



Broad Institute Expansion : 75 Ames Street  
*Cambridge, Massachusetts*

# Technical Report One :

*[ASHRAE Standards 62.1-2010  
& 90.1-2010 Analysis]*

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## Executive Summary

Technical report one tests 75 Ames Street's compliance with ASHRAE Standards 62.1-2010 Ventilation for Acceptable Indoor Air Quality and ASHRAE 90.1-2010 Energy Standard for Buildings except Low-Rise Residential Buildings. This structure is to be used for office and biotechnology manufacturing by The Broad Institute as well as having retail/restaurant space on the ground floor.

The investigation into ASHRAE 62.1 compliance showed that 75 Ames Street is compliant with both Sections 5 and 6. Section five is focused on systems and equipment and Section 6 defines indoor air requirements and ventilation rates that are required by Section 5.1. Detailed calculations in excel were performed for minimum outside air requirement and are shown. Since all air handling units are 100% outside air 75 Ames is far above compliance with the minimum rates.

In the assessment of ASHRAE 90.1 it was found that 75 Ames Street was compliant with the standards stated. Some key analyses to note are the enclosure, fenestration, fan power, and lighting power densities studies. Each performs better then or on par with the guidelines stated in Section 90.1. 75 Ames is looking for a LEED Silver rating meaning it must perform 10% better than a model based off of the standards from ASHRAE 90.1.

## Building Overview

75 Ames Street is a new 250,000 sq. ft., 15-story high-rise addition to Kendal Square in Cambridge, Massachusetts (figure1 below). This building is designed to bring together the multiple Broad institute offices around the Cambridge area into one location attached to their main office at 7 Cambridge Center.

This structure is set to finish the Ames Street frontage and add to the current pedestrian walk space. This is done with a new pedestrian entrance to a 5 floor garage attached to Ames Street as well as 4000 sq. ft. of retail and restaurant space on the ground floor. The primary design is for offices and research & development labs which use a majority of the area. Some other notable areas of the 75 Ames are a vivarium on the 12<sup>th</sup> floor and 3 mechanical rooms making up the penthouse.

The exterior is mainly composed of a mixture of stone, terra cotta, Viracon vision glass and spandrel glass. The penthouse is primarily constructed of aluminum louvers and metal panels. The front façade adds to the vibrant community on Ames Street while the other three facades connect 75 Ames to the current Broad Institute main office next door at 7 Cambridge Center.



Figure 1: A look at the location of 75 Ames Street in Cambridge (courtesy of ELKUS|MANFREDI ARCHITECTS)

## Mechanical System Overview

Four 115,000 CFM 100% outside air, air-handling units are located inside the mechanical rooms on M1, M2 and M3, supplying the basement through level 11. A fifth 100% outside air, air handler is located on M3 serving the vivarium on level 12. Two 230,000 CFM dedicated exhaust air handling units located on the roof exhaust through 8 air induction nozzles roughly 28 feet off the roof.

Level M2 hosts the heating plant consisting of two 500 BHP preheat fire tube boilers, four 120 BHP Reheats with one standby, two 215 BHP MPS boilers for humidification and process steam loads, and finally a pressure reducing LPS for humidifiers. Also on M2 is the chiller plant consisting of three 1000 ton chillers for air cooling air handling units 1 through 4 and two 450 ton chillers to serve vivarium (AHU-5) and fan coil units which serve freezer rooms, tel./data, electrical, and the penthouse for spot cooling. Each chiller has a corresponding cooling tower located on the roof.

The ducting on each floor was taken with future floor plan changes in mind. In order to achieve this, air-handling units 1 through 4 each connect to a main ring on each floor. This can be seen in the following figures 2 & 3 which show the supply and exhaust duct respectively. These rings then supply air to each zone on their floor. Since they are serving both labs and offices together return air cannot be utilized since labs call for 100 % outside air. The only return air used in this building is 16000 CFM of air from the connector of 75 Ames Street to 7 Cambridge Center to level M1.

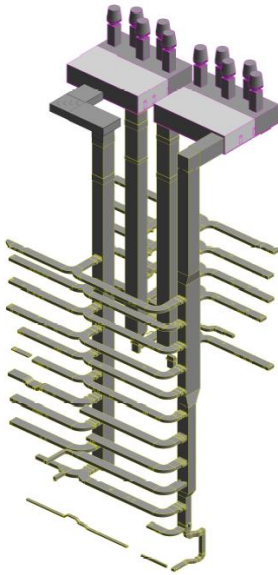


Figure 2: Dedicated Exhaust Ductwork

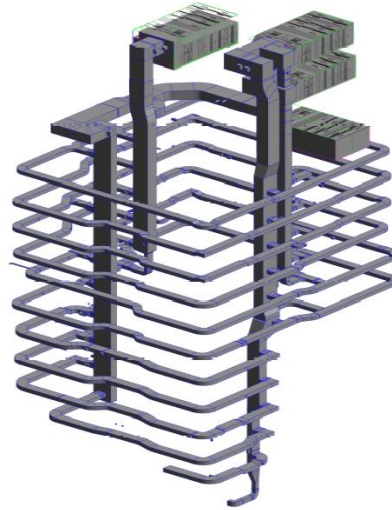


Figure 3: Supply Air Ductwork

## ASHRAE Standard 62.1

### Section 5: Systems and Equipment

#### 5.1 Ventilation Air Distribution

75 Ames Street is designed to meet the design requirements for ventilation air distribution as required by Section 6 of Standard 62.1. Each lab is split into multiple zones and supplied with supply air valves using hot water reheat coils. Each non-lab zone is supplied by a separate variable or constant volume box with hot water heating coils sized to handle the heating load and minimum airflow rates.

#### 5.2 Exhaust Duct Location

All ganged general exhaust is discharged at a safe distance above the roof to minimize recirculation. This is done with two 230,000 CFM exhaust air handling units located on the roof serving floors 0-11 and a 60,000 CFM EAHU serving the vivarium on floor 12. A CFM offset is maintained to keep office zones positively pressurized with respect to adjacent lab areas. Exhaust ducts are held at minimum SMACNA pressure class of 8" H<sub>2</sub>O.

### 5.3 Ventilation System Controls

A complete digital control system is utilized this allows shall be capable of operating at occupied and unoccupied mode of operation on a per-zone basis. All variable air volume boxes are based on an occupancy schedule with a supply damper modulating between flow rates in order to comply with Standard 62.1.

### 5.4 Airstream Surfaces

All ductwork is constructed of galvanized sheet steel in accordance with (SMACNA). Therefore 75 Ames Street falls under the exception of sheet metal surfaces and metal fasteners.

### 5.5 Outdoor Air Intakes

Outdoor air intakes for AHU's 1-5 are located inside on floors M1, M2, and M3 and designed in accordance with table 5-1 from ASHRAE 62..1 Section 5.5. All intakes are over 30' from exhaust stacks.

TABLE 5-1 Air Intake Minimum Separation Distance

Object	Minimum Distance, ft (m)
Class 2 air exhaust/relief outlet (Note 1)	10 (3)
Class 3 air exhaust/relief outlet (Note 1)	15 (5)
Class 4 air exhaust/relief outlet (Note 2)	30 (10)
Plumbing vents terminating less than 3 ft (1 m) above the level of the outdoor air intake	10 (3)
Plumbing vents terminating at least 3 ft (1 m) above the level of the outdoor air intake	3 (1)
Vents, chimneys, and flues from combustion appliances and equipment (Note 3)	15 (5)
Garage entry, automobile loading area, or drive-in queue (Note 4)	15 (5)
Truck loading area or dock, bus parking/idling area (Note 4)	25 (7.5)
Driveway, street, or parking place (Note 4)	5 (1.5)
Thoroughfare with high traffic volume	25 (7.5)
Roof, landscaped grade, or other surface directly below intake (Notes 5 and 6)	1 (0.30)
Garbage storage/pick-up area, dumpsters	15 (5)
Cooling tower intake or basin	15 (5)
Cooling tower exhaust	25 (7.5)

Note 1: This requirements applies to the distance from the outdoor air intakes for one ventilation system to the exhaust/relief outlets for any other ventilation system.

Note 2: Minimum distance listed does not apply to laboratory fume hood exhaust air outlets. Separation criteria for fume hood exhaust shall be in compliance with NFPA 45<sup>5</sup> and ANSI/AIHA Z9.5.<sup>6</sup> Information on separation criteria for industrial environments can be found in the *ACGIH Industrial Ventilation Manual*<sup>7</sup> and in the *ASHRAE Handbook—HVAC Applications*.<sup>8</sup>

Note 3: Shorter separation distances shall be permitted when determined in accordance with (a) ANSI Z223.1/NFPA 54<sup>9</sup> for fuel gas burning appliances and equipment, (b) NFPA 31<sup>10</sup> for oil burning appliances and equipment, or (c) NFPA 211<sup>11</sup> for other combustion appliances and equipment.

Note 4: Distance measured to closest place that vehicle exhaust is likely to be located.

Note 5: Shorter separation distance shall be permitted where outdoor surfaces are sloped more than 45 degrees from horizontal or that are less than 1 in. (3 cm) wide.

Note 6: Where snow accumulation is expected, the surface of the snow at the expected average snow depth constitutes the "other surface directly below intake."

Figure 4: TABLE 5-1 ASHRAE Standard 62.1 Section 5

Louvers located on floors M1, M2, and M3 open to an air plenums which serve each outdoor air intakes. These louvers (figure 3 below) contain welded mesh to prevent rain, snow and bird intrusion. The interior of the plenum has a 15 degree pitch to drain any possible water intrusion. This set up allows for 75 Ames to meet the requirements set by section 5.5.2, 5.5.2, and 5.5.3.

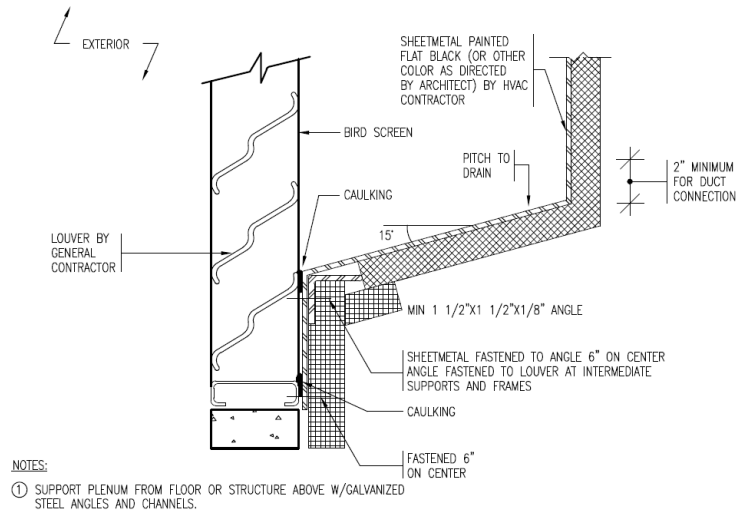


Figure 5: Louvers Supplying Outside Air To AHU's (courtesy BR+A)

### 5.6 Local Capture of Contaminants

Discharge of non-combustion equipment that captures the contaminants generated by the equipment is ducted directly outdoors per section 5.6.

### 5.7 Combustion Air

All fuel burning appliances are provided with sufficient air for combustion and are vented directly outside of the building in order to comply with Section 5.7. Fuel burning appliances include two hot water boilers, 4 hot water condensing boilers, 2 steam boilers, 2 generators.

### 5.8 Particulate Matter Removal

All air handling units use pre-filter with a MERV 8 rating, a secondary filter with MERV 14 and final filter with MERV 17 rating. Pre-filters with MERV rating of 8 are located upstream of all cooling coils and future installation of snow melt coils.

### 5.9 Dehumidification Systems

75 Ames is set to maintain 25% +/- 5 relative humidity in the winter and 50% +/- 5 in the summer. Standard 5.9 specifies 65% relative humidity or less therefore this requirement is satisfied.



**5.10 Drain Pans**

Drain pans shall provide a 1-1/2" deep stainless steel pan under any units with cooling coils and duct mounted humidifiers located above hung ceilings. Pans shall be 6" larger than equipment in all directions. Drain pans are to be piped to floor drains or utility sinks. Pans shall slope at a minimum of 1/8<sup>th</sup> in. per foot from the horizontal towards the drain outlet. Drain pan outlet(s) is the lowest point(s) of the pan with sufficient size to prevent overflow during normal conditions.

**5.11 Finned Tube Coils and Heat Exchangers**

Drain pans are specified for removal of condensate upstream or downstream of coils per section 5.10. All heat exchangers shall be of single-pass construction with all connections on the fixed frame plate to facilitate cleaning of the unit. An access space of 18 in is not specifically mentioned.

**5.12 Humidification and Water-Spray Systems**

The humidifiers receive steam at low pressure steam and discharge at atmospheric pressure. This steam came from a potable source, the city of Cambridge water supply. All air cleaners or ductwork obstructions are located downstream of the humidifier at a distance equal to or greater than 10 in., the absorption distance.

**5.13 Access for Inspection Cleaning & Maintenance**

Access doors allow access to outdoor intake plenums, mixed air plenums, upstream surface of each heating, cooling, and heat recovery coil as well as air cleaners, drain pans, fans, and humidifiers. Each heating coil in the air terminal boxes will provide an access door on each side, upstream and downstream. Below figure 7 shows a duct access door detail.

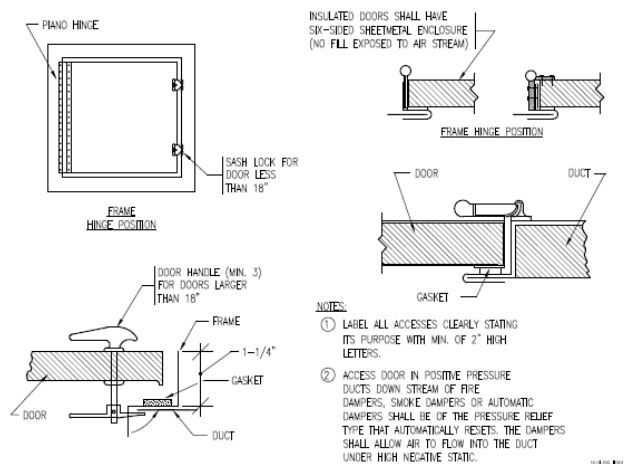


Figure 6: Duct Access Doors Detail (courtesy BR+A)

### 5.14 Building Envelope and Interior Surfaces

The building envelope contains a continuous vapor barrier and penetrations in this envelope are sealed to limit infiltration. Below Table 1 shows the various insulated piping, ductwork and equipment to comply with condensation on interior surfaces.

Table 1: Insulation For Piping Ductwork and Equipment (courtesy BR+A)

Service	Type Insulation & Thickness (Inches)	Concealed Areas	Finished Areas
<b>Piping</b>			
Hot Water Up to 2" 2 1/2" and up	Molded Fiberglass 1 1/2 2	ASJ " "	ASJ " "
Chilled Water Up to 12" 14" and up	Molded Fiberglass 1 2	ASJ ASJ ASJ	ASJ ASJ ASJ
LPS Steam Up to 1-1/2" 1-1/2" to 6" 6" & Up	Molded Fiberglass 1-1/2 2 3-1/2		
Condensation Drains & Vents, Cold Water Make-Up	Molded Fiberglass 1	ASJ	
Blowdowns & Condensate (All Pressures) 1/2" to 2" 2-1/2" & Up	Molded Fiberglass 1 1-1/2	ASJ ASJ	
Emergency Generator Exhaust Piping	Hydrous Calcium Silicate 3-1/2	ADJ-6	ADJ-3b
Piping with Heat Trace	Molded Fiberglass 3"	ASJ	ADJ-3b
All Outdoor Piping	Two times thickness scheduled except heat traced		ADJ-3b
All Pipe within Equipment Room with Chillers or Boiler Plant	As Scheduled		ADJ-5

Service	Type Insulation & Thickness (Inches)	Concealed Areas	Finished Areas
Others not Scheduled	Molded Fiberglass 1	ASJ	
<b>Ductwork</b>			
All Concealed Supply Air Ductwork	Flexible Fiberglass with Vapor Barrier 1	---	---
Outside Air Intake Ducts & Exposed Supply Air Ducts	Rigid Fiberglass (Flexible) 1	---	---
All Kitchen Hood Exhaust Ductwork	Super Firetemp Type M System 3"		
Louver Blank-off Panels	Rigid Fiberglass Board Insulation 3"	FSKL	
Outside Ductwork Supply, Exhaust, Return and Other	Rigid Fiberglass Board Insulation 2 times scheduled but not less than 2"	FSKL	EPDM Roofing
<b>Equipment</b>			
Hot Water, Glycol, Expansion, Compression Tanks and Air Separators	Calcium Silicate Block 1	---	Finishing Cement & Porterlag
Condensate Tanks	Calcium Silicate Block 3	ADJ-6	
Hot Water Pumps	Fiberglass 3		Same as piping
Emergency Generator Exhaust	Calcium Silicate Block 3		ADJ-3b
Emergency Generator Mufflers	Calcium Silicate Block 3	---	Finishing Cement & Porterlag
Breeching	Calcium Silicate Block 3		ADJ-3b
Humidifier Steam Kettles, Deaerator Tank, Blowdown Tanks, Boiler Feed System	Calcium Silicate Block 3		ADJ-6
Tanks	Calcium Silicate Block 3		ADJ-6

Service	Type Insulation & Thickness (Inches)	Concealed Areas	Finished Areas
Boiler Feed System	Calcium Silicate Block 3		ADJ-6
Blowdown Tanks	Calcium Silicate Block 3		ADJ-6
Blowdown Separator	Calcium Silicate Block 3		ADJ-6
Chilled Water Pumps	Insulcote or Armaflex 2	---	Formed Covers w/Velcro Fastening

**5.15 Buildings with Attached Parking Garages.**

The basement through level 5 has an attached garage. The building is positively pressured when compared to the parking garage and a vestibule located on the ground floor is used to separate the garage from 75 Ames.

**5.16 Air Classification and Recirculation.**

Most zones are exhausted through two 230,000 CFM EAHU on the roof or directly exhausted through exhaust fans located on the roof with no recirculation. The only return air in the system is 16,000 CFM from the 7 Cambridge Center to 75 Ames street connector on floor two through seven that supply return air to level M1. The vivarium on floor 12 has its own dedicated exhaust air handling unit.

**5.17 Requirements for Buildings Containing ETS Areas and ETS-Free Areas.**

75 Ames St. is a non-smoking facility; therefore this section is not applicable.

**Section 6: Ventilation Rate Procedure Analysis**

To verify compliance with ASHRAE Standard 62.1 Section 6 Ventilation Air Rate Procedure, all 5 AHU’s were analyzed. All ducting is designed in a loop fashion allowing connections to multiple air handling units. This was chosen for flexibility of future designs as-well as ensuring the labs achieve appropriate ventilation levels needed. Below table 2 shows all 5 AHU’s and the supplied air to each floor. Each AHU is 100% outside air due to the loop duct design and labs demanding 100% outside air. Below (table 2) is a helpful table of the airflow to each floor from each air handling unit to the main rings on each floor.

Level	AHU 1 (CFM)	AHU 2 (CFM)	AHU 3 (CFM)	AHU 4 (CFM)	AHU 5 (CFM)
Level 12 (Vivarium)	0	0	0	0	60,000
Level 11	0	23,500	23,500	0	0
Level 10	7,000	18,000	18,000	4,000	0
Level 9	7,000	18,000	18,000	4,000	0
Level 8	7,000	18,000	18,000	4,000	0
Level 7	7,000	18,000	18,000	4,000	0
Level 6	7,000	1,950	1,950	4,000	0
Level 5	20,000	0	0	16,000	0
Level 4	20,000	0	0	16,000	0
Level 3	20,000	0	0	16,000	0
Level 2	20,000	0	0	16,000	0
Level 1	0	0	0	21,000	0
Basement	0	0	0	10,000	0

Table 2: Air Supplied To Each Floor

To calculate the breathing zone outdoor airflow ( $V_{bz}$ ) the following equation, given by Equation 6-1 in Section 6.2.2.1 of Standard 62.1.

$$V_{bz} = (R_p \cdot P_z) + (R_a \cdot A_z)$$

Where:  $A_z$  = zone floor area: the net occupiable floor area of the ventilation zone ft<sup>2</sup> (m<sup>2</sup>)

$P_z$  = zone population: the number of people in the ventilation zone during typical usage.

$R_p$  = outdoor airflow rate required per person as determined from Table 6-1

$R_a$  = outdoor airflow rate required per unit area as determined from Table 6-1

The zone outdoor airflow ( $V_{oz}$ ) is the air that must be provided to the ventilation zone by the supply air distribution system. This is calculated using Equation 6-2 from Standard 62.1.

$$V_{oz} = V_{bz}/E_z$$

$E_z$  = zone air distribution effectiveness. For 75 Ames was found from table 6-2 to be 1

For 100% outside air system the outdoor air intake is given by Equation 6-4 of Standard 62.1, also shown below.

$$V_{ot} = \sum_{\text{all zones}} V_{oz}$$

$V_{oz}$  = zone outdoor air flow

The primary outdoor air fraction ( $Z_{pz}$ ), the minimum percent of supply air that is outdoor ventilation air, is calculated with the ratio of zone outdoor airflow and zone primary airflow shown in Equation 6.5 from Standard 62.1 below

$$Z_{pz} = V_{oz}/V_{pz}$$

$V_{pz}$  is the primary airflow rate supplied to the zone from an air handling unit where the outdoor intake is located. When used with variable air volume supply this primary airflow rate shall be the lowest expected primary airflow rate to the zone when fully occupied.

## ASHRAE Standard 62.1 Summary

Using the equations given above a spread sheet was used (Appendix A) to calculate the minimum outside air CFM to comply with ASHRAE 62.1. Since Air handling units one, two, three and four are all connected via ducting to one another they were analyzed as one system for the whole building. Air handling unit 5 was analyzed by itself since it only serves the vivarium on the 12<sup>th</sup> floor.

75 Ames Street is in complete compliance with ASHRAE Standard 62.1-2010 shown in table 3 below. This is since all air handling unit's supply 100% outside air. This building was designed to be easily retrofitted so in order to do this easily a ring ducting system was utilized serving all spacing including labs which are designed for 100% outside air. Thus all spaces must use 100% outside air. Future considerations could be to install return air ducting from and to offices and similar areas.

ASHRAE 62.1 Ventilation Compliance Summary						
Air Handling Unit	Location	Floors Served	Design CFM	Design Min OA CFM	ASHRAE 62.1 Min OA CFM	Comply?
1,2,3,4	M2&M3	0-11	460,000	460,000	74,213	Y
5	M1	12	60,000	60,000	3,191	Y

Table 3: Ventilation Compliance Summary

## ASHRAE Standard 90.1

### Section 5 Building Envelope

#### 5.1.4 Climate Zone

75 Ames Street is located in Cambridge Massachusetts, which can be seen in the figure below. This location classifies Ames Street as zone 5A a cold, moist climate.

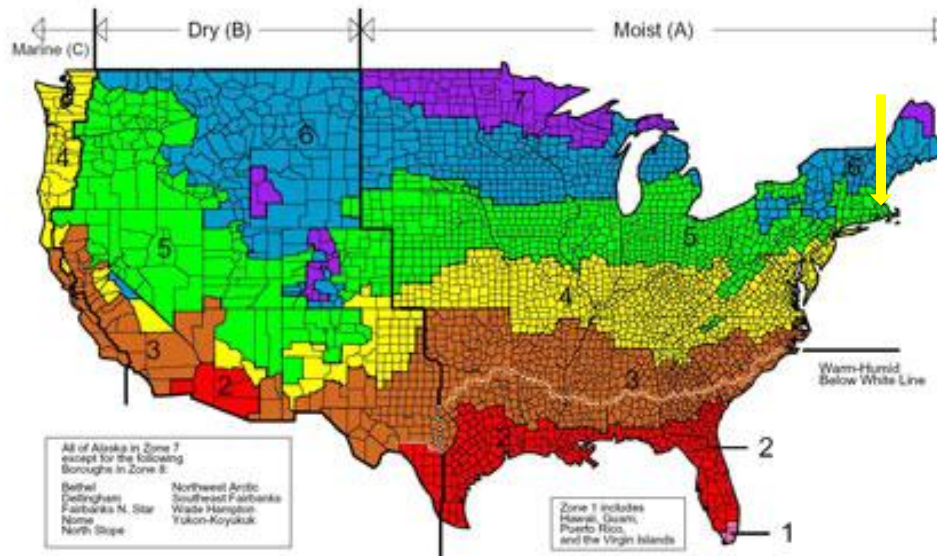


Figure 7 : Climate Zones for the United States (ASHRAE)

#### 5.4 Mandatory Provisions

75 Ames utilizes two vestibules for the main entrances from the attached garage and from the Ames Street side of the building both with self-closing devices attached. The entire building envelope is constructed with a continuous air barrier and any penetration to the exterior envelope to be sealed.

#### 5.5 Prescriptive Building Envelope

Compliance was determined for the building envelope required by Standard 90.1 was done using the prescriptive building technique. Below are two tables. Table 4 matches various enclosure materials R, U and SHGC to those for a nonresidential building located in climate zone 5A. Table 5 assures compliance with Section 5.5.4.2.1 Vertical Fenestration Area which states “the total vertical fenestration area shall be less than 40% of the gross wall area”.

Table 4

Building Envelope Requirement for Nonresidential 5A									
Element	R-Value	Insulation Min. R-value	U-Value	Max U-Value	SHGC	Max SHGC	Comply?		
							U-Value	R-Value	SHGC
Roof Metal Deck Roof	R= 20 c.i.	R=20 c.i.	-	-	-	-	-	Y	-
Walls, Above-Grade, Steel Framed	R=12 c.i.	R-13.0 + R-7.5 c.i.	-	-	-	-	-	Y	-
Vertical Glazing, Metal framing (curtain wall/storefront)	-	-	0.29 0.26	0.50	0.38 0.40	0.40	Y	-	Y

Table 5

Vertical Fenestration Area				
Face	Glazing Area ft <sup>2</sup>	Wall Area ft <sup>2</sup>	Glazing %	Comply?
North	16870.68	34831.25	48.43547	-
East	30983.36	51076	60.66129	-
South	7047.96	40217.035	17.52481	-
West	13453.72	48093.825	27.9739	-
Total	68355.72	174218.11	39.23571	Y

As seen by the tables 75 Ames Street performance complies with or beyond the given prescription for the building envelope insulations and U-values. For fenestration even though some wall areas have over 40% glazing that is made up for by using much less glazing on other wall such as the south and west in order for the whole building enclosure to reach just below the 40% set by Standard 90.1.

## Section 6 Heating, Ventilating and Air Conditioning

### 6.2 Compliance Paths

75 Ames does not meet the height, square footage and HVAC system conditions to use the simplified approach option for HVAC systems. Because of this the Mandatory Provisions and Section 6.5 Prescriptive Path must be used.

### 6.4 Mandatory Provisions

Minimum equipment efficiencies from Tables 6.8.1A-K of ASHRAE 90.1 are met.

A combination directs digital/electric/electronic temperature control system and building automated system is to be utilized in this building. The system is



comprised of digital controllers, electric/electronic control equipment, thermostats, sensors, controllers, valves, dampers, actuators, and other accessory equipment.

Generally only private/enclosed offices shall have open set point adjustments. Because of tampering concerns all other areas shall be sensor only. Room sensors shall have an accuracy of +/-2% at 70 F. The system will have setback controls for times when the building is unoccupied. As well rooms shall be fitted with CO2 occupancy sensors.

**6.5 Prescriptive Path**

All the AHU's that serve 75 Ames are 100% outside air units. Heat recovery is used with between each of the AHU's and EAHU's with a heat exchanger. As can be seen by the table 6 (next page), some fans do comply with Section 6.5.3.1.1 on fan power. For the fans which do not comply, this is because 75 Ames can fall under the exception having both laboratory systems and a vivarium that utilizes flow control devices on exhaust and return to maintain space pressure relationships necessary.

Table 6: Fan Power Limitation Compliance

Fan Power Limitation Compliance					
Unit	CFM	HP	CFM*0.0011	CFM*0.0015	Comply?
AHU-1	115000	224	-	172.5	N
AHU-2	115000	224	-	172.5	N
AHU-3	115000	224	-	172.5	N
AHU-4	115000	224	-	172.5	N
AHU-5	60000	112	-	90	N

EAHU-1	230000	320	-	345	N
EAHU-2	230000	320	-	345	N
EAHU-3	60000	80	-	90	Y
EF-1	20,000	6.6	22.0000	-	Y
EF-2	7,500	2.6	8.25	-	Y
EF-4	6,000	2.39	6.6	-	Y
EF-5	750	0.32	0.825	-	Y
EF-7	2,150	1.3	2.365	-	Y
EF-10	2,500	1.6	2.75	-	Y
EF-11	1,000	0.6	1.1	-	Y
EF-12	1,000	0.5	1.1	-	Y
EF-13	800	0.5	0.88	-	Y
EF-14	1,300	0.7	1.43	-	Y
EF-15	800	1.1	0.88	-	N
EF-16	1,700	0.9	1.87	-	Y
EF-17	800	0.4	0.88	-	Y
EF-18	7,500	3.6	8.25	-	Y
EF-19	1,500	1.5	1.65	-	Y
RF-1	16,000	8.7	17.6	-	Y
SF-1	27,000	14.6	29.7	-	Y
SF-2	18,000	9.0	19.8	-	Y
SF-3	7,500	2.8	8.25	-	Y
SF-4	2,500	1.0	2.75	-	Y
SF-5	7,000	2.6	7.7	-	Y

### 6.7 Submittals

100% construction drawings were supplied to the Broad Institute. These included locations, performance data, dimensions and general configurations of all HVAC equipment. Brochures shall be submitted that contain only information relative to the particular equipment.

## Section 7 Service Water Heating

### 7.4 Mandatory Provisions

Table 7.8 gives the minimum performance requirements for water heating equipment. The heating for 75 Ames is from two 16738 MBH hot water boilers and four 3880 MBH hot water condensing boilers. All necessary service hot water piping is insulated. The system utilizes service water heating controls for temperature. Sequencing ensures that if one boiler cannot maintain 140 F leaving water temperature then another boiler control valve shall open and its boiler shall be started.

## Section 8 Power

75 Ames Street specifications call for compliance with the National Electric Code (NEC). The National Electric Code specifies a maximum of 3% voltage drop for feeders and maximum of 5% voltage drop for branch circuits. This does not comply with Section 8 of ASHRAE 90.1 which states feeders should have a max voltage drop of 2% and branch circuits 3%.

## Section 9 Lighting

### 9.4 Mandatory provisions

Rooms are equipped with occupancy sensors in the ceilings to control the lighting for occupied/unoccupied times, along with manual controls on the wall.

### 9.6 Alternate Compliance Path: Space by Space Method.

Table 9.6.1 Lighting Power Densities Using the Space-by-Space Method was used to determine compliance with ASHRAE 90.1 Section 9. Below in Table 7 (next page) you can see a spread sheet with space types total areas and allowed lighting power densities. The actual data is then compared against the ASHRAE standard. The percent under ASHRAE 90.1 is shown as well. 75 Ames goes beyond the ASHRAE 90.1 Standard reducing lighting power density by 30%.

Table 7:Space-by-Space LPD Compliance

Space-By-Space LPD Compliance				
SPACE TYPE	AREA	ALLOWED	ALLOWED	ACTUAL

		W/SF	WATTS	WATTS
STAIRS ACTIVE	9802	0.69	6763.38	13051
ELECTRICAL/MECHANICAL	79214	1.5	118821	25020
ACTIVE STORAGE	5809	0.63	3659.67	3494
CORRIDOR/TRANSITION	51581	0.66	34043.46	28462
WAREHOUSE	1905	0.95	1809.75	767
RESTROOMS	6052	0.98	5930.96	7203
OFFICE-ENCLOSED	54448	1.11	60437.28	41878
LOBBY	5470	0.9	4923	11927
CONFERENCE MEETING/MULTI-PURPOSE	9324	1.23	11468.52	12174
LOUNGE/RECREATION	17809	0.73	13000.57	18842
LABORATORY	74939	1.81	135639.59	108279
ATRIUM	4291	0.6	2574.6	6822
CAGE WASH	4059	1.2	4870.8	3960

TOTAL AREA:	324703
ALLOWED WATTS:	403943
ACTUAL WATTS:	281878
WATTS/ SQUARE FOOT:	0.87
PERCENT UNDER ASHRE 90.1	30%

Table 8: LPD Compliance

## Section 10 Other Equipment

Nominal motor efficiencies are specified to meet NEMA Standard MG 1 therefore, 75 Ames meets the requirements set by ASHRAE 90.1 Section 10. The Values used in Table 10.8C of ASHRAE 90.1 are based off of the values established by NEMA Standard MG 1.

### ASHRAE Standard 90.1 Summary

ASHRAE Standard 90.1 provides a baseline of rules and standards to make an energy efficient design. The standard goes detailed into building material, HVAC, heating, power, lighting and other equipment. By comparing a design to these baseline standards, conclusions may be drawn about the efficiency of a design.

Using the prescriptive method on 75 Ames Street with Standard 90.1, 75 Ames fared well especially in the lighting power density section where it preformed 30% better than the baseline model. The exterior envelope was on par with ASHRAE 90.1 having values at or better than those required and the total fenestration fell right to the max allowed 40% of the total wall area.

There were few areas of concern with comparing 75 Ames with Standard 90.1. The fan power section had a few fans that did not comply, but given the exception that 75 Ames is providing for labs and a vivarium those larger horse powers are necessary.

## References

ANSI/ASHRAE. (2010). Standard 62.1-2010, Ventilation for Acceptable Indoor Air Quality. Atlanta, GA: American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.

ANSI/ASHRAE. (2010). Standard 90.1-2010, Energy Standard for Buildings Except Low-Rise Residential Buildings. Atlanta, GA: American Society of Heating Refrigeration and Air Conditioning Engineers, Inc.

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Bard, Rao + Athanas Consulting Engineers, LLP. Electrical Construction Documents. Bard, Rao + Athanas Consulting Engineers, LLP, Watertown, MA

Bard, Rao + Athanas Consulting Engineers, LLP. Mechanical Construction Documents. Bard, Rao + Athanas Consulting Engineers, LLP, Watertown, MA

Bard, Rao + Athanas Consulting Engineers, LLP. Mechanical Specs. Bard, Rao + Athanas Consulting Engineers, LLP, Watertown, MA

Bard, Rao + Athanas Consulting Engineers, LLP. Electrical Specs. Bard, Rao + Athanas Consulting Engineers, LLP, Watertown, MA

# Appendix A - Minimum Ventilation Calculation

## AHU'S 1-4 %OA ANALYSIS

<b>Building:</b>		<b>Delete Zone</b>		<b>75 AMES St.</b>			
<b>System Tag/Name:</b>		<b>Add Zone</b>		<b>AHU-1-2-3-4</b>			
<b>Operating Condition Description:</b>				<b>Occupied Operation</b>			
<b>Units (select from pull-down list)</b>				<b>IP</b>			
<b>Inputs for System</b>		<b>Name</b>	<b>Units</b>	<b>System</b>	<b>Diversity</b>	<b>System</b>	<b>System</b>
Floor area served by system		As	sf	176713.6994			
Population of area served by system		Ps	P	2,185	D	100%	2,185
Design primary supply fan airflow rate		Vpsd	cfm	321,250	D	100%	321,250
OA req'd per unit area for system (Weighted average)		Ras	cfm/sf	0.09			
OA req'd per person for system area (Weighted average)		Rps	cfm/p	6.7			
Does system have Outdoor Air Economizer		Rps	Select from pull-down list				No
<b>Outdoor air intake provided for system</b>		OA	cfm	460,000			
<b>Inputs for Potentially Critical zones</b>		<b>Show Values per Zone</b>					
Zone Name							
Zone Tag							
Occupancy Category							
Floor Area of zone		Az	sf	Select from pull-down list:			
Design population of zone		Pz	P	(default value listed; may be overridden)			
Design total supply to zone (primary plus local recirculated)		Vdzd	cfm				
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A:					
Frac. of local recirc. air that is representative of system RA		Er					
<b>Inputs for Operating Condition Analyzed</b>							
Percent of total design airflow rate at conditioned analyzed		Ds	%	57%			
Air distribution type at conditioned analyzed		Select from pull-down list:					
Zone air distribution effectiveness at conditioned analyzed		Ez		<b>Show codes for Ez</b>			
Primary air fraction of supply air at conditioned analyzed		Ep					
<b>Inputs for Systems with Outdoor Air Economizers</b>							
Outdoor air Temperature		Toa	Deg F				
Supply Air Temperature		Tip	Deg F				
Return Air Temperature		Tr	Deg F				
Supply Fan Heat Gain		dTsf	Deg F				
Return Fan Heat Gain		dTrf	Deg F				
<b>Results of Minimum ASHRAE 62.1 Ventilation Rate Procedure (EQp1)</b>							
System Ventilation Efficiency		Ev		0.41			
<b>Outdoor air intake required for system (EQp1)</b>		Vot	cfm	74,213			
Outdoor air per unit floor area		Vot/As	cfm/sf	0.42			
Outdoor air per person served by system (including diversity)		Vot/Ps	cfm/p	34.0			
Outdoor air as a % of design primary supply air		Ypd	%	23%			
<b>Results of 30% Increase beyond ASHRAE 62.1 Ventilation Rate Procedure (EQc2)</b>							
System Ventilation Efficiency with 30% increase (EQc2)		Ev30		0.23			
<b>Outdoor air intake required for system with 30% increase (EQc2)</b>		Vot30	cfm	169,091			
Outdoor air per unit floor area for system with 30% increase (EQc2)		Vot30/As	cfm/sf	0.96			
Outdoor air per person served by system (including diversity) (EQc2)		Vot30/Ps	cfm/p	77.4			
Outdoor air as a % of design primary supply air (EQc2)		Ypd30	%	53%			
<b>Detailed Calculations</b>							
<b>Initial Calculations for the System as a whole</b>							
System primary supply air flow at conditioned analyzed		Vps	cfm	=	Vpsd Ds	=	182815
Uncorrected OA intake flow req'd for system		Vou	cfm	=	Rps Ps + Ras As	=	30522
30% increase Uncorrected OA intake flow req'd for system (EAc2)		Vou30	cfm	=	(Rps Ps + Ras As)*1.3	=	39678
Uncorrected OA req'd as a fraction of primary SA		Xs		=	Vou / Vps	=	0.17
30% increase Uncorrected OA req'd as a fraction of primary SA		Xs30		=	Vou30 / Vps	=	0.22
<b>Initial Calculations for individual zones</b>							
Area outdoor air rate		Ra	cfm/sf				
People outdoor air rate		Rp	cfm/p				
Total supply air to zone (at condition being analyzed)		Vdz	cfm	=	Vdzd Ds	=	
Primary airflow to zone (at condition being analyzed)		Vpz	cfm	=	Vdz Ep	=	
Breathing zone outdoor airflow		Vbz	cfm	=	Rp Pz + Ra Az	=	
Breathing zone outdoor airflow with 30% increase (EAc2)		Vbz30	cfm	=	(Rp Pz + Ra Az)*1.3	=	
Zone outdoor airflow		Voz	cfm	=	Vbz / Ez	=	
Zone outdoor airflow with 30% increase (EAc2)		Voz30	cfm	=	Vbz30/Ez	=	
Fraction of zone supply not directly recirc. from zone		Fa		=	Ep + (1-Ep) Er	=	
Fraction of zone supply from fully mixed primary air		Fb		=	Ep	=	
Fraction of zone OA not directly recirc. from zone		Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=	
OA fraction required in the supply air to the zone		Zd		=	Voz / Vdz	=	
OA fraction required in the primary air to the zone		Zp		=	Voz / Vpz	=	
OA fraction required in the supply air to the zone for EAc2		Zd30		=	Voz30 / Vdz	=	
OA fraction required in the primary air to the zone for EAc2		Zp30		=	Voz30 / Vpz	=	
<b>System Ventilation Efficiency</b>							
Zone Ventilation Efficiency (App A Method)		Evz		=	(Fa+FbXs-FcZpEp)/Fa	=	
Zone Ventilation Efficiency with 30% increase (EAc2) (App A)		Evz30		=	(Fa+FbXs-FcZp30Ep)/Fa	=	
System Ventilation Efficiency (App A Method)		Ev		=	min (Evz)	=	0.41
System Ventilation Efficiency (Table 6.3 Method)		Ev		=	Value from Table 6.3	=	n/a
System Ventilation Efficiency w/ 30% increase (EAc2) (App A)		Ev30		=	min (Evz30)	=	0.23
System Ventilation Efficiency w/ 30% increase (EAc2) (Table 6.3)		Ev30		=	Value from Table 6.3	=	n/a
<b>Minimum outdoor air intake airflow (EQp1)</b>							
Outdoor Air Intake Flow required to System		Vot	cfm	=	Vou / Ev	=	74213
OA intake req'd as a fraction of primary SA		Y		=	Vot / Vps	=	0.41
Outdoor Air Intake Flow required to System (Table 6.3 Method)		Vot	cfm	=	Vou / Ev	=	n/a
OA intake req'd as a fraction of primary SA (Table 6.3 Method)		Y		=	Vot / Vps	=	n/a
<b>Time-averaging</b>							
Time period with high occupancy		Th	min	=		=	
Room height		h	ft	=		=	
Time period over which averaging can take place		T	min	=	3 v / Vbz	=	
Error - sum of all values above will show error							
Error flag		FALSE					
<b>30% increase beyond Minimum Outdoor air intake airflow (EQc2)</b>							
Outdoor Air Intake Flow required to System		Vot30	cfm	=	Vou / Ev	=	169091
OA intake req'd as a fraction of primary SA		Y30		=	Vot / Vps	=	0.92
Outdoor Air Intake Flow required to System (Table 6.3 Method)		Vot30	cfm	=	Vou / Ev	=	n/a
OA intake req'd as a fraction of primary SA (Table 6.3 Method)		Y30		=	Vot / Vps	=	n/a
<b>OA Temp at which Min OA provides all cooling</b>							
OAT below which OA intake flow is @ minimum		Deg F		=	((Tp-dTsf)-(1-Y)*(Tr+dTrf))/Y	=	30

B0018 - EHS STORAGE	B0013 - FUEL OIL STORAGE	B0011 - MECH/PLUMBING	B0012 - HOLDING	B0010 - FIRE PUMP	B000LA - FIRE SERVICE ACCESS LOBBY	B0001 - FACILITIES	B0005 - MICROBULK NIT4 CO2	B0003 - BIO WASTE	VESIBULE	1000CB - PASSAGE
0-1	0-3	0-5A, 0-5B	0-7	0-9	0-11	0-13	0-15	0-17	0-19	1-1
Storage rooms	Storage rooms	Elec/mech equipment rooms	Storage rooms	Elec/mech equipment rooms	Corridors	Storage rooms	Unocc / Not Used	Storage rooms	Corridors	Corridors
101	690	2,647	320	501	211	75	203	195	86	82
0	0	0	0	0	0	0	0	0	0	0
300	1,950	2,600	325	525	300	200	200	750	200	200
50%	100%	56%	46%	48%	50%	50%	50%	50%	100%	100%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.06	0.06
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
150	1950	1450	150	250	150	100	100	375	200	200
150	1950	1450	150	250	150	100	100	375	200	200
0	0	0	0	0	13	0	0	0	5	5
0	0	0	0	0	16	0	0	0	7	6
0	0	0	0	0	13	0	0	0	5	5
0	0	0	0	0	16	0	0	0	7	6
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.03	0.02
0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.03	0.02
0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.03	0.03
0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.03	0.03
1.17	1.17	1.17	1.17	1.17	1.08	1.17	1.17	1.17	1.14	1.14
1.22	1.22	1.22	1.22	1.22	1.11	1.22	1.22	1.22	1.18	1.19

9  
27270000  
27272320  
FALSE



1015 - FCC	1011 - LOBBY	1007 - MANAGER	1003 - LOADING DOCK	1000LV - VIVARIUM ELEV LOBBY	1000LA - SERVICE ELEV LOBBY	1012 - PH NEUT	1000LB - ELEVATOR LOBBY	1010 - SECURITY	1008 - VIRGIN CHEM STORAGE (H-2)	1006 - WASTE CHEM STORAGE (H-2)	2000CA - BREAKOUT CONNECTOR	2001 - MULTIPURPOSE CONFERENCE	2001 - MULTIPURPOSE CONFERENCE
1-3	1-5	1-9	1-11, 1-13	1-15	1-17	1-19	1-21	1-23	1-25	1-27	2-1, 2-3	2-5	2-7
Unocc / Not Used	Main entry lobbies	Office space	Unocc / Not Used	Corridors	Corridors	Unocc / Not Used	Corridors	Telephone closets	Storage rooms	Storage rooms	Corridors	Conference/meeting	Conference/meeting
186	876	84	1,966	82	131	135	163	94	116	173	2,100	788	788
0	8.76	0.42	0	0	0	0	0	0	0	0	0	39.375	39.375
300	1,200	200	2,200	400	400	1,300	400	850	650	600	2,100	1,500	1,500
50%	100%	100%	100%	100%	100%	100%	100%	41%	50%	50%	50%	50%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.06	0.06	0.00	0.06	0.06	0.00	0.06	0.00	0.00	0.00	0.06	0.06	0.06
0.00	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	5.00
150	1200	200	2200	400	400	1300	400	350	325	300	1050	750	750
150	1200	200	2200	400	400	1300	400	350	325	300	1050	750	750
0	96	7	0	5	8	0	10	0	0	0	126	244	244
0	125	9	0	6	10	0	13	0	0	0	164	317	317
0	96	7	0	5	8	0	10	0	0	0	126	244	244
0	125	9	0	6	10	0	13	0	0	0	164	317	317
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.08	0.04	0.00	0.01	0.02	0.00	0.02	0.00	0.00	0.00	0.12	0.33	0.33
0.00	0.08	0.04	0.00	0.01	0.02	0.00	0.02	0.00	0.00	0.00	0.12	0.33	0.33
0.00	0.10	0.05	0.00	0.02	0.03	0.00	0.03	0.00	0.00	0.00	0.16	0.42	0.42
0.00	0.10	0.05	0.00	0.02	0.03	0.00	0.03	0.00	0.00	0.00	0.16	0.42	0.42
1.17	1.09	1.13	1.17	1.15	1.15	1.17	1.14	1.17	1.17	1.17	1.05	0.84	0.84
1.22	1.11	1.17	1.22	1.20	1.19	1.22	1.19	1.22	1.22	1.22	1.06	0.79	0.79

2007 - FREEZER ROOM	2011 - PRE PCR	2006 - WARM ROOM	2008 - COLD ROOM	2005 - RNAI LAB	2015 - RNAI LAB	2035 - DNA CLEAN LAB	2025 - CLONE PRODUCTIO N CLEAN LAB	2053 - OFFICE	2051 - LAB DESKS	2058E - ELEC	2000LB - ELEVATOR LOBBY
2-9	2-11	2-13	2-13	2-15A, 2-15B	2-17A, 2-17B	2-19	2-21	2-23	2-25	2-27	2-29
Storage rooms	Science laboratories	Storage rooms	Storage rooms	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Office space	Office space	Elec/mech equipment rooms	Corridors
998	186	112	151	1,345	1,374	237	273	159	448	236	379
0	3	0	0	24	19	5	6	1	2,2382	0	0
925	400	25	50	3,600	3,600	600	750	250	1,100	850	400
51%	63%	100%	100%	35%	35%	100%	100%	50%	50%	41%	100%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.18	0.00	0.00	0.18	0.18	0.18	0.18	0.06	0.06	0.00	0.06
0.00	10.00	0.00	0.00	10.00	10.00	10.00	10.00	5.00	5.00	0.00	0.00
475	250	25	50	1250	1250	600	750	125	550	350	400
475	250	25	50	1250	1250	600	750	125	550	350	400
0	63	0	0	482	437	93	109	15	38	0	23
0	82	0	0	627	568	121	142	19	49	0	30
0	63	0	0	482	437	93	109	15	38	0	23
0	82	0	0	627	568	121	142	19	49	0	30
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.25	0.00	0.00	0.39	0.35	0.15	0.15	0.12	0.07	0.00	0.06
0.00	0.25	0.00	0.00	0.39	0.35	0.15	0.15	0.12	0.07	0.00	0.06
0.00	0.33	0.00	0.00	0.50	0.45	0.20	0.19	0.15	0.09	0.00	0.07
0.00	0.33	0.00	0.00	0.50	0.45	0.20	0.19	0.15	0.09	0.00	0.07
1.17	0.91	1.17	1.17	0.78	0.82	1.01	1.02	1.05	1.10	1.17	1.11
1.22	0.89	1.22	1.22	0.72	0.76	1.02	1.03	1.07	1.13	1.22	1.14

2040 - MEN, 2044 - WOMEN, 2000CB - CORRIDOR, 2000LA - FIRE SERVICE ACCESS LOBBY	3000CA - BREAKOUT/CONNECTOR	3001 - LARGE CONFERENCE	3005 - COPY	3007 - OFFICE, 3011 - OFFICE, 3009 - OFFICE	3013 - OFFICE	3000CC - CORRIDOR	3008 - OFFICE, 3022 - OFFICE	3010 - OFFICE, 3020 - OFFICE	3015 - OFFICE, 3017 - OFFICE, 3019 - OFFICE	3026 - LAB SUPPORT	3029 - TISSUE CULTURE ROOM	3035 - NOVEL THERAPEUTIC/ CHEM BIO	3053 - LAB DESKS
2-31, 2-33	3-1, 3-3	3-5	3-7	3-9	3-11	3-13	3-15	3-17	3-19	3-21	3-25	3-27A, 3-27B, 3-27C, 3-27D, 3-27E, 3-27F, 3-27G	3-27H
Corridors	Corridors	Conference/meeting	Corridors	Office space	Office space	Corridors	Office space	Office space	Office space	Storage rooms	Science laboratories	Science laboratories	Office space
1,460	1,352	626	167	449	268	234	419	274	254	148	314	3,163	782
0	0	31,2855	0	9	1	0	8	6	5	0	4	27	3,91
1,600	2,400	1,280	150	525	300	125	400	350	525	500	1,500	21,000	1,650
100%	50%	50%	100%	48%	50%	100%	50%	50%	48%	50%	100%	17%	11%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.18	0.18	0.06
0.00	0.00	5.00	0.00	5.00	5.00	0.00	5.00	5.00	5.00	0.00	10.00	10.00	5.00
1600	1200	640	150	250	150	125	200	175	250	250	1500	3500	180
1600	1200	640	150	250	150	125	200	175	250	250	1500	3500	180
88	81	194	10	72	21	14	65	46	40	0	97	839	66
114	105	252	13	94	27	18	85	60	52	0	125	1091	86
88	81	194	10	72	21	14	65	46	40	0	97	839	66
114	105	252	13	94	27	18	85	60	52	0	125	1091	86
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.05	0.07	0.30	0.07	0.29	0.14	0.11	0.33	0.27	0.16	0.00	0.06	0.24	0.37
0.05	0.07	0.30	0.07	0.29	0.14	0.11	0.33	0.27	0.16	0.00	0.06	0.24	0.37
0.07	0.09	0.39	0.09	0.37	0.18	0.15	0.42	0.34	0.21	0.00	0.08	0.31	0.48
0.07	0.09	0.39	0.09	0.37	0.18	0.15	0.42	0.34	0.21	0.00	0.08	0.31	0.48
1.11	1.10	0.86	1.10	0.88	1.03	1.05	0.84	0.90	1.01	1.17	1.10	0.93	0.80
1.15	1.13	0.82	1.13	0.84	1.03	1.07	0.79	0.87	1.01	1.22	1.13	0.91	0.74

3000LB - ELEVATOR LOBBY	3058E - ELEC	3044 - WOMEN, 3040 - MEN, 3000CE - CORRIDOR, 3000LA - FIRE SERVICE ACCESS LOBBY	4007 - OFFICE, 4009 - OFFICE, 4011 - OFFICE	4013 - OFFICE	4015 - OFFICE	4017 - OFFICE	4010 - OFFICE, 4012 - OFFICE	4008 - OFFICE, 4016 - OFFICE	4023 - OFFICE, 4021 - OFFICE, 4019 - OFFICE	4020 - OFFICE, 4024 - OFFICE, 4022 - OFFICE	4018 - OFFICE, 4034 - OFFICE, 4014 - OFFICE	4032 - OFFICE	4031 - MEDIUM CONFERENCE ROOM	4036 - OFFICE	4047 - LAB SUPPORT	
3-33	3-35	3-37, 3-39	4-1	4-3	4-5	4-7	4-9	4-11	4-13	4-15	4-17	4-19	4-21	4-23	4-25	
Corridors	Elec/mech equipment rooms	Corridors	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Conference/meeting	Office space	Storage rooms	
360	249	1,347	392	275	170	135	260	320	465	390	475	156	251	154	281	
0	0	0	8	1	3	3	6	8	6	9	12	4	12.55	4	0	
400	850	1,600	525	300	400	400	400	400	800	525	600	200	525	200	600	
100%	41%	100%	48%	50%	50%	100%	50%	50%	50%	48%	50%	50%	48%	50%	50%	
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
0.06	0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00
0.00	0.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	0.00
400	350	1600	250	150	200	400	200	200	400	250	300	100	250	100	300	
400	350	1600	250	150	200	400	200	200	400	250	300	100	250	100	300	
22	0	81	64	22	25	23	46	59	58	68	89	29	78	29	0	
28	0	105	83	28	33	30	59	77	75	89	115	38	101	38	0	
22	0	81	64	22	25	23	46	59	58	68	89	29	78	29	0	
28	0	105	83	28	33	30	59	77	75	89	115	38	101	38	0	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
0.05	0.00	0.05	0.25	0.14	0.13	0.06	0.23	0.30	0.14	0.27	0.30	0.29	0.31	0.29	0.00	
0.05	0.00	0.05	0.25	0.14	0.13	0.06	0.23	0.30	0.14	0.27	0.30	0.29	0.31	0.29	0.00	
0.07	0.00	0.07	0.33	0.19	0.16	0.08	0.30	0.38	0.19	0.36	0.38	0.38	0.40	0.38	0.00	
0.07	0.00	0.07	0.33	0.19	0.16	0.08	0.30	0.38	0.19	0.36	0.38	0.38	0.40	0.38	0.00	
1.11	1.17	1.12	0.91	1.02	1.04	1.11	0.94	0.87	1.02	0.89	0.87	0.87	0.86	0.87	1.17	
1.15	1.22	1.15	0.89	1.03	1.05	1.14	0.92	0.83	1.03	0.86	0.83	0.84	0.81	0.84	1.22	

4038 - PRE PCR LAB	4045 - POST PCR LAB BL2	4053 - LAB DESKS	4058E - ELEC	4000LB - ELEVATOR LOBBY	4040 - MEN, 4044 - WOMEN, 4000CE - CORRIDOR, 4000LA - FIRE SERVICE ACCESS LOBBY	4000CA - BREAKOUT/CORRIDOR	4005 - COPY	4001 - LARGE CONFERENCE
4-27	4-29A, 4-29B	4-31	4-33	4-35	4-37, 4-39	4-41, 4-43	4-45	4-47
Science laboratories	Science laboratories	Office space	Elec/mech equipment rooms	Corridors	Corridors	Corridors	Corridors	Conference/meeting
283	1,366	630	248	522	1,413	1,226	147	622
6	23	3.15	0	0	0	0	0	31.1
800	2,800	1,500	850	400	1,600	2,400	150	1280
50%	45%	50%	41%	100%	100%	88%	100%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.18	0.18	0.06	0.00	0.06	0.06	0.06	0.06	0.06
10.00	10.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00
400	1250	750	350	400	1600	2100	150	640
400	1250	750	350	400	1600	2100	150	640
111	476	54	0	31	85	74	9	193
144	619	70	0	41	110	96	11	251
111	476	54	0	31	85	74	9	193
144	619	70	0	41	110	96	11	251
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.28	0.38	0.07	0.00	0.08	0.05	0.04	0.06	0.30
0.28	0.38	0.07	0.00	0.08	0.05	0.04	0.06	0.30
0.36	0.49	0.09	0.00	0.10	0.07	0.05	0.08	0.39
0.36	0.49	0.09	0.00	0.10	0.07	0.05	0.08	0.39
0.89	0.79	1.10	1.17	1.09	1.11	1.13	1.11	0.87
0.86	0.72	1.12	1.22	1.12	1.15	1.17	1.14	0.83

4001 - LARGE CONFERENCE	5007 - OFFICE, 5009 - OFFICE, 5011 - OFFICE	5013 - OFFICE	5008 - WORKSTATIONS	5012 - WORKSTATIONS	5000CC - CORRIDOR	5019 - OFFICE, 5017 - OFFICE, 5015 - OFFICE	5021 - MEDIUM CONFERENCE	5022 - LAB DESKS, 5030 LAB DESKS, 5028 - LAB DESKS	5036 - COLD ROOM	5038 - FREEZER ROOM	5045 - RNAI BL2+ LAB	5035 - RNAI BL2+ LAB	5058E - ELEC	5000LB - ELEVATOR LOBBY	5000CE - CORRIDOR, 5000LA - FIRE SERVICE ACCESS LOBBY, 5040 MEN, 5044 - WOMEN
4-47	5-1	5-3	5-5	5-7	5-9	5-11	5-13	5-15	5-17	5-19	5-23A, 5-23B, 5-25	5-27A, 5-27B, 5-27C, 5-27D	5-39	5-41	5-43
Conference/meeting	Office space	Office space	Office space	Office space	Corridors	Office space	Conference/meeting	Office space	Storage rooms	Storage rooms	Science laboratories	Science laboratories	Elec/mech equipment rooms	Corridors	Corridors
622	429	179	276	457	276	339	252	466	107	255	1,509	2,077	247	348	1,456
31.1	6	1	4	8	0	5	12.6	18	0	0	12	12	0	0	0
1280	525	300	400	1,000	300	475	400	450	35	800	3,850	5,250	850	400	1,700
50%	48%	50%	50%	50%	100%	53%	50%	50%	100%	100%	90%	100%	100%	100%	100%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.00	0.18	0.18	0.00	0.06	0.06
5.00	5.00	5.00	5.00	5.00	0.00	5.00	5.00	5.00	0.00	0.00	10.00	10.00	0.00	0.00	0.00
640	250	150	200	500	300	250	200	225	35	800	3450	5250	850	400	1700
640	250	150	200	500	300	250	200	225	35	800	3450	5250	850	400	1700
193	56	16	37	67	17	45	78	118	0	0	392	494	0	21	87
251	72	20	48	88	22	59	102	153	0	0	509	642	0	27	114
193	56	16	37	67	17	45	78	118	0	0	392	494	0	21	87
251	72	20	48	88	22	59	102	153	0	0	509	642	0	27	114
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.30	0.22	0.10	0.18	0.13	0.06	0.18	0.39	0.52	0.00	0.00	0.11	0.09	0.00	0.05	0.05
0.30	0.22	0.10	0.18	0.13	0.06	0.18	0.39	0.52	0.00	0.00	0.11	0.09	0.00	0.05	0.05
0.39	0.29	0.14	0.24	0.18	0.07	0.24	0.51	0.68	0.00	0.00	0.15	0.12	0.00	0.07	0.07
0.39	0.29	0.14	0.24	0.18	0.07	0.24	0.51	0.68	0.00	0.00	0.15	0.12	0.00	0.07	0.07
0.87	0.94	1.06	0.98	1.03	1.11	0.99	0.78	0.64	1.17	1.17	1.05	1.07	1.17	1.11	1.12
0.83	0.93	1.08	0.98	1.04	1.15	0.98	0.71	0.54	1.22	1.22	1.07	1.09	1.22	1.15	1.15

5000CA - BREAKOUT/CONNECTOR	5001 - LARGE CONFERENCE	5005 - COPY	6007 - OFFICE, 6009 - OFFICE, 6011 - OFFICE, 6013 - OFFICE	6013 - OFFICE	6008 - OFFICE, 6020 - OFFICE	6010 - OFFICE, 6012 - OFFICE	6015 - OFFICE, 6017 - OFFICE	6019 - OFFICE, 6021 - OFFICE	6014 - OFFICE, 6016 - OFFICE, 6028 - OFFICE	6018 - OFFICE, 6024 - WORKSTATIONS	6023 - OFFICE, 6029 - OFFICE	6026 - OFFICE, 6030 - OFFICE	6040 - MEN, 6044 - WOMEN, 6000CA - CORRIDOR, 6000LB - ELEVATOR LOBBY, 6000LA - FIRE SERVICE ACCESS LOBBY	6031 - LARGE CONFERENCE
5-45, 5-47	5-49	5-51	6-1	6-3	6-7	6-9	6-11	6-13	6-15	6-17	6-23	6-25	6-27, 6-43	6-29
Corridors	Conference/meeting	Corridors	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Corridors	Conference/meeting
1,365	635	151	649	266	358	218	249	250	348	474	403	316	1,889	419
0	31.75	0	8	1	4	1	5	4	5	7	4	6	0	20.95
2,400	1,250	200	525	300	400	400	375	400	525	600	400	400	1,600	900
50%	50%	100%	52%	50%	50%	50%	53%	50%	48%	50%	50%	50%	100%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1200	625	200	275	150	200	200	200	200	250	300	200	200	1600	450
1200	625	200	275	150	200	200	200	200	250	300	200	200	1600	450
82	197	9	79	21	41	18	40	35	46	63	44	49	113	130
106	256	12	103	27	54	24	52	46	60	82	57	64	147	169
82	197	9	79	21	41	18	40	35	46	63	44	49	113	130
106	256	12	103	27	54	24	52	46	60	82	57	64	147	169
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.07	0.31	0.05	0.29	0.14	0.21	0.09	0.20	0.18	0.18	0.21	0.22	0.24	0.07	0.29
0.07	0.31	0.05	0.29	0.14	0.21	0.09	0.20	0.18	0.18	0.21	0.22	0.24	0.07	0.29
0.09	0.41	0.06	0.37	0.18	0.27	0.12	0.26	0.23	0.24	0.27	0.29	0.32	0.09	0.38
0.09	0.41	0.06	0.37	0.18	0.27	0.12	0.26	0.23	0.24	0.27	0.29	0.32	0.09	0.38
1.10	0.85	1.12	0.88	1.03	0.96	1.08	0.97	0.99	0.98	0.96	0.95	0.92	1.10	0.88
1.13	0.81	1.16	0.84	1.04	0.95	1.10	0.96	0.99	0.98	0.94	0.93	0.90	1.12	0.84

6032 - SCIENTIFIC LIVING ROOM	6048 - OFFICE, 6050 - OFFICE	6055 - OFFICE, 6057 - OFFICE, 6053 - OFFICE	6053 - OFFICE	6047 - OFFICE, 6049 - OFFICE	6091 - OFFICE	6095 - OFFICE, 6093 - OFFICE	6099 - OFFICE, 6101 - OFFICE, 6097 - OFFICE	6103 - OFFICE	6109 - OFFICE, 6107 - OFFICE, 6105 - OFFICE	6111 - OFFICE, 6113 - OFFICE	6106 - OFFICE, 6108 - OFFICE	6080 - OFFICE, 6082 - OFFICE, 6084 - OFFICE	6092 - OFFICE, 6094 - OFFICE	6060E1 - ELEC, 6058E2 - ELEC
6-31	6-33	6-35	6-37	6-39	6-47	6-49	6-51	6-53	6-55	6-57	6-59	6-61	6-63	6-65
Break rooms	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Elec/mech equipment rooms
323	262	518	254	261	235	255	384	264	421	274	397	397	394	227
6	6	3	2	5	4	6	9	1	8	2	9	9	8	0
1,000	350	375	400	350	350	350	575	275	625	400	525	525	350	1,350
50%	50%	47%	50%	50%	50%	50%	52%	55%	48%	50%	52%	52%	50%	26%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00
5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	0.00
500	175	175	200	175	175	175	300	150	300	200	275	275	175	350
500	175	175	200	175	175	175	300	150	300	200	275	275	175	350
49	46	46	25	41	34	45	68	21	65	26	69	69	64	0
64	59	60	33	53	44	59	88	27	85	34	89	89	83	0
49	46	46	25	41	34	45	68	21	65	26	69	69	64	0
64	59	60	33	53	44	59	88	27	85	34	89	89	83	0
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.10	0.26	0.26	0.13	0.23	0.19	0.26	0.23	0.14	0.22	0.13	0.25	0.25	0.36	0.00
0.10	0.26	0.26	0.13	0.23	0.19	0.26	0.23	0.14	0.22	0.13	0.25	0.25	0.36	0.00
0.13	0.34	0.34	0.16	0.30	0.25	0.34	0.29	0.18	0.28	0.17	0.33	0.33	0.47	0.00
0.13	0.34	0.34	0.16	0.30	0.25	0.34	0.29	0.18	0.28	0.17	0.33	0.33	0.47	0.00
1.07	0.91	0.90	1.04	0.93	0.97	0.91	0.94	1.03	0.95	1.03	0.92	0.92	0.80	1.17
1.09	0.88	0.87	1.05	0.91	0.96	0.88	0.92	1.04	0.93	1.05	0.89	0.89	0.74	1.22



6074 - OFFICE, 6078 - OFFICE	6062 - OFFICE, 6064 - OFFICE	6068 - OFFICE, 6070 - OFFICE, 6072 - OFFICE	6116 - SMALL CONFERENCE	6000CP - CORRIDOR	6112 - OFFICE, 6114 - OFFICE	6115 - GSAP LAB	6130 - COLD ROOM	6133 - LAB DESKS	6135 - LAB DESKS, 6137 - LAB DESKS	6139 - LAB DESKS	6141 - MEETING	6128 - TISSUE CULTURE	6132 - CLEAN ROOM
6-67	6-69	6-73	6-75	6-79	6-77	6-83A, 6-83B, 6-85, 6-87A	6-89	6-91	6-93	6-95	6-95	6-99	6-101
Office space	Office space	Office space	Conference/meeting	Corridors	Office space	Science laboratories	Storage rooms	Office space	Office space	Office space	Conference/meeting	Science laboratories	Storage rooms
245	270	383	148	546	239	3,375	134	112	277	141	131	211	152
5	4	9	7.4	0	4	60	0	3	10	5	4	2	0
350	350	525	350	400	350	7,500	35	200	400	200	200	1,200	300
50%	50%	52%	50%	100%	50%	49%	100%	50%	75%	75%	75%	100%	67%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.18	0.00	0.06	0.06	0.06	0.06	0.18	0.00
5.00	5.00	5.00	5.00	0.00	5.00	10.00	0.00	5.00	5.00	5.00	5.00	10.00	0.00
175	175	275	175	400	175	3700	35	100	300	150	150	1200	200
175	175	275	175	400	175	3700	35	100	300	150	150	1200	200
40	36	68	46	33	34	1208	0	22	67	33	28	58	0
52	47	88	60	43	45	1570	0	28	87	43	36	75	0
40	36	68	46	33	34	1208	0	22	67	33	28	58	0
52	47	88	60	43	45	1570	0	28	87	43	36	75	0
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.23	0.21	0.25	0.26	0.08	0.20	0.33	0.00	0.22	0.22	0.22	0.19	0.05	0.00
0.23	0.21	0.25	0.26	0.08	0.20	0.33	0.00	0.22	0.22	0.22	0.19	0.05	0.00
0.29	0.27	0.32	0.34	0.11	0.26	0.42	0.00	0.28	0.29	0.29	0.24	0.06	0.00
0.29	0.27	0.32	0.34	0.11	0.26	0.42	0.00	0.28	0.29	0.29	0.24	0.06	0.00
0.94	0.96	0.92	0.90	1.09	0.97	0.84	1.17	0.95	0.94	0.94	0.98	1.12	1.17
0.92	0.95	0.90	0.88	1.11	0.96	0.79	1.22	0.93	0.93	0.93	0.98	1.15	1.22

6122 - FREEZER ROOM	6124 - BL2+ VIRAL PREP	6000CR - CORRIDOR	6120 - PRE PCR	6118 - GEL ROOM	6143 - MEDIUM CONFERENCE	6145 - BREAK AREA, UNAMED SPACE NEXT TO 6145	6000 - ATRIUM	7001 - BREAK AREA	7011 - MEDIUM CONFERENCE	7015 - OFFICE, 7017 - OFFICE, 7019 - OFFICE	7025 - OFFICE, 7027 - OFFICE	7003 - OPEN OFFICE
6-107	6-103	6-105	6-109	6-111	6-113	6-115	6-117A, 6-117B, 6-121	7-1	7-3	7-5	7-7	7-9, 7-11, 7-15, 7-19
Storage rooms	Science laboratories	Corridors	Science laboratories	Science laboratories	Conference/meeting	Break rooms	Multi-use assembly	Break rooms	Conference/meeting	Office space	Office space	Office space
483	225	325	173	155	183	301	1,347	574	368	383	255	3,776
0	2	0	3	3	9.15	10	125	14.35	18.4	1,915	1,275	18.88
200	1,200	250	375	375	400	600	3,300	750	500	525	350	4,725
100%	100%	60%	53%	53%	50%	50%	45%	50%	50%	52%	50%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.18	0.06	0.18	0.18	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.00	10.00	0.00	10.00	10.00	5.00	5.00	7.50	5.00	5.00	5.00	5.00	5.00
200	1200	150	200	200	200	300	1475	375	250	275	175	2375
200	1200	150	200	200	200	300	1475	375	250	275	175	2375
0	61	20	61	58	57	68	1018	106	114	33	22	321
0	79	25	79	75	74	88	1324	138	148	42	28	417
0	61	20	61	58	57	68	1018	106	114	33	22	321
0	79	25	79	75	74	88	1324	138	148	42	28	417
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.05	0.13	0.31	0.29	0.28	0.23	0.69	0.28	0.46	0.12	0.12	0.14
0.00	0.05	0.13	0.31	0.29	0.28	0.23	0.69	0.28	0.46	0.12	0.12	0.14
0.00	0.07	0.17	0.40	0.38	0.37	0.29	0.90	0.37	0.59	0.15	0.16	0.18
0.00	0.07	0.17	0.40	0.38	0.37	0.29	0.90	0.37	0.59	0.15	0.16	0.18
1.17	1.12	1.04	0.86	0.88	0.88	0.94	0.48	0.88	0.71	1.05	1.04	1.03
1.22	1.15	1.05	0.82	0.84	0.85	0.92	0.32	0.85	0.62	1.06	1.06	1.04

7031 - SMALL CONFERENCE	7000CC - CORRIDOR, 7000LB - ELEVATOR LOBBY	7045 - R&D	7000LA - FIRE SERVICE ACCESS LOBBY	706000 - ELEC, 70580 - ELEC	7076 - REAGENT PREP	7055 - ION DETECTION	7065 - ILLUMINA	7075 - SAMPLE PREP	7057 - BREAKING RM	7059 - GOWNING RM
7-13	7-17	7-21A, 7-21B	7-23	7-25	7-27	7-29	7-31	7-33A, 7-33B, 7-33C, 7-33D, 7-35A, 7-35B, 7-35C, 7-35D	7-37	7-39
Conference/meeting	Corridors	Science laboratories	Corridors	Elec/mech equipment rooms	Occupiable storage rooms for dry materials	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Corridors
181	1,150	1,510	237	300	129	1,132	1,831	3,326	248	218
9.05	0	20	0	0	0.258	20	4	26	4	0
225	750	2,950	400	1,350	1,000	1,025	1,650	7,800	1,900	800
67%	100%	54%	100%	26%	100%	100%	100%	38%	100%	25%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.18	0.06	0.00	0.06	0.18	0.18	0.18	0.18	0.06
5.00	0.00	10.00	0.00	0.00	5.00	10.00	10.00	10.00	10.00	0.00
150	750	1600	400	350	1000	1025	1650	3000	1900	200
150	750	1600	400	350	1000	1025	1650	3000	1900	200
56	69	472	14	0	9	404	370	859	85	13
73	90	613	18	0	12	525	480	1116	110	17
56	69	472	14	0	9	404	370	859	85	13
73	90	613	18	0	12	525	480	1116	110	17
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.37	0.09	0.29	0.04	0.00	0.01	0.39	0.22	0.29	0.04	0.07
0.37	0.09	0.29	0.04	0.00	0.01	0.39	0.22	0.29	0.04	0.07
0.49	0.12	0.38	0.05	0.00	0.01	0.51	0.29	0.37	0.06	0.09
0.49	0.12	0.38	0.05	0.00	0.01	0.51	0.29	0.37	0.06	0.09
0.79	1.07	0.87	1.13	1.17	1.16	0.77	0.94	0.88	1.12	1.10
0.73	1.10	0.83	1.17	1.22	1.21	0.70	0.93	0.84	1.16	1.13

7085 - CLEAN SAMPLE 2	7000CF - CORRIDOR	7000CG - CORRIDOR	7095 - CLEAN SAMPLE 1	7105 - SINGLE CELL PCR	7115 - BL2	7119 - GOWNING RM	7116 - ANTEROOM	7084 - RODI/GAS MANIFOLD RM	7000CB - PASSAGE	7121 - SMALL CONFERENCE	7000CJ - CORRIDOR	8009 - OFFICE, 8007 - OFFICE, 8011 - OFFICE	8013 - OFFICE
7-43, 7-49	7-45	7-51	7-55, 7-59, 7-61, 7-63	7-67	7-69	7-71	7-73	7-75	7-75	7-77	7-79, 7-81A, 7-81B	8-1	8-3
Science laboratories	Corridors	Corridors	Science laboratories	Science laboratories	Science laboratories	Corridors	Corridors	Storage rooms	Corridors	Conference/meeting	Corridors	Office space	Office space
914	363	569	1,373	494	240	242	75	93	63	188	649	490	209
13	0	0	20	10	5	0	0	0	0	9.4	0	8	1
2,600	400	400	3,300	800	900	800	200	100	300	300	5,000	625	200
42%	50%	50%	20%	31%	25%	28%	100%	100%	100%	50%	50%	52%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

0.18	0.06	0.06	0.18	0.18	0.18	0.06	0.06	0.00	0.06	0.06	0.06	0.06	0.06
10.00	0.00	0.00	10.00	10.00	10.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00	5.00
1100	200	200	650	250	225	225	200	100	300	150	2500	275	100
1100	200	200	650	250	225	225	200	100	300	150	2500	275	100
295	22	34	447	189	93	15	5	0	4	58	39	69	18
383	28	44	581	246	121	19	6	0	5	76	51	90	23
295	22	34	447	189	93	15	5	0	4	58	39	69	18
383	28	44	581	246	121	19	6	0	5	76	51	90	23
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.27	0.11	0.17	0.69	0.76	0.41	0.06	0.02	0.00	0.01	0.39	0.02	0.25	0.18
0.27	0.11	0.17	0.69	0.76	0.41	0.06	0.02	0.00	0.01	0.39	0.02	0.25	0.18
0.35	0.14	0.22	0.89	0.98	0.54	0.08	0.03	0.00	0.02	0.51	0.02	0.33	0.23
0.35	0.14	0.22	0.89	0.98	0.54	0.08	0.03	0.00	0.02	0.51	0.02	0.33	0.23
0.90	1.06	1.00	0.48	0.41	0.75	1.10	1.14	1.17	1.15	0.78	1.15	0.91	0.99
0.87	1.08	1.00	0.32	0.23	0.68	1.13	1.19	1.22	1.20	0.71	1.20	0.89	0.99

8015 - SMALL CONFERENCE	8008 - OFFICE, 8010 - OFFICE, 8012 - OFFICE	8029 - BSP POST PCR	8014 - TISSUE CULTURE ROOM	8016 - COLD ROOM, 8018 - FREEZER	8028 - RTS ROOM	8026 - LAB DESKS	8025 - BSP PRE LAB	8039 - LAB DESKS	8037 - LAB DESKS	8035 - LAB DESKS	8033 - LAB DESKS
8-5	8-7	8-9	8-11	8-13	8-15	8-17	8-17A, 8-17B, 8-19A	8-21A	8-21B	8-21C	8-21D
Conference/meeting	Office space	Science laboratories	Science laboratories	Storage rooms	Science laboratories	Office space	Science laboratories	Office space	Office space	Office space	Office space
223	394	350	252	181	489	232	3,160	210	209	186	174
11.15	9	8	3	0	5	6	48	4	8	6	6
350	525	750	1,200	60	350	400	6,250	250	250	250	250
50%	52%	50%	100%	100%	79%	50%	51%	60%	60%	60%	60%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.18	0.18	0.00	0.18	0.06	0.18	0.06	0.06	0.06	0.06
5.00	5.00	10.00	10.00	0.00	10.00	5.00	10.00	5.00	5.00	5.00	5.00
175	275	375	1200	60	275	200	3200	150	150	150	150
175	275	375	1200	60	275	200	3200	150	150	150	150
69	69	143	75	0	138	44	1049	33	53	41	40
90	89	186	98	0	179	57	1363	42	68	54	53
69	69	143	75	0	138	44	1049	33	53	41	40
90	89	186	98	0	179	57	1363	42	68	54	53
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.40	0.25	0.38	0.06	0.00	0.50	0.22	0.33	0.22	0.35	0.27	0.27
0.40	0.25	0.38	0.06	0.00	0.50	0.22	0.33	0.22	0.35	0.27	0.27
0.51	0.32	0.50	0.08	0.00	0.65	0.29	0.43	0.28	0.46	0.36	0.35
0.51	0.32	0.50	0.08	0.00	0.65	0.29	0.43	0.28	0.46	0.36	0.35
0.77	0.92	0.79	1.10	1.17	0.67	0.95	0.84	0.95	0.82	0.89	0.90
0.70	0.89	0.72	1.14	1.22	0.56	0.93	0.79	0.93	0.76	0.86	0.87

8040 - MEN, 8044 - WOMEN, 8000LB - ELEVATOR LOBBY, 8000CC - CORRIDOR, 8000LA - FIRE SERVICE ACCESS LOBBY	8061 - PROJECT MANAGERS OFFICE	8059 - LAB MANAGERS	8063 - LAB DESKS	8065 - POST PCR GAP LAB	8058E2 - ELEC, 8060 - ELEC	8062 - SMALL CONFERENCE	8064 - STORAGE	8070, 8066 COLD ROOM, 8068, 8072 FREEZER	8075 - PRE PCR WHOLE GENOME	8085 - PRE PCR EXPRESSION	8095 - PRE PCR LOWPLEX	8097 - OFFICE	8099 - OFFICE, 8103 - OFFICE	8111 - MEETING	8086 - LAB SUPPORT	8102 - COPY
8-23, 8-61	8-25	8-27	8-29A, 8-29B	8-31A, 8-31B, 8-31C, 8-31D, 8-33B, 8-33C	8-35	8-37	8-39	8-41	8-43A, 8-43B	8-45	8-47A, 8-47B	8-49	8-51	8-51	8-53	8-55
Corridors	Office space	Office space	Office space	Science laboratories	Elec/mech equipment rooms	Conference/meeting	Storage rooms	Storage rooms	Science laboratories	Science laboratories	Science laboratories	Office space	Office space	Conference/meeting	Storage rooms	Corridors
1,768	242	389	738	4,451	286	229	162	492	746	312	957	195	260	122	133	120
0	3	6	5	51	0	11.45	0	0	12	4	18	4	6	6.1	0	0
1,600	300	550	1,000	9,325	1,350	400	300	120	1,600	850	1,950	300	400	200	250	250
100%	50%	50%	50%	43%	26%	50%	50%	100%	42%	47%	45%	50%	50%	50%	50%	60%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

0.06	0.06	0.06	0.06	0.18	0.00	0.06	0.00	0.00	0.18	0.18	0.18	0.06	0.06	0.06	0.00	0.06
0.00	5.00	5.00	5.00	10.00	0.00	5.00	0.00	0.00	10.00	10.00	10.00	5.00	5.00	5.00	0.00	0.00
1600	150	275	500	4050	350	200	150	120	675	400	875	150	200	100	125	150
1600	150	275	500	4050	350	200	150	120	675	400	875	150	200	100	125	150
106	30	53	69	1311	0	71	0	0	254	96	352	32	46	38	0	7
138	38	69	90	1705	0	92	0	0	331	125	458	41	59	49	0	9
106	30	53	69	1311	0	71	0	0	254	96	352	32	46	38	0	7
138	38	69	90	1705	0	92	0	0	331	125	458	41	59	49	0	9
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.07	0.20	0.19	0.14	0.32	0.00	0.35	0.00	0.00	0.38	0.24	0.40	0.21	0.23	0.38	0.00	0.05
0.07	0.20	0.19	0.14	0.32	0.00	0.35	0.00	0.00	0.38	0.24	0.40	0.21	0.23	0.38	0.00	0.05
0.09	0.26	0.25	0.18	0.42	0.00	0.46	0.00	0.00	0.49	0.31	0.52	0.27	0.30	0.49	0.00	0.06
0.09	0.26	0.25	0.18	0.42	0.00	0.46	0.00	0.00	0.49	0.31	0.52	0.27	0.30	0.49	0.00	0.06
1.10	0.97	0.97	1.03	0.84	1.17	0.81	1.17	1.17	0.79	0.93	0.76	0.96	0.94	0.79	1.17	1.12
1.13	0.96	0.96	1.04	0.80	1.22	0.76	1.22	1.22	0.73	0.90	0.69	0.94	0.92	0.73	1.22	1.15

8084 - THERMO CYCLER, 8082 - CRYOGEN MANIFOLD, 8080 - -80 FREEZER, 8078 - -80 FREEZER	8001 - BREAK AREA	9009 - OFFICE, 9007 - OFFICE, 9011 - OFFICE	9013 - OFFICE	9017 - OFFICE, 9015 - OFFICE	9010 - OFFICE	9012 - BREAKOUT	9022 - OFFICE, 9008 - OFFICE	9021 - OFFICE, 9019 - OFFICE	9014 - OFFICE, 9016 - OFFICE, 9018 - OFFICE	9026 - OFFICE, 9024 - OFFICE, 9020 - OFFICE	9040 - MEN, 9044 - WOMEN, 9000LB - ELEVATOR LOBBY, 9000CA - CORRIDOR, 9000LA - FIRE SERVICE ACCESS LOBBY
8-57	8-59	9-1	9-3	9-5	9-7	9-9	9-11	9-13	9-15	9-17	9-19, 9-97
Storage rooms	Break rooms	Office space	Office space	Office space	Office space	Corridors	Office space	Office space	Office space	Office space	Corridors
1,251	910	390	276	308	109	138	336	260	327	540	1,754
0	22.75	7	1	6	1	0	7	5	3	12	0
800	1,400	525	300	400	200	200	450	350	450	675	1,600
800.00	800.00	800.00	800.00	800.00	800.00	800.00	800.00	800.00	800.00	800.00	800.00
100%	50%	48%	50%	50%	50%	50%	50%	50%	50%	48%	100%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.00	5.00	5.00	5.00	5.00	5.00	5.00	0.00	5.00	5.00	5.00	0.00
800	700	250	150	200	100	100	225	175	225	325	1600
800	700	250	150	200	100	100	225	175	225	325	1600
0	168	58	22	48	12	8	55	41	35	92	105
0	219	76	28	63	15	11	72	53	45	120	137
0	168	58	22	48	12	8	55	41	35	92	105
0	219	76	28	63	15	11	72	53	45	120	137
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.00	0.24	0.23	0.14	0.24	0.12	0.08	0.25	0.23	0.15	0.28	0.07
0.00	0.24	0.23	0.14	0.24	0.12	0.08	0.25	0.23	0.15	0.28	0.07
0.00	0.31	0.30	0.19	0.32	0.15	0.11	0.32	0.30	0.20	0.37	0.09
0.00	0.31	0.30	0.19	0.32	0.15	0.11	0.32	0.30	0.20	0.37	0.09
1.17	0.93	0.93	1.02	0.92	1.05	1.08	0.92	0.93	1.01	0.88	1.10
1.22	0.90	0.91	1.03	0.90	1.07	1.11	0.90	0.92	1.02	0.85	1.13

9023 - OFFICE, 9029 - OFFICE	9028 - OFFICE, 9030 - OFFICE	9031 - LARGE CONFERENCE	9032 - SCIENTIFIC LIVING ROOM	9057 - OFFICE, 9055 - OFFICE	9053 - OFFICE	9047 - OFFICE, 9049 - OFFICE	9048 - OFFICE, 9050 - OFFICE	9077 - TISSUE CULTURE ROOM	9066 - MICROSCOPY IMAGING
9-21	9-23	9-25	9-27	9-29	9-31	9-33	9-35	9-37	9-41
Office space	Office space	Conference/meeting	Break rooms	Office space	Office space	Office space	Office space	Science laboratories	Office space
355	316	433	322	273	255	270	260	484	188
6	6	21.65	6	2	1	6	6	5	0.94
450	400	1,300	1,200	350	350	400	350	2,500	450
50% CSCRW	50% CSCRW	50% CSCRW	50% CSCRW	50% CSCRW	50% CSCRW	50% CSCRW	50% CSCRW	100% CSCRW	50% CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.18	0.06
5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	10.00	5.00
225	200	650	600	175	175	200	175	2500	225
225	200	650	600	175	175	200	175	2500	225
51	49	134	49	26	20	46	46	137	16
67	64	174	64	34	26	60	59	178	21
51	49	134	49	26	20	46	46	137	16
67	64	174	64	34	26	60	59	178	21
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.23	0.24	0.21	0.08	0.15	0.12	0.23	0.26	0.05	0.07
0.23	0.24	0.21	0.08	0.15	0.12	0.23	0.26	0.05	0.07
0.30	0.32	0.27	0.11	0.20	0.15	0.30	0.34	0.07	0.09
0.30	0.32	0.27	0.11	0.20	0.15	0.30	0.34	0.07	0.09
0.94	0.92	0.96	1.08	1.02	1.05	0.94	0.91	1.11	1.10
0.92	0.90	0.95	1.11	1.02	1.07	0.92	0.88	1.15	1.12





9101 - BREAK	9105 - OFFICE	9090 - FREEZER ROOM	9086 - RADIO ISOTOPE RM	9084 - DARK ROOM	9080 - STORAGE	9088 - LAB MECH RM	9000CK - CORRIDOR	9082 - HOLDING	9078 - PROCEDURE ROOM
9-71	9-73	9-75	9-77	9-79	9-79	9-81	9-83	9-85	9-87
Break rooms	Office space	Storage rooms	Science laboratories	Science laboratories	Storage rooms	Storage rooms	Corridors	Storage rooms	Medical Procedure
270	148	291	121	110	92	92	326	86	224
6.75	1	0	2	1	0	0	0	0	4.48
350	200	150	650	175	100	775	300	250	500
50% CSCRW 1.00	50% CSCRW 1.00	100% CSCRW 1.00	100% CSCRW 1.00	100% CSCRW 1.00	100% CSCRW 1.00	13% CSCRW 1.00	100% CSCRW 1.00	100% CSCRW 1.00	80% CSCRW 1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

0.06	0.06	0.00	0.18	0.18	0.00	0.00	0.06	0.00	0.00
5.00	5.00	0.00	10.00	10.00	0.00	0.00	0.00	0.00	15.00
175	100	150	650	175	100	100	300	250	400
175	100	150	650	175	100	100	300	250	400
50	14	0	42	30	0	0	20	0	67
65	18	0	54	39	0	0	25	0	87
50	14	0	42	30	0	0	20	0	67
65	18	0	54	39	0	0	25	0	87
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.29	0.14	0.00	0.06	0.17	0.00	0.00	0.07	0.00	0.17
0.29	0.14	0.00	0.06	0.17	0.00	0.00	0.07	0.00	0.17
0.37	0.18	0.00	0.08	0.22	0.00	0.00	0.08	0.00	0.22
0.37	0.18	0.00	0.08	0.22	0.00	0.00	0.08	0.00	0.22
0.88	1.03	1.17	1.10	1.00	1.17	1.17	1.10	1.17	1.00
0.85	1.04	1.22	1.13	1.00	1.22	1.22	1.13	1.22	1.00

9076 - TISSUE CULTURE ROOM	9108 - COPY	9107 - SMALL CONFERENCE	9001 - BREAK AREA	10011 - OFFICE, 10009 - OFFICE, 10007 - OFFICE	10013 - OFFICE	10017 - OFFICE, 10015 - OFFICE	10010 - OFFICE	10012 - BREAKOUT	10022 - OFFICE, 10008 - OFFICE	10021 - OFFICE, 10019 - OFFICE	10014 - OFFICE, 10016 - OFFICE, 10018 - OFFICE	10026 - OFFICE, 10024 - OFFICE, 10020 - OFFICE	10023 - OFFICE, 10029 - OFFICE
9-89	9-91	9-93	9-95	10-1	10-3	10-5	10-7	10-7	10-9	10-11	10-13	10-15	10-17
Science laboratories	Corridors	Conference/meeting	Break rooms	Office space	Office space	Office space	Office space	Break rooms	Office space	Office space	Office space	Office space	Office space
280	102	219	1,028	387	257	297	128	138	313	262	390	477	353
3	0	10.95	25.7	8	1	6	3	3	6	5	9	9	4
1,700	175	300	1,200	525	300	350	175	200	400	350	525	600	500
100%	100%	50%	50%	48%	50%	50%	57%	50%	50%	50%	48%	50%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.18	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
10.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1700	175	150	600	250	150	175	100	100	200	175	250	300	250
1700	175	150	600	250	150	175	100	100	200	175	250	300	250
80	6	68	190	63	20	48	23	23	49	41	68	74	41
105	8	88	247	82	27	62	29	30	63	53	89	96	54
80	6	68	190	63	20	48	23	23	49	41	68	74	41
105	8	88	247	82	27	62	29	30	63	53	89	96	54
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.05	0.03	0.45	0.32	0.25	0.14	0.27	0.23	0.23	0.24	0.23	0.27	0.25	0.16
0.05	0.03	0.45	0.32	0.25	0.14	0.27	0.23	0.23	0.24	0.23	0.27	0.25	0.16
0.06	0.05	0.59	0.41	0.33	0.18	0.36	0.29	0.30	0.32	0.30	0.36	0.32	0.21
0.06	0.05	0.59	0.41	0.33	0.18	0.36	0.29	0.30	0.32	0.30	0.36	0.32	0.21
1.12	1.13	0.71	0.85	0.91	1.03	0.89	0.94	0.93	0.92	0.93	0.89	0.92	1.00
1.16	1.17	0.63	0.80	0.89	1.04	0.86	0.92	0.91	0.90	0.91	0.86	0.90	1.00

10028 - OFFICE, 10030 - OFFICE	10040 - MEN, 10044 - WOMEN, 10000LB - ELEVATOR LOBBY, 10000CA - CORRIDOR, 10000LA - FIRE SERVICE ACCESS LOBBY	10031 - LARGE CONFERENCE	10032 - SCIENTIFIC LIVING ROOM	10057 - OFFICE, 10055 - OFFICE	10053 - OFFICE	10047 - OFFICE, 10049 - OFFICE	10048 - OFFICE, 10050 - OFFICE	10077 - -80 FREEZER ROOM	10079 - TISSUE CULTURE	10066 - COLD ROOM	10062 - H-2 STORAGE	1000CJ - CORRIDOR	10064 - EPHYS ROOM	10068 - MICROSCOPY IMAGING
10-19	10-21, 10-73	10-23	10-25	10-27	10-29	10-31	10-33	10-35	10-37	10-39	10-41	10-43	10-45	10-47
Office space	Corridors	Conference/meeting	Break rooms	Office space	Office space	Office space	Office space	Storage rooms	Science laboratories	Storage rooms	Storage rooms	Corridors	Corridors	Office space
314	2,250	433	323	271	247	269	260	464	207	100	92	197	188	184
6	0	21.65	6	3	1	5	6	0	2	0	0	0	0	0.92
400	1,600	1,200	1,200	350	350	400	350	450	950	35	150	100	400	350
50%	100%	50%	50%	50%	50%	50%	50%	100%	100%	100%	100%	100%	50%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.18	0.00	0.00	0.06	0.06	0.06
5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	0.00	10.00	0.00	0.00	0.00	0.00	5.00
200	1600	600	600	175	175	200	175	450	950	35	150	100	200	175
200	1600	600	600	175	175	200	175	450	950	35	150	100	200	175
49	135	134	49	31	20	41	46	0	57	0	0	12	11	16
63	176	174	64	41	26	53	59	0	74	0	0	15	15	20
49	135	134	49	31	20	41	46	0	57	0	0	12	11	16
63	176	174	64	41	26	53	59	0	74	0	0	15	15	20
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.24	0.08	0.22	0.08	0.18	0.11	0.21	0.26	0.00	0.06	0.00	0.00	0.12	0.06	0.09
0.24	0.08	0.22	0.08	0.18	0.11	0.21	0.26	0.00	0.06	0.00	0.00	0.12	0.06	0.09
0.32	0.11	0.29	0.11	0.23	0.15	0.27	0.34	0.00	0.08	0.00	0.00	0.15	0.07	0.12
0.32	0.11	0.29	0.11	0.23	0.15	0.27	0.34	0.00	0.08	0.00	0.00	0.15	0.07	0.12
0.92	1.08	0.94	1.08	0.99	1.05	0.96	0.91	1.17	1.11	1.17	1.17	1.05	1.11	1.08
0.90	1.11	0.93	1.11	0.98	1.07	0.95	0.88	1.22	1.14	1.22	1.22	1.06	1.14	1.10

10068 - MICROSCOPY IMAGING	10058E1 - ELEC, 10060E2 - ELEC	10070 - MACHINE SHOP/ELECTRONICS	10083 - LAB DESKS, 10081 - LAB DESKS	10087 - LAB DESKS, 10085 - LAB DESKS, 10089 - LAB DESKS	10075 - LAB DESKS	10093 - LAB DESKS, 10095 - LAB DESKS, 10097 - LAB DESKS	10099 - LAB DESKS, 10101 - LAB DESKS, 10103 - LAB DESKS	10105 - OFFICE	10107 - SMALL CONFERENCE	10090 - MICROSCOPY IMAGING	10000CK - CORRIDOR	10086 - CELL SORTER	10084 - HOLDING	10082 - PROCEDURE ROOM
10-47	10-49	10-51	10-55	10-57A, 10-57B	10-59A, 10-59B, 10-59C, 10-61A, 10-61B, 10-61C, 10-61D, 10-63A, 10-63B, 10-63C	10-65A, 10-65B	10-67	10-69A	10-69B	10-79	10-83	10-85	10-87	10-89
Office space	Elec/mech equipment rooms	Storage rooms	Office space	Office space	Science laboratories	Office space	Office space	Office space	Conference/meeting	Office space	Corridors	Science laboratories	Storage rooms	Medical Procedure
184	286	115	307	432	6,705	391	415	140	205	120	319	113	86	140
0.92	0	0	10	13	42	13	15	3	10.25	0.6	0	1	0	2.8
350	1,350	300	400	600	14,400	600	600	200	275	250	175	300	300	950
50%	26%	50%	75%	75%	42%	75%	75%	75%	55%	50%	100%	50%	50%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.00	0.00	0.06	0.06	0.18	0.06	0.06	0.06	0.06	0.06	0.06	0.18	0.00	0.00
5.00	0.00	0.00	5.00	5.00	10.00	5.00	5.00	5.00	5.00	5.00	5.00	10.00	0.00	15.00
175	350	150	300	450	6100	450	450	150	150	125	175	150	150	475
175	350	150	300	450	6100	450	450	150	150	125	175	150	150	475
16	0	0	68	91	1627	88	100	23	64	10	19	30	0	42
20	0	0	89	118	2115	115	130	30	83	13	25	39	0	55
16	0	0	68	91	1627	88	100	23	64	10	19	30	0	42
20	0	0	89	118	2115	115	130	30	83	13	25	39	0	55
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.09	0.00	0.00	0.23	0.20	0.27	0.20	0.22	0.16	0.42	0.08	0.11	0.20	0.00	0.09
0.09	0.00	0.00	0.23	0.20	0.27	0.20	0.22	0.16	0.42	0.08	0.11	0.20	0.00	0.09
0.12	0.00	0.00	0.30	0.26	0.35	0.26	0.29	0.20	0.55	0.11	0.14	0.26	0.00	0.11
0.12	0.00	0.00	0.30	0.26	0.35	0.26	0.29	0.20	0.55	0.11	0.14	0.26	0.00	0.11
1.08	1.17	1.17	0.94	0.96	0.90	0.97	0.94	1.01	0.74	1.09	1.06	0.96	1.17	1.08
1.10	1.22	1.22	0.92	0.95	0.87	0.96	0.93	1.01	0.67	1.11	1.07	0.95	1.22	1.10

10108 - COPY	10001 - BREAK AREA	11007 - OFFICE, 11009 - OFFICE, 11011 - OFFICE	11000CB - CORRIDOR	11008 - OFFICE, 11010 - OFFICE, 11012 - OFFICE	11013 - OFFICE	11017 - OFFICE, 11019 - OFFICE, 11021 - OFFICE, 11023 - OFFICE	11014 - OFFICE, 11022 - OFFICE	11027 - OFFICE, 11029 - OFFICE	11000CE - CORRIDOR	11024 - OFFICE, 11026 - OFFICE, 11028 - OFFICE, 11030 - OFFICE	11031 - LARGE CONFERENCE	11032 - SCIENTIFIC LIVING ROOM	11048 - OFFICE, 11050 - OFFICE	11055 - OFFICE, 11057 - OFFICE
10-101	10-105	11-1	11-3	11-5	11-7	11-9	11-11	11-13	11-15	11-17	11-19	11-21	11-23	11-25
Corridors	Break rooms	Office space	Corridors	Office space	Office space	Office space	Office space	Office space	Corridors	Office space	Conference/meeting	Break rooms	Office space	Office space
120	872	426	171	327	172	508	333	359	171	652	433	361	260	277
0	21.8	8	0	5	1	10	7	2	0	11	21.65	6	6	3
175	1,200	550	300	425	225	675	425	450	300	700	450	450	300	325
100%	50%	41%	100%	47%	44%	44%	47%	50%	100%	50%	50%	50%	50%	46%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00
175	600	225	300	200	100	300	200	225	300	350	225	225	150	150
175	600	225	300	200	100	300	200	225	300	350	225	225	150	150
7	161	66	10	45	15	80	55	32	10	94	134	52	46	32
9	210	85	13	58	20	105	71	41	13	122	174	67	59	41
7	161	66	10	45	15	80	55	32	10	94	134	52	46	32
9	210	85	13	58	20	105	71	41	13	122	174	67	59	41
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.04	0.27	0.29	0.03	0.22	0.15	0.27	0.27	0.14	0.03	0.27	0.60	0.23	0.30	0.21
0.04	0.27	0.29	0.03	0.22	0.15	0.27	0.27	0.14	0.03	0.27	0.60	0.23	0.30	0.21
0.05	0.35	0.38	0.04	0.29	0.20	0.35	0.36	0.18	0.04	0.35	0.78	0.30	0.40	0.27
0.05	0.35	0.38	0.04	0.29	0.20	0.35	0.36	0.18	0.04	0.35	0.78	0.30	0.40	0.27
1.13	0.90	0.88	1.13	0.94	1.01	0.90	0.89	1.03	1.13	0.90	0.57	0.94	0.86	0.96
1.16	0.87	0.84	1.17	0.93	1.02	0.87	0.86	1.03	1.17	0.87	0.44	0.92	0.82	0.94

11053 - OFFICE	11047 - OFFICE, 11049 - OFFICE	11000CA - CORRIDOR, 11000LB - ELEVATOR LOBBY, 11040 - MEN, 11044 - WOMEN, 11000LA - FIRE SERVICE ACCESS LOBBY	11081 - MEDIUM CONFERENCE	11083 - OFFICE, 11085 - OFFICE	11074 - OFFICE, 11078 - OFFICE, 11084 - OFFICE	11062 - MEETING	11064 - OFFICE, 11082 - OFFICE	110580 - ELEC, 1106000 - ELEC	11087 - OFFICE, 11089 - OFFICE, 11091 - OFFICE	11093 - OFFICE	11090 - OFFICE, 11098 - OFFICE, 11102 - OFFICE	11000CN - CORRIDOR	11066 - FILES	11068 - OFFICE, 11070 - OFFICE, 11072 - OFFICE
11-27	11-29	11-31, 11-81	11-33	11-35	11-37	11-39	11-39	11-41	11-43	11-45	11-47	11-49	11-57	11-57
Office space	Office space	Corridors	Conference/meeting	Office space	Office space	Conference/meeting	Office space	Elec/mech equipment rooms	Office space	Office space	Office space	Corridors	Storage rooms	Office space
262	262	2,202	250	274	361	126	259	283	414	180	391	861	130	380
1	2	0	12.5	5	6	6.3	6	0	8	1	9	0	0	8
325	350	1,600	500	350	450	150	300	1,350	525	225	450	400	150	450
46%	43%	100%	50%	43%	50%	50%	50%	26%	48%	44%	50%	100%	50%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.06	0.06	0.06	0.06	0.00	0.06
5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	0.00	5.00
150	150	1600	250	150	225	75	150	350	250	100	225	400	75	225
150	150	1600	250	150	225	75	150	350	250	100	225	400	75	225
21	26	132	78	41	52	39	46	0	65	16	68	52	0	63
27	33	172	101	54	67	51	59	0	84	21	89	67	0	82
21	26	132	78	41	52	39	46	0	65	16	68	52	0	63
27	33	172	101	54	67	51	59	0	84	21	89	67	0	82
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.14	0.17	0.08	0.31	0.28	0.23	0.52	0.30	0.00	0.26	0.16	0.30	0.13	0.00	0.28
0.14	0.17	0.08	0.31	0.28	0.23	0.52	0.30	0.00	0.26	0.16	0.30	0.13	0.00	0.28
0.18	0.22	0.11	0.40	0.36	0.30	0.68	0.39	0.00	0.34	0.21	0.40	0.17	0.00	0.36
0.18	0.22	0.11	0.40	0.36	0.30	0.68	0.39	0.00	0.34	0.21	0.40	0.17	0.00	0.36
1.03	1.00	1.08	0.86	0.89	0.94	0.65	0.86	1.17	0.91	1.01	0.86	1.04	1.17	0.89
1.04	0.99	1.11	0.81	0.86	0.92	0.54	0.82	1.22	0.88	1.01	0.82	1.05	1.22	0.85

11095 - OFFICE, 11097 - OFFICE, 11103 - OFFICE	11076 - OFFICE, 11080 - OFFICE, 11088 - OFFICE	11104 - OFFICE, 11106 - OFFICE, 11108 - OFFICE, 11110 - OFFICE	11105 - OFFICE, 11107 - OFFICE, 11109 - OFFICE, 11111 - OFFICE	11000CS - CORRIDOR	11125 - OFFICE, 11127 - OFFICE, 11129 - OFFICE	11112 - NETWORK OPERATIONS CENTER	11130 - WORKSTATIONS	11133 - OFFICE	11135 - OFFICE, 11137 - OFFICE, 11139 - OFFICE	11142 - OFFICE, 11144 - OFFICE	11122 - IT WORKROOM	11141 - OFFICE, 11143 - OFFICE, 11145 - OFFICE, 11147 - OFFICE	11001 - BREAK AREA	11116 - OFFICE, 11120 - OFFICE	11000CL - CORRIDOR	11148 - COPY	11016 - FILES	11018 - MEETING
11-51	11-53	11-55	11-59	11-61	11-63	11-65	11-67	11-69	11-71	11-73	11-75	11-77	11-79	11-83	11-85	11-87	11-89	11-89
Office space	Office space	Office space	Office space	Corridors	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Office space	Break rooms	Office space	Corridors	Corridors	Storage rooms	Conference/meeting
418	391	520	576	629	389	309	571	180	412	260	271	553	906	296	955	92	158	158
4	9	12	9	0	6	5	12	1	8	5	4	10	22.65	5	0	0	0	4
575	450	600	600	400	475	350	600	225	450	300	900	600	1,200	300	500	250	200	300
48%	50%	50%	50%	100%	47%	50%	50%	44%	50%	50%	56%	50%	50%	50%	100%	50%	50%	50%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.06
5.00	5.00	5.00	5.00	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	0.00	0.00	5.00
275	225	300	300	400	225	175	300	100	225	150	500	300	600	150	500	125	100	150
275	225	300	300	400	225	175	300	100	225	150	500	300	600	150	500	125	100	150
45	68	91	80	38	53	44	94	16	65	41	36	83	168	43	57	6	0	29
59	89	119	103	49	69	57	123	21	84	53	47	108	218	56	74	7	0	38
45	68	91	80	38	53	44	94	16	65	41	36	83	168	43	57	6	0	29
59	89	119	103	49	69	57	123	21	84	53	47	108	218	56	74	7	0	38
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.16	0.30	0.30	0.27	0.09	0.24	0.25	0.31	0.16	0.29	0.27	0.07	0.28	0.28	0.29	0.11	0.04	0.00	0.23
0.16	0.30	0.30	0.27	0.09	0.24	0.25	0.31	0.16	0.29	0.27	0.07	0.28	0.28	0.29	0.11	0.04	0.00	0.23
0.21	0.40	0.40	0.34	0.12	0.31	0.32	0.41	0.21	0.37	0.35	0.09	0.36	0.36	0.37	0.15	0.06	0.00	0.26
0.21	0.40	0.40	0.34	0.12	0.31	0.32	0.41	0.21	0.37	0.35	0.09	0.36	0.36	0.37	0.15	0.06	0.00	0.26
1.00	0.86	0.86	0.90	1.07	0.93	0.92	0.85	1.01	0.88	0.90	1.09	0.89	0.89	0.88	1.05	1.12	1.17	0.97
1.00	0.82	0.82	0.87	1.09	0.91	0.89	0.81	1.01	0.84	0.87	1.12	0.86	0.85	0.85	1.07	1.16	1.22	0.96



M1000LA - FIRE SERVICE ACCESS LOBBY, M1000LB - ELEVATOR LOBBY	new zone	M1007 - MECHANICAL	M2000LA - FIRE SERVICE ACCESS LOBBY	M3000LA - FIRE SERVICE ACCESS LOBBY	Totals/averages		
M1-1	M1-2	M1-3, M1-4	M2-1	M3-1			
Corridors	Elec/mech equipment rooms	Elec/mech equipment rooms	Corridors	Corridors			
590	553	1,012	230	223	176,714	total sf	
0	0	0	0	0	2,184,582	total P	
800	500	2,000	400	400	321,250	total cfm	
					1.00	average	
100%	100%	100%	100%	100%	63%	average	
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	1.00	average	Primary airflow
1.00	1.00	1.00	1.00	1.00	1.00	average	182815
1.00	1.00	1.00	1.00	1.00	1.00	Er for ITU/TF	57%
1.00	1.00	1.00	1.00	1.00	1.00	Ep for ITU/DFDD/TF	
0.06	0.00	0.00	0.06	0.06			
0.00	0.00	0.00	0.00	0.00			
800	500	2000	400	400	183455		
800	500	2000	400	400	183455		
35	0	0	14	13	30522		
46	0	0	18	17	39678		
35	0	0	14	13	30522		
46	0	0	18	17	39678		
1.00	1.00	1.00	1.00	1.00			
1.00	1.00	1.00	1.00	1.00			
1.00	1.00	1.00	1.00	1.00			
0.04	0.00	0.00	0.03	0.03	0.76	Maximum Zd	
0.04	0.00	0.00	0.03	0.03	0.76	Maximum Zpz	
0.06	0.00	0.00	0.04	0.04	0.98	Maximum Zd30	
0.06	0.00	0.00	0.04	0.04	0.98	Maximum Zpz 30	
1.12	1.17	1.17	1.13	1.13			
1.16	1.22	1.22	1.17	1.17			

# AHU-5 OA% ANALYSIS

<b>Building:</b>		<b>Delete Zone</b>		<b>75 Ames AHU-5</b>			
<b>System Tag/Name:</b>		<b>Add Zone</b>		<b>*****IMPORTANT NOTES***** Enable Macros</b>			
<b>Operating Condition Description:</b>				<b>Macros - Security Warning -&gt; Options -&gt; Enable Content</b>			
<b>Units (select from pull-down list)</b>				<b>IP</b>			
<b>Inputs for System</b>		<b>Name</b>	<b>Units</b>	<b>w/o diversity</b>	<b>Diversity</b>	<b>w/ diversity</b>	<b>System</b>
Floor area served by system		As	sf	20007.01			
Population of area served by system		Ps	P	81	D	100%	81
Design primary supply fan airflow rate		Vpsd	cfm	53,910	D	100%	53,910
OA req'd per unit area for system (Weighted average)		Ras	cfm/sf	0.09			
OA req'd per person for system area (Weighted average)		Rps	cfm/p	9.8			
Does system have Outdoor Air Economizer							No
<b>Outdoor air intake provided for system</b>		OA	cfm	<b>60,000</b>			
<b>Inputs for Potentially Critical zones</b>		<b>Show Values per Zone</b>					
Zone Name		<i>Zone title turns purple italic for critical zone(s)</i>					
Zone Tag							
Occupancy Category							
Floor Area of zone		Az	sf	Select from pull-down list:			
Design population of zone		Pz	P	(default value listed; may be overridden)			
Design total supply to zone (primary plus local recirculated)		Vzdz	cfm				
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?				Select from pull-down list or leave blank if N/A:			
Frac. of local recirc. air that is representative of system RA		Er					
<b>Inputs for Operating Condition Analyzed</b>		<b>Ds</b>	%				80%
Percent of total design airflow rate at conditioned analyzed		<b>Ez</b>		Select from pull-down list:			
Air distribution type at conditioned analyzed		<b>Ep</b>					
Zone air distribution effectiveness at conditioned analyzed				<b>Show codes for Ez</b>			
Primary air fraction of supply air at conditioned analyzed							
<b>Inputs for Systems with Outdoor Air Economizers</b>		Toa	Deg F				
Outdoor air Temperature		Tp	Deg F				
Supply Air Temperature		Tr	Deg F				
Return Air Temperature		dTsf	Deg F				
Supply Fan Heat Gain		dTrf	Deg F				
Return Fan Heat Gain							
<b>Results of Minimum ASHRAE 62.1 Ventilation Rate Procedure (EQp1)</b>		<b>Ev</b>					<b>0.83</b>
System Ventilation Efficiency		<b>Vot</b>	cfm				<b>3,191</b>
Outdoor air intake required for system (EQp1)		<b>Vot/As</b>	cfm/sf				<b>0.16</b>
Outdoor air per unit floor area		<b>Vot/Ps</b>	cfm/p				<b>39.5</b>
Outdoor air per person served by system (including diversity)		<b>Ypd</b>	%				<b>6%</b>
Outdoor air as a % of design primary supply air							
<b>Results of 30% Increase beyond ASHRAE 62.1 Ventilation Rate Procedure (EQc2)</b>		<b>Evz30</b>					<b>0.78</b>
System Ventilation Efficiency with 30% increase (EQc2)		<b>Vot30</b>	cfm				<b>4,421</b>
Outdoor air intake required for system with 30% increase (EQc2)		<b>Vot30/As</b>	cfm/sf				<b>0.22</b>
Outdoor air per unit floor area for system with 30% increase (EQc2)		<b>Vot30/Ps</b>	cfm/p				<b>54.7</b>
Outdoor air per person served by system (including diversity) (EQc2)		<b>Ypd30</b>	%				<b>8%</b>
Outdoor air as a % of design primary supply air (EQc2)							
<b>Detailed Calculations</b>							
<b>Initial Calculations for the System as a whole</b>		<b>Vps</b>	cfm	=	$Vpsd \cdot Ds$	=	43210
System primary supply air flow at conditioned analyzed		<b>Vou</b>	cfm	=	$Rps \cdot Ps + Ras \cdot As$	=	2648
Uncorrected OA intake flow req'd for system		<b>Vou30</b>	cfm	=	$(Rps \cdot Ps + Ras \cdot As) \cdot 1.3$	=	3442
30% increase Uncorrected OA intake flow req'd for system (EAc2)		<b>Xs</b>		=	$Vou / Vps$	=	0.06
Uncorrected OA req'd as a fraction of primary SA		<b>Xs30</b>		=	$Vou30 / Vps$	=	0.08
30% increase Uncorrected OA req'd as a fraction of primary SA							
<b>Initial Calculations for individual zones</b>		<b>Ra</b>	cfm/sf				
Area outdoor air rate		<b>Rp</b>	cfm/p				
People outdoor air rate		<b>Vdz</b>	cfm	=	$Vdz \cdot Ds$	=	
Total supply air to zone (at condition being analyzed)		<b>Vpz</b>	cfm	=	$Vdz \cdot Ep$	=	
Primary airflow to zone (at condition being analyzed)		<b>Vbz</b>	cfm	=	$Rp \cdot Pz + Ra \cdot Az$	=	
Breathing zone outdoor airflow		<b>Vbz30</b>	cfm	=	$(Rp \cdot Pz + Ra \cdot Az) \cdot 1.3$	=	
Breathing zone outdoor airflow with 30% increase (EAc2)		<b>Voz</b>	cfm	=	$Vbz / Ez$	=	
Zone outdoor airflow		<b>Voz30</b>	cfm	=	$Vbz30 / Ez$	=	
Zone outdoor airflow with 30% increase (EAc2)		<b>Fa</b>		=	$Ep + (1-Ep) \cdot Er$	=	
Fraction of zone supply not directly recirc. from zone		<b>Fb</b>		=	$Ep$	=	
Fraction of zone supply from fully mixed primary air		<b>Fc</b>		=	$1 - (1-Ez)(1-Ep)(1-Er)$	=	
Fraction of zone OA not directly recirc. from zone		<b>Zd</b>		=	$Voz / Vdz$	=	
OA fraction required in the supply air to the zone		<b>Zpz</b>		=	$Voz / Vpz$	=	
OA fraction required in the primary air to the zone		<b>Zd30</b>		=	$Voz30 / Vdz$	=	
OA fraction required in the supply air to the zone for EAc2		<b>Zpz30</b>		=	$Voz30 / Vpz$	=	
OA fraction required in the primary air to the zone for EAc2							
<b>System Ventilation Efficiency</b>		<b>Evz</b>		=	$(Fa + Fb \cdot Xs - Fc \cdot Zpz \cdot Ep) / Fa$	=	
Zone Ventilation Efficiency (App A Method)		<b>Evz30</b>		=	$(Fa + Fb \cdot Xs30 - Fc \cdot Zpz30 \cdot Ep) / Fa$	=	
Zone Ventilation Efficiency with 30% increase (EAc2) (App A)		<b>Ev</b>		=	$\min(Evz)$	=	<b>0.83</b>
System Ventilation Efficiency (App A Method)		<b>Ev</b>		=	Value from Table 6.3	=	<b>0.92</b>
System Ventilation Efficiency (Table 6.3 Method)		<b>Ev30</b>		=	$\min(Evz30)$	=	<b>0.78</b>
System Ventilation Efficiency w/ 30% increase (EAc2) (App A)		<b>Ev30</b>		=	Value from Table 6.3	=	<b>0.85</b>
System Ventilation Efficiency w/ 30% increase (EAc2) (Table 6.3)							
<b>Minimum outdoor air intake airflow (EQp1)</b>		<b>Vot</b>	cfm	=	$Vou / Ev$	=	<b>3191</b>
Outdoor Air Intake Flow required to System		<b>Y</b>		=	$Vot / Vps$	=	<b>0.07</b>
OA intake req'd as a fraction of primary SA		<b>Vot</b>	cfm	=	$Vou / Ev$	=	<b>2883</b>
Outdoor Air Intake Flow required to System (Table 6.3 Method)		<b>Y</b>		=	$Vot / Vps$	=	<b>0.07</b>
OA intake req'd as a fraction of primary SA (Table 6.3 Method)							
<b>Time-averaging</b>		<b>Th</b>	min				
Time period with high occupancy		<b>h</b>	ft	=	$3 \cdot v / Vbz$	=	
Room height		<b>T</b>	min	=		=	
Time period over which averaging can take place							
Error - sum of all values above will show error							<b>FALSE</b>
Error flag							
<b>30% increase beyond Minimum Outdoor air intake airflow (EQc2)</b>		<b>Vot30</b>	cfm	=	$Vou / Ev$	=	<b>4421</b>
Outdoor Air Intake Flow required to System		<b>Y30</b>		=	$Vot / Vps$	=	<b>0.10</b>
OA intake req'd as a fraction of primary SA		<b>Vot30</b>	cfm	=	$Vou / Ev$	=	<b>4054</b>
Outdoor Air Intake Flow required to System (Table 6.3 Method)		<b>Y30</b>		=	$Vot / Vps$	=	<b>0.09</b>
OA intake req'd as a fraction of primary SA (Table 6.3 Method)							
<b>OA Temp at which Min OA provides all cooling</b>			Deg F	=	$\{(Tp - dTsf) - (1 - Y) \cdot (Tr + dTrf)\} / Y$	=	<b>-158</b>
OAT below which OA Intake flow is @ minimum							

12000CD - CLEAN CORRIDOR	12000CC - VESTIBULE	12005 - ANIMAL HOLDING	12007 - ANIMAL HOLDING	12009 - ANIMAL HOLDING	12011 - ANIMAL HOLDING	12013 - ANIMAL HOLDING	12015 - ANIMAL HOLDING	12122 - LOCKERS/BR EAK	12017 - ANIMAL HOLDING	12019 - ANIMAL HOLDING
12-1	12-1	12-3	12-5	12-7	12-9	12-11	12-13	12-93	12-15	12-17
Corridors	Corridors	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Break rooms	Science laboratories	Science laboratories
1,117	193	381	382	382	383	305	304	300	304	303
0	0	2	2	2	2	2	2	7.5	2	2
1,200	50	1,000	1,000	1,000	1,000	750	750	750	750	750
100%	100%	75%	75%	75%	75%	73%	73%	67%	73%	73%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

0.06	0.06	0.18	0.18	0.18	0.18	0.18	0.18	0.06	0.18	0.18
0.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	5.00	10.00	10.00
1200	50	750	750	750	750	550	550	500	550	550
1200	50	750	750	750	750	550	550	500	550	550
67	12	89	89	89	89	75	75	56	75	75
87	15	115	115	115	116	97	97	72	97	97
67	12	89	89	89	89	75	75	56	75	75
87	15	115	115	115	116	97	97	72	97	97
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.06	0.23	0.12	0.12	0.12	0.12	0.14	0.14	0.11	0.14	0.14
0.06	0.23	0.12	0.12	0.12	0.12	0.14	0.14	0.11	0.14	0.14
0.07	0.30	0.15	0.15	0.15	0.15	0.18	0.18	0.14	0.18	0.18
0.07	0.30	0.15	0.15	0.15	0.15	0.18	0.18	0.14	0.18	0.18
1.01	0.83	0.94	0.94	0.94	0.94	0.93	0.93	0.95	0.93	0.93
1.01	0.78	0.93	0.93	0.93	0.93	0.90	0.90	0.94	0.90	0.90
308.30										
0.10										
9										
450										
7403										
FALSE										
366.32										
0.08										

12021 - ANIMAL HOLDING	12023 - ANIMAL HOLDING	12025 - ANIMAL HOLDING	12000CE - CLEAN CORRIDOR	12027 - PROCEDURE ROOM	12029 - PROCEDURE ROOM	12031 - PROCEDURE ROOM	12033 - NECROPSY	12035 - NARCOTICS	12037 - BREAK RM	12039 - OFFICE	12048, 12052, 12056 - TESTING
12-19	12-21	12-23	12-25, 12-35	12-27	12-29	12-31	12-33	12-37	12-39	12-41	12-43
Science laboratories	Science laboratories	Science laboratories	Corridors	Medical Procedure	Medical Procedure	Medical Procedure	Science laboratories	Storage rooms	Break rooms	Office space	Science laboratories
349	345	282	958	103	109	84	94	49	193	67	98
2	2	2	0	2.06	2.18	1.68	2	0	4.825	0.335	2
1,000	1,000	750	1,800	300	300	300	1,350	200	400	220	825
75%	75%	73%	100%	100%	100%	100%	100%	100%	63%	100%	55%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

0.18	0.18	0.18	0.06	0.00	0.00	0.00	0.18	0.00	0.06	0.06	0.18
10.00	10.00	10.00	0.00	15.00	15.00	15.00	10.00	0.00	5.00	5.00	10.00
750	750	550	1800	300	300	300	1350	200	250	220	450
750	750	550	1800	300	300	300	1350	200	250	220	450
83	82	71	57	31	33	25	37	0	36	6	38
108	107	92	75	40	43	33	48	0	46	7	49
83	82	71	57	31	33	25	37	0	36	6	38
108	107	92	75	40	43	33	48	0	46	7	49
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.11	0.11	0.13	0.03	0.10	0.11	0.08	0.03	0.00	0.14	0.03	0.08
0.11	0.11	0.13	0.03	0.10	0.11	0.08	0.03	0.00	0.14	0.03	0.08
0.14	0.14	0.17	0.04	0.13	0.14	0.11	0.04	0.00	0.19	0.03	0.11
0.14	0.14	0.17	0.04	0.13	0.14	0.11	0.04	0.00	0.19	0.03	0.11
0.95	0.95	0.93	1.03	0.96	0.95	0.98	1.03	1.06	0.92	1.04	0.98
0.94	0.94	0.91	1.04	0.95	0.94	0.97	1.04	1.08	0.89	1.05	0.97

12050, 12054, 12062 - TESTING	12041 - PROCEDURE ROOM	12043 - PROCEDURE ROOM	12045 - PROCEDURE ROOM	12000C - CLEAN CORRIDOR	12047 - PROCEDURE ROOM	12000CH - BEHAVIORAL TESTING CORRIDOR	12000CH - BEHAVIORAL TESTING CORRIDOR	12049 - CONTROL AREA	120681 12072, 12076 - TESTING	12061, 12063, 12065 - IC	12067 - CONTROL AREA	12066, 12070, 12074 - TESTING	12000CJ - SOILED CORRIDOR	12077 - VESTIBULE	12079 - ANIMAL HOLDING
12-45	12-47	12-49	12-51	12-53	12-55	12-57	12-63	12-57	12-59	12-61	12-63	12-65	12-67	12-67	12-69
Science laboratories	Medical Procedure	Medical Procedure	Medical Procedure	Corridors	Medical Procedure	Corridors	Corridors	Corridors	Science laboratories	Science laboratories	Corridors	Science laboratories	Corridors	Unocc / Not Used	Science laboratories
121	107	99	104	228	96	360	360	443	99	37	446	118	356	74	370
2	2.14	1.98	2.08	0	1.92	0	0	0	2	0	0	0	0	0	2
825	300	450	300	650	300	275	275	900	825	150	900	825	200	50	1,000
55%	100%	100%	100%	100%	100%	100%	100%	100%	55%	100%	100%	55%	100%	100%	75%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.18	0.00	0.00	0.00	0.06	0.00	0.06	0.06	0.06	0.18	0.18	0.06	0.18	0.06	0.00	0.18
10.00	15.00	15.00	15.00	0.00	15.00	0.00	0.00	0.00	10.00	10.00	0.00	10.00	0.00	0.00	10.00
450	300	450	300	650	300	275	275	900	450	150	900	450	200	50	750
450	300	450	300	650	300	275	275	900	450	150	900	450	200	50	750
42	32	30	31	14	29	22	22	27	38	7	27	21	21	0	87
54	42	39	41	18	37	28	28	35	49	9	35	28	28	0	113
42	32	30	31	14	29	22	22	27	38	7	27	21	21	0	87
54	42	39	41	18	37	28	28	35	49	9	35	28	28	0	113
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.09	0.11	0.07	0.10	0.02	0.10	0.08	0.08	0.03	0.08	0.04	0.03	0.05	0.11	0.00	0.12
0.09	0.11	0.07	0.10	0.02	0.10	0.08	0.08	0.03	0.08	0.04	0.03	0.05	0.11	0.00	0.12
0.12	0.14	0.09	0.14	0.03	0.12	0.10	0.10	0.04	0.11	0.06	0.04	0.06	0.14	0.00	0.15
0.12	0.14	0.09	0.14	0.03	0.12	0.10	0.10	0.04	0.11	0.06	0.04	0.06	0.14	0.00	0.15
0.97	0.95	1.00	0.96	1.04	0.97	0.98	0.98	1.03	0.98	1.02	1.03	1.01	0.95	1.06	0.95
0.96	0.94	0.99	0.94	1.05	0.95	0.98	0.98	1.04	0.97	1.02	1.04	1.02	0.94	1.08	0.93

12081 - ANIMAL HOLDING	12083 - ANIMAL HOLDING	12000CF - CLEAN CORRIDOR	12112 - OFFICE	12146 - OFFICE	12036 - AIR LOCK	12134 - MEN / LOCKERS, 12128 - WOMEN TOILET	12000LB - ELEVA LOBBY	1206000 - ELEC	120580 - ELEC	12110 - STORAGE	12116 - FEED EXP	12000CL - STREET CORRIDOR	12114 - AIR LOCK	12108 - IRR	12106 - VESTIBULE	12000CA - SOILED CORRIDOR
12-71	12-73	12-75, 12-77	12-79	12-81	12-83	12-85	12-87	12-89	12-89	12-95	12-97	12-101	12-103	12-105	12-105	12-107A, 12-107B
Science laboratories	Science laboratories	Corridors	Office space	Office space	Corridors	Corridors	Corridors	Elec/mech equipment rooms	Elec/mech equipment rooms	Storage rooms	Occupiable storage rooms for dry materials	Corridors	Corridors	Science laboratories	Unocc / Not Used	Corridors
370	370	849	113	111	64	231	241	254	85	237	430	526	59	71	52	897
2	2	0	0.565	0.555	0	0	0	0	0	0	0.86	0	0	1	0	0
1,000	1,000	1,350	220	220	550	600	300	1,250	100	300	600	550	50	150	50	700
75%	75%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%	100%	100%	100%	100%	100%
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.18	0.18	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.06	0.06	0.06	0.18	0.00	0.06
10.00	10.00	0.00	5.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	10.00	0.00	0.00
750	750	1350	220	220	550	600	300	1250	100	150	300	550	50	150	50	700
750	750	1350	220	220	550	600	300	1250	100	150	300	550	50	150	50	700
87	87	51	10	9	4	14	14	0	0	0	30	32	4	23	0	54
113	113	66	12	12	5	18	19	0	0	0	39	41	5	30	0	70
87	87	51	10	9	4	14	14	0	0	0	30	32	4	23	0	54
113	113	66	12	12	5	18	19	0	0	0	39	41	5	30	0	70
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.12	0.12	0.04	0.04	0.04	0.01	0.02	0.05	0.00	0.00	0.00	0.10	0.06	0.07	0.15	0.00	0.08
0.12	0.12	0.04	0.04	0.04	0.01	0.02	0.05	0.00	0.00	0.00	0.10	0.06	0.07	0.15	0.00	0.08
0.15	0.15	0.05	0.06	0.06	0.01	0.03	0.06	0.00	0.00	0.00	0.13	0.07	0.09	0.20	0.00	0.10
0.15	0.15	0.05	0.06	0.06	0.01	0.03	0.06	0.00	0.00	0.00	0.13	0.07	0.09	0.20	0.00	0.10
0.95	0.95	1.02	1.02	1.02	1.05	1.04	1.01	1.06	1.06	1.06	0.96	1.00	0.99	0.91	1.06	0.98
0.93	0.93	1.03	1.02	1.02	1.07	1.05	1.02	1.08	1.08	1.08	0.95	1.01	0.99	0.88	1.08	0.98

12094 - ANIMAL RECEIVING	12118 ANIMAL RECEIVING	12000LA FIRE SERVICE ACCESS LOBBY	12098 - PREP	12100 - MCT	12102 - X-SPECT	12104 - MCT/ PET/ SPECT	12096 - PREP	12087, 12089, 12091 - IC	12085 - QUARANTINE	12093 - TUNNEL WASHER / CAGE RACK WASHER	12001 - CLEAN ROOM	12003 - STERILE HOLDING	Totals/averages
12-209	12-111	12-113	12-115	12-117	12-119	12-121	12-123	12-125	12-127, 12-141	12-129A, 12-129B	12-135A, 12-135B	12-137, 12-139	
Science laboratories	Science laboratories	Corridors	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Science laboratories	Occupiable storage rooms for liquids or gels	Storage rooms	Storage rooms	
127	108	189	65	82	81	112	164	53	410	1,072	1,404	677	20,007 total sf
3	2	0	1	1	1	1	2	0	2	2,144	0	0	80,824 total P
500	300	350	600	250	250	300	550	300	3,400	4,950	4,400	3,100	53,910 total cfm
													1.00 average
100%	100%	100%	83%	60%	60%	50%	100%	100%	85%	57%	72%	76%	86% average
CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	CSCRW	1.00 average
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00 average
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	Primary airflow rate to zones 43210 cfm
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	Er for ITU/TF 80% Percent of design
													Ep for ITU/DFDD/TF

0.18	0.18	0.06	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.12	0.00	0.00	
10.00	10.00	0.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	5.00	0.00	0.00	
500	300	350	500	150	150	150	550	300	2900	2800	3150	2350	43210
500	300	350	500	150	150	150	550	300	2900	2800	3150	2350	43210
53	39	11	22	25	25	30	50	10	94	139	0	0	2648
69	51	15	28	32	32	39	64	12	122	181	0	0	3442
53	39	11	22	25	25	30	50	10	94	139	0	0	2648
69	51	15	28	32	32	39	64	12	122	181	0	0	3442
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.11	0.13	0.03	0.04	0.17	0.16	0.20	0.09	0.03	0.03	0.05	0.00	0.00	0.23 Maximum Zd
0.11	0.13	0.03	0.04	0.17	0.16	0.20	0.09	0.03	0.03	0.05	0.00	0.00	0.23 Maximum Zpz
0.14	0.17	0.04	0.06	0.21	0.21	0.26	0.12	0.04	0.04	0.06	0.00	0.00	0.30 Maximum Zd30
0.14	0.17	0.04	0.06	0.21	0.21	0.26	0.12	0.04	0.04	0.06	0.00	0.00	0.30 Maximum Zpz30
0.96	0.93	1.03	1.02	0.90	0.90	0.86	0.97	1.03	1.03	1.01	1.06	1.06	
0.94	0.91	1.04	1.02	0.87	0.87	0.82	0.96	1.04	1.04	1.01	1.08	1.08	