



Airflow Testing Report

Prepared for

Portland Public Schools

November 2021





9700 SW Capitol Hwy, Suite 110
Portland, OR 97219
ameresco.com

PROJECT OVERVIEW

As part of the continuing process to ensure a safe return to in-person learning, Portland Public Schools has contracted with Ameresco to test the airflow and ventilation of all educational and office spaces in each school. The data is reviewed by both Ameresco and PPS personnel to identify any potential shortcomings in the airflow from the HVAC systems. To accomplish this task, Ameresco has partnered with a local NEBB certified Test-Adjust-Balance (TAB) firm, Neudorfer Engineers, who will measure the airflow to each zone with calibrated measurement equipment in accordance with current testing standards and procedures. As part of this effort, HVAC professionals will review the operation of the HVAC equipment serving every educational and office space in each school.

Ameresco is pleased to have partnered with PPS over the last decade as the district's Energy Services Company (ESCO) on six energy efficiency construction projects, four service projects, and numerous energy audits. Our partnership has resulted in reducing over 3,000 tons of CO₂ and other GHG emissions and over \$1,000,000 in utility cost savings per year. Ameresco appreciates this opportunity to play a small role in the safe reopening of schools.

About Ameresco, Inc.

Founded in 2000, Ameresco, Inc. (NYSE:AMRC) is a leading cleantech integrator and renewable energy asset developer, owner and operator. Our comprehensive portfolio includes energy efficiency, infrastructure upgrades, asset sustainability and renewable energy solutions delivered to clients throughout North America and the United Kingdom. Ameresco's sustainability services in support of clients' pursuit of Net Zero include upgrades to a facility's energy infrastructure and the development, construction, and operation of distributed energy resources. Ameresco has successfully completed energy saving, environmentally responsible projects with Federal, state and local governments, healthcare and educational institutions, housing authorities, and commercial and industrial customers. With its corporate headquarters in Framingham, MA, Ameresco has more than 1,000 employees providing local expertise in the United States, Canada, and the United Kingdom. For more information, visit www.ameresco.com.

Explanation of ASHRAE Total Effective Air Changes per Hour (ACH_e) Calculation

ASHRAE has been updating their Building Readiness document to reflect the most current understanding in the engineering community for how to operate and maintain buildings during the pandemic. Their update on 4/27/2021 provided an explanation of the impact air filters and air cleaning devices have on the air in buildings. They provided the methodology, formulas, and an Excel-based tool for determining the equivalent outside air a space is receiving by having a mix of outside air, filtered recirculated air, and additional air filtration or cleaning devices in the room. Here is the explanation from ASHRAE:

Epidemic Conditions in Place



Equivalent Outdoor Air:

The equivalent outdoor air calculation indicates that the outdoor air can be calculated by using the combination of the actual outdoor air, impact of filtration or air cleaning technologies on recirculated air, and the impact of air cleaning technologies in the space.

This is using the principal of filters in series and the effectiveness at reducing particles. For items in series, the initial item would see the recirculated airflow to clean. The second item in the series would see the “cleaned” air from Item 1 and so the impact of Item 1 must be accounted for in Item 2.

As part of the airflow testing project that Portland Public Schools has partnered with Ameresco to complete, we are including the calculation of the Total Effective Air Changes per Hour (ACH_e) to show the impact of the air filtration that is active in nearly all spaces in the PPS schools. The formula for doing so is:

$$ACH_e = (ACH_{oa} + ACH_f) * E_z + ACH_{ir}$$

where:

- ACH_{oa} = air changes per hour of outside air = outside airflow in cubic feet per minute * 60 minutes per hour / room volume in cubic feet
- ACH_f = air changes per hour of clean air from filtered recirculated air with filters of the specified MERV rating as determined by ASHRAE
- E_z = Zone Air Distribution Effectiveness = how effective the HVAC system is at circulating and mixing the air to distribute the clean air throughout the room
- ACH_{ir} = the air changes per hour of clean air from portable air filters in the room = number of filters * CADR * 60 minutes per hour / room volume in cubic feet
 - CADR = Clear Air Delivery Rate = the CFM of clean air as specified by the manufacturer of the air filter

In order to include these calculations in the airflow testing reports, Ameresco and PPS have made the following assumptions as not all the variables are known:

1. PPS is in process of upgrading the air filters in their HVAC systems to MERV 13 and plans to be complete with that project for the start of the '21-'22 school year. In this report and for the sake of the ACH_e calculation, we are using the filters that are in place at the time of the measurements, so some of them are still MERV 8.
2. ASHRAE has guidelines for what should be used for the Zone Air Distribution Effectiveness (E_z) based on the HVAC system configuration, but they do not provide a value for every HVAC system and room configuration. For the majority of PPS rooms, an E_z of 0.8 – 1.0 would be most appropriate, so we have made the conservative assumption of using 0.8 for every space as that yields the lower ACH_e.
3. The CADR for a given air filter is from manufacturer ratings and is based on certain conditions (fan speed, particulate size, filter cleanliness, etc.) that change with operating conditions.



NEUDORFER ENGINEERS INC.

**TEST REPORT TYPE:
SURVEY REPORT**

Portland Public Schools Airflow Testing Hosford MS

Job Number: 2021-0297

Project Completion Date: November 2021

Revision Date:

-

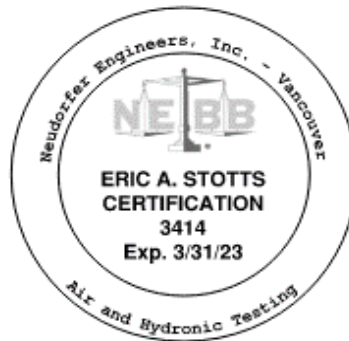
Revision Number:

-



SEATTLE

5516 1st Avenue South
Seattle, Washington 98108
Phone (206) 621-1810
Fax (206) 343-9820



PORTLAND

2501 SE Columbia Way, Suite 230
Vancouver, Washington 98661
Phone (503) 235-8924
Fax (503) 235-8925



Neudorfer Engineers, Inc.

Consulting Engineers Seattle, Washington - Portland, Oregon



www.NeudorferEngineers.com

**Portland Public Schools Airflow Testing
Hosford MS**

TABLE OF CONTENTS

Title Sheet	3
Report Certification	4
Terms	5
Instrument Calibration	6
Report Summary	7
Airflow Survey Report	8
TAB Notes	12
Floor Layout	13



Neudorfer Engineers, Inc.

Consulting Engineers Seattle, Washington - Portland, Oregon



www.NeudorferEngineers.com

REPORT TITLE

CERTIFIED TEST: SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Hosford MS

NEI Job#: 2021-0297

Mechanical Engineer: NA

Architect: NA

HVAC Contractor: NA

TAB Firm: Neudorfer Engineers Inc
Test Engineer: Zach Mayer



5516 1st Ave South
Seattle, Washington 98108
Phone (206) 621-1810
Fax (206) 343-9820



2501 SE Columbia Way, Suite 230
Vancouver, Washington 98661
Phone (503) 235-8924
Fax (503) 235-8925

CERTIFICATION

Portland Public Schools Airflow Testing

The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems. Any variances from design quantities, which exceed NEBB tolerances, are noted in the Test-Adjust-Balance Report Project Summary.

Significant / Noteworthy Remarks are noted on the General Remarks and General Field Notes pages. Other remarks are noted on individual test sheets.

Noted deficiencies are not the TAB firms responsibility to repair. Prior to issuance of this report, Deficiency Reports are forwarded to our contracted agent.

Warranty is limited to one year from date of this report. Within that time, any discrepancies, ambiguities, or omissions found in this report will be retested, adjusted, or balanced as needed. A written notification will be required.

Submitted and Certified by:

NEBB TAB Firm: **Neudorfer Engineers Inc**

Certification No: **3414**

Expiration Date: **March 31, 2023**

Certification Date: **March 31, 2021**

(Date completed) **Signed and Sealed by:**

NEBB Supervisor: **Mike Vawter P.E.**

NEBB Supervisor: **Eric Stotts**





Neudorfer Engineers, Inc.

Consulting Engineers Seattle, Washington - Portland, Oregon



www.NeudorferEngineers.com

TERMS AND ABBREVIATIONS

Project: **Portland Public Schools Airflow Testing**

AC or ACU Air Conditioner or Air Conditioning Unit

AH or AHU Air Handler or Air Handling Unit

ACH Air Changes per Hour

AVG Average

BHP Brake Horsepower

CAV Constant Air Volume

CBV Calibrated Balancing Valve
(Circuit Setter)

CC Cooling Coil

CD Ceiling Diffuser

CFM Cubic Feet per Minute

CH Chiller

CHWS Chilled Water Supply

CHWR Chilled Water Return

CP Circulating Pump

CR Ceiling Register

CRAC Computer Room Air Conditioner

CRU Computer Room Unit

CT Cooling Tower

CU Condenser Unit

CUH Cabinet Unit Heater

CWS Condenser Water Supply

CWR Condenser Water Return

DAT Discharge Air Temperature

DB Dry Bulb

DD Direct Drive

DDC Direct Digital Controls: EMS Control
System for the HVAC

Des. Design

Dia. Diameter

Disch. Discharge

EA Exhaust Air

EAT Entering Air Temperature

Economizer Controls and components that allow an
air handler to logically utilize outdoor air
for cooling as opposed to the use of
mechanical cooling.

EF Exhaust Fan

EG Exhaust Grille

EMCS Energy Management Control System

ERU Energy Recovery Unit

E.S.P. External Static Pressure

HRC Heat Recovery Coil

EWT Entering Water Temperature

FCU Fan Coil Unit

FD Fire Damper

FSD Fire Smoke Damper

FLA Full Load Amperage: Maximum
amperage a motor can draw.

Flow Hood Instrument that captures air and
converts the reading to CFM.

FHT Fume Hood Test

FPB Fan Powered Box

FPM Feet per Minute

FR Field Report

FT Foot, Feet

FTU Fan Terminal Unit

GPM Gallons per Minute

HC Heating Coil

TDH Pressure Difference across the entering
and leaving side of a pump.

HEPA High Efficiency Particulate Absorbing

HP Horsepower

HVAC Heating Ventilation and Air Conditioning

HWS Heating Water Supply

HWR Heating Water Return

HX Heat Exchanger

HZ Hertz, cycle per second

in. inches

in.w.g. inches of water gauge

Kfactor Correction factor to the free area need to
calculate CFM.

KW Kilowatts

LAT Leaving Air Temperature

LBWG Low Wall Grille

LWR Low Wall Register

LWT Leaving Water Temperature

MAU Make-up Air Handling Unit

MBH 1,000 BTUH

N/A Not Applicable

OSA Outside Air

OBD Opposed Blade Damper

ΔP Pressure Drop.

PH Phase

PSI Pounds per Square Inch

RA Return Air

RAT Return Air Temperature

RF Return Fan

RH Relative Humidity

RHC Reheat Coil

RPM Revolutions per Minute

RTU Roof Top Unit

SA Supply Air

SAT Supply Air Temperature

S.F. Service Factor

SF Supply Fan

SFD Smoke/Fire Damper

SP Static Pressure

sq.ft. square feet

Suct. Suction

SWG Sidewall Grille

SWR Sidewall Register

TAB Test; Adjust; and Balance

TSP Total Static Pressure: Difference
between the entering and leaving
static pressure of a fan.

UH Unit Heater

VAV Variable Air Volume; box that
contains a motorized damper that
modulates airflow.

VD Volume Damper

VFD Variable Frequency Drive

Velgrid Instrument that reads used to read
velocity in feet per minute.

VVT Variable Volume Terminal

WC Water Column

W.G. Water Gauge

WB Wet Bulb

INSTRUMENT CALIBRATIONS

Portland Public Schools Airflow Testing

Hosford MS

Instrument Type	Air Data Meter with Flowhood	Instrument Serial #	M97410
Instrument Manufacturer	Shortridge	Calibration Date	10/4/2021
Instrument Model Number	ADM 860	Calibration Due	10/4/2022
Instrument Type	Differential Pressure Water Meter	Instrument Serial #	W12178
Instrument Manufacturer	Shortridge	Calibration Date	10/4/2021
Instrument Model Number	HDM-250	Calibration Due	10/4/2022
Instrument Type	Psychrometer	Instrument Serial #	181128924
Instrument Manufacturer	Extech	Calibration Date	10/1/2021
Instrument Model Number	RH390	Calibration Due	10/1/2022
Instrument Type	Tachometer	Instrument Serial #	B185B5022P
Instrument Manufacturer	Nidec	Calibration Date	10/1/2021
Instrument Model Number	MT-200	Calibration Due	10/1/2022
Instrument Type	Amp Probe	Instrument Serial #	33380179WS
Instrument Manufacturer	Fluke	Calibration Date	10/1/2021
Instrument Model Number	323 Clamp Meter	Calibration Due	10/1/2022
Instrument Type	Digital Thermometer	Instrument Serial #	45400509WS
Instrument Manufacturer	Fluke	Calibration Date	10/1/2021
Instrument Model Number	52 II	Calibration Due	10/1/2022
Instrument Type	Manometer	Instrument Serial #	M97410
Instrument Manufacturer	Shortridge	Calibration Date	10/4/2021
Instrument Model Number	ADM 860	Calibration Due	10/4/2022
Instrument Type	Thermal Anemometer	Instrument Serial #	AVM440808002
Instrument Manufacturer	Alnor Instruments	Calibration Date	9/22/2021
Instrument Model Number	AVM 440	Calibration Due	9/22/2022
Instrument Type	Ultrasonic Flow Meter	Instrument Serial #	N1F1823T
Instrument Manufacturer	Fuji	Calibration Date	9/20/2021
Instrument Model Number	Portaflow-C	Calibration Due	9/20/2022



PROJECT	Portland Public Schools Airflow Testing
LOCATION	Hosford MS; 2303 SE 28th Pl, Portland, OR 97214

REPORT SUMMARY

This project has been surveyed per plans and specifications using the National Environmental Balancing Bureau (NEBB) standards and procedures.

The scope of work for this project was to assess the current airflows for each classroom, office, and special purpose space. Air changes per hour were calculated along with the % of OSA for the spaces and any deficiencies found for each piece of equipment has been noted in the following report.

All ventilation equipment was commanded to run by the BMS system. Ventilation units were measured with a flowhood on the supply outlets. Outside air was recorded with a flowhood on the OSA louvre where accessible. AK factors were calculated from flowhood readings. The remaining OSA values were recorded with a velgrid. AHU supply air was recorded by a summation of the outlets as recorded by flowhood or velgrid when appropriate. Outside air was recorded with a velgrid or airfoil and calculated by the free area method.

The measured airflows in this report represent the performance of the equipment at the time of measurement, which vary over time based on operating conditions. There are factors outside the control of Neudorfer that impact airflow, and variance in those factors is expected and normal. One significant factor is the MERV rating and condition of the air filters on the equipment. During the summer of 2021, PPS began upgrading the filters on all their fan systems to MERV 13. Those upgraded filters are more effective at capturing particles but also impact the amount of airflow from the equipment. These filter changes were occurring while the airflow measurement project was happening, so some schools had the new filters, and some had the old filters at the time of measurement. On the data page included this report, there is a line stating whether or not the upgraded filters were in place at the time of measurement.



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Hosford MS; 2303 SE 28th Pl, Portland, OR 97214
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
Lower Level 1																
Rm 12NA	AHU-1	AHU	31.8	51.7	1,644	8.6	14,139	1,335	80	6%	5.7	0.3	0	N/A	4.1	
Rm 13NA	AHU-1	AHU	37.7	63.9	2,709	8.6	23,297	2,015	121	6%	5.2	0.3	0	N/A	3.8	Non-rectangular room
Rm 20	UV	UV	48.9	60.7	2,968	12.5	37,103	1,740	810	47%	2.8	1.3	1	2.6	2.1	
21	-	-	37.4	38.3	142	12.1	1,718	-	-	-	0.0	0.0	1	9.1	0.0	Ventilation from hallway. Non-rectangular room
22	-	-	12.7	23.8	302	12.5	3,778	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation from adjacent spaces.
First Floor																
01	N Wing Office	FCU	22.1	15.4	267	10.9	2,914	85	85	100%	0.8	0.8	2	5.9	0.7	Note #1
01B	-	-	9.0	15.5	140	7.9	1,102	-	-	-						Open to room 01.
02	-	-	7.3	12.6	92	10.9	1,003	-	-	-						Open to room 01.
02A	-	-	7.3	12.6	92	10.9	1,003	-	-	-						Open to room 01.
01A	N Wing Office	FCU	15.7	12.1	190	10.9	2,071	115	115	100%	3.3	3.3	1	10.2	2.7	Note #1
Rm 04	N Wing Office	FCU	31.2	21.5	576	10.9	6,276	40	40	100%	0.4	0.4	1	2.8	0.3	Note #1
Rm 06	SU-1	AHU	22.0	35.0	770	10.9	8,393	465	465	100%	3.3	3.3	1	4.5	2.7	Note #2
Rm 08	SU-1	AHU	22.0	63.2	1,390	10.9	15,155	815	815	100%	3.2	3.2	1	3.6	2.6	Note #2
Rm 09	SU-1	AHU	21.8	63.2	1,378	10.9	15,018	200	200	100%	0.8	0.8	1	1.7	0.6	Note #2
Rm 07	SU-1	AHU	22.0	31.3	689	10.9	7,506	635	635	100%	5.1	5.1	1	6.1	4.1	Note #2
Rm 05	SU-1	AHU	21.4	37.0	792	10.9	8,631	473	473	100%	3.3	3.3	1	4.4	2.6	Note #2
03	SU-1	AHU	22.0	28.7	631	11.0	6,945	360	360	100%	3.1	3.1	1	4.7	2.5	Note #2
Conf. Room 3A	SU-1	AHU	13.5	15.5	209	11.0	2,302	265	265	100%	6.9	6.9	1	12.3	5.5	Note #2
10	-	-	7.5	8.5	64	11.0	701	-	-	-	0.0	0.0	1	22.2	0.0	Ventilation provided by adjacent spaces.
11	N Wing Office	FCU	13.5	23.4	316	11.0	3,475	160	160	100%	2.8	2.8	1	6.7	2.2	Note #1
Cafeteria 16	SF-1	AHU	47.4	51.8	2,455	13.7	33,638	1,525	0	0%	2.7	0.0	2	2.9	2.0	Note #3
18	SU-2	AHU	32.5	21.9	565	9.9	5,591	780	0	0%	8.4	0.0	0	N/A	6.0	Note #3. Shares mixed air plenum with SF-1.
18A	-	-	5.0	6.0	30	8.0	240	-	-	-	0.0	0.0	0	N/A	0.0	Ventilation provided by adjacent spaces.

Date: 11/1/2021

Readings By: Mayer



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Hosford MS; 2303 SE 28th Pl, Portland, OR 97214
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH					Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter	
First Floor																
18D	-	-	-	-	-	-	-	-	-	-	0.0	0.0	0	N/A	0.0	This is the walk-in cooler.
Rm 17	SU-2	FCU	18.2	31.5	573	13.8	7,912	270	0	0%	2.0	0.0	1	3.4	1.5	Note #3
Rm 100	UV	UV	44.9	23.6	1,060	12.0	12,716	490	0	0%	2.3	0.0	1	2.9	1.7	
Rm 101	UV	UV	23.3	29.8	694	12.0	8,332	610	45	7%	4.4	0.3	1	5.1	3.2	
Rm 102	UV	UV	21.9	29.8	653	12.0	7,831	680	35	5%	5.2	0.3	1	5.8	3.8	
Rm 103	UV	UV	21.9	38.3	839	12.0	10,065	630	210	33%	3.8	1.3	1	4.4	2.8	
Rm 104	UV	UV	30.0	29.8	894	12.0	10,728	79	0	0%	0.4	0.0	1	1.8	0.3	
Rm 105	UV	UV	30.0	22.6	678	12.0	8,136	495	50	10%	3.7	0.4	1	4.6	2.7	
106	FC-1	FCU	28.7	14.5	416	9.5	3,953	400	320	80%	6.1	4.9	1	8.7	4.8	
109	FC-1	FCU	28.8	19.3	376	9.2	3,458	140	112	80%	2.4	1.9	1	6.4	1.9	
Conf. Room 111	-	-	20.5	10.5	215	12.0	2,583	-	-	-	0.0	0.0	1	6.0	0.0	Ventilation from adjacent spaces.
114H	FC-1	FCU	17.8	23.6	420	10.0	4,201	750	600	80%	10.7	8.6	1	12.1	8.4	
114F	-	-	14.9	11.9	177	10.0	1,773	-	-	-	0.0	0.0	1	8.8	0.0	
114	FC-1	FCU	23.6	10.0	236	10.0	2,360	320	256	80%	8.1	6.5	1	13.0	6.4	
114E	-	-	15.0	11.9	179	10.0	1,785	-	-	-	0.0	0.0	1	8.7	0.0	
114G	FC-1	FCU	23.7	19.0	450	10.0	4,503	470	376	80%	6.3	5.0	1	8.4	4.9	
Rm 115	FC-1	FCU	55.1	24.7	1,201	10.5	12,610	755	604	80%	3.6	2.9	1	4.1	2.8	
Gym 113	FC-2	FCU	80.9	60.0	4,854	21.7	105,332	1,820	1,456	80%	1.0	0.8	1	1.0	0.8	
113A	-	-	8.1	5.9	48	15.1	722	-	-	-						Open to gymnasium.
Auditorium 112	SF-2	AHU	45.0	49.9	2,246	24.6	55,239	2,065	2,065	100%	1.2	1.2	1	1.1	1.0	Not ducted for return.
Stage 112C	-	-	31.9	41.2	1,314	25.5	33,514	-	-	-						Open to Auditorium.
Balcony 213	-	-	17.9	49.9	893	12.5	11,165	-	-	-						Open to Auditorium.
125	121 FCU	FCU	12.9	10.3	133	8.5	1,129	60	60	100%	3.2	3.2	1	16.4	2.6	Note #4
124	121 FCU	FCU	10.9	12.9	141	9.6	1,350	145	145	100%	6.4	6.4	1	16.7	5.2	Note #4

Date: 11/1/2021

Readings By: Mayer



AIRFLOW SURVEY REPORT

Project: Portland Public Schools Airflow Testing
Location: Hosford MS; 2303 SE 28th Pl, Portland, OR 97214
Filter Status: Upgraded

Room	Equipment Info		Room Dimensions					Airflow Measurements			Calculated ACH						Notes
	Served By	Equipment Type	Room Length	Room Width	Room Area	Room Height	Room Volume	Total CFM Supply	OA CFM Supply	OA %	Air Changes per Hour (supply)	Air Changes per Hour (OA)	# of Portable Filters	Total Effective Air Changes per Hour (ACH_e) with Portable Filter	Total Effective Air Changes per Hour (ACH_e) without Portable Filter		
First Floor																	
Conf. Room 121	121 FCU	FCU	28.8	24.2	640	9.5	6,080	385	385	100%	3.8	3.8	1	5.6	3.0	Note #4	
Conf. Room 122	-	-	12.4	10.5	130	9.5	1,237	-	-	-	0.0	0.0	0	N/A	0.0		
123	121 FCU	FCU	16.7	13.2	220	9.4	2,072	160	160	100%	4.6	4.6	0	N/A	3.7	Note #4	
Rm 126	UV	UV	38.3	26.9	954	12.0	11,451	620	100	16%	3.2	0.5	1	3.7	2.4		
Library 129B	-	-	17.7	7.8	138	12.0	1,657	-	-	-	0.0	0.0	0	N/A	0.0		
Library 129	UV	UV	60.0	60.2	3,025	11.5	34,788	635	320	50%	1.1	0.6	1	1.3	0.8		
Conf. Room 128	128 FCU	FCU	12.9	16.1	208	9.5	1,973	165	20	12%	5.0	0.6	1	11.6	3.7		
Conf. Room 127	127 FCU	FCU	13.0	14.5	189	9.6	1,810	124	20	16%	4.1	0.7	0	N/A	3.0		
118	-	-	16.2	11.0	178	10.1	1,800	-	-	-	0.0	0.0	1	8.7	0.0		
Second Floor															0		
Rm 200	UV	UV	29.8	23.4	697	12.1	8,438	580	170	29%	4.1	1.2	1	4.9	3.1		
Rm 201	UV	UV	29.8	23.2	691	12.1	8,365	485	150	31%	3.5	1.1	1	4.5	2.6		
Rm 202	UV	UV	29.8	24.5	730	12.1	8,834	485	220	45%	3.3	1.5	1	4.3	2.5		
Rm 203	-	-	-	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	Room does not exist.	
Rm 204	UV	UV	31.8	21.9	696	12.1	8,427	555	90	16%	4.0	0.6	1	4.7	2.9		
Rm 205	UV	UV	29.8	24.6	733	12.2	8,944	450	170	38%	3.0	1.1	1	4.0	2.3		
Rm 206	UV	UV	30.0	24.5	735	12.0	8,820	565	230	41%	3.8	1.6	1	4.7	2.9		
207	-	-	16.1	13.8	222	9.6	2,133	-	-	-	0.0	0.0	1	7.3	0.0	Ventilation provided by adjacent spaces.	
Rm 211	UV	UV	30.0	24.5	735	12.0	8,820	580	230	40%	3.9	1.6	1	4.7	3.0		
Rm 225	UV	UV	30.0	24.8	744	12.0	8,928	585	170	29%	3.9	1.1	1	4.7	2.9		
Rm 215	UV	UV	30.0	24.6	738	12.0	8,856	560	270	48%	3.8	1.8	1	4.6	2.9		
Rm 216	UV	UV	22.2	29.8	662	12.1	8,005	525	90	17%	3.9	0.7	1	4.8	2.9		
Rm 217	UV	UV	21.9	29.9	655	12.1	7,923	620	130	21%	4.7	1.0	1	5.4	3.5		
Rm 219	UV	UV	29.8	21.9	653	12.0	7,831	555	120	22%	4.3	0.9	1	5.1	3.1		

Date: 11/1/2021

Readings By: Mayer



Project:	Portland Public Schools Airflow Testing
Location:	Hosford MS; 2303 SE 28th Pl, Portland, OR 97214
Filter Status:	Upgraded

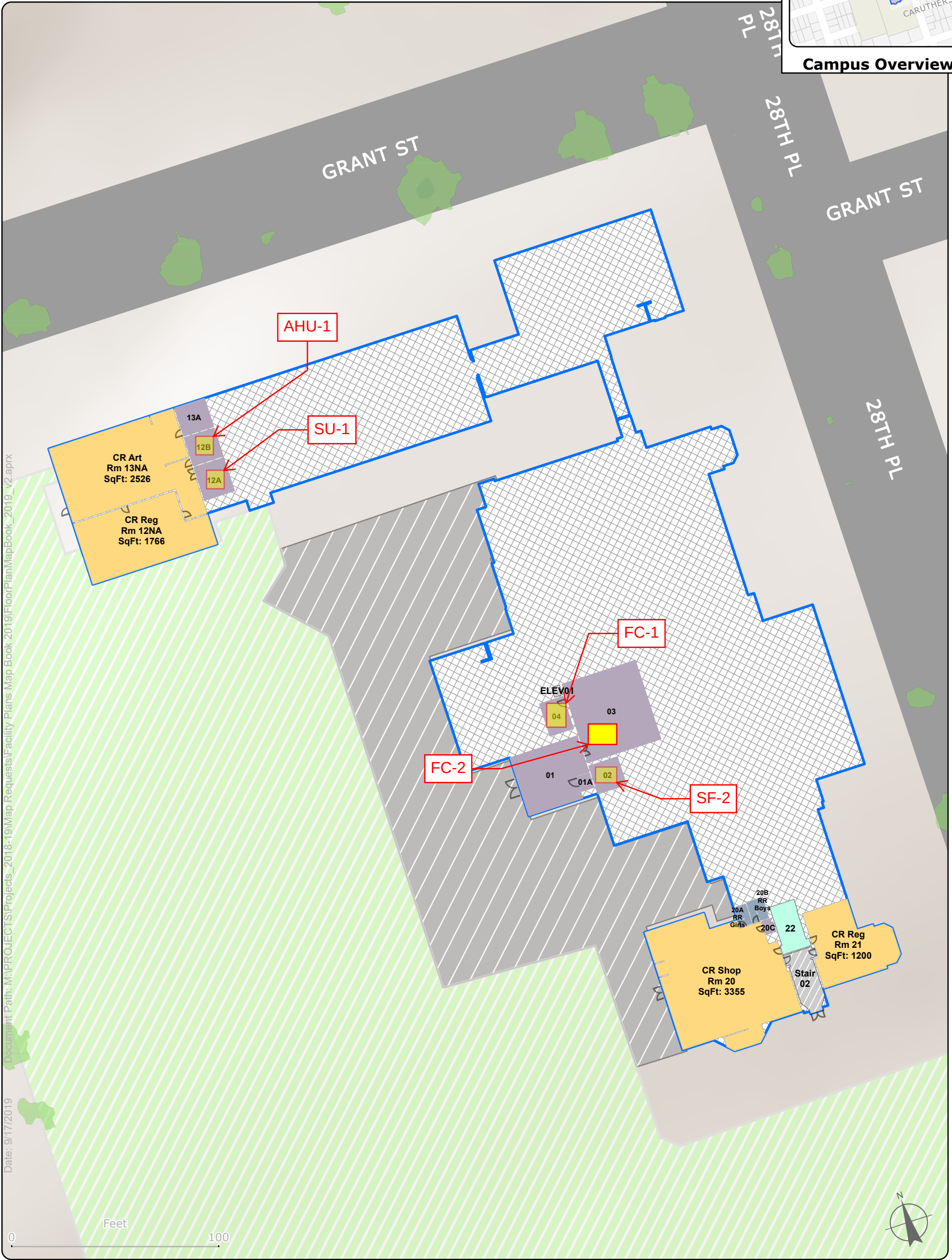
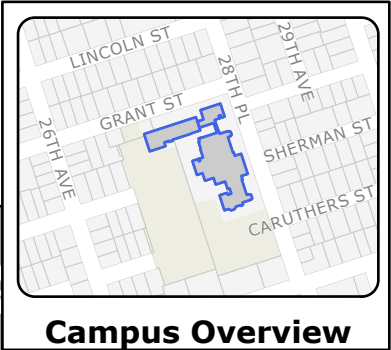
Date: 11/1/2021 Readings By: Mayer



Location: Hosford MS; 2303 SE 28th Pl, Portland, OR 97214

Page 12 of 15

HOSFORD: Lower Level 1

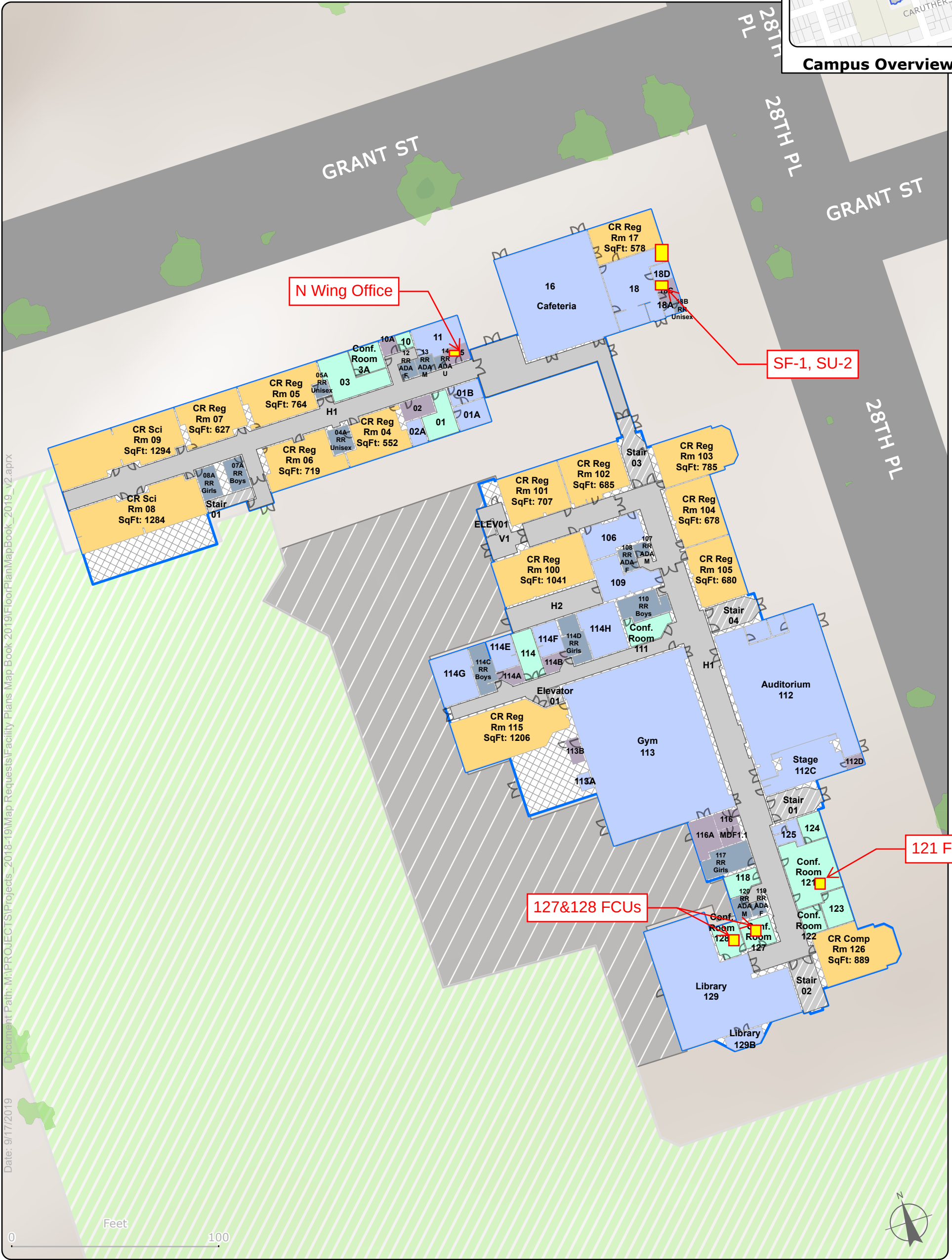
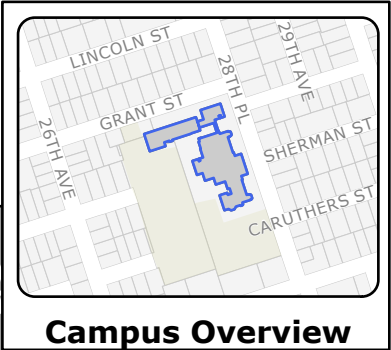


Space Use		School Grounds	
	Classroom		Campus Footprints
	Office		Athletic Field
	Rest Room		Playground: Paved
	Special Purpose		Playground: Unpaved
	Corridor		Streets
	Other		Doors
	Stairs/Elevator		

Total Number Of Rooms By Classification

Classrooms: 4	Special Purpose: 0
Office Spaces: 1	Storage: 5

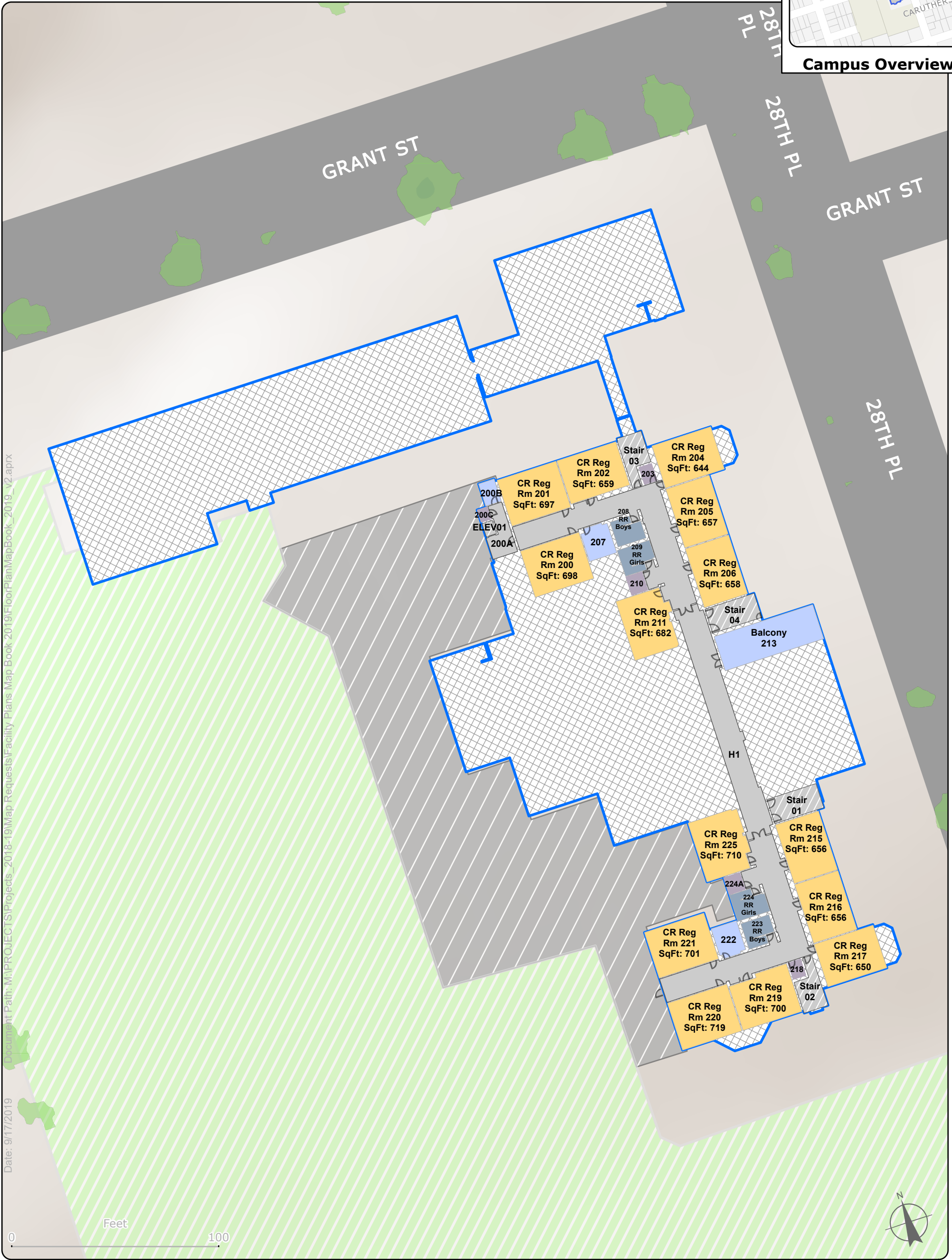
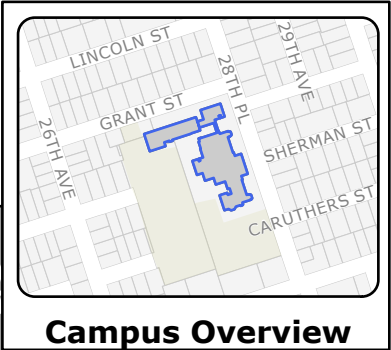
HOSFORD: First Floor



Space Use		School Grounds	
	Classroom		Campus Footprints
	Office		Athletic Field
	Rest Room		Playground: Paved
	Special Purpose		Playground: Unpaved
	Corridor		Streets
	Other		Doors
	Stairs/Elevator		

Total Number Of Rooms By Classification	
Classrooms: 15	Special Purpose: 23
Office Spaces: 13	Storage: 7

HOSFORD: Second Floor



Space Use		School Grounds	
	Classroom		Campus Footprints
	Office		Athletic Field
	Rest Room		Playground: Paved
	Special Purpose		Playground: Unpaved
	Corridor		Streets
	Other		Doors
	Stairs/Elevator		

Total Number Of Rooms By Classification

Classrooms: 14	Special Purpose: 4
Office Spaces: 0	Storage: 2