

HAMOT WOMEN'S HOSPITAL

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Technical Report #1

This Document contains an analysis of ASHRAE Standard 62.1-2007 and ASHRAE Standard 90.1-2007 for the Hamot Women's Hospital, located in Erie, PA.

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TECHNICAL REPORT #1

Executive Summary:

The Hamot Women's Hospital is a 163,616 sq. ft. building located in downtown Erie, Pennsylvania. The hospital is an extension of the Hamot Medical Center, and is dedicated strictly to women's health. It is expected to deliver 2,500 babies each year and perform at least 2,000 surgical procedures. It will bring about 200 jobs to the Erie area and is another big addition to the Hamot Medical Center.

The purpose of this report was to analyze the hospital's compliance with ASHRAE Standard 62.1-2007 and ASHRAE Standard 90.1-2007.

The ASHRAE Standard 62.1-2007 compliance analysis showed that the building is completely compliant with the code requirements. The analysis of Section 5 showed that the indoor air quality will exceed the ASHRAE standards. The Hamot Women's Hospital was designed using the 2006 AIA Guidelines for Design and Construction of Healthcare Facilities, so the air quality is higher using these guidelines. In Section 6 the ventilation procedure was used, and it was determined that the ventilation levels are more than acceptable to comply with ASHRAE Standards.

The ASHRAE Standard 90.1-2007 compliance analysis showed that some areas of the building are not compliant with the standard, in particular the floor u-values, the fan power levels, and the minimum equipment efficiency rates. A logical reason for the non-compliance is the anticipation of future construction, which increased the size of the AHU's. This will increase fan power levels and decrease equipment efficiency. Also the increased fan power could be a result of the need to account for the two high efficiency filters located in each system.

ASHRAE Standard 62.1-2007 Section 5 – Systems and Equipment:

Section 5.1 - Natural Ventilation

There are no operable windows in the Hamot Women's Hospital, so natural ventilation is not a ventilation method for the building.

Section 5.2 – Ventilation Air Distribution

All spaces were designed to meet ventilation requirements. Assuming all variable volume boxes are working properly the minimum flow through the box should maintain minimum ventilation rates. All constant volume boxes were designed to handle ventilation requirements. A more detailed analysis of minimum ventilation airflow will be discussed in the next section.

Section 5.2.3 – Documentation

Air balancing and testing throughout the building was required to be documented by the building specifications.

Section 5.3 – Exhaust Duct Location

Exhaust ducts containing harmful contaminants have been specified to be negatively pressurized relative to the space in which the duct runs.

Section 5.4 – Ventilation System Controls

The mechanical ventilation of the building is supplied by three modular indoor dehumidification air handling units. Each unit is controlled by its own Direct Digital Controller (DDC). Each controller allows control of settings, including temperature, humidity, and economizer, as well as monitoring by the owner. The fans are set to default to run twenty-four hours a day seven days a week, but have the capability to be started and stopped by an optimum start-stop seven day time schedule program.

Section 5.5 – Airstream Surfaces

Specifications state that all ducts and duct joints “shall be constructed in accordance with SMACNA recommendations, except where SMACNA recommendations are exceeded by these specifications. The specifications also specify that all insulation used on mechanical equipment shall meet the air erosion and mold growth limits of UL-181. UV-C lights for the air handling unit will be installed downstream of the cooling coil over the condensate drain pan.

Section 5.6 – Outdoor Air Intakes

The Location of outdoor intakes comply with Table 5-1 from ASHRAE 62.1-2007 Section 5, which states that the potential contaminant source be greater than the separation distance listed in the table. The air intake louvers are specified to carry less than .001 ounces of water per square foot free area during a 15 minute period when

tested in accordance with AMCA Standard 500. The louvers shall bear the AMCA certified rating for air performance and water penetration. Bird screens have been specified to be 3/4" mesh aluminum with an extruded aluminum frame. Screens shall be mounted on the frame.

Section 5.7 – Local Capture of Contaminants

The hospital does not have any noncombustion equipment, so Section 5.7 is not applicable.

Section 5.8 – Combustion Air

All fuel burning appliances are provided with sufficient air for combustion and the combustion products are vented directly outdoors.

Section 5.9 – Particulate Matter Removal

The filters specified are high efficiency filters with cartridge filters, at 95% efficient, MERV rating of 14, and rated in accordance with ASHRAE 52 and UL class 1 or class 2. In addition 2in angled pleated media pre-filters will be installed as a separate section upstream of the desiccant wheel.

Section 5.10 – Dehumidification Systems

Each air handling unit has a type 3 desiccant wheel sized for the dehumidification requirements of that unit. Control of the desiccant wheel is incorporated into the air handler control system. The building will always be positively pressurized during dehumidification, as stated in Section 5.10.

Section 5.11 – Drain Pans

The drain pans, as specified, are designed so that water drains correctly regardless of the operation. All drain pans will be inspected to ensure that they are installed properly. No other information is available on the drain pans.

Section 5.12 – Finned-Tube Coils and Heat Exchangers

All condensate-producing heat exchangers are specified to have a drain pan. No finned-tube coils are used in the building, so Section 5.12.2 is not applicable.

Section 5.13 – Humidifiers and Water-Spray Systems

Each air handling unit has a steam injection type humidifier, and the water originates from a high quality source. All obstructions are an equal or greater distance away from the manufactures recommended absorption distance.

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Section 5.14 – Access for Inspection, Cleaning, and Maintenance

All ventilation equipment is specified to be installed with sufficient working space for maintenance, inspection, and cleaning. Access panels, specified in 15050 – 11, shall be of appropriate size but not less than 24”.

Section 5.15 – Building Envelope

All exterior walls have been constructed to prevent liquid penetration into the envelope. A vapor barrier with an airspace behind the brick finish will prevent condensation from forming on cold surfaces on the building envelope. All pipes, ducts, and other surfaces within the building which could potentially have condensation will be insulated. The roof is EPDM on polyisocyanurate board which conforms with Section 5.15.

Section 5.16 – Buildings with Attached Parking Garages

Hamot Women's Hospital does not have an attached parking garage so section 5.16 is not applicable.

Section 5.17 – Re-designation

All class 2, class 3, and class 4 air is exhausted directly to the outdoors. Some class 1 air is recirculated and blended with fresh air in the air handling units which is permitted by section 5.17 of ASHRAE 62.1.

Section 5.18 – Requirements for Buildings containing ETS Areas and ETS-Free Areas

The Hamot Women's Hospital is a non-smoking facility, so Section 5.18 is not applicable.

ASHRAE Standard 62.1-2007 Section 6 – Ventilation Calculation

Section 6 of ASHRAE STANDARD 62.1-2007 explains the ventilation rate procedure. This procedure is used to design the ventilation system in a building using information about the types of spaces, occupancy, and floor area.

Systems Analyzed

The Hamot Women's Hospital consists of three modular indoor dehumidification air handling units that provide the required ventilation air for the hospital. AHU #1 serves floors 3, 4, 5 and the multipurpose room on the first floor. AHU #2 supplies air to the first and second floor. AHU #3 is much smaller than the other two units, and it serves the OR suite located on the 3rd floor. In this section an evaluation will be done to determine if the specified amounts of ventilation for each air handler unit is adequate.

The outdoor air in Erie, PA is acceptable in accordance with Section 4.1. In addition all air provided to occupied spaces will go through a prefilter with an efficiency of 30% and a high efficiency filter which is 95% efficient with a MERV rating of 14.

Calculation Variables

- **Breathing Zone Outdoor Airflow (V_{bz})** – The outdoor airflow required in the occupied space in a building.
- **Outdoor Air Intake Flow (V_{oi})** – The amount of outdoor air taken into the building.
- **Zone Floor Area (A_z)** – The occupied floor area of a zone or space. Value taken from floor plans and schedules.
- **Zone Population (P_z)** – The largest amount of people expected to occupy a specific zone during typical operation.
- **Outdoor Airflow Rate (R_p)** – Outdoor airflow rate required for each person based on Table 6-1.
- **Outdoor Airflow Rate (R_a)** – Outdoor airflow rate required per unit area

$$V_{bz} = R_p * P_z + R_a * A_z$$

- **Zone Air Distribution Effectiveness (E_z)**
- **Zone Outdoor Airflow (V_{oz})** – Outdoor Airflow that must be provided by the supply air distribution system.

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

- **Zone primary Outdoor Air Fraction (Z_p)**

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$$Z_p = V_{OZ}/V_{pz}$$

- **System Ventilation Efficiency (E_v)**
- **Uncorrected Outdoor Air Intake (V_{ou})**

$$V_{ou} = D * \text{sum all } (R_p * P_z) + \text{sum all } (R_a * A_z)$$

- **Occupant Diversity (D)**

$$D = P_s / \text{sum all } P_z$$

- **System Population (P_s)**
- **Outdoor Air Intake Flow (V_{ot})**

$$V_{ot} = V_{ou} / E_v$$

All Calculations for the Ventilation Rate Procedure are located in Appendix A.

ASHRAE Standard 62.1-2007 Conclusion:

The Hamot Women's Hospital is compliant with ASHRAE standard 62.1-2007 Section 5 and 6. The designed outdoor air scheduled for each air handling unit is greater than the OA requirements calculated, using the ventilation rate procedure. One reason for the significant difference was the hospital was designed following the 2006 AIA Guidelines for Design and Construction of Healthcare Facilities. The ventilation requirements for a hospital following AIA guidelines are greater than ASHRAE 62.1. In addition there are spaces in the hospital that will not be completed until the space is needed. The air handling units are oversized in anticipation of this future construction and also future renovations of the hospital.

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ASHRAE Standard 90.1-2007 Section 5 – Building Envelope

Section 5.1 – General

There were no envelope alterations, so the first part of Section 5.1 does not apply to this building. The Climate Zone for the Hamot Women's Hospital is 5A based on Table B-1 in ASHRAE 90.1-2007.

Section 5.2 – Compliance Paths

Based on the climate category of 5A nonresidential conditioned space, the class of construction and building envelope must comply with Section 5.1, 5.4, 5.7, and 5.8 of ASHRAE Standard 90.1-2007. The vertical fenestration area is 31% of the 72,185 sq. ft. of the building envelope. This does not exceed 40% of the gross wall area for each space-conditioning category, so the Section 5.5 Prescriptive Building Envelope Option was used to determine compliance with ASHRAE 90.1-2007 Section 5.

Section 5.4 – Mandatory Provisions

The Hamot Women's Hospital complies with section 5.4 which gives requirements for building envelope sealing, fenestration and doors, and insulation. Insulation requirements are found in Section 5.8. The air leakage through fixed glazing and framing areas is specified in the specifications to be a max of .06 cfm/sq. ft. (ASTM E 283). There is no loading dock in the building, so Section 5.5.3.3 does not apply. The Vestibule in the Hamot Women's Hospital complies with 5.4.4.4 of Section 5 of ASHRAE 90.1-2007.

Section 5.5 – Prescriptive Building Envelope Option

Table 1 summarizes the building compliance with nonresidential building envelope requirements for climate zone 5A. The requirements are taken from Table 5.5-5 in ASHRAE 90.1-2007.

Table 1: Section 5 Compliance Summary

	Roof Assembly U-Value	Walls Above Grade U-Value	Slab on Grade Floors Unheated	Vertical Glazing Metal Framing U-Value	Floors Concrete U-Value
Required	U-0.063	U-0.124	N.R.	U-1.20	U-0.282
Designed	U-0.023	U-0.101	N.R.	U-0.69	U-0.42

The building Envelope of the Hamot Women's Hospital complies with Section 5 except for Floor U-Value.

ASHRAE Standard 90.1-2007 Section 6 – HVAC

Section 6.2 – Compliance Path

To comply with Section 6 the building must meet the requirements for Section 6.1, 6.7, and 6.8. The simplified approach is not an option for compliance because the Hamot Women's Hospital is over two stories high and the gross floor area is greater than 25,000 ft², so Section 6.4 Mandatory Provisions and Section 6.5 Prescriptive Path will be followed.

Section 6.4 – Mandatory Provisions

The supply of heating and cooling to each zone is individually controlled by thermostats responding to temperature within the zone. The dead band for the zone thermostats is three degrees. The HVAC system is intended to operate continuously so off-hour controls are not required for this building.

A security system is set up to shut down the system when the security system is activated. Setback controls are required since the climate zone is 5. The control sequence for the building shows that the system has the capability to temporarily operate the system to maintain zone temperatures above a heating setpoint that can be adjusted down to 55 degrees Fahrenheit. Optimum start controls are required for all three air handling units since the supply air capacity exceeds 10,000 cfm. The control sequence states that optimum controls have been installed for all three air handling units. Zone isolation is not required since all zones are intended to operate continuously.

Outdoor air supply and exhaust systems are equipped with motorized dampers in accordance with Section 6.4.3.4.3. All dampers have a maximum leakage rate of 3 cfm/sq. ft. and are AMCA licensed for Class 1A. All fans with motors greater than .75 hp have automatic controls that are capable of shutting off fans when not required.

The humidifiers installed in the building do not have preheating jackets so 6.4.3.6 does not apply. Humidification and Dehumidification can be in simultaneous operation because humidifiers are located throughout the hospital in humidity sensitive areas. An exception to Section 6.4.3.7 is systems serving zones where specific humidity levels are required, such as a hospital. Therefore the system installed should comply with this section of the code as long as it was approved.

Ventilation control for high-occupancy areas is served by a system with an air-side economizer so the building complies with Section 6.4.3.9.

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Section 6.4.4 – HVAC System Construction and Insulation

All ductwork is insulated with 1.5" thick 1.5" dense glass fiber insulation. Pipe insulation compliance is shown in Table 2 below.

Table 2: Piping Insulation Summary

	Hot Water <1" Pipe	Steam <1" Pipe	Chilled Water <1" Pipe	Hot Water >1.5" Pipe	Steam >1.5" Pipe	Chilled Water >1.5" Pipe
Required	.5"	1.5"	.5"	1"	3"	1"
Specified	1"	2.5"	1"	1.5"	3"	1.5"

The Hamot Women's Hospital complies with piping insulation requirements and ductwork insulation requirements of 6.4.4.1.3 of ASHRAE standard 90.1-2007.

Section 6.4.4.2 – Ducts and Plenum Leakage

The specifications say all duct joints are to be sealed. All ductwork shall be tested for leakage at 150% of design static pressure and leakage shall not exceed .005 of the system capacity. All ductwork shall be tested before it is covered or concealed, and shall be isolated and capped-off and tested in sections. This complies with Section 6.4.4.2 of Section 6 of ASHRAE Standard 90.1.

Section 6.5 – Prescriptive Path

Air side economizers are used for all three air handling units in the hospital. The economizers are capable of providing 100% of the design supply air quantity as outdoor air for cooling. They are sequenced with the mechanical cooling equipment and are controlled by the outdoor air temperature. A high-limit shutoff has been installed for all three air handling units. A means of relieving excess outdoor air has been installed into the system. All these features of the economizer's are compliant with Section 6.5.1.

Section 6.5.3.1- Fan System Power Limitations

Table 3 below summarizes the fan system power limitations. All variable air volume and constant air volume boxes are compliant with Section 6.5.3.1.

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Table 3 Summary of Compliance with Fan System Power Limitations

Unit	hp	CFMs	CFMs*.0015	Compliant
KEF-1	2	3300	5.0	Yes
KEF-2	2	3300	5.0	Yes
EF-3	0.25	1087	1.6	Yes
PH-EF-1	5	9975	15.0	Yes
PH-EF-2	7.5	15000	22.5	Yes
PH-EF-3	1.5	950	1.4	No
PH-EF-3A	1.5	950	1.4	No
AHU-1-Supply	200	96245	144.4	No
AHU-1-Return	100	64935	97.4	No
AHU-2-Supply	150	64480	96.7	No
AHU-2-Return	60	47485	71.2	Yes
AHU-3-Supply	50	9200	13.8	No
AHU-3-Return	20	7825	11.7	No

Most of the fans in the Hamot Women's Hospital are not compliant with Section 6.5.3.1. The reason for this is because the air handling units were oversized in anticipation of future renovations and construction. Another reason for the increased fan horsepower is the high efficiency filters that require more fan horsepower in the system.

Section 6.5.7 – Exhaust Hoods

All exhaust hoods installed in the Hamot Women's Hospital comply with Section 6.5.7 of ASHRAE Standard 90.1-2007.

Section 6.7 – Submittals

All documents and manuals were submitted in compliance with Section 6.7 Submittals. Air balancing and testing is clearly stated in the specifications for all HVAC equipment. Written report formats and what needs to be included in each report is listed in the design specifications. The HVAC system is to be commissioned by an outside party which complies with Section 6.7.2.4 which requires commissioning for all buildings over 50,000 sq. ft.

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Section 6.8 – Minimum Equipment Efficiency Tables

The Hamot Women's Hospital is not compliant with minimum equipment efficiencies. A summary of the results are found in table 4 below.

Table 4 Summary of Minimum Equipment Efficiencies

Air Conditioners Air Cooled			
Unit	Required EER	Designed EER	Compliance
AHU-1	9.3	8	No
AHU-2	9.3	8.3	No
AHU-3	9.3	9.0	No

ASHRAE Standard 90.1-2007 Section 7 – Service Water Heating

Service water heating is taken care of in the main boiler room located adjacent to the Hamot Women's Hospital in the Main Hamot Hospital building. Since the service is taken care of by an existing system Section 7 of ASHRAE 90.1 does not apply to the building. As a result the service water heating does not need to comply with this section of the standard.

ASHRAE Standard 90.1-2007 Section 8 – Power

Section 8 of ASHRAE Standard 90.1-2007 specifies that feeder conductors have a maximum voltage drop of 2% and branch circuits have a maximum voltage drop of 3%. The Hamot Women's Hospital is compliant with the maximum voltage drops as specified in the specifications.

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ASHRAE Standard 90.1-2007 Section 9 – Lighting

Section 9.4.1 Lighting Control

An automatic control device to shut off building lighting in all spaces is not required since the building is intended to be occupied 24 hours a day. However, in order to reduce the lighting load occupant sensors have been installed in all spaces of the hospital. Lighting control devices have been installed in all spaces and are easily accessible to the space occupant in compliance with Section 9.4.1.2. All exterior lighting is designated for dusk-to-dawn operation which complies with Section 9.4.1.3.

The building area method was used to determine the hospital's compliance with Section 9.5 of Standard 90.1. Since it is a hospital, based on the table located in Section 9 of Standard 90.1 the allowed LPD (W/ft²) is 1.2. The calculated LPD is summarized in Table 5.

Table 5 Summary of Power Density

Floor	Fixture 1	Fixture 2	Fixture 3	Fixture 4	Fixture 5	Fixture 6	Fixture 7
1st	128	18	195	1	22	0	0
2nd	124	10	175	1	0	0	0
3rd	104	59	252	5	15	34	0
4th	55	43	178	25	38	0	24
5th	29	77	156	0	39	0	24
Watts/Fixture	64	64	42	32	64	42	108
Total (Watts)	28160	13248	40152	1024	7296	1428	5184
Total (Watts) for building:		96492					
Sq. Ft for Floors 1-5:		149066					
Lighting Power Density:		0.65					

Based on the calculations the Hamot Women's Hospital is compliant with the allowed lighting power density.

ASHRAE Standard 90.1-2007 Section 10 – Other Equipment

Section 10.4.1 – Electric Motors

Information for the efficiencies of the electric motors in the AHU's could not be obtained. However, it is specified in the specifications that all motor efficiencies at least meet the EAct efficiency requirements, which complies with Section 10.4.1.

ASHRAE Standard 90.1-2007 Conclusion:

The Hamot Women's Hospital complied with most of the requirements of Section's 5-10 of ASHRAE 90.1-2007. In Section 5 the only requirement that was not met was the Floor U-value.

In Section 6 the controls, piping insulation, and duct sealing requirements exceeded the standards minimums. However, the system fan power levels were higher than the standards maximums. Seven of the thirteen fans did not comply with the code requirements. Most likely the reason for this is because the air handling units were oversized in anticipation of future renovations and construction. Another reason for the increased fan horsepower is the high efficiency filters located in two places within each system. The minimum equipment efficiencies were also not compliant. Again most likely a result of the high efficiency filters and future construction.

Section 7 service water heating does not apply to this building since the system that supplies the service water heating was installed in a previous project. The hospital completely complied with the power, lighting, and other equipment requirements of ASHRAE Standard 90.1-2007.

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References:

ASHRAE. 2007, ANSI/ASHRAE, Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality. American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc., Atlanta, GA.

ASHRAE. 2007, ANSI/ASHRAE, Standard 90.1-2007, Energy Standard for Buildings Except Low-Rise Residential Buildings. American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc., Atlanta, GA.

Hamot Women's Hospital Construction Documents and Specifications for Phase 2

Appendix A:

In Appendix A are the calculations for the ventilation rate procedure. This method was used to check compliance with ASHRAE Standard 62.1 Section 6. Included in the spreadsheet are all the room areas, use, occupancy, supply air, outside air, and Z_p values. The second chart is a comparison of nominal outside air vs. required outside air for each Air Handling Unit.

From Table 6-2 Zone Air Distribution Effectiveness in ASHRAE 62.1-2007 the E_z for the Hamot Women's Hospital is equal to one. All air is distributed from the ceiling.

Since E_z is equal to one $V_{bz} = V_{oz}$

V_{pz} is the minimum primary airflow for the VAV box supplying air to that zone, which complies with 6.2.5.1 Primary Outdoor Air Fraction in ASHRAE Standard 62.1-2007.

Max Z_p for all three AHU's is between .45-.55, so the E_v is equal to .6 for all three units.

Diversity was calculated using P_s values from an estimated population calculation found in the plans.

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Ventilation Rate Procedure Calculations

AHU-2			ft cub.	ft	ft sq.	cfm/occ.	#/1000 sq ft	cfm/ft sq	People	OA CFM		
Room	Room Title	Occupancy	Volume	Ht	Az	Rp	Occ. Density	Ra	Pz	Vbz = Voz	Vpz	Zp
1000	Lower Lobby	Lobby	48690	21.5	2265	5	10	0.06	22.6	249	500	0.50
1001	Elevator Lobby	Lobby	722	8	90	5	10	0.06	0.9	10	155	0.06
1002	Telephone/Data	Telephone	480	8	60	5	60	0.06	3.6	22	1060	0.02
1003	Trash and Linen	Storage	1152	8	144			0.12	0.0	17	190	0.09
1006	Electrical	Electrical	1000	8	125			0.06	0.0	8	840	0.01
1008	Telephone/Data	Telephone	768	8	96	5	60	0.06	5.8	35	830	0.04
1009	Electrical	Electrical	768	8	96			0.06	0.0	6	840	0.01
1011	Mechanical Room	Storage	640	8	80			0.12	0.0	10	40	0.24
1012	Upper Lobby	Lobby	23928	8	2991	5	10	0.06	29.9	329	1585	0.21
1014	Wheel Chair	Storage	1056	10	106			0.12	0.0	13	195	0.06
1015	Corridor	Corridor	6824	10	682			0.06	0.0	41	195	0.21
1018	Men Toilet	N/A	1497	8	187				0.0	0		
1019	Women Toilet	N/A	1882	8	235				0.0	0		
1020	Elevator Lobby	Lobby	6042	8	755	5	10	0.06	7.6	83	195	0.43
1022	Triage Wait	Reception	6416	8	802	5	30	0.06	24.1	168	320	0.53
1024	Equipment	Equipment	450	8	56			0.06	0.0	3	55	0.06
1025	Work Room	Office	950	8	119	5	5	0.06	0.6	10	105	0.10
1026	Toilet Room	N/A	560	8	70				0.0	0		
1027	Triage	Patient	14912	8	1864	25	10	0.06	18.6	578	3175	0.18
1028	Nurse	Office	1480	8	185	5	5	0.06	0.9	16	520	0.03
1029	Toilet Room	N/A	560	8	70				0.0	0		
1030	TR Support	Patient	1026	8	128	5	5	0.06	0.6	11	175	0.06
1031	Microscope	Office	306	8	38	5	5	0.06	0.2	3	55	0.06
1032	Janitor	Storage	342	8	43			0.12	0.0	5	55	0.09

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1034	Lounge	Break Room	1240	8	155	5	25	0.06	3.9	29	75	0.38
1035	Reg Work	Office	1360	8	170	5	5	0.06	0.9	14	75	0.19
1036	Student Lockers	Storage	3632	8	454			0.12	0.0	54	350	0.16
1037	W. Lockers	Storage	4568	8	571			0.12	0.0	69	350	0.20
1038	W. Restroom	N/A	864	8	108				0.0	0		
1039	M. Restroom	N/A	920	8	115				0.0	0		
1040	M. Lockers	Storage	1960	8	245			0.12	0.0	29	380	0.08
1041	Env Services	N/A	336	8	42				0.0	0	75	0.00
1079	Storage	Storage	984	8	123			0.12	0.0	15	40	0.37
1043	Corridor	Corridor	4928	8	616			0.06	0.0	37	155	0.24
1044	Corridor	Corridor	7296	8	912			0.06	0.0	55	300	0.18
1046	Clean Hold	Storage	306	8	38			0.12	0.0	5	55	0.08
1047	Regular Interview	Office	1152	8	144	5	5	0.06	0.7	12	75	0.16
1077	Janitor	Storage	288	8	36			0.12	0.0	4	45	0.10
1051	Waiting Room	Reception	2688	8	336	5	30	0.06	10.1	71	140	0.50
1053	Linen Deposit	N/A	5544	8	693				0.0	0	300	0.00
1054	Toilet Room	N/A	448	8	56				0.0	0		
1072	Kitchen	N/A	19584	8	2448				0.0	0		
1071	Office	Office	800	8	100	5	5	0.06	0.5	9	750	0.01
2089	NICU 8	Recovery/ICU	2256	12	188	15	20	0.06	3.8	68	320	0.21
2090	NICU 9	Recovery/ICU	2256	12	188	15	20	0.06	3.8	68	325	0.21
2091	NICU 10	Recovery/ICU	2388	12	199	15	20	0.06	4.0	72	300	0.24
2088	NICU 13	Recovery/ICU	2388	12	199	15	20	0.06	4.0	72	290	0.25
2124	IC/CCN	Recovery/ICU	3804	12	317	15	20	0.06	6.3	114	300	0.38
2120	Scrub	Storage	772	9	86			0.12	0.0	10	315	0.03
2008	Tele/Data Room	Telephone	1504	9	167	5	60	0.06	10.0	60	360	0.17
2009	Electrical Room	Electrical	1504	9	167			0.06	0.0	10	250	0.04

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2010	On Call 5	Office	1110	9	123	5	5	0.06	0.6	10	90	0.12
2011	On Call 4	Office	1439	9	160	5	5	0.06	0.8	14	90	0.15
2012	Storage	Storage	1215	9	135			0.12	0.0	16	325	0.05
2013	Staff Toilet	N/A	774	9	86				0.0	0		
2014	Storage	Storage	1350	9	150			0.12	0.0	18	40	0.45
2015	Toilet	N/A	664	9	74				0.0	0		
2016	Toilet	N/A	656	9	73				0.0	0		
2017	Corridor	Corridor	3681	10	368			0.06	0.0	22	440	0.05
2018	Toilet	N/A	1024	9	114				0.0	0		
2019	On Call 6	Office	1075	9	119	5	5	0.06	0.6	10	90	0.11
2020	On Call 3	Office	1240	9	138	5	5	0.06	0.7	12	90	0.13
2021	Toilet	N/A	664	9	74				0.0	0		
2022	ENV Services	Office	1152	9	128	5	5	0.06	0.6	11	90	0.12
2023	Dev. Room	Conference	1260	9	140	5	50	0.06	7.0	43	70	0.62
2025	On Call 2	Office	1526	9	170	5	5	0.06	0.8	14	90	0.16
2026	On Call 1	Office	1301	9	145	5	5	0.06	0.7	12	90	0.14
2027	Kids Play Room	Daycare	1350	9	150	10	25	0.18	3.8	65	135	0.48
2028	Toilet	N/A	592	9	66				0.0	0		
2029	Security	Office	860	9	96	5	5	0.06	0.5	8	90	0.09
2030	Corridor	Corridor	5630	10	563			0.06	0.0	34	490	0.07
2032	Corridor	Corridor	4210	10	421			0.06	0.0	25	435	0.06
2033	Corridor	Corridor	2280	10	228			0.06	0.0	14	420	0.03
2034	Com. Center	Reception	2628	9	292	5	30	0.06	8.8	61	510	0.12
2035	Scrub	Storage	693	9	77			0.12	0.0	9	55	0.17
2036	Corridor	Corridor	990	10	99			0.06	0.0	6	210	0.03
2037	Family Toilet	N/A	512	9	57				0.0	0		
2038	Family Conf.	Conference	2034	9	226	5	50	0.06	11.3	70	210	0.33
2040	IC/CCN 10	Recovery/ICU	4620	12	385	15	20	0.06	7.7	139	470	0.29

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2043	NICU 4	Recovery/ICU	3096	12	258	15	20	0.06	5.2	93	310	0.30
2044	NICU 3	Recovery/ICU	4560	12	380	15	20	0.06	7.6	137	300	0.46
2045	NICU 2	Recovery/ICU	2268	12	189	15	20	0.06	3.8	68	240	0.28
2046	NICU 1	Recovery/ICU	2268	12	189	15	20	0.06	3.8	68	230	0.30
2047	IC/CCN 1	Recovery/ICU	3768	12	314	15	20	0.06	6.3	113	445	0.25
2049	IC/CCN 3	Recovery/ICU	3768	12	314	15	20	0.06	6.3	113	445	0.25
2051	Team Room	Conference	2340	9	260	5	50	0.06	13.0	81	180	0.45
2052	Corridor	Corridor	6804	10	680			0.06	0.0	41	385	0.11
2053	Parents Lounge	Break Room	2277	9	253	5	25	0.06	6.3	47	240	0.20
2054	Quiet Lounge	Break Room	1386	9	154	5	25	0.06	3.9	28	100	0.28
2055	NEO Office	Office	1530	9	170	5	5	0.06	0.9	14	90	0.16
2056	Nurse Manager	Office	1017	9	113	5	5	0.06	0.6	10	55	0.17
2057	Corridor	Corridor	2650	10	265			0.06	0.0	16	170	0.09
2058	NEO NP	Office	792	9	88	5	5	0.06	0.4	7	55	0.14
2059	NEO Office	Office	954	9	106	5	5	0.06	0.5	9	55	0.16
2060	Staff Lounge	Break Room	3285	9	365	5	25	0.06	9.1	68	215	0.31
2061	ASST Nurse	Office	918	9	102	5	5	0.06	0.5	9	90	0.10
2062	Resp Therapists	Office	2268	9	252	5	5	0.06	1.3	21	160	0.13
2063	Toilet	N/A	756	9	84				0.0	0		
2064	Phys On-Call	Office	927	9	103	5	5	0.06	0.5	9	90	0.10
2065	Staff TLT/Shower	N/A	711	9	79				0.0	0		
2067	Breast Pump	Patient Room	711	9	79	25	10	0.06	0.8	24	100	0.24
2068	Corridor	Corridor	5640	10	564			0.06	0.0	34	330	0.10
2069	Family TLT	N/A	594	9	66				0.0	0		
2071	Corridor	Corridor	11250	10	1125			0.06	0.0	68	525	0.13
2072	NICU 11	Recovery/ICU	2076	10	208	15	20	0.06	4.2	75	350	0.21
2073	NICU 10	Recovery/ICU	2100	10	210	15	20	0.06	4.2	76	350	0.22
2074	Clean Supply	Storage	1530	9	170			0.12	0.0	20	175	0.12

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2075	Soiled Utility	Storage	1071	9	119			0.12	0.0	14	175	0.08
2076	Formula	Storage	1467	9	163			0.12	0.0	20	200	0.10
2077	Equipment	Storage	1530	9	170			0.12	0.0	20	295	0.07
2078	Corridor	Corridor	7068	9	785			0.06	0.0	47	470	0.10
2079	Corridor	Corridor	8379	9	931			0.06	0.0	56	1050	0.05
2080	Shell Space	Storage	47160	9	5240			0.12	0.0	629	600	
2081	Storage	Storage	3276	9	364			0.12	0.0	44	90	0.49
2083	IC/CCN 6	Recovery/ICU	3804	12	317	15	20	0.06	6.3	114	380	0.30
2086	NICU 11	Recovery/ICU	2412	12	201	15	20	0.06	4.0	72	240	0.30
2087	NICU 12	Recovery/ICU	2412	12	201	15	20	0.06	4.0	72	240	0.30
2092	Corridor	Corridor	7152	10	715			0.06	0.0	43	470	0.09
2093	Corridor	Corridor	4540	10	454			0.06	0.0	27	225	0.12
2094	Large Conf.	Conference	2853	9	317	5	50	0.06	15.9	98	200	0.49
2095	Small Conf	Conference	1143	9	127	5	50	0.06	6.4	39	100	0.39
2096	Office	Office	900	9	100	5	5	0.06	0.5	9	90	0.09
2097	Toilet	N/A	477	9	53				0.0	0		
2098	Case Manager	Office	954	9	106	5	5	0.06	0.5	9	90	0.10
2099	Administration	Office	3330	9	370	5	5	0.06	1.9	31	300	0.10
2100	Supply	Storage	837	9	93			0.12	0.0	11	45	0.25
2101	Corridor	Corridor	2385	10	239			0.06	0.0	14	300	0.05
2103	Lactation Office	Office	1314	9	146	5	5	0.06	0.7	12	45	0.28
2104	Case Manager	Office	954	9	106	5	5	0.06	0.5	9	80	0.11
2105	Director	Office	1323	9	147	5	5	0.06	0.7	12	80	0.16
2106	Care by Parent 2	Patient	2475	9	275	25	10	0.06	2.8	85	250	0.34
2107	Toilet	N/A	657	9	73				0.0	0		
2108	Toilet	N/A	657	9	73				0.0	0		
2109	Care by Parent 1	Patient	2556	9	284	25	10	0.06	2.8	88	180	0.49
2112	Women Toilet	N/A	633	9	70				0.0	0		

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2113	ENV Services	Office	900	9	100	5	5	0.06	0.5	9	90	0.09
2114	Men Toilet	N/A	633	9	70				0.0	0		
2116	Supply	Storage	432	9	48			0.12	0.0	6	75	0.08
2117	Office	Office	882	9	98	5	5	0.06	0.5	8	45	0.19
2118	Washer/Dryer	Laundry Room	747	9	83	5	10	0.12	0.8	14	125	0.11
2121	Janitor	Storage	540	9	60			0.12	0.0	7	170	0.04
2125	Corridor	Corridor	13440	10	1344			0.06	0.0	81	385	0.21
Totals					46199				335.1		34010	
AHU-1			ft cub.	ft	ft sq.	cfm/occ.	#/1000 sq ft	cfm/ft sq	People	OA CFM		
Room	Room Title	Occupancy	Volume	Ht	Az	Rp	Occ. Density	Ra	Pz	Vbz = Voz	Vpz	Zp
3062	OR Break Room	Break Room	3627	9	403	5	25	0.06	10.1	75	420	0.18
3059	LKR Room	Storage	3555	9	395			0.12	0.0	47	600	0.08
3060	Toilet Room	N/A	688	9	76				0.0	0		
3057	LKR Room	Storage	1629	9	181			0.12	0.0	22	80	0.27
3056	Toilet Room	N/A	552	9	61				0.0	0		
3052	Corridor	Corridor	1740	10	174			0.06	0.0	10	290	0.04
3054	GYN Waiting	Reception	2178	9	242	5	30	0.06	7.3	51	285	0.18
3172	Toilet	N/A	496	9	55				0.0	0		
3050	LDR 1	Recovery/ICU	3780	10	378	15	20	0.06	7.6	136	420	0.32
3048	Toilet	N/A	552	9	61				0.0	0		
3045	LDR 2	Recovery/ICU	3780	10	378	15	20	0.06	7.6	136	420	0.32
3043	Toilet	N/A	552	9	61				0.0	0		
3040	LDR 3	Recovery/ICU	3780	10	378	15	20	0.06	7.6	136	420	0.32
3038	Toilet	N/A	552	9	61				0.0	0		
3035	LDR 4	Recovery/ICU	3780	10	378	15	20	0.06	7.6	136	420	0.32
3033	Toilet	N/A	552	9	61				0.0	0		

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3030	LDR 5	Recovery/ICU	3780	10	378	15	20	0.06	7.6	136	420	0.32
3028	Toilet	N/A	552	9	61				0.0	0		
3024	Corridor	Corridor	2294	10	229			0.06	0.0	14	185	0.07
3022	Toilet	N/A	499	9	55				0.0	0		
3025	Toilet	N/A	525	9	58				0.0	0		
3000	Lobby/Waiting	Reception	7600	9	844	5	30	0.06	25.3	177	705	0.25
3020	Security	Office	936	9	104	5	5	0.06	0.5	9	60	0.15
3053	GYN Consultant	Office	864	9	96	5	5	0.06	0.5	8	90	0.09
3021	Bereavement	Storage	1287	9	143			0.12	0.0	17	160	0.11
3019	Consultant	Office	1242	9	138	5	5	0.06	0.7	12	90	0.13
3051	O.R. EQ.	Storage	472	9	52			0.12	0.0	6	125	0.05
3047	Storage	Storage	216	9	24			0.12	0.0	3	45	0.06
3046	NICU EQ	Storage	472	9	52			0.12	0.0	6	55	0.11
3037	Delivery Supply	Storage	216	9	24			0.12	0.0	3	75	0.04
3041	EQ	Storage	472	9	52			0.12	0.0	6	75	0.08
3036	EQ	Storage	472	9	52			0.12	0.0	6	75	0.08
3032	EP Cart and Pump	Storage	216	9	24			0.12	0.0	3	75	0.04
3031	Linen Storage	Storage	472	9	52			0.12	0.0	6	75	0.08
3027	Storage	Storage	280	9	31			0.12	0.0	4	45	0.08
3065	Corridor	Corridor	10450	10	1045			0.06	0.0	63	540	0.12
3068	Corridor	Corridor	8160	10	816			0.06	0.0	49	670	0.07
3111	Corridor	Corridor	9550	10	955			0.06	0.0	57	200	0.29
3017	Corridor	Corridor	6090	10	609			0.06	0.0	37	400	0.09
3013	Toilet	N/A	456	9	51				0.0	0		
3012	Phy. Ready Room	Office	2268	9	252	5	5	0.06	1.3	21	100	0.21
3014	Corridor	Corridor	729	10	73			0.06	0.0	4	100	0.04
3011	Asst. Nurse	Office	882	9	98	5	5	0.06	0.5	8	90	0.09
3016	Env. Services	Office	801	9	89	5	5	0.06	0.4	8	90	0.08

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3010	Nurse Manager	Office	981	9	109	5	5	0.06	0.5	9	90	0.10
3092	Team Room	Conference	1863	9	207	5	50	0.06	10.4	64	130	0.49
3108	LDR. Cl. EQ.	Storage	1188	9	132			0.12	0.0	16	350	0.05
3067	OB Storage	Storage	693	9	77			0.12	0.0	9	225	0.04
3171	Toilet	N/A	578	9	64				0.0	0		
3090	Nurse Station	Office	1292	9	144	5	5	0.06	0.7	12	200	0.06
3089	Nour.	Storage	729	9	81			0.12	0.0	10	200	0.05
3087	PACU 3	Patient	1250	9	139	25	10	0.06	1.4	43	385	0.11
3086	PACU 2	Patient	1250	9	139	25	10	0.06	1.4	43	385	0.11
3085	PACU 1	Patient	1241	9	138	25	10	0.06	1.4	43	385	0.11
3083	Soil Utility	Storage	738	9	82			0.12	0.0	10	125	0.08
3102	Nurse Station	Office	1114	9	124	5	5	0.06	0.6	11	90	0.12
3101	PACU Corridor	Corridor	10719	9	1191			0.06	0.0	71	540	0.13
3154	Nurse Station	Office	1053	9	117	5	5	0.06	0.6	10	90	0.11
3152	Induction 1	Patient	1046	9	116	25	10	0.06	1.2	36	385	0.09
3153	Induction 2	Patient	1030	9	114	25	10	0.06	1.1	35	385	0.09
3098	Soiled Utility	Storage	990	9	110			0.12	0.0	13	110	0.12
3104	Nour.	Storage	810	9	90			0.12	0.0	11	100	0.11
3154	PACU 1	Patient	1114	9	124	25	10	0.06	1.2	38	385	0.10
3146	PACU 2	Patient	1114	9	124	25	10	0.06	1.2	38	385	0.10
3147	PACU 3	Patient	1114	9	124	25	10	0.06	1.2	38	385	0.10
3148	PACU 4	Patient	1114	9	124	25	10	0.06	1.2	38	385	0.10
3159	Corridor	Corridor	6885	10	689			0.06	0.0	41	685	0.06
3093	Toilet	N/A	578	9	64				0.0	0		
3094	Toilet	N/A	657	9	73				0.0	0		
3074	Nurse Station	Office	1258	9	140	5	5	0.06	0.7	12	90	0.13
3168	Nour.	Storage	477	9	53			0.12	0.0	6	100	0.06
	C-Section Waiting	Reception	799	9	89	5	30	0.06	2.7	19	400	0.05

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3105	Prep 1	Patient	1020	9	113	25	10	0.06	1.1	35	170	0.21
3106	Prep 2	Patient	1020	9	113	25	10	0.06	1.1	35	170	0.21
3107	Prep 3	Patient	1020	9	113	25	10	0.06	1.1	35	170	0.21
3164	Env. Services	Office	342	9	38	5	5	0.06	0.2	3	90	0.04
3165	Soiled Utility	N/A	378	9	42				0.0	0	110	0.00
3158	Meds	Storage	648	9	72			0.12	0.0	9	225	0.04
3070	Clean	Storage	711	9	79			0.12	0.0	9	175	0.05
3127	LDR 10	Recovery/ICU	3591	10	359	15	20	0.06	7.2	129	400	0.32
3128	Toilet	N/A	552	9	61				0.0	0		
3126	Delivery Supply	Storage	280	9	31			0.12	0.0	4	75	0.05
3123	LDR 9	Recovery/ICU	3591	10	359	15	20	0.06	7.2	129	400	0.32
3124	Toilet	N/A	552	9	61				0.0	0		
3122	Storage	Storage	280	9	31			0.12	0.0	4	45	0.08
3119	LDR 8	Recovery/ICU	3591	10	359	15	20	0.06	7.2	129	400	0.32
3120	Toilet	N/A	616	9	68				0.0	0		
3115	LDR 7	Recovery/ICU	3591	10	359	15	20	0.06	7.2	129	400	0.32
3116	Toilet	N/A	552	9	61				0.0	0		
3114	Linen Storage	Storage	280	9	31			0.12	0.0	4	75	0.05
3110	LDR 6	Recovery/ICU	3591	10	359	15	20	0.06	7.2	129	400	0.32
3112	Toilet	N/A	552	9	61				0.0	0		
3109	Office Supplies	Storage	280	9	31			0.12	0.0	4	45	0.08
3063	CL Holding	Storage	1170	9	130			0.12	0.0	16	250	0.06
3044	Soiled Utility	N/A	1575	9	175				0.0	0		
3151	CL. Storage	Storage	675	9	75			0.12	0.0	9	125	0.07
3113	Delivery Storage	Storage	2358	9	262			0.12	0.0	31	75	0.42
3003	Trash and Linen	Storage	1449	9	161			0.12	0.0	19	225	0.09
3099	CL. Holding	Storage	855	9	95				0.0	0	110	0.00
3097	MED.	Storage	630	9	70			0.12	0.0	8	225	0.04

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4000	Lobby/Waiting	Reception	817	9	91	5	30	0.06	2.7	19	350	0.05
4002	TELE/Data	Telephone	878	9	98	5	60	0.06	5.9	35	150	0.23
4003	Trash/Linen	Storage	1260	9	140			0.12	0.0	17	100	0.17
4006	Electrical RM	Electrical	1660	9	184			0.06	0.0	11	75	0.15
4007	Mech Shaft	N/A	11097	9	1233				0.0	0		
4008	Tele/Data	Telephone	1309	9	145	5	60	0.06	8.7	52	150	0.35
4009	Electrical RM	Electrical	1228	9	136			0.06	0.0	8	150	0.05
4010	Post Partum 28	Recovery/ICU	3204	9	356	15	20	0.06	7.1	128	300	0.43
4011	Toilet	N/A	432	9	48				0.0	0		
4012	Toilet	N/A	512	9	57				0.0	0		
4013	Post Partum 29	Recovery/ICU	2673	9	297	15	20	0.06	5.9	107	300	0.36
4014	Post Partum 30	Recovery/ICU	2574	9	286	15	20	0.06	5.7	103	300	0.34
4015	Toilet Room	N/A	432	9	48				0.0	0		
4016	Nurse Station	Office	2057	9	229	5	5	0.06	1.1	19	90	0.22
4017	Corridor	Corridor	5620	10	562			0.06	0.0	34	550	0.06
4021	Toilet Room	N/A	408	9	45				0.0	0		
4022	Post Partum 27	Recovery/ICU	2763	9	307	15	20	0.06	6.1	111	300	0.37
4023	Womens TLT	N/A	520	9	58				0.0	0		
4024	Mens TLT	N/A	585	9	65				0.0	0		
4025	Closet	N/A	216	9	24				0.0	0	45	0.00
4026	Security	Office	792	9	88	5	5	0.06	0.4	7	90	0.08
4027	Corridor	Corridor	3720	10	372			0.06	0.0	22	555	0.04
4028	Vending	Corridor	837	9	93			0.06	0.0	6	200	0.03
4030	Toilet	N/A	440	9	49				0.0	0		
4031	Post Partum 12	Recovery/ICU	2925	9	325	15	20	0.06	6.5	117	300	0.39
4032	Post Partum 11	Recovery/ICU	2853	9	317	15	20	0.06	6.3	114	300	0.38
4033	Toilet Room	N/A	440	9	49				0.0	0		

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4034	Toilet Room	N/A	440	9	49				0.0	0		
4035	Post Partum 13	Recovery/ICU	2853	9	317	15	20	0.06	6.3	114	300	0.38
4036	Post Partum 9	Recovery/ICU	2907	9	323	15	20	0.06	6.5	116	300	0.39
4037	Toilet Room	N/A	440	9	49				0.0	0		
4038	Toilet Room	N/A	440	9	49				0.0	0		
4039	Post Partum 8	Recovery/ICU	2916	9	324	15	20	0.06	6.5	117	300	0.39
4040	Post Partum 7	Recovery/ICU	2862	9	318	15	20	0.06	6.4	114	300	0.38
4041	Toilet Room	N/A	424	9	47				0.0	0		
4042	Toilet Room	N/A	440	9	49				0.0	0		
4043	Post Partum 6	Recovery/ICU	2916	9	324	15	20	0.06	6.5	117	300	0.39
4044	Post Partum 5	Recovery/ICU	2664	9	296	15	20	0.06	5.9	107	300	0.36
4045	Toilet Room	N/A	440	9	49				0.0	0		
4046	Toilet Room	N/A	440	9	49				0.0	0		
4047	Post Partum 4	Recovery/ICU	384	9	43	15	20	0.06	0.9	15	300	0.05
4048	Post Partum 3	Recovery/ICU	2601	9	289	15	20	0.06	5.8	104	300	0.35
4049	Toilet Room	N/A	2871	9	319				0.0	0		
4050	Post Partum 2	Recovery/ICU	424	9	47	15	20	0.06	0.9	17	300	0.06
4051	Toilet Room	N/A	3339	9	371				0.0	0		
4052	Toilet Room	N/A	408	9	45				0.0	0		
4053	Post Partum 1	Recovery/ICU	3348	9	372	15	20	0.06	7.4	134	300	0.45
4054	Ante Room	Storage	1053	9	117			0.12	0.0	14		
4055	Linen Storage	Storage	4430	9	492			0.12	0.0	59	355	0.17
4056	B Feed Office	Office	1431	9	159	5	5	0.06	0.8	14	120	0.11
4057	Soiled Utility	Storage	594	9	66			0.12	0.0	8	200	0.04
4058	Equipment Room	Storage	1215	9	135			0.12	0.0	16	250	0.06
4059	Nurse Manager	Office	819	9	91	5	5	0.06	0.5	8	125	0.06
4060	Asst Manager	Office	819	9	91	5	5	0.06	0.5	8	90	0.09
4061	Corridor	Corridor	3730	10	373			0.06	0.0	22	550	0.04

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4062	Toilet Room	N/A	408	9	45				0.0	0		
4063	Post Partum 23	Recovery/ICU	2736	9	304	15	20	0.06	6.1	109	300	0.36
4064	Post Partum 22	Recovery/ICU	2817	9	313	15	20	0.06	6.3	113	300	0.38
4065	Toilet Room	N/A	432	9	48				0.0	0		
4066	Toilet Room	N/A	408	9	45				0.0	0		
4067	Post Partum 21	Recovery/ICU	2682	9	298	15	20	0.06	6.0	107	300	0.36
4068	Post Partum 20	Recovery/ICU	2808	9	312	15	20	0.06	6.2	112	300	0.37
4069	Toilet	N/A	408	9	45				0.0	0		
4070	Toilet	N/A	432	9	48				0.0	0		
4071	Post Partum 19	Recovery/ICU	2781	9	309	15	20	0.06	6.2	111	300	0.37
4072	Post Partum 18	Recovery/ICU	2745	9	305	15	20	0.06	6.1	110	300	0.37
4073	Toilet	N/A	440	9	49				0.0	0		
4074	Toilet	N/A	464	9	52				0.0	0		
4075	Post Partum 17	Recovery/ICU	2772	9	308	15	20	0.06	6.2	111	300	0.37
4076	Post Partum 16	Recovery/ICU	2826	9	314	15	20	0.06	6.3	113	300	0.38
4077	Toilet Room	N/A	432	9	48				0.0	0		
4078	Toilet Room	N/A	408	9	45				0.0	0		
4079	Post Partum 15	Recovery/ICU	2673	9	297	15	20	0.06	5.9	107	300	0.36
4080	Post Partum 14	Recovery/ICU	2781	9	309	15	20	0.06	6.2	111	300	0.37
4081	Toilet Room	N/A	432	9	48				0.0	0		
4082	Toilet Room	N/A	432	9	48				0.0	0		
4083	Post Partum 13	Recovery/ICU	2799	9	311	15	20	0.06	6.2	112	300	0.37
4084A	Corridor	Corridor	2420	10	242			0.06	0.0	15	300	0.05
4084B	Corridor	Corridor	11530	10	1153			0.06	0.0	69	750	0.09
4085	Photo Room	Office	848	9	94	5	5	0.06	0.5	8	95	0.08
4086	Audio Room	Office	744	9	83	5	5	0.06	0.4	7	135	0.05
4087	Nursery	Recovery/ICU	5730	10	573	15	20	0.06	11.5	206	550	0.38
4088	Consultant	Office	1170	9	130	5	5	0.06	0.7	11	95	0.12

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4089	Nurse Station	Office	1700	9	189	5	5	0.06	0.9	16	100	0.16
4090	Nurse Station	Office	1490	9	166	5	5	0.06	0.8	14	125	0.11
4091	Corridor	Corridor	2110	10	211			0.06	0.0	13	350	0.04
4092	Procedure Room	Procedure	1053	9	117	15	20	0.06	2.3	42	350	0.12
4093	Clean Hold	Storage	768	9	85			0.12	0.0	10	280	0.04
4094	ENV Services	Storage	504	9	56			0.12	0.0	7	100	0.07
4095	Soiled Utility	Storage	584	9	65			0.12	0.0	8	110	0.07
4096	Eq. Room	Storage	768	9	85			0.12	0.0	10	100	0.10
4097	Team Room	Conference	2232	9	248	5	50	0.06	12.4	77	175	0.44
4098	Corridor	Corridor	5470	10	547			0.06	0.0	33	350	0.09
4099	Corridor	Corridor	12230	10	1223			0.06	0.0	73	625	0.12
4100	Eq. Room	Storage	1332	9	148			0.12	0.0	18	100	0.18
4101	Soiled Utility	Storage	927	9	103			0.12	0.0	12	110	0.11
4102	Team Room	Conference	1161	9	129	5	50	0.06	6.5	40	175	0.23
4103	Nurse Station	Office	1326	9	147	5	5	0.06	0.7	13	85	0.15
4104	Corridor	Corridor	9160	10	916			0.06	0.0	55	500	0.11
4105	Nour	Storage	648	9	72			0.12	0.0	9	50	0.17
4106	Clean Hold	Storage	4410	9	490			0.12	0.0	59	250	0.24
4107	Nour	Storage	630	9	70			0.12	0.0	8	50	0.17
4108	Nurse Station	Office	1513	9	168	5	5	0.06	0.8	14	250	0.06
4109	Team Room	Conference	1143	9	127	5	50	0.06	6.4	39	175	0.22
4110	Staff TLT/Shower	N/A	488	9	54				0.0	0		
4111	Lockers	Storage	531	9	59			0.12	0.0	7	100	0.07
4112	Staff Lounge	Break Room	1845	9	205	5	25	0.06	5.1	38	250	0.15
4116	Ante Room	Storage	1062	9	118			0.12	0.0	14	75	0.19
4117	Eq. Room	Storage	999	9	111			0.12	0.0	13	75	0.18
4118	Soiled Holding	Storage	104	9	12			0.12	0.0	1	50	0.03
4119	Soiled Holding	Storage	104	9	12			0.12	0.0	1	50	0.03

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4124	ENV Services	Storage	297	9	33			0.12	0.0	4	75	0.05
4130	Toilet Room	N/A	408	9	45				0.0	0		
4131	Post Partum 26	Recovery/ICU	2727	9	303	15	20	0.06	6.1	109	300	0.36
4132	Toilet Room	N/A	408	9	45				0.0	0		
4133	Post Partum 25	Recovery/ICU	2772	9	308	15	20	0.06	6.2	111	300	0.37
4134	Toilet Room	N/A	408	9	45				0.0	0		
4135	Post Partum 24	Recovery/ICU	2718	9	302	15	20	0.06	6.0	109	300	0.36
4137	Storage	Storage	765	9	85			0.12	0.0	10		
5000	Lobby/Waiting	Reception	817	10.5	78	5	30	0.06	2.3	16	350	0.05
5002	Tele/Data	Telephone	878	9	98	5	60	0.06	5.9	35	210	0.17
5003	Trash/Linen	Storage	1260	9	140			0.12	0.0	17	50	0.34
5006	Electrical Room	Electrical	1660	9	184			0.06	0.0	11	250	0.04
5007	Mechanical Room	Storage	11097	9	1233			0.12	0.0	148		
5008	Tele/Data	Telephone	1309	9	145	5	60	0.06	8.7	52	320	0.16
5009	Electrical Room	Electrical	1228	9	136			0.06	0.0	8	250	0.03
5010	Patient Room 28	Patient	3204	9	356	25	10	0.06	3.6	110	330	0.33
5011	Toilet Room	N/A	432	9	48				0.0	0		
5012	Toilet Room	N/A	512	9	57				0.0	0		
5013	Patient Room 29	Patient	2673	9	297	25	10	0.06	3.0	92	270	0.34
5014	Patient Room 30	Patient	2574	9	286	25	10	0.06	2.9	89	260	0.34
5015	Toilet Room	N/A	432	9	48				0.0	0		
5016	Nurse Station	Office	2057	9	229	5	5	0.06	1.1	19	75	0.26
5017	Corridor	Corridor	5620	10	562			0.06	0.0	34	280	0.12
5021	Toilet Room	N/A	408	9	45				0.0	0		
5022	Patient Room 27	Patient	2763	9	307	25	10	0.06	3.1	95	300	0.32
5023	Womens Toilet Room	N/A	520	9	58				0.0	0		
5024	Mens Toilet Room	N/A	585	9	65				0.0	0		

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5025	Closet	N/A	216	9	24				0.0	0		
5026	Security	Office	792	9	88	5	5	0.06	0.4	7	120	0.06
5027	Corridor	Corridor	3720	10	372			0.06	0.0	22	85	0.26
5028	Vending	Corridor	837	9	93			0.06	0.0	6	85	0.07
5030	Toilet Room	N/A	440	9	49				0.0	0		
5031	Patient Room 12	Patient	2925	9	325	25	10	0.06	3.3	101	300	0.34
5032	Patient Room 11	Patient	2853	9	317	25	10	0.06	3.2	98	300	0.33
5033	Toilet Room	N/A	440	9	49				0.0	0		
5034	Toilet Room	N/A	440	9	49				0.0	0		
5035	Patient Room 10	Patient	2853	9	317	25	10	0.06	3.2	98	300	0.33
5036	Patient Room 9	Patient	2907	9	323	25	10	0.06	3.2	100	300	0.33
5037	Toilet Room	N/A	440	9	49				0.0	0		
5038	Toilet Room	N/A	440	9	49				0.0	0		
5039	Patient Room 8	Patient	2916	9	324	25	10	0.06	3.2	100	300	0.33
5040	Patient Room 7	Patient	2862	9	318	25	10	0.06	3.2	99	300	0.33
5041	Toilet Room	N/A	424	9	47				0.0	0		
5042	Toilet Room	N/A	440	9	49				0.0	0		
5043	Patient Room 6	Patient	2916	9	324	25	10	0.06	3.2	100	300	0.33
5044	Patient Room 5	Patient	2664	9	296	25	10	0.06	3.0	92	300	0.31
5045	Toilet Room	N/A	440	9	49				0.0	0		
5046	Toilet Room	N/A	384	9	43				0.0	0		
5047	Patient Room 4	Patient	2601	9	289	25	10	0.06	2.9	90	300	0.30
5048	Patient Room 3	Patient	2871	9	319	25	10	0.06	3.2	99	300	0.33
5049	Toilet Room	N/A	424	9	47				0.0	0		
5050	Patient Room 2	Patient	3339	9	371	25	10	0.06	3.7	115	340	0.34
5051	Toilet Room	N/A	408	9	45				0.0	0		
5052	Toilet Room	N/A	408	9	45				0.0	0		
5053	Patient Room 1	Patient	3348	9	372	25	10	0.06	3.7	115	670	0.17

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5054	Ante Room	Storage	1053	9	117			0.12	0.0	14	185	0.08
5055	Linen Storage	Storage	4430	9	492			0.12	0.0	59	670	0.09
5056	Office	Office	1431	9	159	5	5	0.06	0.8	14	50	0.27
5057	Soiled Utility	Storage	594	9	66			0.12	0.0	8	150	0.05
5058	Equipment Room	Storage	1215	9	135			0.12	0.0	16	150	0.11
5059	Nurse Manager	Office	819	9	91	5	5	0.06	0.5	8	60	0.13
5060	Asst Nurse Manager	Office	819	9	91	5	5	0.06	0.5	8	60	0.13
5061	Corridor	Corridor	3730	10	373			0.06	0.0	22	450	0.05
5062	Toilet Room	N/A	408	9	45				0.0	0		
5063	Patient Room 23	Patient	2736	9	304	25	10	0.06	3.0	94	300	0.31
5064	Patient Room 22	Patient	2817	9	313	25	10	0.06	3.1	97	300	0.32
5065	Toilet Room	N/A	432	9	48				0.0	0		
5066	Toilet Room	N/A	408	9	45				0.0	0		
5067	Patient Room 21	Patient	2682	9	298	25	10	0.06	3.0	92	300	0.31
5068	Patient Room 20	Patient	2808	9	312	25	10	0.06	3.1	97	300	0.32
5069	Toilet Room	N/A	408	9	45				0.0	0		
5070	Toilet Room	N/A	432	9	48				0.0	0		
5071	Patient Room 19	Patient	2781	9	309	25	10	0.06	3.1	96	300	0.32
5072	Patient Room 18	Patient	2745	9	305	25	10	0.06	3.1	95	300	0.32
5073	Toilet Room	N/A	440	9	49				0.0	0		
5074	Toilet Room	N/A	464	9	52				0.0	0		
5075	Patient Room 17	Patient	2772	9	308	25	10	0.06	3.1	95	300	0.32
5076	Patient Room 16	Patient	2826	9	314	25	10	0.06	3.1	97	300	0.32
5077	Toilet Room	N/A	432	9	48				0.0	0		
5078	Toilet Room	N/A	408	9	45				0.0	0		
5079	Patient Room 15	Patient	2673	9	297	25	10	0.06	3.0	92	300	0.31
5080	Patient Room 14	Patient	2781	9	309	25	10	0.06	3.1	96	300	0.32
5081	Toilet Room	N/A	432	9	48				0.0	0		

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5082	Toilet Room	N/A	432	9	48				0.0	0		
5083	Patient Room 13	Patient	2799	9	311	25	10	0.06	3.1	96	570	0.17
5084A	Corridor	Corridor	2420	10	242			0.06	0.0	15	100	0.15
5084B	Corridor	Corridor	11530	10	1153			0.06	0.0	69	300	0.23
5087	Shell Space		5730	9	637			0.12	0.0	76	350	0.22
5088	Consultant	Office	1170	9	130	5	5	0.06	0.7	11	200	0.06
5089	Nurse Station	Office	1700	9	189	5	5	0.06	0.9	16	300	0.05
5094	ENV Services	Storage	504	9	56			0.12	0.0	7	150	0.04
5097	Team Room	Conference	2232	9	248	5	50	0.06	12.4	77	150	0.51
5098	Corridor	Corridor	5470	10	547			0.06	0.0	33	270	0.12
5099	Corridor	Corridor	12230	10	1223			0.06	0.0	73	410	0.18
5100	Equipment Room	Storage	1332	9	148			0.12	0.0	18	60	0.30
5101	Soiled Utility	Storage	927	9	103			0.12	0.0	12	140	0.09
5102	Team Room	Conference	1161	9	129	5	50	0.06	6.5	40	200	0.20
5103	Nurse Station	Office	1326	9	147	5	5	0.06	0.7	13	85	0.15
5104	Corridor	Corridor	9160	10	916			0.06	0.0	55	400	0.14
5105	NOUR	Storage	648	9	72			0.12	0.0	9	150	0.06
5106	Clean Hold	Office	4410	9	490	5	5	0.06	2.5	42	670	0.06
5107	NOUR	Storage	630	9	70			0.12	0.0	8	100	0.08
5108	Nurse Station	Office	1513	9	168	5	5	0.06	0.8	14	95	0.15
5109	Team Room	Conference	1143	9	127	5	50	0.06	6.4	39	100	0.39
5110	Staff TLT/Shower	N/A	488	9	54				0.0	0		
5111	Lockers	Storage	531	9	59			0.12	0.0	7	120	0.06
5112	Staff Lounge	Break Room	1845	9	205	5	25	0.06	5.1	38	225	0.17
5116	Ante Room	Storage	1062	9	118			0.12	0.0	14	185	0.08
5117	Equipment Room	Storage	999	9	111			0.12	0.0	13	100	0.13
5118	Soiled Tray Holding	Storage	104	9	12			0.12	0.0	1	120	0.01
5119	Soiled Tray Holding	Storage	104	9	12			0.12	0.0	1	120	0.01

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5124	ENV Services	Storage	297	9	33			0.12	0.0	4	85	0.05
5130	Toilet Room	N/A	408	9	45				0.0	0		
5131	Patient Room 26	Patient	2727	9	303	25	10	0.06	3.0	94	300	0.31
5132	Toilet Room	N/A	408	9	45				0.0	0		
5133	Patient Room 25	Patient	2772	9	308	25	10	0.06	3.1	95	300	0.32
5134	Toilet Room	N/A	408	9	45				0.0	0		
5135	Patient Room 24	Patient	2718	9	302	25	10	0.06	3.0	94	300	0.31
5137	Storage	Storage	765	9	85			0.12	0.0	10	50	0.20
Totals					65959				548.2		58180	
AHU-3			ft cub.	ft	ft sq.	cfm/occ.	#/1000 sq ft	cfm/ft sq	People	OA CFM		
Room	Room Title	Occupancy	Volume	Ht	Az	Rp	Occ. Density	Ra	Pz	Vbz = Voz	Vpz	Zp
3077	Nurse Station	Office	1098	9	122	5	5	0.06	0.6	10	370	0.03
3142	O.R. 1	OR	4190	10	419	30	20	0.06	8.4	277	500	0.55
3141	O.R. 2	OR	4200	10	420	30	20	0.06	8.4	277	500	0.55
3140	O.R. 3	OR	4200	10	420	30	20	0.06	8.4	277	500	0.55
3131	O.R. 4	OR	4190	10	419	30	20	0.06	8.4	277	500	0.55
3135	O.R. 5	OR	4230	10	423	30	20	0.06	8.5	279	500	0.55
3130	O.R. EQ.	Storage	2870	9	319			0.12	0.0	38	265	0.14
3139	Anesthesia	Patient	1710	10	171	25	10	0.06	1.7	53	180	0.29
3143	Corridor	Corridor	11330	10	1133			0.06	0.0	68	450	0.15
3162	O.R. Storage	Storage	1160	9	129			0.12	0.0	15	220	0.07
Totals					3975				44.3		3985	

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Summary of Ventilation Rate Procedure/ Comparison of nominal outside air vs. required outside air for each AHU

	People	sq. ft	CFM	People	Diversity	CFM OA		CFM OA	CFM
	P_z	A_z	V_{pz}	P_s	D	V_{ou}	E_v	V_{ot}	Minimum OA Scheduled
AHU 1	548	65959	58180	350	0.639	8930	0.6	14883	33686
AHU 2	335	46199	34010	227	0.678	5073	0.6	8455	22580
AHU 3	44.3	3975	3985	35	0.790	1297	0.6	2162	3026