Honeywell

Honeywell Building Solutions

Investment Grade Energy Audit

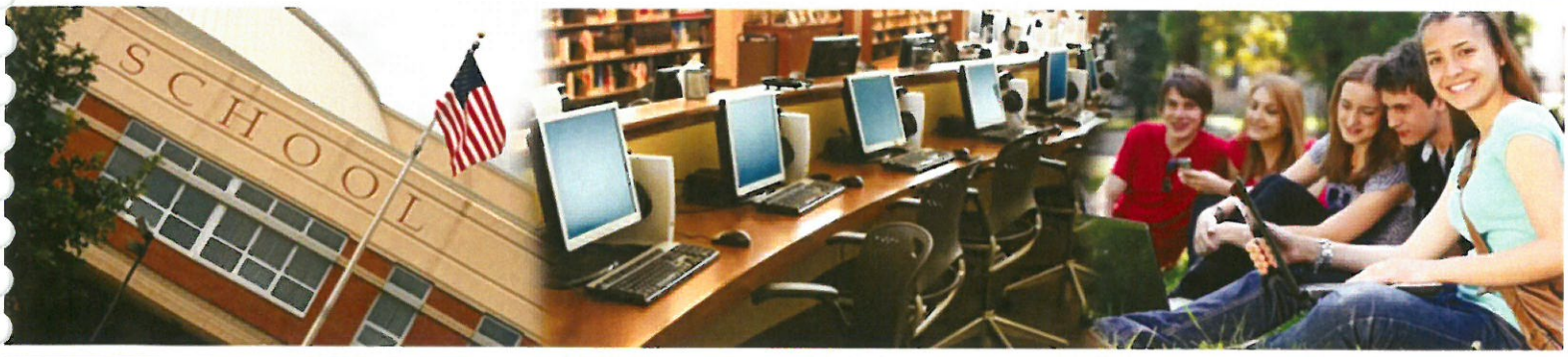
for

Boothbay Region High & Elementary Schools
AOS 98

Boothbay Harbor, ME

May 2, 2018

ENERGY SERVICES GROUP



HONEYWELL PROPRIETARY

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Section One: Executive Summary

The following report is intended to provide an overview of our recommendations to reduce and contain energy costs at the Boothbay Region High & Elementary School buildings. In addition, it was developed to outline additional "non-energy saving" capital improvements designed to provide a more comfortable and healthy learning environment, and to address ongoing deferred maintenance needs.

This report is also intended to provide a basis for AOS 98 to select a project scope for final development and construction. Once selected, Honeywell will proceed with final development and pricing in order to develop a final contract for construction. All pricing options included in this report are budgetary and within +/- 15% of the final project costs.

Section Two: Scope of Work Overview

Section Two provides a complete description of our audit findings and recommended scope of work measures. Due to the amount and total cost of the work identified, we have broken the scope of work into 2 project options for consideration. A summary of each option, including scope of work selections, total estimated cost, incentives and annual energy cost avoidance is outlined in the following tables.

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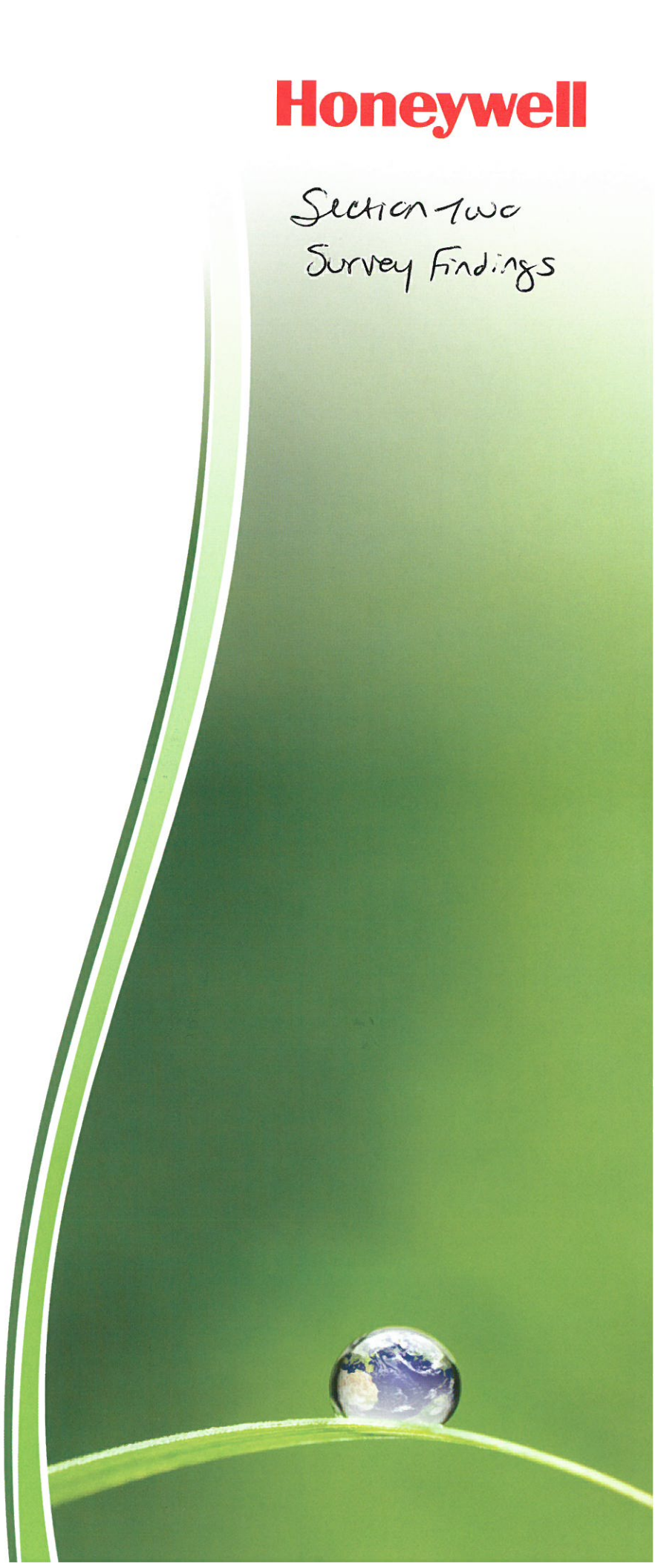
Section Two
Survey Findings



Section Two: Survey Findings

Introduction

The information used to develop this Section was obtained through building surveys, interviews with operators and end users, and data logger results. The information obtained includes nameplate data, equipment age, condition, the systems design and actual load, operational practices and schedules, and operations and maintenance history.

Honeywell has done a review of the Energy Conservation Measures (ECM's) which would provide energy and cost savings to Boothbay Region High & Elementary Schools. This report aims to be an assessment of the feasibility and cost effectiveness of such measures, and an indication of the potential for their implementation.

ECM #1 - Lighting Upgrades

A detailed lighting audit was performed to identify opportunities for lighting and lighting controls efficiency upgrades.

Proposed Upgrades

Provide the following lighting upgrades:

A. Boothbay Region High School:

1. Interior Lighting Upgrades:
   a. Quantity of 173 - 4 ft, 2 lamp T8 wrap fixtures in Hallways and Classrooms to be replaced with 130 - new 2 ft. x 2 ft. DLC Premium Listed LED Low Glare recessed fixtures. Occupancy sensors will be added to control lighting when vacant.
   b. Quantity of 3- 4 ft, 3 lamp T8 recessed troffer fixtures in Classrooms to be retrofitted with DLC Premium Listed LED 24 watt Low Glare retrofit kit.
   c. Quantity of 126- 4 ft, 4 lamp T8 recessed troffer fixtures in Classrooms to be retrofitted with DLC Premium Listed LED 31 watt Low Glare retrofit kit.
   d. Quantity of 40- 4 ft, 4 lamp T8 wrap fixtures in Shop to be 30- new 2 ft. x 4 ft. DLC Premium Listed LED flat panel troffers.
   e. Quantity of 33- 4 ft, 2 lamp T8 wrap fixtures in Cafe to be 15- new 2 ft. x 4 ft. DLC Premium Listed LED flat panel troffers.
   f. Quantity of 5- 4 ft, 4 lamp T8 recessed troffer fixtures in Kitchen to be 5- new 2 ft. x 4 ft. DLC Premium Listed LED flat panel troffers.
   g. Quantity of 11 - 65 watt R30 down light fixtures in Hallway to be replaced with 9 watt LED Energy Star Listed down lights.
   h. Quantity of 19 - 65 watt R30 down light fixtures in Auditorium to be relamped with 15 watt LED Energy Star Listed dimmable lamps.
   i. Quantity of 21- 4 ft, 2 lamp T8 wrap and vapor tight fixtures in Locker Rooms and Fitness Room to be 21- new 2 ft. x 2 ft. DLC Premium Listed LED flat panel troffers.
   j. Quantity of 4- 2 ft, 4 lamp T8 troffer fixtures in Locker Rooms to be 4- new 2 ft. x 2 ft. DLC Premium Listed LED flat panel troffers.
   k. Quantity of 106 - 4 ft, 2 lamp T8 fixtures in Art Room, Stage, Custodial Closets, P.E. Storage and Bathrooms to be retrofit with 2-4 ft. Linear DLC Listed LED T8 tubes and operate on existing ballast.
   l. Quantity of 5 - 4 ft, 2 lamp T8 fixtures in the Main Lobby to be removed and install 2 - 4 ft. LED suspended ring fixtures at staggered heights with the bodies of the fixtures being painted, one in Blue and the other in Gold, the School colors.

m. Quantity of 72 - 2 ft. x 2 ft. 4 lamp T8 fixtures in Hallways and Main Office to be retrofitted with DLC Listed LED 16 watt Low Glare retrofit kit.
n. Quantity of 26- Occupancy Sensors will be installed in the Hallways to control lighting when vacant.
o. Quantity of 23- Dual Technology Occupancy Sensors will be installed in the Classrooms to control lighting when vacant.
p. Quantity of 8 - New LED recessed Wall Wash fixtures will be installed in the Main Lobby and Café to highlight wall mounted displays.
q. Quantity of 4 - 8 ft, 2 lamp T12 strip fixtures without covers in Stage and Boiler Room to be new 8 ft. 60 watt DLC Premium Listed LED Strip fixtures with lens.
r. Quantity of 18 - 2 ft, 2 lamp T8 wrap fixtures or 4 ft. 1 lamp T8 strip fixtures without covers in Custodial Rooms, Storage Rooms and Mechanical Rooms to be new 4 ft. 24 watt DLC Premium Listed LED Strip fixtures with lens.
s. Quantity of 2 - 2 x 13 watt CFL light fixtures in custodial closets to be replaced with 14 watt LED Energy Star Listed lights.
t. Quantity of 30-4 ft. 3 lamp T5HO High Bay fixtures in Gym to be retrofit with high lumen 4 ft. Linear DLC Premium listed LED High Bay retrofit kits with LED drivers. Existing occupancy sensors will remain to control Gym lighting.

2. Exterior Lighting Upgrades:
   a. Quantity of 14 - 50 watt High Pressure Sodium Canopy fixtures to be replaced with 23 watt LED Energy Star Listed Canopy fixtures.

B. Boothbay Region Elementary School:

1. Interior Lighting Upgrades
   a. Quantity of 71 - 4 ft, 2 lamp T8 fixtures in Kitchen, Shop, Shop Office, Locker Rooms and Bathrooms to be retrofit with 2-4 ft. Linear 30 watt DLC Listed LED retrofit kits with LED external drivers.
   b. Quantity of 10- 4 ft, 2 lamp T8 fixtures in Vault, Kitchen Office, Closets and Small Bathrooms to be retrofit with 2-4 ft. Linear 20 watt DLC Listed LED retrofit kits with LED external drivers.
   c. Quantity of 11 - 2 ft, 2 lamp T8 fixtures in Bathrooms to be retrofit with 2-2 ft. Linear DLC Listed LED T8 tubes to operate on existing ballast.
   d. Quantity of 598- 4 ft, 2 lamp T8 recessed troffer fixtures with reflectors in Classrooms, Offices and Library to be retrofitted with DLC Premium Listed LED 24 watt Low Glare retrofit kit.
   e. Quantity of 17- 4 ft, 3 lamp T8 recessed troffer fixtures in Shop to be 16- new 2 ft. x 4 ft. DLC Premium Listed LED flat panel troffers.
   f. Quantity of 3 - New LED recessed Wall Wash fixtures will be installed in the Upper Lobby to highlight wall mounted displays.
   g. Quantity of 157 - 2 ft. x 2 ft. 2 lamp U lamp T8 fixtures in Hallways, Main Office and Baths to be retrofitted with DLC Premium Listed LED 18 watt Low Glare retrofit kit.
   h. Quantity of 20- Occupancy Sensors will be installed in the Hallways to control lighting when vacant.
   i. Quantity of 27 - 8 ft, 2 lamp T8 strip fixtures without covers in Offices, Copier Room, Custodial Rooms, Storage Rooms and Mechanical Rooms to be new 4 ft. 24 watt DLC Premium Listed LED Strip or Recessed fixtures with lens.
   j. Quantity of 5 -2 ft. x 2 ft. 4 lamp U lamp T8 fixtures in Main Lobby to be removed and replaced with 18 - 9 watt LED Energy Star Listed down lights.
   k. Quantity of 2- 65 watt 10 in. recessed fixtures in Lobby under stairs to be retrofit with 16 watt LED Energy Star Listed kit.

l. Quantity of 24-4 ft. 4 lamp T5HO High Bay fixtures and 8-4 ft. 3 lamp T5HO High Bay fixtures in Gym to be retrofit with high lumen 4 ft. Linear DLC Premium listed LED High Bay retrofit kits with LED drivers. Existing occupancy sensors will remain to control Gym lighting.

2. Exterior Lighting Upgrades:
   a. Quantity of 14 - 50 watt High Pressure Sodium Canopy fixtures to be replaced with 23 watt LED Energy Star Listed Canopy fixtures.
   b. Quantity of 1 - 250 watt High Pressure Sodium Flood fixture in rear parking lot fixture to be replaced with new 100 watt DLC Listed LED Flood fixture.
   c. Quantity of 1 - Existing exterior lighting timers will be replaced with new Astronomic/Programmable time clock.

ECM #2 – Building Envelope Upgrades

A detailed building envelope audit was performed to identify opportunities for reducing building infiltration and improving building envelope insulation.

Proposed Upgrades

Provide the following building envelope upgrades:

A. Boothbay Region High School:

1. Base Measures:
   a. 9 - Single commercial doors to be weather-stripped (3 dark bronze anodized).
   b. 1 - Single commercial interior boiler room door to be weather-stripped.
   c. 1 - Single commercial mechanical room access door to be weather-stripped (roof).
   d. 1 - Single commercial electrical closet interior door to be weather-stripped (electrical vault door in Wood Shop).
   e. 2 - Double commercial doors to be weather-stripped (1 dark bronze anodized).
   f. 2 - Overhead garage doors to be weather-stripped, 64 linear feet.
   g. 53 - Window casings to have trim removed, perimeters sealed and trim re-installed, 1,605 linear feet.
   h. 2 - Windows to be sealed at exterior with waterproof construction sealant, all existing sealants to be removed and surfaces treated for installation of new sealant, 48 linear feet.
   i. 5 - Roof top ventilators to be opened, dampers lubricated and perimeters sealed, 40 linear feet.
   j. 24 Ft - Mechanical room floor joint to conditioned space to be sealed.
   k. 300 Ft - Roof/wall joint to be sealed (20" H Dow Thermax Sheathing).
   l. 3 - Windows to be removed, properly disposed of and openings filled-in with 2" insulated FRP panels (gray), 2 @ 45.5"x24.5", 1 @ 92.5"x24.5", 30.5 linear feet, 22.5 square feet.
   m. 1 - Wall louver and duct sleeve to be sealed and insulated with 3" rigid board foam insulation (R21) at interior side of wall, 16 linear feet, 13.75 square feet.
   n. 14 - Unit ventilator louvers to be removed from exterior duct work cleaned, and perimeter interior wall/cabinet interface to be sealed with 2-component foam, 77"x12" at interface, 210 linear feet. All louvers to be re-installed at existing locations and caulked at perimeters with color matching construction sealant.
   o. 4 – Skylights on roof of original section of building to be removed when customer replaces roofing in summer 2018. Savings captured in Honeywell energy project, and cost captured by customer through separate roof replacement project.

2. Window Pane Replacements:
   a. A detailed survey was performed to identify existing windows which have failed or defective thermal breaks/seals between the thermal panes. Failed or defective thermal breaks cause unsightly windows, due to infiltration of water vapor, and more importantly they compromise the thermal integrity of the windows, resulting in additional heat loss. Windows with failed thermal breaks can be repaired by replacing the window panes with new window panes with thermal breaks. This will result in reduced heat loss and improved window appearance. The following windows were identified as being in need of pane replacement due to broken thermal breaks/seals.
   b. Replace 25 existing window pane units (240 Sq Ft) which have failed or defective seals, with new units. New units shall have maximum U value of 0.57 (R 1.75).

B. Boothbay Region Elementary School:

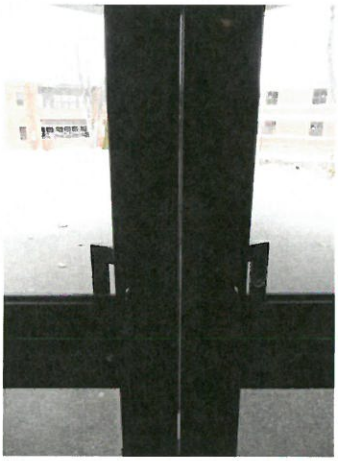
1. Base Measures:
   a. 35 - Single commercial doors to be weather-stripped (32 dark bronze anodized).
   b. 7 - Double commercial doors to be weather-stripped (3 dark bronze anodized).
   c. 2 - Roll-up garage door to be weather-stripped, 72 linear feet.
   d. 60 Ft - Exterior window sill to be sealed with waterproof construction sealant, all existing sealants to be removed and surfaces treated for installation of new sealant. Measure to prevent water leakage into rooms 110 and 109.
   e. 3 - Bulkheads to be sealed and insulated to R21, 128 square feet, 81 linear feet.
   f. 23 - Window panels (FRP panels below windows) to be re-caulked at exterior perimeter, 265 linear feet.
   g. 2 - Pipe penetrations, located in boiler room, to be sealed with fire block sealant at perimeter.
   h. 37 - Unit ventilator's to be sealed to interior wall/cabinet interface, 73"x28" at interface, 612 linear feet. Measure requires coordination with installation of new unit ventilator cabinets. (Note: One unit ventilator will not be included in savings estimates as it is in DDC graphics, but was not found in occupied room counts.)
2. Air-Sealing Existing Air-Barrier:
   a. 19,856 - Square feet of existing polyiso board insulation to be sealed at perimeters with 2-component fire rated foam, all foam to be coated with DC315 intumescent paint (approx. 14,891 linear feet).
   b. Option to Increase R Value To ASHRAE Standard of R38: 19,856 - Square feet of cellulose insulation to be added atop existing insulation to achieve an overall R38. Cellulose vs. fiberglass ?
3. Adding Air-Barrier:
   a. 14,165 - Square feet of 1" Dow Thermax Sheathing to be installed to underside of truss joists and vertical knee-walls (hallways), seams to be sealed with FSK tape and 2-component fire rated foam, all foam to be coated with DC315 intumescent paint (approx. 10,961 linear feet).
   b. Option to Increase R Value to ASHRAE Standard of R38: 14,165 - Square feet of cellulose insulation to be added atop existing insulation to achieve an overall R38.
4. Window Pane Replacements:
   a. A detailed survey was performed to identify existing windows which have failed or defective thermal breaks/seals between the thermal panes. Failed or defective thermal breaks cause unsightly windows, due to infiltration of water vapor, and more importantly they compromise the thermal integrity of the windows, resulting in additional heat loss. Windows with failed thermal breaks can be repaired by replacing the window panes with new window panes with thermal breaks. This will result in reduced

heat loss and improved window appearance. The following windows were identified as being in need of pane replacement due to broken thermal breaks/seals.

b. Replace 35 existing window pane units (427 Sq Ft) which have failed or defective seals, with new units. New units shall have maximum U value of 0.57 (R 1.75).

5. Overhead Door Replacement:

a. The Elementary School has 2 overhead metal roll-up doors which are original (1975 vintage) and which have little to no insulation value. Replace these two overhead doors with new insulated roll-up overhead doors. New overhead doors shall have minimum R value of R 4.23.

Examples of Door Weatherstripping Missing/Inadequate


Attic Insulation Inadequate/Missing in Areas

Typical Window with Failed Thermal Breaks/Seals

Overhead Doors to be Replaced

ECM #3 – Controls & HVAC System Upgrades

Provide the following Controls and HVAC system upgrades:

A. Boothbay Region High School:

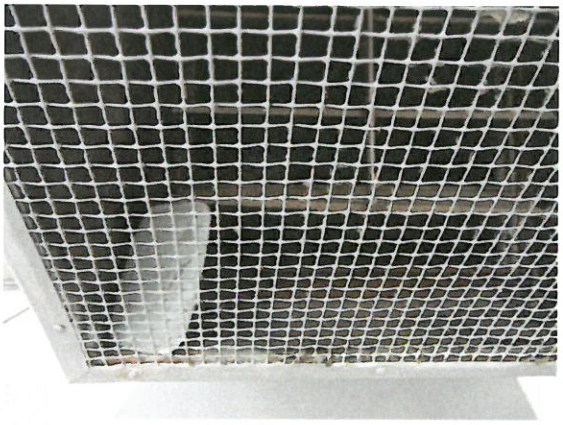
1. Add ACV's & Associated Controls to Unit Ventilators:
   a. 14 unit ventilators have face & bypass dampers, and no control valves on the hot water coils. This allows potential overheating in spring and fall when the boiler/pumps are ON and the units are in full bypass mode. Add automatic control valves and associated controls to these 14 unit ventilators. When OAT is < 40 deg F, full flow through coils and used F & BP dampers for control. When OAT > 40 deg F, all airflow through coil and use ACV's for control.

Existing Unit Ventilator

2. Add Gravity Backdraft Damper to Fume Hood Exhaust System:
   a. The existing fume hood exhaust fan has no gravity backdraft damper. This allows air to gravity flow out of the fan whenever the exhaust fan is OFF. Provide a gravity backdraft damper, to prevent gravity airflow when the fan is OFF.

Existing Fume Hood Exhaust Fan

3. Remove Styrofoam Block from Gooseneck's Backdraft Damper:
   a. A gooseneck on the roof has a backdraft damper which prevents gravity flow when the exhaust fan is OFF. This backdraft damper has a Styrofoam block that is keeping the backdraft damper form closing. Remove the Styrofoam block, to allow the backdraft damper to close when the exhaust fan is OFF.



Gooseneck with Styrofoam Block in Backdraft Damper

4. Replace Paint Spray Exhaust System's Damper and Add Actuator:
   a. The paint spray booth's exhaust system has a damper located near the exhaust louver at the wall. This damper is manually operated by the shop teacher. The teacher manually shuts this damper when the paint spray exhaust fan is OFF, but the damper is of poor quality and it has no blade or jamb seals, which allows cold outdoor air to dump back into the paint spray booth and into the shop.
   b. Replace the existing manually operated damper with a new low leakage damper that has blade and jamb seals. Provide a motorized damper actuator, interlocked with the exhaust fan, so that the damper will automatically close when the exhaust fan is turned OFF and automatically open when the exhaust fan is turned ON.
   c. Provide duct wrap insulation between the new damper and the exhaust louver, to reduce heat loss to the cold section of duct.

Paint Spray Exhaust System's Existing Damper

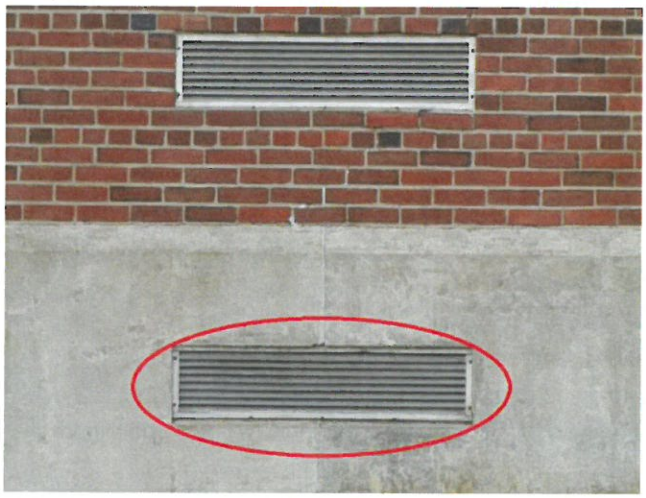
5. Provide Summer Electric Water Heater:
   a. Domestic hot water for the building is provided through heat exchangers that are connected to the heating system boilers. This requires the large boilers to be active in order for domestic hot water to be available. Currently the school shuts the boilers in the summer and does not use domestic hot water in the summer. There is a desire to have the ability to provide a small amount of domestic hot water for summer use.
   b. Provide a 40 gallon electric water heater in the boiler room. Connect the new water heater to domestic hot water main, and provide manual valves so that selection of domestic hot water source (boilers or electric) can be made manually through the valves.
   c. NOTE: A 40 gallon electric water heater will not be capable of providing high demand domestic hot water such as for locker room showers or for high demand kitchen use. This electric water heater is intended to provide minimal hot water in the summer, for uses such as floor washing and limited lavatory use.
6. Retro-Commission HV-1:
   a. HV-1, which is the large variable air volume air handling unit which serves the 1996 addition, was discovered with its outside air damper remaining approximately 60% open when the unit was turned OFF.
   b. Retro-commission HV-1, to ensure that the sequence of operation is in compliance with the design intent.

HV-1

7. Add 4 Hour No-Hold Timer Switch for Dishwasher Hood Exhaust Fan:
   a. The dishwasher exhaust hood's fan is currently controlled by an ON/OFF wall switch. At times, the switch can inadvertently be left ON overnight or on weekends by kitchen staff.
   b. Remove the existing wall switch and provide a 4 hour no-hold timer switch. This will require kitchen staff to wind the switch as much as 2 times per day (assuming an 8 hour shift and continuous operation), and will limit excessive run time of the fan to 4 hours if staff forget to turn the fan OFF.

4 Hour No Hold Timer Switch

8. Add Duct Sleeves, Motorized Dampers and Humidistats to the 2 Crawl Space Louvers:
   a. Each of the 2 basement crawl spaces has a wall louver at the exterior foundation wall. The purpose of this louver is to provide passive control of humidity in the crawl spaces. The crawl spaces were dry during our surveys, and typically crawl spaces are dry in the winter. Summer is typically when humidity control in crawl spaces might be required. The open louvers in the winter allow cold air to enter the crawl spaces, and that increases heat loss through the floor of the occupied spaces above.
   b. Provide duct sleeves and motorized dampers at the two wall louvers. Provide a humidistat in each of the 2 crawl spaces. Use the humidistats to control the motorized dampers based on crawl space humidity. This will allow the dampers to close in the winter, which will reduce heat loss through the floors above.



Crawl Space Louver (Circled in Red)

9. Provide Air Conditioning/Dehumidification for The Auditorium:
   a. The Auditorium is currently not air conditioned. The owner desires a minimal amount of air conditioning, to help control humidity in the space.
   b. Provide three – 3 ton mini split AC units for the Auditorium.
   c. NOTE: This solution is not intended to provide full air conditioning under extreme load conditions. It is intended to provide dehumidification and air conditioning under average load conditions.

Auditorium

10. Provide De-Stratification Fan in The Auditorium:
    a. Provide a de-stratification fan in the Auditorium, to circulate air in the room, in an effort to reduce humidity in conjunction with the new mini split AC units.

Typical De-Stratification Fan

11. Add Transfer Fan to Computer Server Room:
    a. The computer server room near the Library overheats.
    b. Provide a transfer fan, to transfer warm air from the Server Room to the corridor.
    c. NOTE: This is intended as a low cost method of removing heat from the room. Should this method prove to be insufficient, a mini split AC unit will be required.
12. Replace 1950's Vintage Cabinet Heater In Main Lobby:
    a. The 1950's vintage cabinet heater in the Main Lobby is in poor condition. The service technician has indicated that the fan in this unit has not worked for years. As this is the main entrance w2ith significant cold air infiltration, this unit is important in maintaining a comfortable environment.

b. Replace the existing cabinet heater with a new, appropriately sized unit.

Existing Cabinet Heater in Main Lobby

13. Add Access Door to Gymnasium Duct Heating Coil, and Vacuum Clean Coil:
    a. The Gymnasium air handling unit's heating coil, which is in the exposed supply duct in the Gym, has an access door on the discharge side of the coil, but no access door on the inlet side of the coil where vacuuming needs to be performed.
    b. Provide a new access door on the inlet side of the coil, and vacuum clean the coil.

Gymnasium Duct Heating Coil

14. Replace Sawdust Collector:
    a. The outdoor sawdust collector cyclone unit is in very poor condition. It is nearly completely rusted out at the base. In addition, the sawdust collector does not have an after-filter unit, so fine dust, which is a known carcinogen, is blown outdoors.
    b. The ductwork in the Wood Shop is not of proper quality and construction for a sawdust collection system. In addition, the system does not have an explosion backdraft damper.
    c. Base Solution:
        1) Replace the cyclone unit with a new, appropriately sized cyclone unit.
        2) Provide a new motor starter.
        3) Provide a new after-filter unit, to capture fine dust particles.
        4) Remove the existing fencing and provide new fencing.

5) Provide a new concrete pad.

d. Optional Solution:
   1) Provide all scope listed above in Base Solution, and include the following:
   2) Provide a variable frequency drive in lieu of a motor starter, for soft start and balancing of the new unit.
   3) Provide an explosion backdraft damper in the main duct.
   4) Replace existing sawdust collection system ductwork with new ductwork that is designed for sawdust collection systems (clamped joints).


Gymnasium Duct Heating Coil

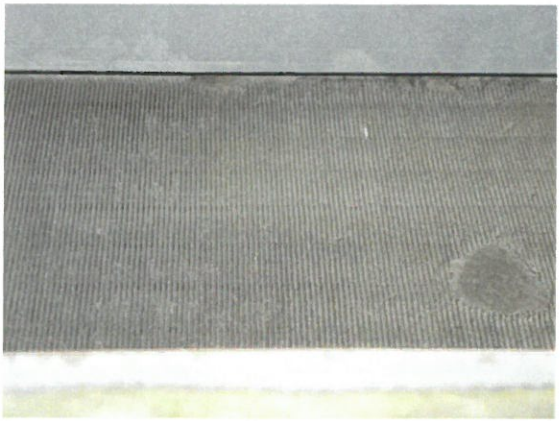
15. Provide Ventilation System for Weight Room, PE Health Teacher, and 3 Adjacent Small Offices:
    a. The Weight Room, PE Health Teacher and 3 adjacent small offices, all in the basement, have no means of mechanical fresh air ventilation.
    b. Provide a new mechanical ventilation system, to supply code compliant ventilation air to these rooms.
       1) Provide a 100% outdoor air ventilation system, to eliminate the need for additional return ductwork.
       2) Locate the new unit in the crawl space.
       3) Provide concealed ductwork where space above ceilings permits. Where space does not permit, provide exposed painted ductwork.
       4) Provide new DDC controls for new unit, and interface with the operator workstation and user interface graphics.
16. Provide Ventilation System for IA Shop:
    a. The Industrial Arts Shop has no means of mechanical fresh air ventilation. With the sawdust collector and a paint spray booth, this unit is in need of not only ventilation air for the occupants but also for make-up air for these large exhaust systems.
    b. Provide a new mechanical ventilation system, to supply make-up air and code compliant ventilation air to the Industrial Arts Shop.
       1) Locate the new unit in the storage room.
       2) Provide exposed painted ductwork, as space above ceilings is limited.
       3) Interlock the unit with the sawdust collector and the paint spray booth exhaust fan, so that make-up air will be provided if either exhaust system is ON. NOTE: The new unit will be designed assuming that diversity of use in the Wood Shop will result in minimal occurrences when both the sawdust collector and the paint spray booth are running simultaneously, so make-up air design will be based on only one of these systems running at a time.
       4) Provide new DDC controls for new unit, and interface with the operator workstation and user interface graphics.

17. Replace Boiler Jockey Pumps with Greater Capacity Pumps:
    a. There have been issues with cracked boiler sections in recent years. Although we believe that it is a factory quality control issue, we continue to take steps to protect the boilers. One step that has been suggested by our service technician is to increase the sizes of the boiler jockey pumps, to provide additional protection from low return water.
    b. Replace the existing 45 GPM jockey pumps with new 100 GPM jockey pumps.

letter from Jay Mercotte to Wieluk Law re their expert opinion

Existing Jockey Pump

18. Vacuum Clean VAV Box Heating Coils:
    a. There are 18 VAV boxes associated with HV-1. These VAV boxes have heating coils, and our surveys revealed that the heating coils have signs of dust and debris partially clogging the coils.
    b. Vacuum clean the 18 VAV box heating coils.



Typical VAV Box Heating Coil (This Coil Located in Art Room)

19. Add Water Meter to DHW System:
    a. The domestic hot water system has no means to monitor usage. Having the ability to monitor domestic hot water usage will benefit the owner by knowing how domestic hot water usage changes from month to month and year to year.
    b. Add an analog water meter to the domestic hot water system's cold water make-up line, to monitor domestic hot water usage. NOTE: This will be a simple analog meter; it will not be tied into the DDC system for automatic monitoring, so manual readings will need to be taken.

20. Add Rain Hood Over Art Room's Wall Mounted Exhaust Fan:
    a. The owner reports that the wall mounted exhaust fan, which serves the kiln hood, leaks water into the building during wind driven rain storms.
    b. Provide a rain hood over the wall mounted exhaust fan.


Art Room's Wall Mounted Exhaust Fan

B. Boothbay Region Elementary School:

1. Add Backdraft Damper to Dryer Vent Outlet:
    a. In the Industrial Arts/Maintenance Shop, the dryer vent outlet at the outside wall is missing. This allows cold air to dump into the building through the dryer when it is OFF.
    b. Provide a new backdraft damper on the dryer vent outlet.


Dryer Vent Outlet – Missing Backdraft Damper

2. Disconnect and Cap Ductwork at 2 Abandoned Exhaust Hoods:
    a. In the Industrial Arts/Maintenance Shop, there are two abandoned yellow exhaust hoods. The ductwork for these hoods is still connected and it terminates outdoors. There is no active backdraft damper in this exhaust system, so warm building air gravity flows out through this ductwork when the exhaust fan is OFF.
    b. Disconnect the ductwork from the two abandoned hoods, and cap the ductwork to eliminate gravity airflow.

Abandoned Exhaust Hoods

3. Remove Abandoned Sawdust Collector & Cap Duct:
   a. In the Industrial Arts/Maintenance Shop, there is an abandoned sawdust collection system, with the sawdust collection cyclone located outdoors. The ductwork for this sawdust collection system is still connected and it terminates outdoors. There is no active backdraft damper in this exhaust system, so warm building air gravity flows out through this ductwork when the exhaust fan is OFF.
   b. Remove the outdoor sawdust collection cyclone, and cap the duct at the exterior wall, to eliminate gravity airflow.
   c. NOTE: The cyclone and its steel framework will be removed, but the concrete base will remain abandoned in place.

Abandoned Sawdust Collector

4. Add Backdraft Dampers to Rooftop Exhaust Fans:
   a. There are 3 rooftop exhaust fans (Fan # 5 – Fume Hood System, Fan # 9 – Dishwasher Exhaust Hood, Fan # 3 – Classroom Exhaust) that have no gravity backdraft dampers, so warm building air gravity flows out through these fans when they are OFF.
   b. Add gravity backdraft dampers to these 3 fans.



Fan #5, Fan #3, Fan #9 (On Left)

5. Add Transfer Fan System to Transfer Heat From Server Room to Main Entrance:
   a. The Server Room on the lower level overheats. Small portable fans have been installed to move the heat out of the room. That heat could be beneficially used in the winter, if it could be transferred to the entrance area.
   b. Provide a new transfer fan system, to transfer warm air from the Server Room to the entrance/lobby area down the hall.

Fan Transferring Heat Out of Server Room

6. Provide Summer LP Gas Water Heater:
   a. Domestic hot water for the building is provided through heat exchangers that are connected to the heating system boilers. This requires the large boilers to be active in order for domestic hot water to be available. Currently the school shuts the boilers in the summer and does not use domestic hot water in the summer. There is a desire to have the ability to provide a small amount of domestic hot water for summer use.
   b. As there is an existing 500 gallon LP Gas tank outside the boiler room which serves the emergency generator, provide a new LP Gas water heater to supply domestic hot water for the summer. Serve the new gas water heater from the existing 500 gallon LP Gas tank.
   c. NOTE: The 500 gallon LP Gas tank may not be of sufficient size to serve the new gas water heater and the emergency generator simultaneously. This should not create a problem, as the boilers are capable of supplying domestic hot water if the emergency generator should be needed for an outage.

Existing 500 Gallon LP Gas Tank

7. Add 4 Hour No-Hold Timer Switch for Dishwasher Hood Exhaust Fan:
   a. The dishwasher exhaust hood's fan is currently controlled by an ON/OFF wall switch. At times, the switch can inadvertently be left ON overnight or on weekends by kitchen staff.
   b. Remove the existing wall switch and provide a 4 hour no-hold timer switch. This will require kitchen staff to wind the switch as much as 2 times per day (assuming an 8 hour shift and continuous operation), and will limit excessive run time of the fan to 4 hours if staff forget to turn the fan OFF.

4 Hour No Hold Timer Switch

8. Add CO2 Controls To IA/Maintenance Shop Air Handling Unit (HV-7):
   a. The IA/Maintenance Shop's air handling unit (HV-7) was found during our surveys with its outside air damper at 45% open on a cold day (i.e. no need for free cooling) and with no occupancy in the IA/Maintenance Shop.
   b. Provide CO2 controls for HV-7, to reduce outdoor air as occupancy levels change.

HV-7

9. Provide Ventilation System for Band Room/Stage:
   a. The Stage is used as the Band classroom, and this room has no means of mechanical fresh air ventilation.
   b. Provide a new mechanical ventilation system, to supply code compliant ventilation air to the Band Room/Stage.
      1) Locate the new unit in the storage room behind the Stage.
      2) Provide new DDC controls for new unit, and interface with the operator workstation and user interface graphics.

Stage Storage Room

10. Replace 36 - 1977 Vintage Unit Ventilators:
    a. The 36 - 1977 vintage unit ventilators have exceeded their useful service lives. Although the outer cabinets of the units appear to be in generally fair to good condition, the service technician reports that these units have been problematic. Damper blades have been breaking loose from their shafts.

Temporary repairs have been made, but more permanent repairs require the units to be nearly disassembled, which would be very time consuming and costly, so replacement of these units is justified.

b. Replace the 36 existing unit ventilators with new units.
   1) New units will have face & bypass dampers and automatic control valves.
   2) Existing units are assumed to have code compliant power feeds. Upgrading of power feeds is excluded.
   3) Valves and accessories in the unit ventilator cabinets will be replaced with new.
   4) Casework will be modified as required, to accommodate differences in width from existing units to new units.
   5) Air and water balancing are included.


Typical Existing Unit Ventilator

11. <u>Replace HV-2, HV-3, HV-4 and Safety Upgrades to Mechanical Mezzanine:</u>
    a. HV-2 (Gymnasium):
       1) The Gymnasium air handling unit (HV-2) is original 1977 vintage. The unit has exceeded its useful service life and it is in poor condition. There are no blade or jamb seals on the dampers, the return air damper is bent, the return air duct connection to the bottom of the unit is separated. The unit has exposed fiberboard insulation on the inner surfaces of the unit housing, and that fiberboard liner has become friable and has deteriorated over time, sending fiberglass particles out through the ductwork and into the occupied spaces. The deteriorated fiberboard liner accumulates dirt, dust and is a potential for mold growth.
       2) The 2 duct mounted heating coils associated with HV-2 are also original 1977 vintage. They have exceeded their useful service lives and they are in poor condition. They are clogged with dust and debris from many years of use.
       3) Replace HV-2 with a new unit:
          a) New unit will be double wall construction, with solid interior walls so that exposed fiberboard insulation is eliminated.
          b) New unit will have a variable frequency drive (VFD) and associated controls, to allow the fan speed to be reduced when CO2 and temperature are satisfied.
          c) Similar to the existing unit, the new unit will <u>not</u> have a heating coil. Heating will be performed through the 2 duct mounted heating coils.
          d) Valves and accessories will be replaced with new.
          e) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.

4) Replace 2 Duct Mounted Heating Coils:
   a) Replace 2 – 66" x 33" duct mounted heating coils.
   b) Valves and accessories to be replaced with new.
   c) Provide water balancing.

b. HV-3 (Locker Rooms):
   1) The Locker Room air handling unit (HV-3) is original 1977 vintage. The unit has exceeded its useful service life and it is in poor condition. There are no blade or jamb seals on the dampers. The unit has exposed fiberboard insulation on the inner surfaces of the unit housing, and that fiberboard liner has become friable and has deteriorated over time, sending fiberglass particles out through the ductwork and into the occupied spaces. The deteriorated fiberboard liner accumulates dirt, dust and is a potential for mold growth.
   2) The 4 duct mounted heating coils associated with HV-3 are also original 1977 vintage. They have exceeded their useful service lives and they are in poor condition. They are clogged with dust and debris from many years of use.
   3) Replace HV-3 with a new unit:
      a) New unit will be double wall construction, with solid interior walls so that exposed fiberboard insulation is eliminated.
      b) New unit will have a variable frequency drive (VFD) and associated controls, to allow the fan speed to be reduced when the existing Locker Room occupancy sensors indicate no occupancy.
      c) The new unit will have a heating coil. Additional heat will be provided by the 4 duct mounted heating coils (to be replaced).
      d) Valves and accessories will be replaced with new.
      e) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.
   4) Replace 4 Duct Mounted Heating Coils:
      a) Replace 4 duct mounted heating coils (1 – 14" x 12", 1 – 18" x 12", 2 – 6" x 6").
      b) Provide duct access doors for the new coils.
      c) Valves and accessories to be replaced with new.
      d) Provide water balancing.

c. HV-4 (Teacher's Lounge):
   1) The Teacher's Lounge air handling unit (HV-4) is original 1977 vintage. The unit has exceeded its useful service life and it is in poor condition. There are no blade or jamb seals on the dampers. The unit has exposed fiberboard insulation on the inner surfaces of the unit housing, and that fiberboard liner has become friable and has deteriorated over time, sending fiberglass particles out through the ductwork and into the occupied spaces. The deteriorated fiberboard liner accumulates dirt, dust and is a potential for mold growth.
   2) Replace HV-4 with a new unit:
      a) New unit will be a 1,200 CFM unit ventilator.
      b) Valves and accessories will be replaced with new.
      c) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.

d. Safety Upgrades to Mechanical Mezzanine:
   1) Provide safe access to the mechanical mezzanine where HV-2, HV-3 and HV-4 are located.
   2) Add a permanent access ladder in the nearby Janitor's Closet, with an extension of the mechanical mezzanine platform to connect to the new access ladder.

3) Expand the mechanical mezzanine platform as required to allow for safe maintenance and service access to the new air handling units and duct heating coils.
4) Add safety railing around the perimeter of the platform.



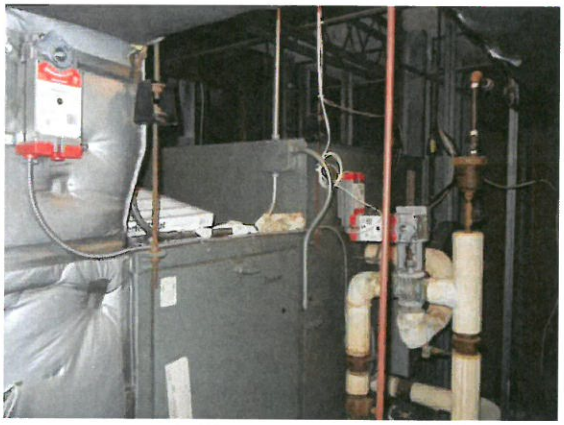


HV-2, HV-3, HV-4

12. Replace HV-5, HV-6, HV-7 And Safety Upgrades to Mechanical Mezzanine:
    a. HV-5 (Kitchen):
        1) The Kitchen air handling unit (HV-5) is original 1977 vintage. The unit has exceeded its useful service life and it is in poor condition. The unit has exposed fiberboard insulation on the inner surfaces of the unit housing, and that fiberboard liner has become friable and has deteriorated over time, sending fiberglass particles out through the ductwork and into the occupied spaces. The deteriorated fiberboard liner accumulates dirt, dust and is a potential for mold growth.
        2) Replace HV-5 with a new unit:
            a) New unit will be double wall construction, with solid interior walls so that exposed fiberboard insulation is eliminated.
            b) The new unit will have a heating coil. Valves and accessories will be replaced with new.
            c) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.
    b. HV-6 (Music):
        1) The Music air handling unit (HV-6) is original 1977 vintage. The unit has exceeded its useful service life and it is in poor condition. There are no blade or jamb seals on the dampers. The unit has exposed fiberboard insulation on the inner surfaces of the unit housing, and that fiberboard liner has become friable and has deteriorated over time, sending fiberglass particles out through the ductwork and into the occupied spaces. The deteriorated fiberboard liner accumulates dirt, dust and is a potential for mold growth.
        2) The 3 duct mounted heating coils associated with HV-6 are also original 1977 vintage. They have exceeded their useful service lives and they are in poor condition. They are clogged with dust and debris from many years of use.
        3) Replace HV-6 with a new unit:
            a) New unit will be double wall construction, with solid interior walls so that exposed fiberboard insulation is eliminated.
            b) Similar to the existing unit, the new unit will not have a heating coil. Heating will be performed through the 3 duct mounted heating coils.
            c) Valves and accessories will be replaced with new.
            d) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.
        4) Replace 3 Duct Mounted Heating Coils:
            a) Replace 3 duct mounted heating coils (1 – 28" x 18", 1 – 12" x 6", 1 – 30" x 18").
            b) Provide duct access doors for the new coils.
            c) Valves and accessories to be replaced with new.
            d) Provide water balancing.
    c. HV-7 (IA/Maintenance Shop):
        1) The IA/Maintenance Shop air handling unit (HV-7) is original 1977 vintage. The unit has exceeded its useful service life and it is in poor condition. There are no blade or jamb seals on the dampers. The unit has exposed fiberboard insulation on the inner surfaces of the unit housing, and that fiberboard liner has become friable and has deteriorated over time, sending fiberglass particles out through the ductwork and into the occupied spaces. The deteriorated fiberboard liner accumulates dirt, dust and is a potential for mold growth.
        2) Replace HV-7 with a new unit:
            a) New unit will be double wall construction, with solid interior walls so that exposed fiberboard insulation is eliminated.

b) The new unit will have a heating coil. Valves and accessories will be replaced with new.
c) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.

d. Safety Upgrades to Mechanical Mezzanine:
1) Provide safe access to the mechanical mezzanine where HV-5, HV-6 and HV-7 are located.
2) Add a permanent access ladder in the nearby Kitchen Storage room, with an extension of the mechanical mezzanine platform to connect to the new access ladder.
3) Expand the mechanical mezzanine platform as required to allow for safe maintenance and service access to the new air handling units and duct heating coils.
4) Add safety railing around the perimeter of the platform.

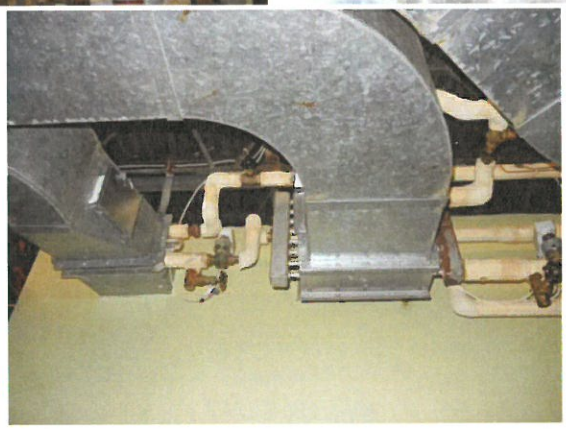




HV-5, HV-6, HV-7

13. Replace HV-1:
    a. HV-1 (Administration):
        1) The Administration air handling unit (HV-1) is original 1977 vintage. The unit has exceeded its useful service life and it is in poor condition. There are no blade or jamb seals on the dampers. The unit has exposed fiberboard insulation on the inner surfaces of the unit housing, and that fiberboard liner has become friable and has deteriorated over time, sending fiberglass particles out through the ductwork and into the occupied spaces. The deteriorated fiberboard liner accumulates dirt, dust and is a potential for mold growth.
        2) The 4 duct mounted heating coils associated with HV-1 are also original 1977 vintage. They have exceeded their useful service lives and they are in poor condition. They are clogged with dust and debris from many years of use.
        3) Replace HV-1 with a new unit:
            a) New unit will be double wall construction, with solid interior walls so that exposed fiberboard insulation is eliminated.
            b) Similar to the existing unit, the new unit will not have a heating coil. Heating will be performed through the 4 duct mounted heating coils.
            c) Valves and accessories will be replaced with new.
            d) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.
        4) Replace 4 Duct Mounted Heating Coils:
            a) Replace 4 duct mounted heating coils (1 – 12" x 6", 1 – 12" x 12", 1 – 14" x 6", 1 – 24" x 12").
            b) Valves and accessories to be replaced with new.
            c) Provide water balancing.





HV-1

14. Replace FCU-1 And Extend Generator Vent Up Higher:
    a. FCU-1 (Computer Lab/Guidance):
        1) The Computer Lab/Guidance air handling unit (FC-1) is of unknown age, and it is in fair to poor condition. It appears as though the heating coil in this unit was disconnected, so the unit provides no heat.
        2) Replace FCU-1 with a new unit:
            a) New unit will be a unit ventilator with hot water coil and face & bypass dampers.
            b) Valves and accessories will be replaced with new.
            c) Air and water balancing of the new unit are included. Air balancing is limited to the unit only; air balancing is not included for the entire ductwork system.
    b. Extend Emergency Generator Vent Up Higher:
        1) The fresh air intake louver for FCU-1 terminates close to and at approximately the same elevation as the exhaust vent outlet of the emergency generator. This creates a serious danger of potentially drawing in carbon monoxide when the generator runs.
        2) Extend the emergency generator exhaust vent up, to an elevation that is a minimum of 10 feet above FCU-1 fresh air intake louver. Brace the emergency generator exhaust vent to the building wall with steel angle support braces.

FCU-1

15. Replace Fuel Oil Transfer Pumps with New Day Tank:
    a. The existing fuel oil transfer pumps in the boiler room are original 1977 vintage. They have exceeded their useful service lives and they are in fair to poor condition. The existing Cleaver Brooks boilers require these pumps to run continuously during the heating season.
    b. Replace the existing fuel oil transfer pumps with a new fuel oil day tank with duplex pump set. This new system will result in a fuel oil transfer system that cycles on and off to maintain oil level in the day tank, versus the more energy intensive existing pumps which must run 24/7. The Cleaver Brooks boilers will be replaced with new boilers that do not require constant oil flow (scope shown elsewhere in this report).

Existing Fuel Oil Transfer Pumps

16. Replace Boilers:
    a. The existing Cleaver Brooks boilers are original 1977 vintage. They have exceeded their useful service lives and they are in fair to poor condition.
    b. Replace the existing Cleaver Brooks boilers with new Buderus 3 pass cast iron sectional boilers.
        1) Provide new metal chimney liner.
        2) Provide new powered combustion air system.
        3) Provide new concrete housekeeping pads.
        4) Modify boiler room piping so that new boilers inject into the primary heating main.

Existing Cleaver Brooks Boilers

17. Replace Heating Water Pumps:
    a. The existing base mounted heating water pumps are original 1977 vintage. They have exceeded their useful service lives and they are in fair to poor condition.
    b. Replace the existing heating pumps with new base mounted pumps.
        1) Extend the concrete housekeeping to accommodate the new pumps.
        2) Re-use existing VFD's.
        3) Provide water balancing of new pumps.

Existing Heating Water Pumps

18. Provide AC for the Administration Area:
    a. Provide mini split AC and heat pump systems for 6 Administration offices.
        1) Per the owner's request, one system will be an AC only system. It will serve 3 of the offices and it will include 1 outdoor unit and 3 indoor units.
        2) Per the owner's request, one system will be a heat pump system, providing both heat and AC. It will serve the Main Reception area and 2 offices and it will include 1 outdoor unit and 3 indoor units.
        3) Indoor units mounted on exterior walls will drain their condensate through the exterior walls.
        4) Indoor units mounted on interior walls will pump their condensate to a safe disposal area (floor drain, sanitary drain line).

19. Extend Dryer Vent to Outdoors:
    a. In Room 228, the dryer vent terminates in the cold attic. This is a code violation, and it is not good practice as moist air from the dryer condenses in the cold attic, and that can cause ceiling staining and mold growth.
    b. Extend the dryer vent up through the roof, with a backdraft damper.

Re-do vent to roof

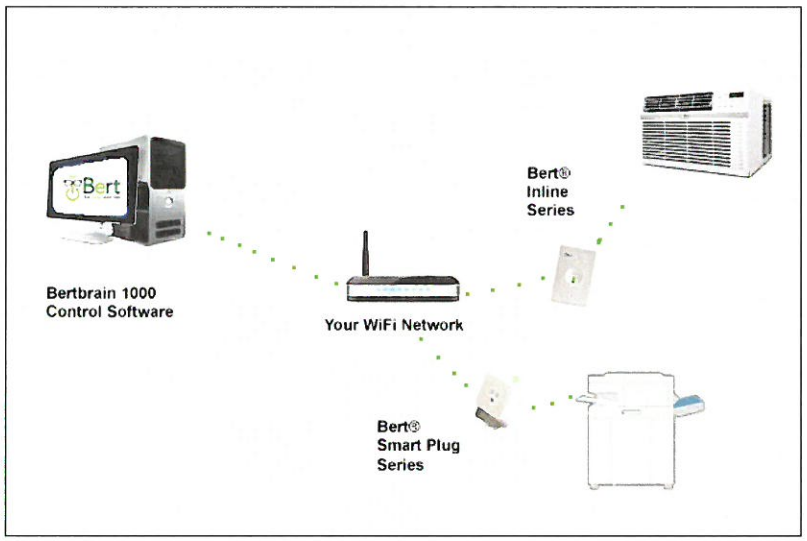
Dryer Vent Terminates in Cold Attic

20. Add Water Meter to DHW System:
    a. The domestic hot water system has no means to monitor usage. Having the ability to monitor domestic hot water usage will benefit the owner by knowing how domestic hot water usage changes from month to month and year to year.
    b. Add an analog water meter to the domestic hot water system's cold water make-up line, to monitor domestic hot water usage. NOTE: This will be a simple analog meter; it will not be tied into the DDC system for automatic monitoring, so manual readings will need to be taken.

ECM #4 – Plug Load Power Management

Provide a plug-load power management system, to implement shut-down of devices during unoccupied times. The plug load power management system would communicate wirelessly through the existing school department LAN. Devices which would be controlled include projectors, smart boards, printers, copiers, vending machines, TV monitors, large coffee makers, water dispensers, plug-in water fountains. This energy conservation measure will be implemented in the following buildings:

A. Boothbay Region High School:
B. Boothbay Region Elementary School:



Plug Load Power Management Devices

ECM #5 – High Efficiency Transformers

Replace existing school department owned transformers with high efficiency transformers. This energy conservation measure will be implemented in the following buildings:

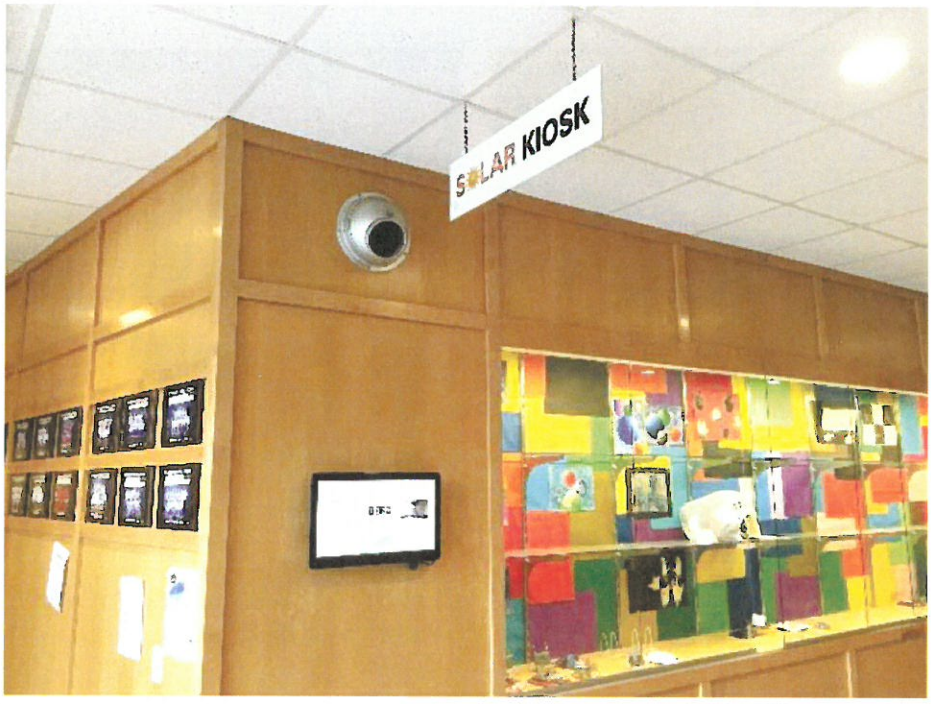
A. Boothbay Region Elementary School:
   1. 2 – 75 kVA Transformers.
   2. 1 – 45 kVA Transformer.
   3. 1 – 37.5 kVA Transformer.
   4. 2 – 30 kVA Transformers.
   5. 1 – 15 kVA Transformer.

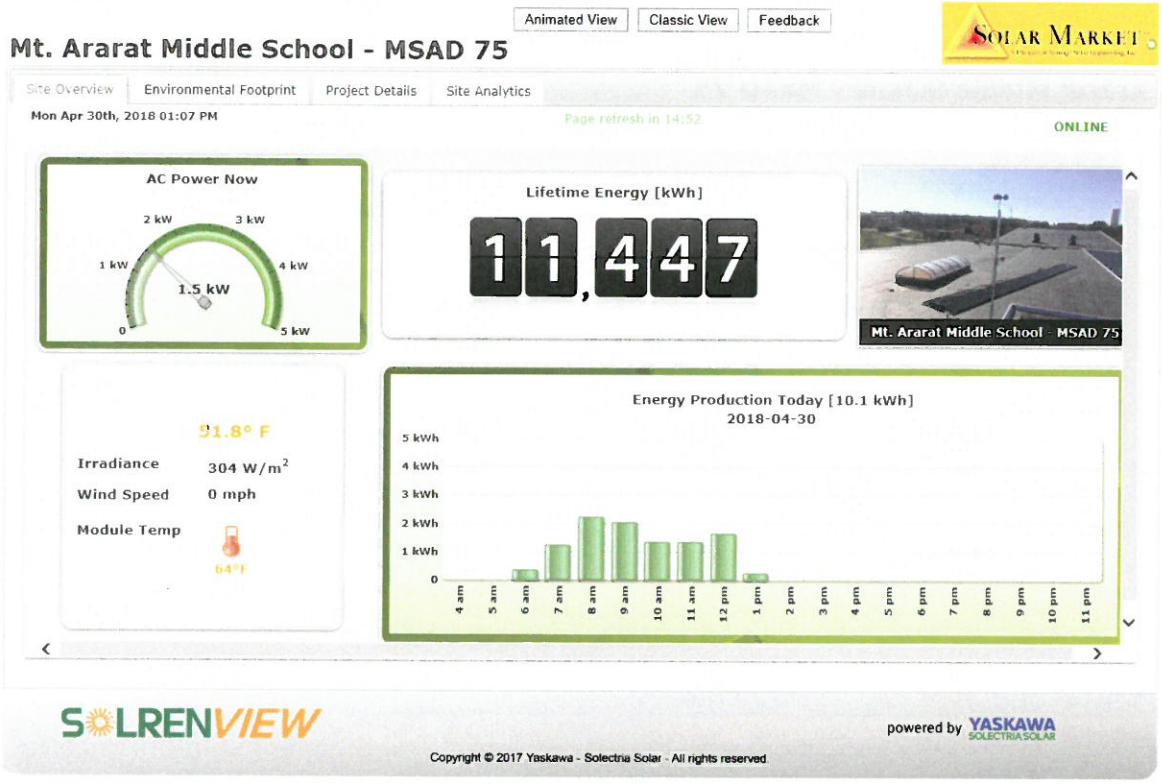
Examples of Existing Transformers

ECM #6 – Solar PV Array

Provide small, 2 kW solar PV system at Boothbay High School, as an educational tool for sustainability and energy efficiency. Provide a graphical interface kiosk at the front entrance of the building.

Example of a Solar PV Array (5 kW Array Shown)




Animated View
Classic View
Feedback
Mt. Ararat Middle School - MSAD 75
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Environmental Footprint
Project Details
Site Analytics
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Module Temp
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2018-04-30
SOLRENVIEW
powered by YASKAWA SOLECTRIA SOLAR
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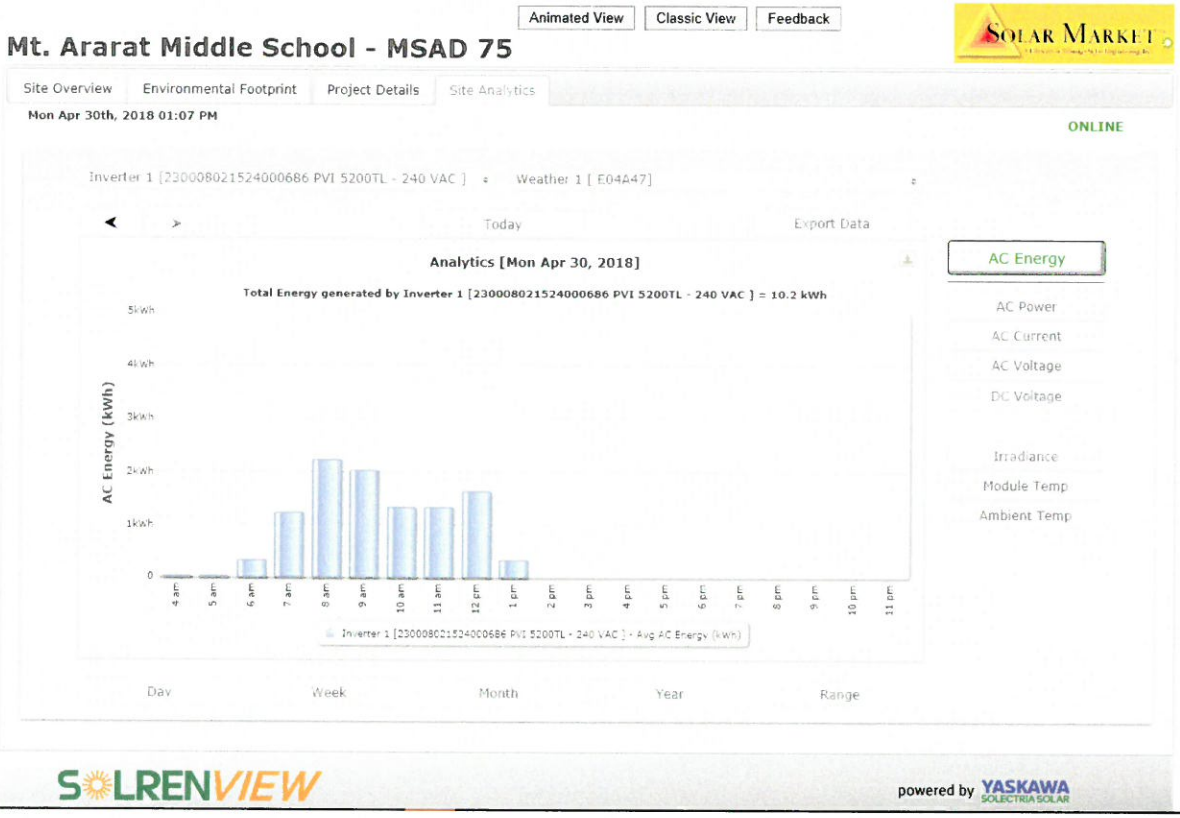
Animated View
Classic View
Feedback
Mt. Ararat Middle School - MSAD 75
Site Overview
Environmental Footprint
Project Details
Site Analytics
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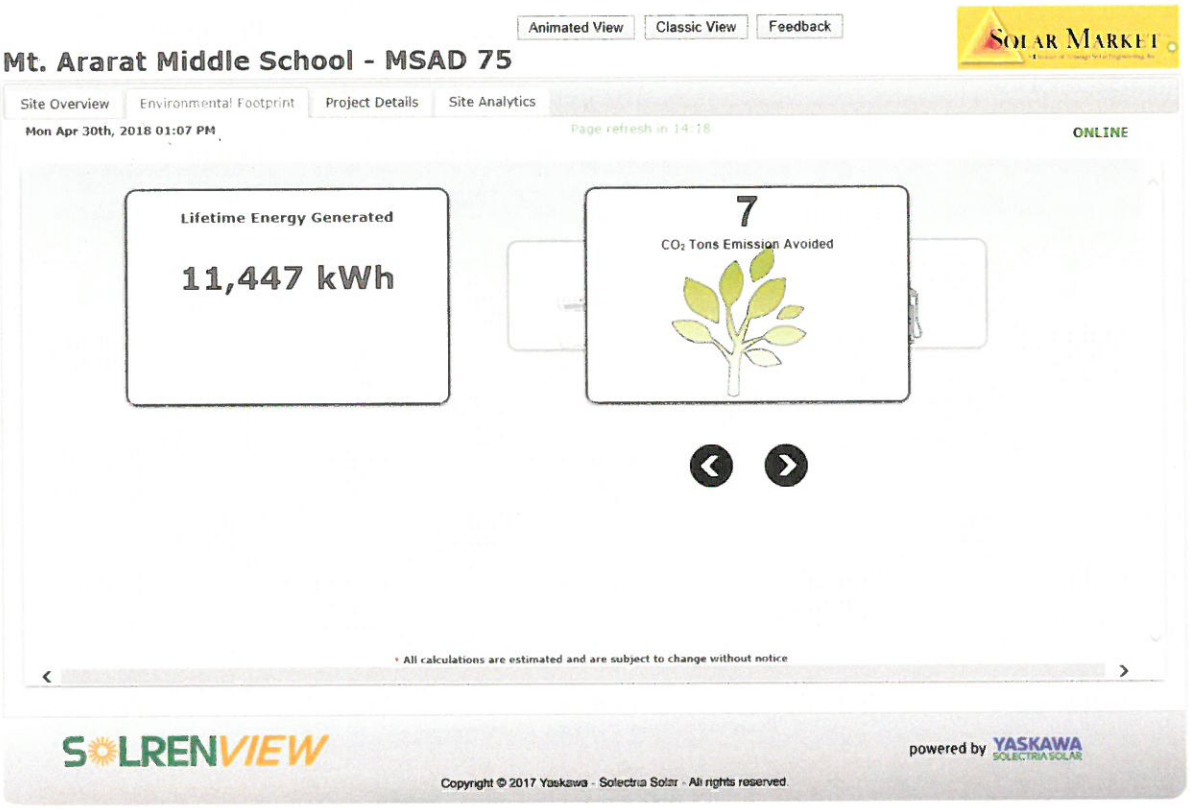
ONLINE
Today
Export Data
Analytics [Mon Apr 30, 2018]
Total Energy generated by Inverter 1 [230008021524000686 PVI 5200TL - 240 VAC] = 10.2 kWh
AC Energy (kWh)
AC Energy
AC Power
AC Current
AC Voltage
DC Voltage
Irradiance
Module Temp
Ambient Temp
Day
Week
Month
Year
Range
SOLRENVIEW
powered by YASKAWA SOLECTRIA SOLAR



Example of a Solar PV Kiosk

Honeywell

Section Three
Appendices

Section Three: Appendices

- Appendix 1 - CO_2 Readings
- Appendix 2 - Temperature & Motor Data Logger Results
- Appendix 3 - Preliminary Utility Analysis

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Appendix 1: CO2 Readings

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CO_2 Reading - Air Quality Sample Results

Date:	3/15/2018
Town:	Boothbay
Facility:	Elementary School

Outdoor Air Readings:		
3/15/2018	Time:	11:15
	CO2 (PPM):	315
	RH (%):	
	Temp (Deg F):	41.1

Sample #	Room Name/Number	# Of People	Time	CO2 (PPM)	TEMP (Deg F)	NOTES
1	Main Office	4	11:18 AM	710	63.1	Door closed - unit running
2	113	10	11:20 AM	1018	67.6	Door open - univent on
3	115	3	11:21 AM	803	68.9	Door open - univent on
4	231	0	11:22 AM	529	68.6	Door open - univent on
5	235	10	11:24 AM	885	69.6	Door closed - univent on
6	237	7	11:25 AM	932	70.0	Door closed - univent on
7	239	4	11:26 AM	663	71.1	Door closed - univent on
8	Music	7	11:28 AM	694	70.5	Door open - univent off
9	Gym	3	11:30 AM	582	71.4	Door open
10	Library	1	11:32 AM	528	69.9	Door open - univent on
11	228	21	11:33 AM	961	70.9	Door closed - univent on
12	221	14	11:35 AM	567	70.2	Door open - window open - univent on
13	216	9	11:37 AM	615	69.1	Door closed - univent on
14	215	10	11:39 AM	880	69.9	Door open - univent on
15	108	12	11:44 AM	742	69.8	Door open - univent on
16	106	11	11:45 AM	691	70.2	Door open - univent off
17	102	13	11:48 AM	716	70.6	Door open - univent on
18	Cafeteria	38	11:30 AM	675	67.6	This reading taken on 4/11/18

CO_2 Reading - Air Quality Sample Results

Date:	3/15/2018
Town:	Boothbay
Facility:	High School

Outdoor Air Readings:	Time:	11:15
3/15/2018	CO2 (PPM):	315
	RH (%):	
	Temp (Deg F):	41.1

Outdoor Air Readings:	Time:	11:20
4/11/2018	CO2 (PPM):	380
	RH (%):	
	Temp (Deg F):	56.2

Sample #	Room Name/Number	# Of People	Time	CO2 (PPM)	TEMP (Deg F)	NOTES
1	201	7	10:49 AM	663	72.2	Door open
2	205	8	10:52 AM	856	70.1	Door closed
3	210	16	10:55 AM	707	70.3	Door closed
4	212	11	10:55 AM	897	72.0	Door open
5	214 Office	1	11:00 AM	613	72.3	Door open
6	Library	10	11:05 AM	642	71.8	Door open
7	108	6	11:06 AM	709	71.9	Door open
8	105	15	11:09 AM	947	71.5	Door open - vent on
9	Art Room	6	11:10 AM	540	70.5	Door open
10	Wood Shops	7	11:15 AM	537	69.4	Door open
11	Gym	28	12:00 PM	610	67.6	Door open
12	Main Office	2	12:05 PM	781	69.3	Door closed - vent off
13	Café	40	12:05 PM	735	71.0	Door open - fans on - this reading taken on 4/11
14						