

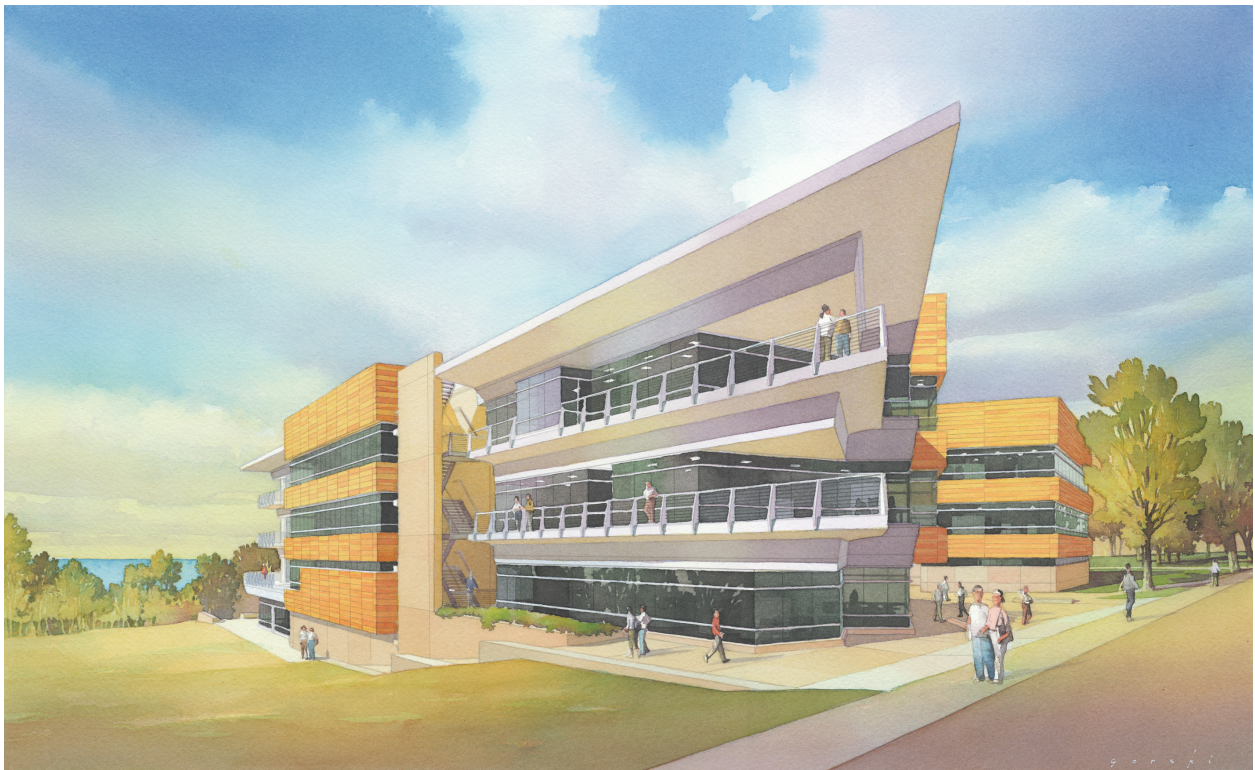
# Technical Report One

## ASHRAE Standard 62.1 Ventilation Report

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Mechanical Option

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UNIVERSITY OF CALIFORNIA – SAN DIEGO

RADY SCHOOL OF MANAGEMENT

LA JOLLA, CA

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## EXECUTIVE SUMMARY

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This report is to evaluate the compliance of the UCSD Rady School of Management building to the standards set forth in ASHRAE 62.1.2007 and ASHRAE 90.1.2007.

It starts off with a quick overview of the building's use and the main components of the mechanical system are listed with a brief description. Then the report goes on to check that ASHRAE standards were followed.

ASHRAE 62.1.5 sets forth the measures to be taken in order to ensure that the indoor air quality will be acceptable. Upon evaluation, it verified that this building is largely compliant with all of these requirements and indoor air quality should be satisfactory.

ASHRAE 62.1.6 sets forth the minimum outdoor air supply requirements to each of the building spaces. Upon evaluation of this standard, it was shown that this building's mechanical system is properly designed and goes above and beyond the outdoor air requirements. Calculations to support these findings can be found in the appendix.

ASHRAE 90.1 sets forth standards to ensure energy efficiency. In section 5, the building envelope minimum requirements are set. Through evaluation, it was shown that this building's envelope is well above the minimum standards. Section 6 deals with making sure the HVAC system is designed in an energy efficient manner. Upon evaluation, it was discovered that the fans located in the AHU's have gone above the fan power limitations. They are substantially too big if you evaluate them at the minimum air flow, but at maximum air flow they still meet these requirements. In section 9, the lighting system is evaluated. Through a quick evaluation, it was shown that the power density of the building is a good deal lower than the maximum level set by the standard. This does not come as a surprise because energy efficient lighting was one of the main focuses in the building's sustainable design.

The report that follows will demonstrate that this building is in compliance with almost all of these ASHRAE standards, and that there are only minor discrepancies. It is a testament to all of the careful design work that was put in to guarantee an energy efficient building that will have minimal adverse effects on the environment.

## Overview

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The UCSD Rady School of management is a roughly 91,000 SF, state-of-the-art, learning facility dedicated to the development of the next generation of science and technology business leaders. This building is home to a combination of learning/research facilities, faculty offices, and student services offices. Some sustainable design principles taken into consideration for this project were: Efficient lighting, recycled materials, and natural ventilation. In addition to these features, they plan on utilizing solar energy with photovoltaic panels that are to be installed in the future.

The mechanical load on the building will be mainly cooling load because of the building's location and usage. Air is distributed to the interior spaces by an over-head VAV system with reheat coils. The VAV system is supplied by three AHU's that are roof mounted to maximize the usable program area.

### AHU's

The facility utilizes three roof-mounted air handling units with variable frequency drives. The air handlers supply air at 53°F through the use of chilled-water cooling coils and utilize a minimum of 30% outdoor air. They have also been oversized in order to leave room for any expansion they may want to do in the future.

AHU-1 has a capacity of 40,000 CFM and serves the northern wing of the building, serving mainly classrooms and faculty offices. The current designed air flow is 33,660 CFM at maximum load.

AHU-2A and AHU-2B are combined into one system and work together cool the other two remaining wings of the building. These AHU's are similar to AHU-1, but they have a slightly smaller capacity. They can each handle 35,000 CFM, so together the combined system can handle up to 70,000 CFM. The current designed air flow on these air handlers is only 60,610 CFM at maximum load.

### FCU's

There are a total of seven fan coil units located throughout the building. These units are located in rooms with high amounts of heat generation to help maintain the spaces at the designed temperature. They cool air down to 55°F and re-circulate it throughout the room in order to achieve this.

### Chilled Water System

Chilled water is chilled by cooling coils and supplied to building spaces, as well as AHU's and FCU's, by one 15 HP base mounted pump.

## Overview

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### Hot Water System

The hot water system is made up of one gas-fired central domestic water heater. The domestic water heater, located in the main mechanical room, has a storage capacity of 130 gallons and can heat up to 480 gallons/hour. The heater operates at a maximum supply temperature of 140°F and return temperature of 40°F. Water is circulated throughout the building by one 5 HP base mounted pump. This system also utilizes a water-to-water heat exchanger to increase efficiency.





## ASHRAE 62.1.5

### PART II

#### ASHRAE 62.1 – Section 5

##### 5.3 Exhaust Duct Location:

All exhaust ducts are maintained at a negative pressure relative to the spaces they pass through. They were also designed to have a short, direct path out of the building in order to expel any contaminants with a minimal risk of contamination to the occupied spaces.

##### 5.5 Airstream Surfaces:

The air handlers have a few preventative measures against mold growth, but also, the mechanical system consists of ducts constructed out of a galvanized metal in order to resist mold growth and erosion.

##### 5.6 Outdoor Air Intakes:

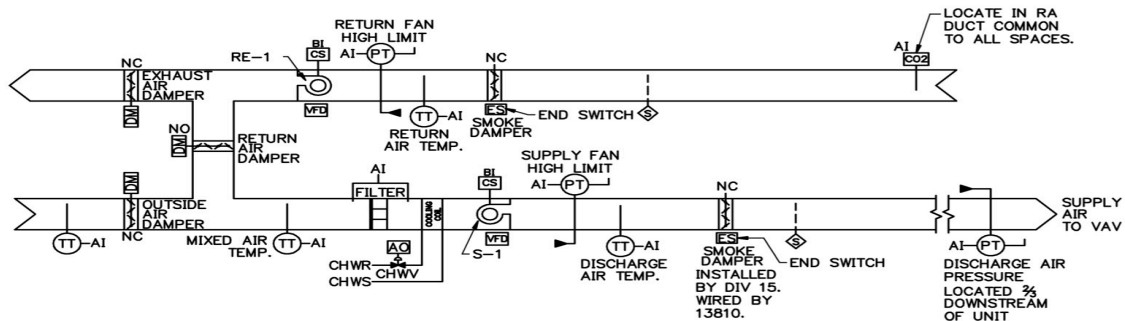
This building is able to utilize the benefits of natural ventilation through operable windows, and this was taken into account during the design. Any possible sources of contamination are located far enough from any way back into the building so that they will not have adverse effects on the occupants of the building.

##### 5.7 Local Capture of Contaminants:

Any type of equipment that could cause contamination to the surrounding areas is directly exhausted to the outside through short and direct duct runs to the roof to keep it from affecting indoor air quality.

##### 5.9 Particulate Matter Removal:

Air filters are located up stream from all cooling coils or any other wetted surface in order to prevent mold growth and protect indoor air quality.



## ASHRAE 62.1.5

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### **5.10 Dehumidification Systems:**

Humidity in the building is maintained at a fairly low level and should stay well below 65% relative humidity. A drain pan is required below all dehumidifying beneath all cooling coil assemblies and condensate-producing heat exchangers. Designed minimum outdoor air intake is greater than designed maximum exhaust airflow while dehumidifying and there is a properly designed drain pan to collect condensate coming off of the heat exchanger.

### **5.14 Access for Inspection, Cleaning, and Maintenance**

The mechanical system has been designed in a very practical manner and leaves plenty of access for someone to clean, inspect, and maintain the system fairly easily.

### **5.15 Building Envelope and Interior Surfaces**

There is a vapor barrier in the building envelope to keep moisture from entering and causing damage. Also, pipes are insulated to prevent condensation from forming on them.

## ASHRAE 62.1.6

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### PART III

#### ASHRAE 6.2 – Section 6

In this section, ASHRAE sets the acceptable level of minimum outside air required to maintain a comfortable and healthy environment. This quantity is based on the floor area, the occupancy level, and the way the space is used. Based on section 6.2.2.1, I used the equation  $V_{bz} = R_p P_z + R_a A_z$  to calculate how much outside air was required, and if the building was in compliance with it. Table 6-1 was used to find  $R_p$  and  $R_a$  for each of the different types of spaces. I set the occupant level based on the information given in the design documents, and used the occupant density given by Table 6-1 to help estimate occupancy loads in the rooms that were not specified. Next,  $E_z$  was assumed to be equal to one since it is cold air supplied by the ceiling. From section 6.2.2.3,  $V_{oz} = V_{bz} / E_z$ , so in this case  $V_{oz} = V_{bz}$ . Equation A-1 given in Appendix A,  $E_{VZ} = 1 + S_x - Z_D$ , was then used. The standard then says to use the lowest calculated value of  $E_{VZ}$  as  $E_V$ . Equation 6-8,  $V_{OT} = V_{bz} / E_V$ , was then used to calculate the required outdoor air to each space. After reviewing the results, it appears that the mechanical design goes above and beyond the minimum outdoor air requirements set forth by ASHRAE standard 62.1.2007. Calculations and results can be found in the appendix.



## ASHRAE 90.1

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### PART IV

### ASHRAE 90.1

#### **Section 5 – Building Envelope**

**\*\*La Jolla, CA is located in climate zone 3\*\***

##### Requirements:

Roof: U-0.048

Walls: U-0.084

Glass: U-0.60

Solar Heat Gain Coefficient (SHGC): 0.25

Shading Coefficient (SHGC/0.87): 0.29

##### Design:

Roof: U-0.033

Walls: U-0.054

Glass: U-0.30

Solar Heat Gain Coefficient (SHGC): 0.19

Shading Coefficient (SHGC/0.87): 0.22

As you can see, this building meets all building envelope requirements set by ASHRAE 90.1 and will perform even better than what is required.

#### **Section 6 – HVAC System**

##### 6.5.1.1 Economizers

All air conditioning systems above 65,000 BTU/Hr must include an economizer, and there are economizers on all AHU's supplying the building.

## ASHRAE 90.1

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### 6.5.3.1 Fan Power Limitations

Unit	Location	Max. Flow (CFM)	Min. Flow (CFM)	HP	.0015* CFM	HP < .0015*CFM
E-2	Roof	2000	600	1	0.9	NO
E-5	Roof	4000	4000	2	6	YES
E-6	Roof	4000	4000	2	6	YES
E-7	Roof	4000	4000	2	6	YES
E-8	Roof	4000	4000	2	6	YES
E-9	Roof	4000	4000	2	6	YES
RF-1	AHU-1	32000	9600	20	14.4	NO
RF-2A	AHU-2A	28000	8400	20	12.6	NO
RF-2B	AHU-2B	28000	8400	20	12.6	NO

Not all of the fans in the building meet the fan power limitations set forth by this section. The AHU fans have substantially more power than they are allowed to, but this is only when they are operating well below full capacity. At full capacity, these fans would easily be in compliance with this standard.

### 6.8.2 Duct Insulation

Duct insulation must be at least R-3.5 for ducts in an unvented attic with roof insulation. The duct insulation provided is R-4.5, so they have gone above and beyond the necessary requirement.

## **Section 9 – Lighting**

### 9.2.2.1 Power Density

Power density for a university building can be no more than 1.2 w/ft<sup>2</sup>. The calculated power density for this building is .95 w/ft<sup>2</sup>, so it is in compliance.

## APPENDIX

**AHU-1**

Room Number	Room Name	Supply Air		Rp		Ra (CFM/ft <sup>2</sup> )	Vbz (CFM)	Z <sub>b</sub>	X <sub>s</sub>	E <sub>v</sub>	Vot
		A <sub>s</sub> (ft <sup>3</sup> )	(CFM)	(CFM/person)	P <sub>z</sub>						
1st Floor - Area A											
1E002	Corridor	364	880	0	0	0.06	22	0.02	0.30	0.72	30
1E004	Entrance Corridor	528	260	0	0	0.06	32	0.12	0.30	0.82	44
1E101	Women's Restroom	280	220	0	0	0.06	17	0.08	0.30	0.78	23
1E102	Men's Restroom	280	220	0	0	0.06	17	0.08	0.30	0.78	23
1E103	Electric Control Room	81	0	0	0	0.06	5	-	0.30	-	7
1E104	Main Electrical Equip.	1,545	0	0	0	0.06	93	-	0.30	-	129
1E106	Tiered Classroom	2,415	2,730	7.5	121	0.06	1,052	0.39	0.30	1.09	1,462
1E106A	Storage	42	100	0	0	0.12	5	0.05	0.30	0.75	7
1E107	Tiered Classroom	2,415	2,835	7.5	121	0.06	1,052	0.37	0.30	1.07	1,462
1E107A	Storage	42	100	0	0	0.12	5	0.05	0.30	0.75	7
1E111	Custodial Office	104	150	5	1	0.06	11	0.07	0.30	0.77	16
1E112	Elevator Equipment	104	0	0	0	0.06	6	-	0.30	-	9
1E113	Breakout	170	250	5	12	0.06	70	0.28	0.30	0.98	98
1E114	Breakout	170	230	5	12	0.06	70	0.31	0.30	1.01	98
1E116	Breakout	170	240	5	12	0.06	70	0.29	0.30	0.99	98
2nd Floor - Area A											
2E001	Hallway	143	115	0	0	0.06	9	0.07	0.30	0.77	12
2E002	Hallway	160	115	0	0	0.06	10	0.08	0.30	0.78	13
2E004	Hallway	152	225	0	0	0.06	9	0.04	0.30	0.74	13
2E006	Hallway	116	200	0	0	0.06	7	0.03	0.30	0.73	10
2E008	Reception	460	840	5	31	0.06	183	0.22	0.30	0.92	254
2E101	Women's Restroom	280	230	0	0	0.06	17	0.07	0.30	0.77	56
2E102	Men's Restroom	280	230	0	0	0.06	17	0.07	0.30	0.77	36
2E103	Electrical Closet	82	0	0	0	0.06	5	-	0.30	-	7
2E104	Women's Changing Room	500	400	5	10	0.12	110	0.28	0.30	0.98	153
2E106	Men's Changing Room	500	320	5	10	0.12	110	0.34	0.30	1.04	153
2E107	Program Staff	163	170	5	4	0.06	30	0.18	0.30	0.88	56
2E108	Interview Room	95	120	5	2	0.06	16	0.13	0.30	0.83	122
2E109	Interview Room	86	100	5	2	0.06	15	0.15	0.30	0.85	121
2E111	Interview Room	86	100	5	2	0.06	15	0.15	0.30	0.85	121
2E112	Program Staff	320	280	5	7	0.06	54	0.19	0.30	0.89	125
2E113	FEMBA Program Staff	100	130	5	5	0.06	31	0.24	0.30	0.94	134
2E114	FEMBA Program Staff	100	130	5	5	0.06	31	0.24	0.30	0.94	134
2E116	Senior Director's Office	200	140	5	1	0.06	17	0.12	0.30	0.82	132
2E117	Workroom	308	400	5	7	0.06	53	0.13	0.30	0.83	74
2E118	FEMBA Program Staff	140	150	5	7	0.06	43	0.29	0.30	0.99	60
2E119	Financial Aid Staff	135	120	5	7	0.06	43	0.36	0.30	1.06	123
2E121	Operations Coordinator	100	100	5	1	0.06	11	0.11	0.30	0.81	115
2E122	Career Staff	100	100	5	5	0.06	31	0.31	0.30	1.01	143
2E123	Interview Room	100	80	5	4	0.06	26	0.33	0.30	1.03	94
2E124	Interview Room	100	80	5	4	0.06	26	0.33	0.30	1.03	94
2E126	Interview Room	100	80	5	4	0.06	26	0.33	0.30	1.03	146
2E127	Interview Room	100	80	5	4	0.06	26	0.33	0.30	1.03	72
2E128	Recruiter's Lounge	285	440	5	7	0.06	52	0.12	0.30	0.82	171
2E129	Career Staff	135	220	5	7	0.06	43	0.20	0.30	0.90	98
2E131	Admission Outreach	135	220	5	7	0.06	43	0.20	0.30	0.90	98
3rd Floor - Area A											
3E001	Corridor	187	200	0	0	0.06	11	0.06	0.30	0.76	160
3E002	Hallway	180	270	0	0	0.06	11	0.04	0.30	0.74	231
3E003	Hallway	628	540	0	0	0.06	38	0.07	0.30	0.77	52
3E101	Women's Restroom	280	240	0	0	0.06	17	0.07	0.30	0.77	23
3E102	Men's Restroom	280	240	0	0	0.06	17	0.07	0.30	0.77	123
3E103	Electrical Closet	82	0	0	0	0.06	5	-	0.30	-	7
3E104	Printing Area	158	230	5	2	0.12	29	0.13	0.30	0.83	65
3E106	Flat Classroom	712	1,260	7.5	35	0.06	305	0.24	0.30	0.94	424
3E107	Tiered Classroom	1,154	2,100	7.5	58	0.06	504	0.24	0.30	0.94	700
3E108	Flat Classroom	747	1,110	7.5	35	0.06	307	0.28	0.30	0.98	427
3E109	Flat Classroom	655	1,500	7.5	34	0.06	294	0.20	0.30	0.90	409
3E111	Seminar Room	403	1,440	5	27	0.06	159	0.11	0.30	0.81	221
3E112	Seminar Room	403	1,400	5	27	0.06	159	0.11	0.30	0.81	221
4th Floor - Area A											
4E002	Hallway	232	250	0	0	0.06	14	0.06	0.30	0.76	119
4E003	Reception	575	1,900	5	39	0.06	230	0.12	0.30	0.82	423
4E101	Women's Restroom	280	260	0	0	0.06	17	0.06	0.30	0.76	134
4E102	Men's Restroom	280	260	0	0	0.06	17	0.06	0.30	0.76	312
4E103	Electrical Closet	82	0	0	0	0.06	5	-	0.30	-	7
4E104	Breakout	195	280	5	13	0.06	77	0.27	0.30	0.97	107
4E106	Tiered Classroom	1,960	3,000	7.5	98	0.06	853	0.28	0.30	0.98	1,184
4E107	Staff Office	235	240	5	2	0.06	24	0.10	0.30	0.80	133
4E108	Staff Office	142	240	5	2	0.06	19	0.08	0.30	0.78	26
4E109	Staff Office	118	200	5	2	0.06	17	0.09	0.30	0.79	124
4E111	Staff Office	118	200	5	2	0.06	17	0.09	0.30	0.79	124
4E112	Senior Staff Office	198	290	5	2	0.06	22	0.08	0.30	0.78	123
4E113	Senior Staff Office	143	290	5	2	0.06	19	0.06	0.30	0.76	126
4E114	Staff Office	212	320	5	2	0.06	23	0.07	0.30	0.77	133
4E116	Catering	170	210	7.5	7	0.18	83	0.40	0.30	1.10	115
4E117	Breakout	171	300	5	12	0.06	70	0.23	0.30	0.93	198
4E118	Breakout	171	300	5	12	0.06	70	0.23	0.30	0.93	198
4E119	Breakout	171	290	5	12	0.06	70	0.24	0.30	0.94	198

Required OA 17,221

**AHU-2A & AHU-2B**

Room Number	Room Name	Supply Air		Rp							
		A <sub>s</sub> (ft <sup>2</sup> )	(CFM)	(CFM/person)	Pz	Ra (CFM/ft <sup>2</sup> )	Vbz (CFM)	Z <sub>o</sub>	X <sub>s</sub>	E <sub>v</sub>	Vot
1st Floor - Area B											
1S101	Women's Restroom	280	200	0	0	0.06	17	0.08	0.3	0.78	124
1S102	Men's Restroom	280	200	0	0	0.06	17	0.08	0.3	0.78	124
1S103	Wet Closet	61	0	0	0	0.06	4	-	0.3	-	5
1S104	Electrical Closet	108	0	0	0	0.06	6	-	0.3	-	9
1S106	Main Cross Connect	414	1000	0	0	0.06	25	0.02	0.3	0.72	35
1S107	Main Mechanical Equip.	1,580	0	5	6	0.06	125	-	0.3	-	176
1S108	Engineering Office	138	190	5	2	0.06	18	0.10	0.3	0.80	26
1S109	Breakout	172	240	5	12	0.06	70	0.29	0.3	0.99	99
1S111	Breakout	172	230	5	12	0.06	70	0.31	0.3	1.01	99
1S112	Translation Booth	143	130	5	2	0.06	19	0.14	0.3	0.84	126
1st Floor - Area C											
1S113	Tiered Classroom	2,818	2940	7.5	141	0.06	1227	0.42	0.3	1.12	1,728
1S113A	Storage	42	100	0	0	0.12	5	0.05	0.3	0.75	7
1S114	Tiered Classroom	2,818	2940	7.5	141	0.06	1227	0.42	0.3	1.12	1,728
1S114A	Storage	42	100	0	0	0.12	5	0.05	0.3	0.75	7
1S116	Café/Kitchen	2,538	1800	7.5	127	0.18	1409	0.78	0.3	1.48	1,985
1S141	Electrical Closet	152	0	0	0	0.06	9	-	0.3	-	13
2nd Floor - Area B											
2S101	Women's Restroom	280	200	0	0	0.06	17	0.08	0.3	0.78	24
2S102	Men's Restroom	280	200	0	0	0.06	17	0.08	0.3	0.78	24
2S103	Wet Closet	61	0	0	0	0.06	4	-	0.3	-	5
2S104	Electrical Closet	82	0	0	0	0.06	5	-	0.3	-	7
2S106	Intermediate Cross Connect	76	400	0	0	0.06	5	0.01	0.3	0.71	6
2S107	Sound Studio	259	640	10	10	0.12	131	0.20	0.3	0.90	185
2S108	Control Room	92	920	5	1	0.12	16	0.02	0.3	0.72	23
2S108A	Equipment Room	66	40	0	0	0.12	8	0.20	0.3	0.90	11
2S109	Computing Help Desk	188	220	5	6	0.06	41	0.19	0.3	0.89	58
2S110	Information	143	110	5	5	0.06	34	0.31	0.3	1.01	47
2S111	Computer Suite	1,018	1300	5	52	0.06	321	0.25	0.3	0.95	452
2S111A	Student Center/Library	1,190	1980	5	83	0.06	486	0.25	0.3	0.95	685
2S112	Student Locker Room	368	0	5	25	0.12	169	-	0.3	-	238
2S115	Equipment Storage	104	0	0	0	0.12	12	-	0.3	-	18
2nd Floor - Area C											
2S113	Breakout	160	250	5	11	0.06	65	0.26	0.3	0.96	91
2S114	Breakout	160	230	5	11	0.06	65	0.28	0.3	0.98	91
2S116	Seminar Room	420	1400	5	30	0.06	175	0.13	0.3	0.83	247
2S117	Multi-Purpose Room	1,951	3400	7.5	98	0.06	852	0.25	0.3	0.95	1,200
2S117A	Equipment Closet	50	100	0	0	0.12	6	0.06	0.3	0.76	8
2S117B	Equipment Closet	50	100	0	0	0.12	6	0.06	0.3	0.76	8
2S118	Seminar Room	420	1400	5	30	0.06	175	0.13	0.3	0.83	247
2S119	Breakout	160	230	5	11	0.06	65	0.28	0.3	0.98	91
2S121	Breakout	160	250	5	11	0.06	65	0.26	0.3	0.96	91
2S122	Student Commons	3,070	2040	7.5	205	0.06	1722	0.84	0.3	1.54	2,425
2S141	Electrical Closet	82	0	0	0	0.06	5	-	0.3	-	7
3rd Floor - Area B											
3S101	Women's Restroom	280	200	0	0	0.06	17	0.08	0.3	0.78	24
3S102	Men's Restroom	280	200	0	0	0.06	17	0.08	0.3	0.78	24
3S103	Wet Closet	61	0	0	0	0.06	4	-	0.3	-	5
3S104	Electrical Closet	82	0	0	0	0.06	5	-	0.3	-	7
3S105	Workroom	253	320	5	20	0.06	115	0.36	0.3	1.06	162
3S106	Intermediate Cross Connect	76	400	0	0	0.06	5	0.01	0.3	0.71	6
3S107	Computing Services Office	112	180	5	2	0.06	17	0.09	0.3	0.79	124
3S108	Computing Services Office	120	180	5	2	0.06	17	0.10	0.3	0.80	124
3S109	Server Room	215	1230	0	0	0.12	26	0.02	0.3	0.72	36
3S111	Conference Room	420	1380	5	21	0.06	130	0.09	0.3	0.79	183
3S112	Computing Services Office	145	250	5	2	0.06	19	0.07	0.3	0.77	26
3S113	Research Director's Office	125	190	5	2	0.06	18	0.09	0.3	0.79	94
3S114	Research Director's Office	140	200	5	2	0.06	18	0.09	0.3	0.79	94
3S116	Research Director's Office	135	190	5	2	0.06	18	0.10	0.3	0.80	25
3S117	Computing Services Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25
3S118	Computing Services Office	135	190	5	2	0.06	18	0.10	0.3	0.80	25
3S119	Computing Services Office	126	200	5	2	0.06	18	0.09	0.3	0.79	25
3S121	Finance Office	130	190	5	2	0.06	18	0.09	0.3	0.79	25
3rd Floor - Area C											
3S011	Hallway	415	750	0	0	0.06	25	0.03	0.3	0.73	35
3S012	Hallway	105	660	0	0	0.06	6	0.01	0.3	0.71	19
3S016	Hallway	465	750	0	0	0.06	28	0.04	0.3	0.74	39
3S122	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25
3S123	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25
3S124	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25
3S126	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25
3S127	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25
3S128	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25

Room Number	Room Name	Supply Air		Rp		Pz	Ra (CFM/ft <sup>2</sup> )	Vbz (CFM)	Zp	Xs	Ev	Vot
		Az (ft <sup>2</sup> )	(CFM)	(CFM/person)								
3rd Floor - Area C (cont'd)												
3S129	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25	
3S131	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25	
3S132	Faculty Office	135	180	5	2	0.06	18	0.10	0.3	0.80	25	
3S133	Faculty Office	130	180	5	2	0.06	18	0.10	0.3	0.80	25	
3S134	Faculty Office	132	220	5	2	0.06	18	0.08	0.3	0.78	25	
3S136	Faculty Office	157	220	5	2	0.06	19	0.09	0.3	0.79	27	
3S137	Faculty Office	140	240	5	2	0.06	18	0.08	0.3	0.78	26	
3S138	Conference Room	305	1320	5	16	0.06	98	0.07	0.3	0.77	138	
3S139	Faculty Office	138	240	5	2	0.06	18	0.08	0.3	0.78	26	
3S141	Electrical Closet	82	0	0	0	0.06	5	-	0.3	-	7	
3S142	File Room	124	120	0	0	0.12	15	0.12	0.3	0.82	21	
3S143	Workroom	280	380	5	14	0.06	87	0.23	0.3	0.93	122	
3S144	Faculty Office	155	250	5	1	0.06	14	0.06	0.3	0.76	20	
3S146	Faculty Office	140	220	5	1	0.06	13	0.06	0.3	0.76	34	
3S147	Faculty Office	140	220	5	1	0.06	13	0.06	0.3	0.76	34	
3S148	Faculty Office	140	220	5	1	0.06	13	0.06	0.3	0.76	34	
3S149	Faculty Office	140	220	5	1	0.06	13	0.06	0.3	0.76	34	
3S151	Faculty Office	140	220	5	1	0.06	13	0.06	0.3	0.76	34	
3S152	Faculty Office	140	220	5	1	0.06	13	0.06	0.3	0.76	34	
3S153	Faculty Office	140	220	5	1	0.06	13	0.06	0.3	0.76	34	
3S154	ER/Alumni	140	220	5	7	0.06	43	0.20	0.3	0.90	61	
3S161	Open Office	915	840	5	15	0.06	130	0.15	0.3	0.85	183	
3S166	Reception	325	330	5	3	0.06	35	0.10	0.3	0.80	49	
3S167	Files	90	110	0	0	0.12	11	0.10	0.3	0.80	15	
4th Floor - Area B												
4S002	Hallway	105	130	0	0	0.06	6	0.05	0.3	0.75	9	
4S004	Reception	582	690	5	10	0.06	85	0.12	0.3	0.82	120	
4S101	Women's Restroom	280	220	0	0	0.06	17	0.08	0.3	0.78	24	
4S102	Men's Restroom	280	220	0	0	0.06	17	0.08	0.3	0.78	24	
4S103	Wet Closet	61	0	0	0	0.06	4	-	0.3	-	5	
4S104	Electrical Closet	82	0	0	0	0.06	5	-	0.3	-	7	
4S106	Intermediate Cross Connect	78	390	0	0	0.06	5	0.01	0.3	0.71	7	
4S107	Dean's Assistant	135	220	5	2	0.06	18	0.08	0.3	0.78	25	
4S108	Senior Staff	140	230	5	2	0.06	18	0.08	0.3	0.78	26	
4S109	Conference Room	292	1100	5	10	0.06	68	0.06	0.3	0.76	95	
4S111	Dean's Assistant	133	150	5	2	0.06	18	0.12	0.3	0.82	25	
4S112	Dean's Office	426	700	5	2	0.06	36	0.05	0.3	0.75	50	
4S113	Senior Staff	145	260	5	2	0.06	19	0.07	0.3	0.77	26	
4S114	Academic Associate	130	210	5	2	0.06	18	0.08	0.3	0.78	25	
4S116	Academic Associate	145	200	5	2	0.06	19	0.09	0.3	0.79	26	
4S117	Academic Associate	130	210	5	2	0.06	18	0.08	0.3	0.78	25	
4S118	Workroom	198	210	5	10	0.06	62	0.29	0.3	0.99	87	
4S121	Faculty Office	130	210	5	2	0.06	18	0.08	0.3	0.78	25	
4th Floor - Area C												
4S009	Hallway	105	280	0	0	0.06	6	0.02	0.3	0.72	9	
4S012	Hallway	560	0	0	0	0.06	34	-	0.3	-	47	
4S013	Open Office	1,150	1260	5	10	0.06	119	0.09	0.3	0.79	168	
4S122	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S123	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S124	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S126	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S127	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S128	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S129	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S131	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S132	Faculty Office	135	190	5	2	0.06	18	0.10	0.3	0.80	76	
4S133	Faculty Office	130	200	5	2	0.06	18	0.09	0.3	0.79	76	
4S134	EIR Office	132	220	5	2	0.06	18	0.08	0.3	0.78	76	
4S136	EIR Office	157	230	5	2	0.06	19	0.08	0.3	0.78	27	
4S137	EIR Office	140	220	5	2	0.06	18	0.08	0.3	0.78	26	
4S138	Conference Room	305	1260	5	10	0.06	68	0.05	0.3	0.75	96	
4S139	EIR Office	138	250	5	2	0.06	18	0.07	0.3	0.77	26	
4S141	Electrical Closet	82	0	0	0	0.06	5	-	0.3	-	7	
4S142	PHD Administration Office	124	380	5	4	0.06	27	0.07	0.3	0.77	39	
4S143	Workroom	280	400	5	14	0.06	87	0.22	0.3	0.92	122	
4S144	Faculty Office	155	260	5	2	0.06	19	0.07	0.3	0.77	27	
4S146	Faculty Office	140	220	5	2	0.06	18	0.08	0.3	0.78	26	
4S147	Faculty Office	140	220	5	2	0.06	18	0.08	0.3	0.78	26	
4S148	Faculty Office	140	220	5	2	0.06	18	0.08	0.3	0.78	26	
4S149	Faculty Office	140	220	5	2	0.06	18	0.08	0.3	0.78	126	
4S151	Faculty Office	140	220	5	2	0.06	18	0.08	0.3	0.78	26	
4S152	Faculty Office	140	220	5	2	0.06	18	0.08	0.3	0.78	124	
4S153	Faculty Office	140	220	5	2	0.06	18	0.08	0.3	0.78	26	
4S154	Finance Office	140	280	5	2	0.06	18	0.07	0.3	0.77	126	
4S162	Lounge	652	1280	5	20	0.06	139	0.11	0.3	0.81	196	
4S168	Reception	325	320	5	10	0.06	70	0.22	0.3	0.92	98	
4S169	Files	90	100	0	0	0.12	11	0.11	0.3	0.81	15	

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