

CASCADE MIDDLE SCHOOL HVAC System Assessment



Completed for:



March 8, 2021

Site Visits, Analysis & Report by:
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SCOPE

Metrix Engineers was hired to perform an assessment of the existing heating, ventilation and air conditioning systems at the Cascade Middle School site in Auburn School District. The goal of the assessment was to provide an executive summary level of detail regarding the type and condition of the existing mechanical systems, determine if the systems are operating in compliance with their original design intent, and identify any areas of improvement based on site observations.

The existing facility is a single-story, five building campus (units A-E) of approximately 85,000 square feet in total. The facility was originally constructed in 1967 and has had small renovations and improvements in the late 1980s and early 2010's.

A site walk was conducted on February 24, 2021 to review the existing mechanical systems. This report summarizes Metrix observations based on that visit.

EXECUTIVE SUMMARY

The existing building appears to be operating per its original design intent. There are a few observed control system items that may need to be investigated further but this is not uncommon for a facility of this age/size.

There are some spaces that have been modified from the original use and other spaces that do not appear to have a dedicated ventilation source included as part of the original design as noted in the observations section below.

EXISTING SYSTEM OBSERVATIONS

HVAC:

All observed equipment is original to the building construction date, with unitary repairs completed for continuous operation. System was overserved to be operation on day of site visit.

A central boiler gas fired boiler plant comprised of a single 7,200 MBH boiler distributes heating water via central system pumps throughout the facility. There is no central mechanical cooling plant.

Heating and ventilation to typical classroom spaces in buildings C and D are provided by hydronic heating unit ventilators, located within casework along the exterior wall. Classrooms without exterior walls are served by packaged heat pump rooftop units.

The administration building A receives ventilation to interior zones and the library from an original air handling unit located in an on floor mechanical room at the center of the building. In the late 1980's, ventilated cabinet heaters were added to each exterior office for independent temperature control and ventilation. A subsequent renovation added VRF cassettes to each space, providing heating and cooling.

Heating and ventilation for larger spaces found in building B and E such as the gym, commons, locker rooms and shop are served by dedicated air handling units located typically within mezzanines adjacent to the spaces served.



A spot check of various HVAC system components was completed during the site visit, including the internals of various air handling units, rooftop units and unit ventilators. All heating and ventilation systems checked were verified operational with no major issues noted. The only deficiencies identified included:

- Exhaust fan (EF-16) serving building E toilets and custodial room (506/507/508) does not have a sheave or belt on the fan and is presently not operational. The fan is located in the loft above the spaces, accessed through classroom 509.

Note 1

A few additional observed operational considerations to be aware of include:

- The computer room workroom off of the library (116A) does not appear to have ventilation or heating. The room originally was a pair of restrooms accessed from the exterior, but ductwork revisions indicated to have been performed in the late 1980's do not appear to be installed. The room may have space temperature deficiencies due to the lack of a heating source.
- The custodial storage room (213) lower louver is blocked by boxes. Recommend shifting boxes at least 6" away from louver for proper ventilation of space with cleaning chemicals stored.
- The staff and student breakout spaces in building C (307/307A/313/313A) do not appear to have dedicated ventilation sources. Rooms 307 and 313 have operable windows, but the adjacent space 307A and 307A do not.
- Special education breakout room / storage (403A) does not appear to have heating or ventilation.
- The loft office in building E above the toilet rooms and accessed through Classroom 509 were converted from a storage room to a two-desk office space. Air is transferred from adjacent spaces via the unit ventilator for Classroom 509 and is adequate for the current use type assuming EF-16 is operational.
- The shop office (511A) was converted from a supply room to a single occupancy office. Space exhaust and transfer air appears adequate for single occupancy use.

Note 2

Note 3

Note 4

Note 5

Controls:

Building automation system controls are an Alerton-Envision digital control system.

A review of the Building Automation System and outside air damper setpoints was conducted and all systems, with exception of UV-509, and spaces appear to be meeting or exceeding design outdoor airflow ventilation rates.

Control system deficiencies observed at:

- CH-26 appears to have lost control signal
- CH-035 appears to have a bad supply air temp or zone temp sensor
- CH-7 serving Principal office heating coil valve position at 0% open on call for heat
- HWC-111 and AH-203 temperature rise at 100% valve open position is negligible inferring incorrect valve position or potentially a clogged strainer limiting flow.
- AHU-202e serving Aux Gym was in a failed off position.
- UV-509 OSA damper position commanded to 0%

Note 6

Note 7

Note 8

Note 9

Note 10

Note 11

During control system review, a couple of space temperature deficiencies were identified. The control system appeared to be responding as desired, so it is unclear why the following spaces were not at



setpoint; this potentially infers a door or window may have been ajar on the on the day of review when OAT was observed at 42F:

- UV-509, UV-405, AH-202e, AH-406, UH-515, HWC-502, HWC-11 and AH-203
- Multiple convectors throughout the facility

Note 12





Cascade Middle School
HVAC System Assessment Notes

Note	Additional Notes		Estimated Completion Date	Final Completion Date
1		Submit work request	3/16/21	3/16/21
	1.1	WO 1-358791- repair parts received	4/5/21	4/9/21
2		Confirm outside air pathway	3/17/21	3/17/21
	2.1	Unoccupied- Provide recommendation to open door to library and limit space to single occupancy to improve air quality.		3/17/21 in person Sites and Joette
3		Move boxes	3/17/21	3/17/21
4		Confirm outside air pathway	3/17/21	3/17/21
	4.1	Unoccupied- Provide recommendation to open outside door and window with occupancy to improve air quality.		3/17/21 in person Sites
5		Confirm outside air pathway	3/17/21	3/17/21
		Provide recommendation to open outside door with occupancy to improve air quality.		3/17/21 in person Sites
6		Submit work request	3/16/21	3/16/21
	6.1	WO 1-358792	3/26/21	3/23/21
7		Submit work request	3/16/21	3/16/21
	7.1	WO 1-358793	3/26/21	3/18/21
8		Submit work request	3/16/21	3/16/21
	8.1	WO 1-358794	3/26/21	3/18/21
9		Submit work request	3/16/21	3/16/21
	9.1	WO 1-358795 to 1-358796	3/26/21	3/25/21
10		Submit work request	3/16/21	3/16/21
	10.1	WO 1-358797	3/26/21	3/25/21
11		Changed setpoint to 40% per standard	3/16/21	3/16/21
12		Submit work request	3/16/21	3/16/21
	12.1	WO 1-358798 to 1-358805	3/26/21	3/30/21
	12.2	WO 1-358802, '804, '805 contract ATS	4/9/21	4/6/21

Revision Date 4/16/21