A	*$215,000*

*Additional Cost for Exhaust Ductwork and increased Rooftop AHU cost
**Additional Cost to provide AC to all office areas

Priority 2:	
Heating System – Convert existing Pneumatic Controls to DDC	$20,000
Heating System – Repair Damaged Fin Tube Radiation Enclosures	$2,000
Ventilation System – Replace Rooftop (Bathroom) Exhaust Fan	$4,000
Air Conditioning System – Replace all additional Window AC units with new AC System	$40,000
Total Priority 1	*$64,000*
Total Priority 1A & 2	*$279,000*

Note: HVAC costs are not total project costs and do not include architectural general conditions.

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Arlington, MA
Electrical Existing Conditions Systems Report
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L#37003/Page 1/March 16, 2012

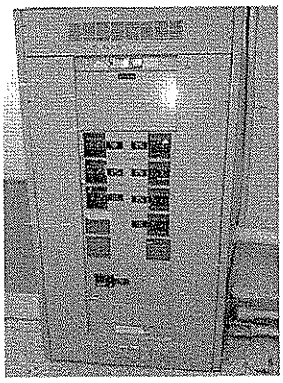
ELECTRICAL:

Electrical Distribution:

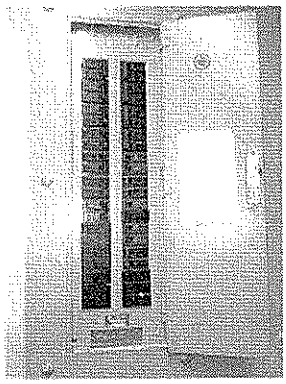
The existing facility's distribution system consists of a 3,000 ampere, 120/208V, 3phase, 4 wire switchboard manufactured by Gould ITE. The six story Area "A" Building is serviced by a 1,200 ampere distribution panel "DA" fed from a 1,000 ampere breaker in the 1978 switchboard with (2) sets of 4 # 750 MCM in (2) 4" conduits.

The Sixth Floor is serviced by two originally installed panelboards, flushmounted in the Corridor. LA6A and LA6B each rated at 225 amperes. Panel LA6A has 30 poles and is fed through the Fifth Floor panel LA5A and both share a single 225 ampere feeder. Panel LA6A services both power and lighting for the Sixth Floor West side. Panel LA6B has 18 poles, and likewise, is fed through the Fifth Floor panel LA5B and both share a single 225 ampere feeder. Panel LA6B services both power and lighting for the Sixth Floor East side.

An air conditioner panelboard was added during the office renovation phase approximately 10-15 years ago, rated at 225 amperes, 42x, with (15) 20 ampere, 2 pole and 30 ampere, 2 pole breakers. This panel is located on the Sixth Floor and is fed from the 3,000 ampere switchboard with a 225 ampere feeder. The panel feeds (15) window A/C units on the Sixth Floor.



Panel DA



A/C Panel

The LA6A and LA6B panels are in fair condition but are over 30 years old and are full. The panels should be replaced on a one for one basis with a 42 pole panel to allow for additional circuitry or new subpanels provided. New panels would reconnect to the existing feeder.

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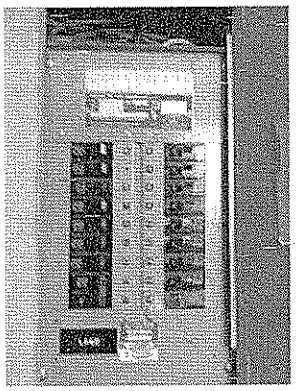
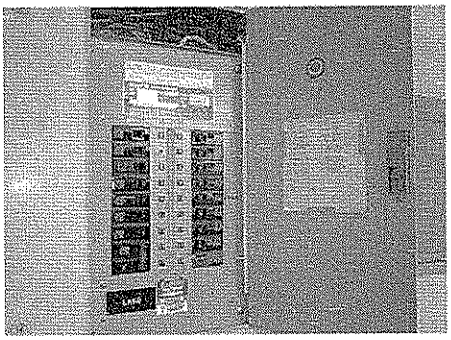


Panel LA6A

12 x SubPanel

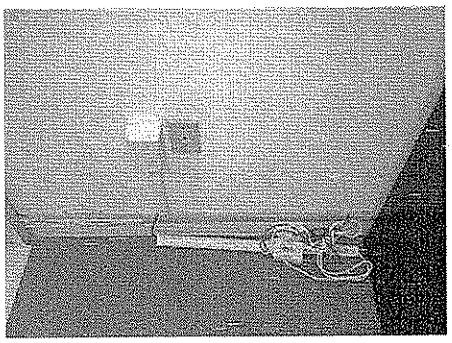


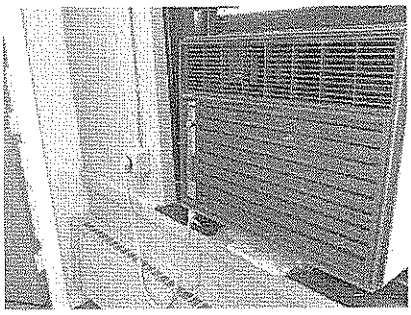
Panel LA6B

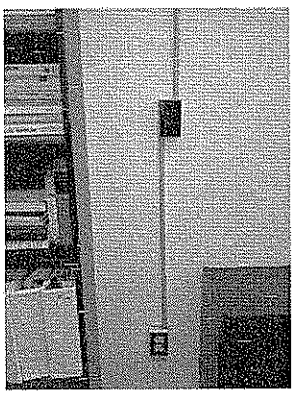
Branch Circuits/Wiring Devices:

Classrooms were originally circuited with (1) dedicated circuit for light fixtures and (1) dedicated circuit for receptacles. Additional wiring has been added during the office renovation with wiremold raceways for receptacles and Tel/Data devices.

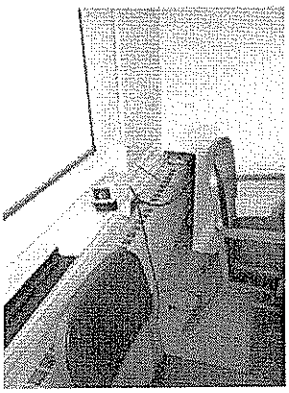
Dedicated branch circuits were added for the window A/C units. Wiring in general runs in surface EMT and surface boxes. Exposed Tel/Data wiring is also common.

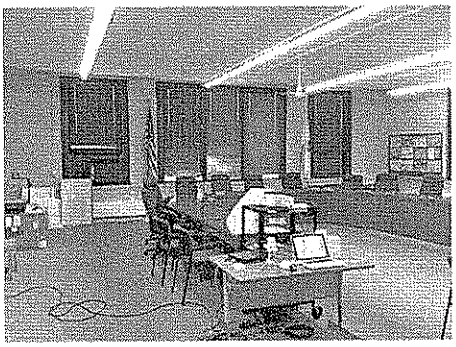






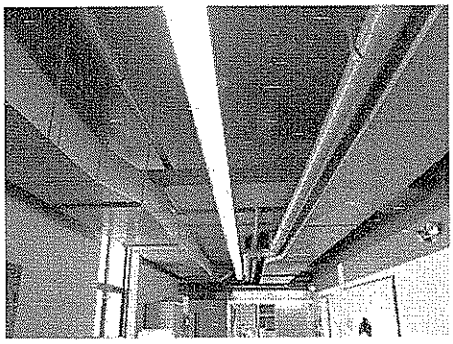
Devices appear to be lacking in various work spaces, extension cords are being used.



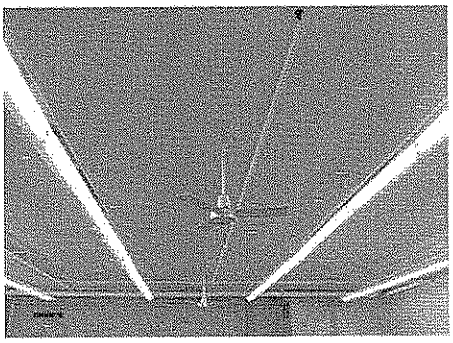


Interior Lighting:

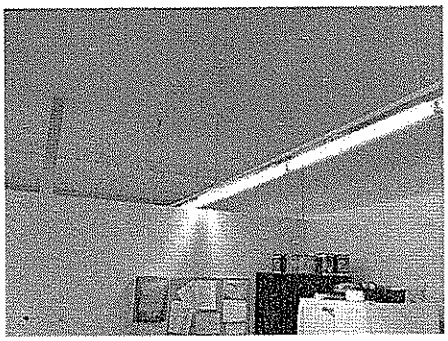
Corridor lighting consists of suspended linear fluorescent fixtures with baffles with single T8 lamps and electronic ballasts. Corridor lighting is locally switched. In general, lighting has been upgraded to T8 lamps and electronic ballasts.

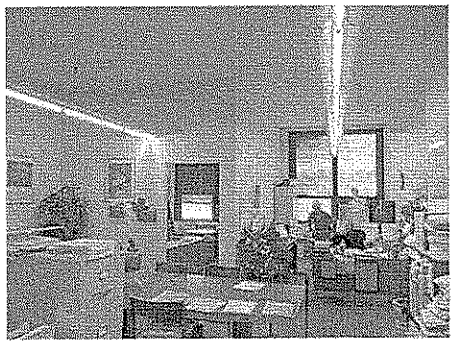


Former classroom spaces have suspended linear fluorescent fixtures with specular reflectors with single T8 lamps and electronic ballasts. Spaces are multi-switched by row.



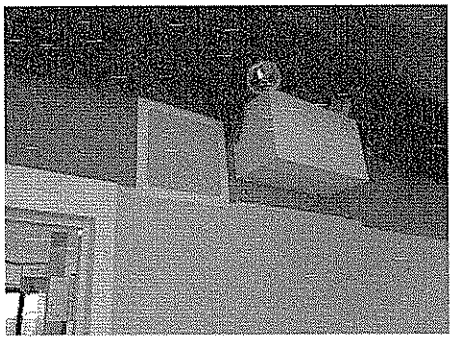
Switching still occurs based on original layout rather than by individual spaces in various locations. Continuous light fixture rows are common to more than one working space.

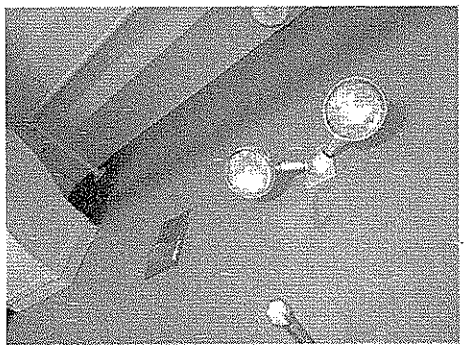




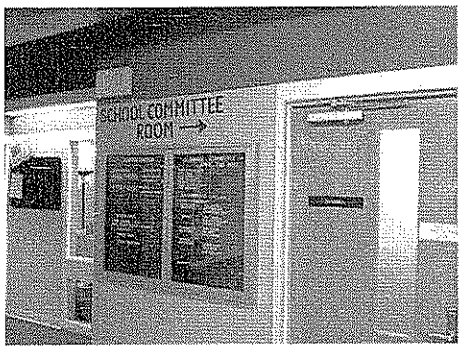
Emergency Lighting System:

The emergency lighting system consists of central battery units with remote heads with PAR 38 lamps.





Exit signs exist with AC/DC sockets where they normally run on normal A/C power and are lit with the DC sockets via the central battery unit upon normal power loss.

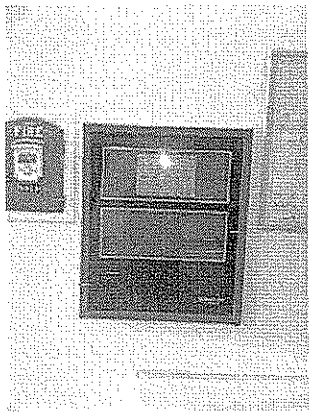


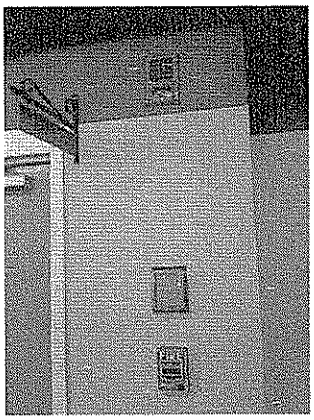
Fire Alarm System:

The overall facility is serviced by three separate fire alarm control panels connected to three radio boxes. The building "A" is serviced by a recently installed Notifier addressable control panel located in the Third Floor. The FACP is connected to a radio box to transmit alarm signals to the Fire Department.

There are heat detectors located in the crawl space below roof deck accessible through ceiling hatches. Two sets of smoke detectors exist in stairwells, one connects to FACP for alarm and the other connects to the stairwell exhaust fan control system. No smoke detectors exist in Corridors.

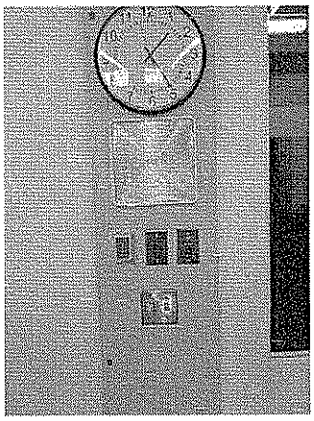
The horn/strobes are not ADA compliant. Manual pull stations exist at the entrance to the stairwells. Existing devices should be replaced with new addressable devices and ADA compliant horn/strobes in Sixth Floor and connect to new control panel.





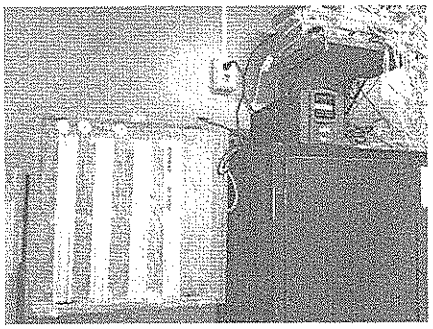
Data, Telephone, Classroom Intercom, Clock System, Security System:

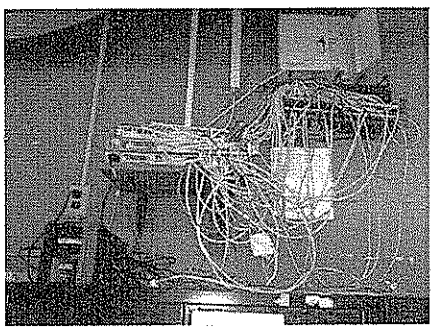
The original clock and speaker system still exists in JC panels by the classroom entrance. Corridor flush speakers exist.

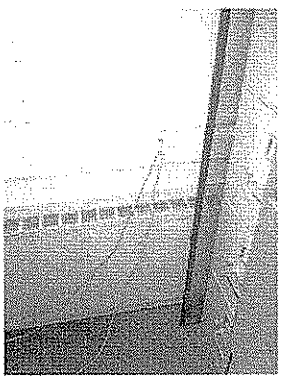


The Tel/Data wiring is CAT5 terminated on wall mounted patch panels. Data switches are connected with fiber. A portable UPS exists for backup power.

Long patch cords are being used due to location of data outlets being distanced from work stations.







The master clock system is a Simplex Time Controller System.

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Arlington District Offices
Arlington, MA
Plumbing Existing Conditions Systems Report
J#525 010 00.00
L#37019/Page 1/March 16, 2012

PLUMBING

Executive Summary:

Presently, the Plumbing Systems serving the building are cold water, hot water, sanitary, waste and vent system, storm drain piping, and natural gas. Municipal sewer and municipal water service the Building.

The majority of the plumbing systems are original to the building and its additions. Portions of the system have been updated as part of building renovation and upgrade projects. The plumbing systems, while continuing to function, have served their useful life. The plumbing systems could continue to be used with maintenance and replacement of failed components; however other non-dependent decisions will likely force the plumbing upgrade.

The plumbing fixtures are in good condition. Attempts have been made to make some bathroom fixtures accessible, however, the majority of fixtures do not meet current accessibility codes. In general, the fixtures appear to have served their useful life. Current Access Code requires accessible fixtures wherever plumbing is provided. In terms of the water conservation fixtures, their use is governed by the provisions of the Plumbing and Building Code. Essentially, the code does not require these fixtures to be upgraded, but where new fixtures are installed, as may be required by other codes or concerns, the new fixtures need to be water conserving type fixtures.

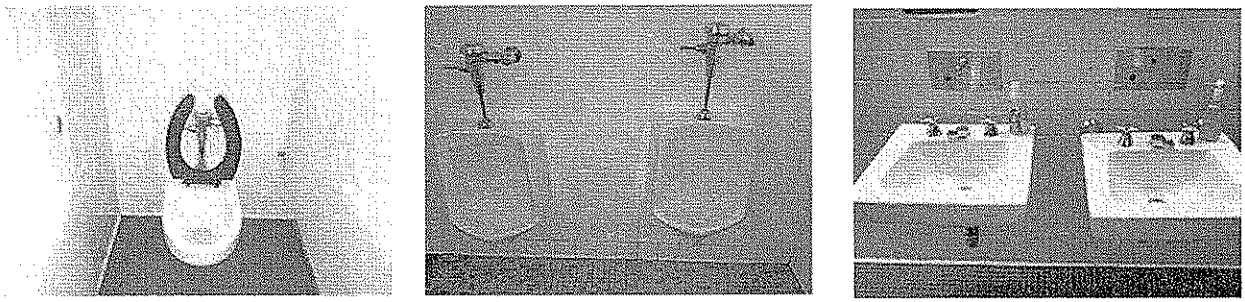
Cast iron is used for sanitary and storm drainage. Rainwater from roof areas is collected by interior rain leaders which appear to discharge to a below grade drainage system. Where visible, the cast iron pipe appears to be in fair condition. Smaller pipe sizes appear to be copper. In general, the drainage piping can be reused where adequately sized for the intended new use.

Fixtures:

The water closets are predominately wall hung vitreous china with manually operated flush valves.

Urinals are wall hung vitreous china with manually operated flush valves.

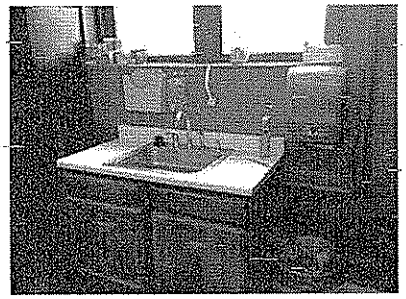
Lavatories are wall hung vitreous china. Lavatories are fitted with hot and cold water handle faucets.

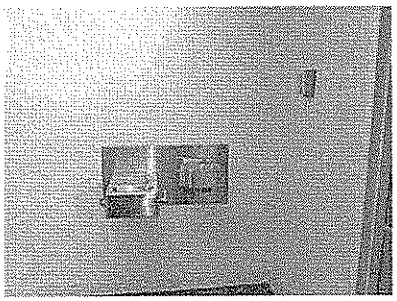


Typical bathroom fixtures

Staff sink is stainless steel counter top mounted with single handle faucet with a vegetable spray.

Drinking fountain is wall mounted, stainless steel, hi-lo fixture.





Water Systems:

Piping, where exposed, appears to be copper with sweat joints. The majority of the piping is insulated.

Drainage Systems:

Cast iron is used for sanitary and storm drainage. Where visible, the cast iron pipe appears to be in fair condition. Smaller pipe sizes appear to be copper. It was reported by the staff that there are partial blockages in the shower drains that cannot be cleared.

In general, the cast iron drainage piping can be reused even in a major renovation where adequately sized for the intended new use.

ENERGY EFFICIENCY

Efficiency Report for proposed Air Conditioning System

The efficiency report on the following pages details the significant energy savings that can be expected if the existing conventional window air conditioners are replaced with a high efficiency ductless air conditioning system. A complete replacement of the existing window air conditioners plus the installation of supplemental air conditioners can result in a simple pay back in energy savings in just a few years.

Replacing air conditioners will also reduce the significant air leaks that occur through the existing window air conditioners in the winter months.

Other Anticipated Energy Savings

If all the heating systems upgrades described in this study are implemented, the School Department will also realize energy savings due to:

- reduced size of the roof top air handling unit (compatible with actual occupancy).
- increased efficiency of new equipment over 30 year old equipment due to energy efficient motors, pumps, variable frequency drives and other technology improvements.
- automatic controls that relate to smaller zones and respond more closely to occupancy patterns.
- elimination of the need for electric heaters (8 @ 12,000 BTU's total) that are currently used by one third of the occupants due to uneven heat distribution.

March 20, 2012

Arlington School District Offices

Air Conditioning System Economic Analysis

HVAC System Narrative – Baseline Air Conditioning versus Proposed Design

The proposed HVAC system design for the Arlington District Office Renovation project incorporates a high efficiency Variable Refrigerant Flow (VRF) air conditioning system consisting of an outdoor air cooled heat pump condensing unit, indoor ductless air handling units and associated programmable thermostat controls. The system is a 3-way variable volume refrigerant system that can provide cooling or heating to each zone. Each zone shall be controlled by a programmable thermostat and all zones shall also be connected to a master controller. The outdoor condensing unit consists of separate modules with a total cooling capacity of approximately 360 MBH. The indoor condensing units have a combined total capacity of approximately 360 MBH. The proposed system shall have an energy efficiency of 16.0 SEER.

The proposed system design will be capable of providing heating and cooling simultaneously to different zones. This design feature will provide improved energy efficiency and reduced energy consumption because when some building zones require heating and others zone require cooling, the system will deliver heat rejected from one zone to a zone which requires heating prior to rejecting the heat to the outdoor condensing unit.

The proposed design has been compared to a lower first cost system consisting of packaged window air conditioning units that could be installed to replace the existing units for the exterior spaces and split system wall mounted ductless cooling units for the interior spaces in lieu of the proposed high efficiency air conditioning system. The window AC units' typical energy efficiency ratio is typically 9.6 SEER and the split system wall mounted ductless cooling units will have the code required efficiency of 13.0 SEER.

Based on a life cycle cost calculation, the proposed design system will result in an annual savings of $36,203. As the capital investment increase between the baseline and design system is $56,000, the design high efficiency Variable Refrigerant Flow (VRF) air conditioning system results in a simple payback of 1.5 years.

March 28, 2012

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370 Faunce Corner Road, Dartmouth, MA 02747-1217

Cooling Life Cycle Cost Estimate for HVAC System Design - Arlington School District Office -Arlington, MA

This energy savings calculator utilizes energy calculation tools developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors.

Choose your city from the menu at right: MA-Boston — *MA-Arlington*

Number of units	15
Electric Rate ($/kWh)	$0.185

	Design High Efficiency	Conventional Baseline System
Initial Cost per Unit (estimated retail price with installation)**	$4,500	$1,100
Seasonal Energy Efficiency Ratio (SEER) rating	16.0	9.6
Cooling Capacity of Air Conditioner (Btu/hr)	2.5 ton	2.5 ton
Use with programmable Thermostat (Yes/No)	Yes	No

Note: Total increased incremental costsof high-efficiency design = 4 units x ($160,000-$31,000) = $36,000

Annual and Life Cycle Costs and Savings for System

	15 Units	15 Conventional Units	Savings with Design
Annual Operating Costs*			
Energy cost	$27,972	$55,500	$27,528
Maintenance cost	$750	$750	$0
Total	**$28,722**	**$56,250**	**$27,528**
Life Cycle Costs*			
Operating costs (energy and maintenance)	$390,341	$764,456	$374,115
Energy costs	$380,149	$754,263	$374,115
Maintenance costs	$10,193	$10,193	$0
Purchase price for 15 unit(s)	$67,500	$16,500	-$51,000
Total	**$457,841**	**$780,956**	**$323,115**
		Simple payback of initial additional cost (years)†	**1.9**

* *Annual costs exclude the initial purchase price. All costs, except initial cost, are discounted over the products' lifetime using a real discount rate of 4%. See "Assumptions" to change factors including the discount rate.*

† *A simple payback period of zero years means that the payback is immediate.*

Summary of Benefits for 15 Central Air Conditioner(s)

Initial cost difference	**$51,000**
Life cycle savings	**$374,115**
Net life cycle savings (life cycle savings - additional cost)	**$323,115**
Simple payback of additional cost (years)	**1.9**
Life cycle energy saved (kWh)	**2,976,000**
Life cycle air pollution reduction (lbs of CO_2)	**4,583,040**
Air pollution reduction equivalence (number of cars removed from the road for a year)	**381**
Air pollution reduction equivalence (acres of forest)	**472**
Savings as a percent of purchase price	**479%**

March 28, 2012

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Cooling Life Cycle Cost Estimate for HVAC System Design - Arlington School District Office -Arlington, MA

This energy savings calculator utilizes energy calculation tools developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors.

Choose your city from the menu at right: MA-Boston — *MA-Arlington*

Number of units	10
Electric Rate ($/kWh)	$0.185

	Design High Efficiency	Conventional Baseline System
Initial Cost per Unit (estimated retail price with installation)**	$4,500	$4,000
Seasonal Energy Efficiency Ratio (SEER) rating	16.0	13.0
Cooling Capacity of Air Conditioner (Btu/hr)	2.5 ton	2.5 ton
Use with programmable Thermostat (Yes/No)	Yes	No

Note: Total increased incremental costsof high-efficiency design = 4 units x ($160,000-$31,000) = $36,000

Annual and Life Cycle Costs and Savings for System

	10 Units	10 Conventional Units	Savings with Design
Annual Operating Costs*			
Energy cost	$18,648	$27,323	$8,675
Maintenance cost	$500	$500	$0
Total	**$19,148**	**$27,823**	**$8,675**
Life Cycle Costs*			
Operating costs (energy and maintenance)	$260,228	$378,125	$117,897
Energy costs	$253,432	$371,330	$117,897
Maintenance costs	$6,795	$6,795	$0
Purchase price for 10 unit(s)	$45,000	$40,000	-$5,000
Total	**$305,228**	**$418,125**	**$112,897**
		Simple payback of initial additional cost (years)†	**0.6**

* *Annual costs exclude the initial purchase price. All costs, except initial cost, are discounted over the products' lifetime using a real discount rate of 4%. See "Assumptions" to change factors including the discount rate.*

† *A simple payback period of zero years means that the payback is immediate.*

Summary of Benefits for 10 Central Air Conditioner(s)

Initial cost difference	**$5,000**
Life cycle savings	**$117,897**
Net life cycle savings (life cycle savings - additional cost)	**$112,897**
Simple payback of additional cost (years)	**0.6**
Life cycle energy saved (kWh)	**937,846**
Life cycle air pollution reduction (lbs of CO_2)	**1,444,283**
Air pollution reduction equivalence (number of cars removed from the road for a year)	**120**
Air pollution reduction equivalence (acres of forest)	**149**
Savings as a percent of purchase price	**251%**

DRAFT SUMMARY OF PROBABLE PROJECT COST

			GC	Owner
Priority 1A				
New Offices and Basic Layout with HVAC Upgrades (Minimum Scope)				
a) Acoustic Privacy at existing offices: revise lights, switching, partitions, fix damaged fintube etc.			$2,000	$4,000
b) Office Suite revisions			$36,700	$ 63,000
New partitions with partial glazing, new Doors, new Carpet				
New Electrical and Data for new work stations				
New electrical for revised staff room				
Revisions to Lighting and switching				
Occupancy sensors at all new lights				
New Wall Hung cabinets				
c) Replace Rooftop Unit and extend ventilation ductwork to existing and proposed Offices			$52,500	
		Subtotal	**81,200**	**$67,000**
General Requirements, Insurance, Bonds, and Profit			$18500	
		Subtotal	**$99,700**	
		Including work completed by owner	**$166,700**	
		Contingency + escalation	**$20,000**	
			$186,700	
Priority 1A				
Ventilation and Office Reorganization				
Construction costs	**$166,700**	*w estimating contingencies*	**$186,700***	
Priority 1B				
Code Related Sprinkler Upgrades				
Construction costs	**$15,000**	*with estimating contingencies*	**$19,800***	
Priority 2				
Air Conditioning				
Construction costs	**$143,500**	*with estimating contingencies*	**$163,000***	
Priority 3				
Other Efficiency Upgrades				
Construction costs	**$56,250**	*w estimating contingencies*	**$66,000***	
Probable Construction Costs				
Priorities 1, 2,3	**$381,450***	*w estimating contingencies*	**415,500***	

***Excludes construction contingency, design and management fees, and reimbursables.**

SCHEDULE

The School Department would like to complete this work during the summer of 2012, taking advantage of vacations and the unused School Committee Meeting space for swing space and minimal disruption of activities. It is anticipated School Committee will meet in Town Hall during June. The early schedule assumes a proposal request and notice to proceed can be executed quickly and that an advertisement for the project will occur in mid April. The late schedule can be modified to meet School requirements.

	EARLY	LATE
Design	**March 30-April 30, 2012**	**June 1-June 30**
Bidding:	**April 30-May 15, 2012**	**July1- July 15**
Mobilization:	**May 15-May 30, 2012**	**August 15-September 1**
	The lead time for HVAC equipment is approximately 8-10 weeks.	
	Orders to factory no later than May 30 for July 30 earliest equipment delivery	
Phasing		
	1) Priority work will be to complete new offices and existing office modifications in the first 5 weeks of the project so that typical office activities can resume August 1. The school Committee meeting room and various work spaces in Business, Payroll, and Reception will serve as swing space for temporarily relocated staff.	
	2) Preparation for new equipment, roof top and corridors will be ongoing throughout the project	
	3) Installation of terminal equipment will occur as equipment is delivered to the site. Existing A/C will remain operational until new A/C is in place.	
Construction	**June 20 – August 30, 2012**	**September 1- December 30**
Weeks 1	Move furniture out of Special Education to School Committee Meeting Room Move or protect furniture and equipment in the Assistant Superintendent/ Human Resources, Offices and Staff Lounge and Copy Rooms. Begin Roof top and Corridor Prep work.	
Weeks 2,3,4	Demolition New Partitions and Duct Work in office suites	
Week 5	Move back to	
Weeks 6-10	Work on-going for overall system modifications Delivery and Removal of Roof top unit	
Weeks 8-10	Testing and Commissioning	