TECHNICAL REPORT 1:

ASHRAE Standard 62.1 Ventilation and Standard 90.1 Energy Design Evaluations

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INOVA South Patient Tower
Falls Church, VA
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Executive Summary

The South Patient Tower is a 233,000 square foot addition to the INOVA Fairfax Hospital located in Falls Church, VA. The building is currently under construction and is scheduled to be completed in the summer of 2012. The thirteen (13) story tower is designed primarily as a patient bed-tower to add more rooms to the existing hospital.

This document includes all the research, documentation and data collected from the South Patient Tower design for analysis with ASHRAE Standards 62.1 and 90.1. These standards specifically relate to the building's mechanical systems and energy consumption. The mechanical system being analyzed is a combined air-handler system with constant volume air boxes to serve the various zones in the building.

After researching the current design of the South Patient Tower, it is apparent that the building complies with ASHRAE 62.1 Section 5 with regards to the mechanical system design layout, construction practices, and guidelines relating to installation being met or exceeded. When calculations were made for the ventilation rates of outdoor air, it was found that not all the spaces in the South Patient Tower complied with the requirements of the standard. Various spaces such as storage rooms, janitor closets, equipment rooms, and electrical closets do not meet ventilation standards due to the use of transfer air to supply these spaces. The system as a whole, however, complied with the requirements of the standard. The system supplies more than the required minimum outdoor air to improve the indoor air quality and provide a healthier healing environment for the patients.

The South Patient Tower as a whole was found to be compliant with ASHRAE Standard 90.1 with a few minor exceptions. These exceptions include the fan power and pump efficiencies not meeting the minimum requirements of the standard. The fans not in compliance were found to be the air-handler supply and return fans which are purposely oversized. The pumps were sized for redundancy, so do not see very high efficiency values. These non-compliances are discussed further later in this report.

In general, the South Patient Tower systems comply with ASHRAE Standard 62.1 and 90.1. Individual spaces and components do not meet the standards but were purposely designed to promote a healthier environment and continuous operation of the building systems. Information on the building and a mechanical summary has also been included on the following pages in order to further discuss the design of the South Patient Tower.

Introduction

Building Information

The South Patient Tower is located on the INOVA Fairfax Hospital campus in Falls Church, Virginia. The tower is a 236,000 SF, thirteen (13) story (12 above grade and 1 below) hospital patient bed tower that expands the existing hospital patient building. The project was contracted under a single prime with negotiated lump-sum contract valued around $76 million overall project cost and delivered via a design-bid-build method.

Project Team

Owner:	INOVA Health System
Architect:	Wilmot/Sanz Inc.
General Contractor:	Turner Construction Company
Structural Engineer:	Cagley & Associates
Mechanical Engineer:	RMF Engineering, Inc.
Electrical Engineer:	RMF Engineering, Inc.
Civil Engineer:	Dewberry & Davis

Architecture

The South Patient Tower was designed to complement and respect the recent Heart Institute to the building's west, while maintaining an architectural style that is consistent with the rest of the INOVA Fairfax Hospital Campus. The building can be broken into two distinctive architectural parts; the lower four floors (podium) and the upper nine floors (tower). The podium section of the building hosts the entrance lobby, cafeteria, kitchen, services, offices and ultrasound exam rooms while the tower is strictly for patient bedrooms. A two floored atrium is used for the entrance lobby and has a circular fountain located on the ground level. The mechanical systems are located on the fifth floor due to a trauma helicopter pad located on the roof of the tower.

Building Façade

The façade of the tower is made up of a curtain wall system. This curtain wall consists of three elements that help to respect the existing patient bed tower while mirroring the newer Heart Institute's façade style. Precast concrete panels, aluminum curtain wall with glazing and metal panels all work together to create this building's façade. There are two varieties of precast concrete panels.

One is a panel formed into thin brick laid in soldier courses and help to tie the building into the older all brick patient tower, and the other is a basic precast panel in the center of each elevation and on the façade of the podium level. The aluminum curtain wall with glazing helps to provide ample amounts of daylight for the interior patient rooms and other interior spaces. Metal panels are used to continue to look of the building but help to hide some of the interior elements such as columns or the mechanical fifth floor.

Zoning

The INOVA South Patient Tower is located in Fairfax County, Virginia and falls under the *I, Merrifield Suburban Center, Land Unit M, Sub-Unit M1* planning area and district. Innovative energy efficiency and conservation strategies should be incorporated into all new buildings in this district. A setback of 100 feet on the western boundary of the district and a maximum height of 165 feet are requirements within Sub-Unit M1.

Roofing

The roofing for the South Patient Tower consists of a similar base of a 9-1/2" reinforced concrete slab, insulation, and a 4" light-weight concrete topping for the three types of roofing materials on the project. These materials include; polyvinyl-chloride (PVC), a fluid-applied protected membrane, and a vegetated roof system. The lower podium roof consists of both the vegetated roof system and the fluid-applied protected membrane, while the higher tower roof is made of the polyvinyl-chloride (PVC) material.

Sustainability

The INOVA Hospital South Patient Tower is pursuing LEED Silver certification which exceeds the zoning requirement to be LEED Certified. This project has an energy reduction goal of at least 24.5% based on a database of similar buildings. Some aspects to help the project reach this goal include a vegetated green roof covering most of the low podium roof, a white reflective PVC roofing material on the upper tower roofs, water efficient landscaping using no potable water, automatic sensors on sinks and dual flush valves on toilets, recycled and local materials and community connectivity by building a new bus stop for the hospital

Mechanical Systems Overview

The INOVA hospital campus has its own existing central utility plant and campus loop for steam and chilled water. The chilled water enters the basement of the tower through two 24" lines and goes directly to the fifth floor mechanical room and low podium roof to serve the air-handling units. The fifth floor mechanical room houses the tower's main air handling equipment and building's return and exhaust fans. The return is combined in a return air plenum and supplied back to the various air-handlers for mixing with outdoor air. A majority of the tower is served from four (4) 50,000 CFM air handlers coupled together that feed into various risers that serve upper and lower floors. The kitchen is served from two (2) air handlers on the western roof of the second floor. These air handlers are 10,000 CFM and 13,000 CFM respectively. The 10,000 CFM air-handler provides make-up air for the exhaust hoods located in the kitchen and the 13,000 CFM air-handler serving the ventilation and supply air for the space. Heating is provided by three (3) steam to heating hot water heat exchangers located in the basement of the tower. These heat exchangers are sized for 715 gallons per minute and provide hot water directly to three (3) 715 GPM pumps that each provide 60 feet of head to serve the air handler heating coils. The distribution throughout the building will be served by constant air volume (CAV) units with the boxes that serve the perimeter patient rooms equipped with hot water reheat coils.

ASHRAE Standard 62.1 Compliance Analysis

The following is a compliance analysis of INOVA South Patient Tower with ASHRAE Standard 62.1-2007. The analysis focuses on Section 5: Systems and Equipment and the Section 6: Ventilation Rate Procedure.

Section 5: Systems and Equipment

Note: ASHRAE Standard 170: Ventilation for Health Care Facilities has its own guidelines that must comply with all of Section 6 as well as the guidelines of Section 5 of Standard 62.1. It has been noted throughout where Standard 170 supersedes the Section 5 guideline.

5.1 Natural Ventilation

The South Patient Tower provides ventilation by means of mechanical ventilation and has no operable windows; therefore, natural ventilation does not apply.

5.2 Ventilation Air Distribution

The air distribution system has been designed to maintain at least the minimum required ventilation airflow as calculated from Section 6 of Standard 62.1 and Section 7 of Standard 170 under any load condition. A plenum system is not used for this building, but instead a ducted supply and return so providing minimum air to the space should not be a problem.

5.3 Exhaust Duct Location

The building exhaust mainly consists of toilet exhaust from the patient rooms and is sealed and negatively pressurized compared to the corridor in which the main duct branch runs until it reaches the exhaust shaft located in the mechanical shaft locations in the North and South of the building. The kitchen on the first floor of the building has its own dedicated exhaust which is routed up to the western low second floor roof. This exhaust duct runs through the ceiling of the cafeteria area but is pressurized and sealed such that no leakage will occur in the surrounding space.

5.4 Ventilation System Controls

Ventilation in the South Patient Tower is controlled by constant air volume units throughout the building to serve the various zones. The hospital this tower serves is a level 1 trauma center and is

therefore rarely fully unoccupied. When certain zones are unoccupied, however, the air handlers are equipped to provide minimum ventilation as required by Section 6 of ASHRAE Standard 62.1 and Section 7 of ASHRAE Standard 170 as necessary.

5.5 Airstream Surfaces

All ductwork in the South Patient Tower is constructed of prime, first quality galvanized steel with gauges referred to by the SMACNA Duct Manual "HVAC Duct Construction Standards." The ductwork is also construction to resist erosion and mold growth as required in Section 5.5.

5.6 Outdoor Air Intakes (Section 6.3.1 in Standard 170)

The air-handling units are all located on the fifth floor mechanical space with the outdoor air intakes being louvers on the façade of the building on the West, South and East sides of the tower which exceeds the recommendation of Section 6.3.1 to be a minimum of 6 ft. above grade. All the exhaust locations exceed the required distances called out in Section 6.3.1 of 25 ft. minimum, as they are either located on the roof of the building (>66 ft. away) or on the roof of the second floor (>33ft. away). All outdoor air intakes are designed to limit or restrict rain and snow entrainment and are constructed with appropriate bird screens as necessary as required by Section 5.6.

5.7 Local Capture of Contaminants

A majority of the equipment in the tower has been designed for discharging indoors and presents minimal levels of contaminants to the occupants. An exception is the kitchen equipment which is provided with dedicated exhaust systems to help eliminate all contaminants from entering the main building system.

5.8 Combustion

Due to the campus central plant, the building is heated with steam service from the plant and has no onsite combustion for mechanical systems. Any combustion that occurs in the kitchen is captured and vented to the environment. Significant air is provided to facilitate the necessary combustion in the kitchen equipment.

5.9 Particulate Matter Removal (Section 6.4 ASHRAE Standard 170)

The filters in the mechanical systems of the patient tower have two filter banks with minimum efficiencies in accordance with the noted section of ASHRAE Standard 170 Section 6.4. *Figure 1* below

shows the minimum efficiencies required. The air-handlers have a filter bank located prior to the heating and cooling coils to provide filtration of the mixed air that are MERV-8 and a second filter bank located downstream of all the supply fan to provide an extra filtration level that are MERV-15. The filtration meets the guidelines of Section 6.4.

TABLE 6-1 Minimum Filter Efficiencies

Space Designation (According to Function)	Filter Bank Number 1 (MERV)[a]	Filter Bank Number 2 (MERV)[a]
Classes B and C surgery; inpatient and ambulatory diagnostic and therapeutic radiology; inpatient delivery and recovery spaces	7	14
Inpatient care, treatment, and diagnosis, and those spaces providing direct service or clean supplies and clean processing (except as noted below); All (rooms)	7	14
Protective environment rooms (PE)	7	17 (HEPA)[c]
Laboratories; Class A surgery and associated semi-restricted spaces	13[b]	N/R*
Administrative; bulk storage; soiled holding spaces; food preparation spaces; and laundries	7	N/R
All other outpatient spaces	7	N/R
Skilled nursing facilities	7	N/R

* NR = not required
Note a: The minimum efficiency reporting value (MERV) is based on the method of testing described in *ANSI/ASHRAE Standard 52.2-2007, Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size* (see Informative Annex B: Bibliography).
Note b: Additional prefilters may be used to reduce maintenance for filters with efficiencies higher than MERV 7.
Note c: Filter Bank No. 2 may be a MERV 14 if a MERV 17 tertiary terminal filter is provided for these spaces.

Figure 1: ASHRAE Standard 170 Table 6-1

5.10 Dehumidification Systems

Due to the variety of spaces in the building, the relative humidity for both summer and winter depends of the space type. *Table 1* shows the design relative humidity values for the various spaces. All the humidity levels in the summer are below the 65% guideline in Section 5.10. The minimum relative humidity seen in the winter design is at least 35% which meets the guideline. Exfiltration is met with the outside air intake airflow being greater than the exhaust airflow when humidification is occurring.

Program Space	Summer	Winter
Café	72°F DB/ 50% RH	72°F DB/ 50% RH
Support Services	72°F DB/ 50% RH	72°F DB/ 50% RH
Imaging	72°F DB/ 50% RH	72°F DB/ 50% RH
Waiting Rooms	72°F DB/ 50% RH	72°F DB/ 50% RH
Administration	72°F DB/ 50% RH	72°F DB/ 50% RH
Volunteers	72°F DB/ 50% RH	72°F DB/ 50% RH
Registration	72°F DB/ 50% RH	72°F DB/ 50% RH
Conference Room	72°F DB/ 50% RH	75°F DB/ 35% RH
Patient Rooms	72°F DB/ 45-55% RH	75°F DB/ 45-55% RH

Table 1: Space Design Conditions

5.11 Drain Pans

Drain pans for all the cooling coils in the building are specified to be constructed with sixteen (16) gauge stainless steel, a two (2) inch lip and corners that are welded water tight. They are designed as double pitched with a minimum pitch of one (1) inch from the high point to drain outlet connection (lowest point). The pans are sized to handle the normal amount of condensate that the individual coil produces under normal operation. The one (1) inch pitch of the drain pans exceeds the guideline of Section 5.11 of one-eighth (1/8) inch pitch.

5.12 Finned-Tube Coils and Heat Exchangers

The finned-tube coils used for cooling and dehumidification in the air-handlers are equipped with an appropriately sized drain pan and meet the minimum adequate intervening space of eighteen (18) inches.

5.13 Humidifiers and Water-Spray Systems (Section 6.6 in Standard 170)

A steam humidifier is used in the air-handlers serving the major of the tower. The steam is provided by the campus central plant and uses a potable water source. All obstructions are located greater than the absorption distance recommended by the manufacturers.

5.14 Access for Inspection, Cleaning and Maintenance

The equipment is placed such that there is sufficient area for access of inspection, cleaning and maintenance. All of the air-handlers are built with appropriate access doors to replace internal parts including: coils, filters, and fans. Due to the drop ceiling in a majority of the hospital, access is easily gained to equipment such as fan coil units and constant air volume units located in the ceiling space.

5.15 Building Envelope and Interior Surfaces

The building envelope is designed such that water will be prevented from entering the building through the exterior wall. Joints and seams are sealed or caulked to limit the amount of liquid penetration. Insulation with a vapor barrier has been placed in the exterior wall cavity to eliminate condensation in the cavity. All the supply ducts and pipes with chilled water which may reach a temperature below the dew point have been properly insulated to prevent condensation build up on the exterior surfaces of the duct and pipe.

5.16 Buildings with Attached Parking Garages

The patient tower is an addition to an existing hospital campus and does not have an attached parking garage; therefore limiting the amount of vehicle exhaust associated with a garage is not necessary for this project.

5.17 Air Classification and Recirculation

Air can be classified in the patient tower according to Table 5-2 or Table 6-1 in Standard 62.1. Due to the nature of the tower being primarily a bed-tower, the air can be classified as Class 1 and recirculated except in the bathrooms (Class 2) and kitchen areas (Class 3 and Class 4). For those classes above Class 1, they are directly exhausted to the outdoor environment and avoid all reuse. The recirculation of air is done with Class 1 air only.

5.18 Requirements for Buildings Containing ETS Areas and ETS-Free Areas

Since this building is a hospital, it is legally a smoke-free environment. A requirement to have smoking areas a minimum of 25 ft. from any building entrance, including outdoor air louvers, along with the exhaust vents being far away from the intake of the air-handlers, there should be very minimal issues with indoor air quality related to ETS.

Section 6: Ventilation Rate Procedure

Due to the South Patient Tower being primarily a patient bed tower, ASHRAE Standard 170 had to be consulted for applicable air change rates to provide a more accurate minimum rate of ventilation. Standard 170 only affects the Patient Rooms and Corridors of the tower. These numbers have been taken into account in the calculation procedure.

The Ventilation Rate Procedure prescribed by Section 6 of ASHRAE 62.1 was used for analysis of compliance due to the outside air being deemed acceptable due to its compliance with ASHRAE 62.1 Section 4.1. This procedure determines minimum ventilation airflow rates based on space type/application, occupancy level, and floor area. (Incorporating ASHRAE Standard 170 also takes into account the ceiling height of the space considered).

The tower is served by a combined system made up of AHU-1, 2, 3, and 4. These primarily serve all of the zones within the building, with the exception of the kitchen area. AHU-5 and AHU-6 provide the necessary ventilation to the kitchen space with AHU-5 being strictly used for kitchen hood make up air. Since AHU-1, 2, 3 and 4 serve the majority of the tower, and AHU-6 serves the kitchen, these five AHU's have been evaluated. AHU-5 was not evaluated since it provides only 100% make up air to the kitchen hoods.

Breathing Zone Outdoor Airflow

The *Breathing Zone Outdoor Airflow* was determined in accordance with Equation 6-1.

$$V_{bz} = R_p \cdot P_z + R_a \cdot A_z \qquad (6\text{-}1)$$

A_z = *zone floor area:* the net occupiable floor area of the zone (ft^2)

P_z = *zone population:* these values were estimated from the occupant densities in Table 6-1 of ASHRAE 62.1 Section 6.

R_p = outdoor airflow rate required per person as determined by Table 6-1.

R_a= outdoor airflow rate required per unit area as determined by Table 6-1.

Zone Air Distribution Effectiveness

The zone air distribution effectiveness (E_z) has been determined from Table 6-2 as a Ceiling supply of cool air in the interior zones, and a Ceiling supply of warm air and ceiling return for the exterior zones that require some reheat.

E_z = 1.0 (Interior Zones)

E_z = 0.8 (Exterior Zones)

Zone Outdoor Airflow

The outdoor airflow that must be provided to the zone by the supply air distribution system, is how the zone outdoor airflow is defined. Equation 6-2 determines the amount of outdoor air required.

$$V_{oz} = V_{bz} / E_z \quad \text{(Equation 6-2)}$$

Primary Outdoor Air Fraction

$$Z_p = V_{oz} / V_{pz} \quad \text{(Equation 6-5)}$$

Z_p = zone primary outdoor airflow
V_{pz} = zone primary airflow (includes outdoor air and recirculated air)

Uncorrected Outdoor Air Intake

$$V_{ou} = D\Sigma_{\text{all zones}}(R_p \times P_z) + \Sigma_{\text{all zones}}(R_a \times A_z) \quad \text{(Equation 6-6)}$$

$$D = P_s / \Sigma_{\text{all zones}} P_z \quad \text{(Equation 6-7)}$$

Outdoor Air Intake

$$V_{ot} = V_{ou} / E_v \quad \text{(Equation 6-8)}$$

This equation holds for AHU-6 whose max Z_p is 0.33 which corresponds with a value of E_v = 0.8 from Table 6-3.

Alternative Procedure to Determine E_v

Since the maximum E_v value was >0.55 for AHU-1, 2, 3, and 4, Appendix A was referenced for an E_v value.

$$E_v = \text{minimum } (E_{vz}) \quad \text{(Equation A-3)}$$

$$E_{vz} = 1 + X_s - Z_d \qquad \text{(Equation A-1)}$$

X_s = fraction of outdoor air intake flow in system primary airflow ($X_s = V_{ou} / V_{ps}$)
Z_d = outdoor air fraction required in air discharged to zone ($Z_d = V_{oz} / V_{dz}$)
V_{dz} = expected supply airflow to zone, includes primary and locally recirculated airflow
V_{ps} = total primary airflow supplied to all zones by the system ($V_{ps} = \Sigma V_{pz}$)

Assumptions for Calculations

To provide a comparison calculation, assumptions were made to the zone type, occupancy, and effectiveness. As previously stated the effectiveness (E_z), was determined by the zone being an interior zone or an exterior zone that required reheat. These values were taken from Table 6-2 in Section 6.

Two calculations were performed to compare ASHRAE Standard 62.1 and ASHRAE Standard 170. The resulting maximum ventilation airflow required from the two calculations provided the minimum required ventilation for the zone. Only two spaces were included in both standards, the patient rooms and corridors. *Table 2* shows the ASHRAE 62.1 calculation assumptions, while *Table 3* shows the ASHRAE 170 calculation assumptions.

CATEGORY	DENSITY (#/1000)	CFM/PERSON	CFM/AREA
Break Rooms	25	5	0.06
Conference/Meeting	50	5	0.06
Corridors	-	-	0.06
Storage Rooms	-	-	0.12
Bedroom/Living Room	10	5	0.06
Office Space	5	5	0.06
Electrical Equipment	-	-	0.06
Elevator Machine Room	-	-	0.12

Table 2: ASHRAE 62.1 Calculation Assumptions

FUNCTION	MINIMUM OA AC/H
Patient Rooms	2
Corridor	2

Table 3: ASHRAE 170 Calculation Assumptions

ASHRAE Standard 62.1-2007 Conclusions

After analyzing the ventilation system of the INOVA South Patient Tower, it has been determined that not all spaces meet the minimum ventilation requirements set by ASHRAE 62.1. The spaces that do not meet the minimum ventilation are storage areas, janitor closets, electrical closets, and equipment rooms. Typically these spaces are not supplied with air, but rather have air transferred from adjoining spaces. Due to this they are not provided with any supply air in the current design.

The South Patient Tower is mainly supplied by AHU-1, 2, 3, and 4, which are coupled together to help serve the loads of the spaces. The maximum Z_p value for the zones served by these air-handlers was found to be 0.99 in the basement. There were other spaces, however over the 0.55 limit of Table 6-3 so even if this zone was not included, the method provided in Appendix A would still need to be exercised. After following the method outlined, it was found that the E_v for AHU-1, 2, 3 and 4 would be 0.77. The uncorrected outdoor airflow for each of these air-handlers was calculated as 9,600 CFM and taking into account the 0.77 efficiency, the adjusted outdoor airflow intake for each was found to be 12,468 CFM. The kitchen is served exclusively by AHU-6. The maximum Z_p value found for the zones that AHU-6 serves was 0.33. From Table 6-3, the efficiency value (E_v) was found to be 0.8. The uncorrected outdoor airflow for AHU-6 was calculated as 2,270 CFM and when the efficiency is taken into account, the adjusted outdoor intake airflow was calculated as 2,838 CFM.

AHU-1, 2, 3, and 4 each are designed to handle a supply of 50,000 CFM with a designed outdoor airflow of 20,000 CFM. The adjusted outdoor airflow minimum of 12,468 CFM is below the design and shows that these air-handlers exceed the standard and thus comply. AHU-6 was selected to handle a supply of 13,000 CFM with an outdoor airflow of 5,000 CFM. The adjusted outdoor airflow minimum of 2,838 CFM is below the design, so AHU-6 complies with Section 6. When combined in viewing the whole building, the designed airflow was found to be 223,000 CFM with a design outdoor airflow of 95,000 CFM. Calculating the minimum outdoor airflow for the building as a whole, it was found that 62,708 CFM was required. This is well below the design value and thus the systems comply with ASHRAE 62.1 Section 6. *Table 4* provides a summary of the design supply and outdoor airflow, efficiency, and comparison to the calculated minimums.

Unit	Area(s) Served	Supply Airflow	Outdoor Airflow	Uncorrected OA	System Efficiency	Minimum OA	Comply Y/N?
AHU-1	Tower	50,000	20,000	9,600	0.77	12,468	Y
AHU-2	Tower	50,000	20,000	9,600	0.77	12,468	Y
AHU-3	Tower	50,000	20,000	9,600	0.77	12,468	Y
AHU-4	Tower	50,000	20,000	9,600	0.77	12,468	Y
AHU-5	Hood MAU	10,000	10,000	-	-	10,000	Y
AHU-6	Kitchen	13,000	5,000	2,270	0.80	2,838	Y
TOTALS		**223,000**	**95,000**			**62,708**	**Y**

Table 4: **Summary Chart of Compliance with ASHRAE 62.1 Section 6**

It can be seen that the designer upsized the equipment for the South Patient Tower. They met the minimum required ventilation airflows and, in fact, exceeded them for the systems. This can be attributed to designer's factors of safety in the calculations, as well as the requirement for there to be redundancy in the hospital so that it may operate 24 hours a day. They also designed in excess of the outdoor airflow required to provide the best possible quality of air for the patients that will be occupying the bed tower.

*All supporting calculations can be found in Appendix B.

ASHRAE Standard 90.1 Compliance Analysis

The following is the compliance analysis of INOVA South Patient Tower in regard to ASHRAE Standard 90.1 – 2007. The analysis has been done on a variety of systems including, but not limited to the building envelope, HVAC systems, service hot water heating, power, and lighting.

Section 5: Building Envelope

5.4.1 Climate

The INOVA South Patient Tower is located in Falls Church, VA which corresponds to climate zone 4A. This climate zone was determined by Table B-1 of ASHRAE Standard 90.1-2007 or by viewing the *Figure 2* below.

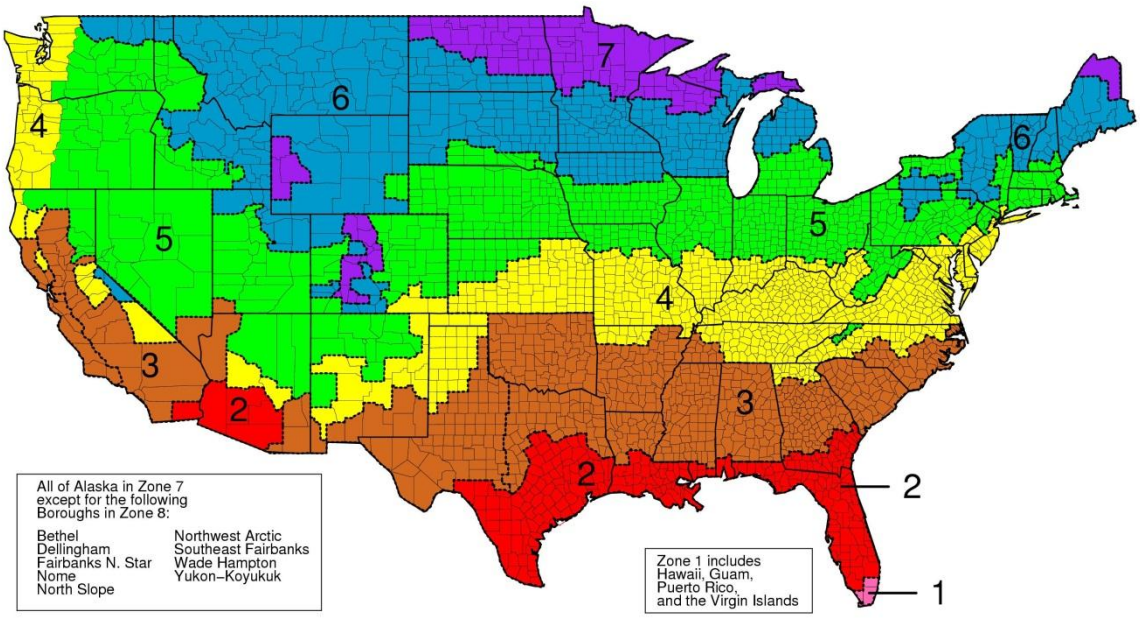

Figure 2: **United States Climate Zones**

5.4 Mandatory Provisions

The exterior of the South Patient Tower is scheduled and noted on the drawings to be sealed at all penetrations, e.g. windows, doors, etc. This is to help prevent infiltration of the unconditioned air into the space and the creation of an unhealthy environment for the hospital patients.

The entrance to the tower is located on the south wall of the ground floor. This will serve as the main entrance for the building from the outside. The doors of the vestibule will be able to be opened and closed at different times due to the in between spacing being approximately 15 feet. This exceeds the recommendation of a minimum of 7 feet between doors.

5.5 Prescriptive Building Envelope Option

To comply with Standard 90.1-2007, the South Patient Tower's envelope should meet the assembly minimum U-values, insulation R-values, F-values and SHGC. Along with meeting these requirements the South Patient Tower should not exceed a 40% fenestration to wall ratio area ratio to be compliant with Section 5 of ASHRAE Standard 90.1.

The South Patient Tower complies with Standard 90.1 due to having around a 38% fenestration to wall area ratio. This went against my prediction due to the large expanses of glass on the lower level lobbies that create an open welcoming area for visitors to the hospital. Also it was a big concern of the architect to include enough day-lighting in the patient bedrooms as it has been seen to help improve the healing process. *Table 5* below shows the breakdown of areas.

Fenestration Area (ft^2)	Wall Area (ft^2)	Percent Glazing	Standard 90.1 Compliance (Y/N)
22,449	59,119	37.97%	**Y**

Table 5: **Summary of Envelope Areas**

For the building to comply with ASHRAE 90.1 Section 5, the building envelope materials must perform equal to or better than the prescribed nonresidential assembly maximum values and minimum insulation. The elements considered were the roof, above and below grade walls, slab-on-grade floor, metal windows, and metal framed curtain walls. *Table 6 and Table 7* below show the summary of the design values of each material compared to the prescribed values. All of the elements met or exceeded the requirements of the Standard, so the South Patient Tower complies with the requirements and recommendations of ASHRAE Standard 90.1 Section 5.

Fenestration	Prescribed Nonresidential		As Designed		Standard 90.1 Compliance (Y/N)
	Maximum U-Value	Maximum SHGC	Maximum U-Value	Maximum SHGC	
Metal Windows	U-0.40	SHGC-0.40	U-0.29	SHGC-0.36	Y
Metal Framing (Curtain Wall)	U-0.50	SHGC-0.40	U-0.29	SHGC-0.36	Y

Table 6: **Fenestration Compliance with Table 5.5-4 Requirements**

Exterior Materials		Prescribed Nonresidential		As Designed		Standard 90.1 Compliance (Y/N)
Element	Element Construction	Assembly Maximum	Insulation Minimum	Assembly U-Value	Insulation R-Value	
Roof	Insulation Above Deck	U-0.048	R-20.0 c.i.	U-0.024	R-41.7	Y
Walls, Above Grade	Steel Framed	U-0.064	R-13.0 + R-7.5 c.i.	U-0.043	R-23.3	Y
Walls, Below Grade	Mass	C-1.140	NR	C-0.80*	NR	Y
Slab-On-Grade Floors	Unheated	F-0.730	NR	F-0.490*	NR	Y

*Calculated Values

Table 7: **Material Compliance with Table 5.5-4 Requirements**

Section 6: Heating, Ventilation and Air Conditioning

6.2 Compliance Path

To achieve compliance with Section 6 of ASHRAE Standard 90.1-2007, there are two methods; the Simplified Approach Method and the Mandatory Provisions. The Simplified Approach Method is only valid for buildings that are two floors or fewer in height and have a maximum of 25,000 ft^2 of gross floor area. The South Patient Tower is not only thirteen (13) stories tall, but far exceeds 25,000 ft^2 . Due to this the Mandatory Provisions approach was analyzed for compliance.

6.4 Mandatory Provisions

Due to currently being constructed, the South Patient Tower does not have any data related to the commissioning and verification process that will follow the construction and occupancy of the building. All the patient rooms will be individually controlled to provide the best conditions for healing, with each room receiving reheat when necessary to control the room temperature. The interior spaces are controlled by common thermostats, with the nurse's station and medical areas being zoned together and the waiting rooms and lobbies being zoned together on each floor. These zones are kept smaller for better set point control throughout the building.

All air intake and exhaust dampers throughout the South Patient Tower are equipped with motorized dampers for control of airflow in various stages of operation. Stairwells are equipped with

pressurization systems in the event of smoke contamination or fire in the building and will be activated if such an event occurs to provide safe travel to the outdoors.

AHU-1 thru AHU-4 and AHU-6 are equipped with variable frequency drives to help control the startup and staging, and to provide continuous operation for the tower. The make-up air unit for the fume hoods operates according to a kitchen operation schedule and provides continuous air throughout the day, so it is not equipped with a variable frequency drive.

All supply and return duct work and piping are insulated throughout the building. Duct work and piping are typically run through the ceiling plenum throughout the hospital and this is considered by ASHRAE an unconditioned space. Chilled water pipe insulation varies from 1" for 6 inch pipe or less, to 1-1/2" for above 6 inch pipe. Domestic Hot Water piping insulation is provides are 1" for the entire system. The preheat and reheat piping is insulated with 1" for 2 inch pipe or less, and 1-1/2" for greater than 2 inch piping. All supply duct work is insulated with 2" of fiberglass blanket type insulation, and all return duct work is insulated with 1"-2" fiberglass insulation.

Duct seam and joint seals are specified per the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) and are being provided to comply with ASHRAE Standard 90.1.

6.5 Prescriptive Path

The South Patient Tower is located in climate zone 4a per the ASHRAE Standard 90.1 climate chart; therefore the air-handlers for the building do not require an economizer to be put in place in the system. Building pressurization relief is provided via the fifth floor mechanical space with relief dampers on the exterior.

Fan Power was calculated and analyzed for compliance by using the motor horsepower in accordance with Option 1 of Section 6.5.3.1.1 and using the standard's maximum value of hp< CFM*0.0011. The results for each fan in the South Patient Tower can be seen below in *Table 8.* As seen, most of the supply and return fans for the AHU's do not comply with Standard 90.1. This is due to the air-handlers being coupled together in the system. If one AHU is taken off-line, the other AHU's can handle a portion of the necessary load to the space. The return fans are located in the return air plenum but needed to be oversized to help overcome the large pressure drop created by the HEPA filters placed on the return lines.

Unit	HP	CFM	CFM*0.011	Compliance?
AHU-1 Supply	125	50,000	55	N
AHU-2 Supply	125	50,000	55	N
AHU-3 Supply	125	50,000	55	N
AHU-4 Supply	125	50,000	55	N
AHU-5 Supply	15	10,000	11	N
AHU-6 Supply	25	13,000	14	N
SPF-1	7.5	10,000	11	Y
GEF-1	5	4,500	5	Y
EF-1	5	6,300	7	Y
EF-2	5	6,300	7	Y
EF-3	2	3,150	3.5	Y
EF-4	2	3,150	3.5	Y
EF-5	1	1,500	2	Y
EF-6	0.25	890	1	Y
TB-1	15	12,600	14	N
VF-1	7.5	40,000	44	Y
RF-1	50	30,000	33	N
RF-2	50	30,000	33	N
RF-3	50	30,000	33	N
RF-4	50	30,000	33	N
RF-5	50	30,000	33	N
RF-6	50	30,000	33	N
RF-6a	7.5	8,000	8.8	Y
KEF-1	5	6,800	7.5	Y
KEF-2	2	2,700	3	N

***Table 8*: Summary of ASHRAE 90.1 Fan Compliance**

6.7 Submittals

All HVAC systems are specified to be commissioned and tested upon installation to ensure that control devices are adjusted correctly, calibrated, and performing as they were designed. The proper documentation will be provided when the tests are completed for review of performance.

Section 7: Service Water Heating

The South Patient Tower has no combustion equipment for creating hot water. Since this is an addition to the existing hospital campus, hot water for the air-handlers, reheat coils, perimeter heaters and additional devices is provided from heat exchangers in the basement from the high pressure steam produced at the existing central utility plant. The generator and kitchen equipment provide the only combustion devices in the building but do not support the creation of hot water.

Section 8: Power

The South Patient Tower is specified to comply with the National Electric Code (NEC), which states that the maximum voltage drop on feeders is 2% and a maximum branch voltage drop of 3% at design conditions. Since it is to comply with the NEC maximums, the tower complies completely with ASHRAE Standard 90.1 Section 8.

Section 9: Lighting

9.2 Compliance Path

To comply with Section 9 of ASHRAE Standard 90.1, there are two paths that can be taken. The Building Area Method looks at the total lighting power in the building divided by the total building area to get a value to compare with the ASHRAE value for that building type. The Building Area Method will be used for this compliance analysis.

9.5 Building Area Method

The South Patient Tower falls under the Hospital category from Table 9.5.1 in Section 9. This means that the entire building must fall under the 1.2 W/sq. ft. value as prescribed by ASHRAE 90.1. The analysis can be summarized in *Table 9* below, which provides the type of fixture, where those fixtures are located, and the total wattage for the building.

Fixture	B	G	1	2	3	4	5	6	7	8	9	10	11	W/fix.	Total
A	22	-	-	3	3	3	22	3	3	3	3	3	3	96	6816
L	-	-	32	-	-	-	-	-	-	-	-	-	-	55	1,760
M	-	10	-	-	11	10	-	45	16	46	47	47	47	52	14,508
N	-	42	6	6	25	23	-	11	25	11	11	11	11	120	21,840
Q	-	-	-	-	18	18	-	22	18	22	22	22	22	240	39,360
R	-	-	-	-	-	-	-	4	-	3	2	2	2	96	1,248
S	-	-	-	-	18	18	-	22	1	22	22	22	22	26	3,822
T	-	-	20	-	-	-	-	-	-	-	-	-	-	18	360
U	-	-	-	-	73	74	-	94	62	95	95	95	95	26	17,758
V	-	-	-	-	8	9	-	6	11	7	8	8	8	64	4,160
W	-	4	49	-	-	-	-	-	-	-	-	-	-	28	1,484
Y	-	-	-	-	18	18	-	22	1	22	22	22	22	26	3,822
Z	-	-	-	-	-	-	-	4	-	-	-	-	-	5	20
AA	-	-	-	-	8	7	-	14	8	14	14	14	14	32	2,976
BB	-	6	-	-	29	30	-	2	31	2	2	2	2	80	8,480
CC	-	-	10	-	-	-	-	20	-	20	20	20	20	62	6,820

EE	-	-	-	-	-	-	-	2	-	-	2	2	2	32	256
FF	-	-	-	-	-	-	-	2	-	-	2	2	2	32	256
GG	-	-	-	-	12	14	-	19	14	16	16	16	16	32	3,936
HH	-	-	-	-	-	-	-	2	-	2	2	2	2	32	320
JJ	-	-	-	-	-	-	-	2	-	2	2	2	2	32	320
KK	-	-	-	-	10	11	-	-	12	-	-	-	-	42	1,386
LL	-	-	-	-	12	12	-	12	12	-	-	-	-	52	2,496
MM	-	-	54	-	-	-	-	-	-	-	-	-	-	64	3,456
PP	-	3	9	-	-	-	-	-	-	-	-	-	-	32	384
QQ	-	-	-	-	-	-	-	2	-	2	2	2	2	52	520
RR	-	7	3	-	-	-	-	-	-	-	-	-	-	56	560
SS	-	-	-	-	-	-	-	-	1	-	-	-	-	26	26
TT	-	-	1	-	-	-	-	-	-	-	-	-	-	42	42
UU	-	-	1	-	-	-	-	-	-	-	-	-	-	42	42
WW	-	-	-	-	1	1	-	-	-	-	-	-	-	32	64
AAA	-	24	30	-	-	-	-	-	-	-	-	-	-	85	4,590
BBB	-	1	-	-	-	-	-	-	-	-	-	-	-	42	42
CCC	-	6	6	-	-	-	-	-	-	-	-	-	-	26	312
DDD	-	21	18	-	-	-	-	-	-	-	-	-	-	32	1,248
FFF	-	-	9	-	-	-	-	-	-	-	-	-	-	52	468
JJJ	-	-	1	-	-	-	-	-	-	-	-	-	-	42	42
PPP	-	4	-	-	-	-	-	-	-	-	-	-	-	6	24
QQQ	-	-	-	-	-	-	-	-	4	-	-	-	-	32	128
RRR	-	-	-	-	-	-	-	-	4	-	-	-	-	32	128
UUU	-	2	-	-	-	-	-	-	-	-	-	-	-	128	256
VVV	-	10	10	-	-	-	-	-	-	-	-	-	-	50	1,000
WWW	-	-	-	6	-	-	-	-	-	-	-	-	-	18.5	111
XXX	-	-	1	-	-	-	-	-	-	-	-	-	-	42	42
														TOTAL	157,589

Table 9: **Summary of Lighting Fixtures per Floor**

Once the total wattage was found for all the lighting in the South Patient Tower, a lighting power density was found by dividing the wattage by the total building area:

Wattage/Building Area = 157,589 W / 233,812 sq. ft.

LPD = 0.67 W/sq. ft.

It can be seen that the lighting power density (LPD) of 0.67 W/sq. ft. is well below the ASHRAE guideline of 1.2 W/sq. ft. therefore the South Patient Tower complies with Section 9.

Section 10: Other Equipment

This section of ASHRAE Standard 90.1 applies to the efficiencies of the electric motors in equipment such as the pumps located within the building project. All of the pumps in the South Patient Tower can be considered enclosed motors and to be installed with the listed efficiencies on the pump schedule. By comparing the listed pump data with the requirements of ASHRAE 90.1, as shown in *Table 10* below, it can be determined that none of the pumps in the South Patient Tower meet the minimum efficiency requirement of the standard. This can be partly attributed to the requirement of redundancy in all systems and the pumps needed to be sized to handle the load in case of a pump not operating due to maintenance or repair. Most of the pumps are oversized and thus operate at lower efficiencies. A majority of the pumps will be equipped with variable frequency drives to help eliminate the losses due to low efficiencies.

Pump	Service	HP	Efficiency	RPM	Minimum Efficiency	Standard 90.1 Compliance
HWP-1	Heating Water	15	80	1760	91	N
HWP-2	Heating Water	15	80	1760	91	N
HWP-3	Heating Water	15	80	1760	91	N
DWBP-1	Dom. Water Booster Pump	30	70	3500	91	N
DWBP-2	Dom. Water Booster Pump	30	70	3500	91	N
DWBP-3	Dom. Water Booster Pump	30	70	3500	91	N
DWBP-4	Dom. Water Booster Pump	25	67	3500	91	N
DWBP-5	Dom. Water Booster Pump	25	67	3500	91	N
DWBP-6	Dom. Water Booster Pump	25	67	3500	91	N
HWRP-1	Hot Water Recirc.	3	41	3450	84	N
HWRP-2	Hot Water Recirc.	3	41	3450	84	N
HWRP-3	Hot Water Recirc.	3	41	3450	84	N
HWRP-4	Hot Water Recirc.	3	41	3450	84	N
HWRP-5	Hot Water Recirc.	3	41	3450	84	N

HWRP-6	Hot Water Recirc.	3	41	3450	84	N
HWRP-7	Hot Water Recirc.	3	41	3450	84	N
CRP-1	Coil Recirculation	2	52	1750	84	N
CRP-2	Coil Recirculation	2	52	1750	84	N
CRP-3	Coil Recirculation	2	52	1750	84	N
CRP-4	Coil Recirculation	2	52	1750	84	N
CRP-5	Coil Recirculation	0.75	58	1750	-	-
CRP-6	Coil Recirculation	1/12	50	1750	-	-
FR-1	Fire Pump	150	79	3565	94.5	N

Table 10: **Summary of Pump Electric Motor Compliance**

ASHRAE Standard 90.1-2007 Conclusions

To determine compliance with ASHRAE Standard 90.1, the prescriptive path method was used for all sections. After evaluating all sections of the standard the South Patient Tower was determined as compliant with a few minor exceptions. The fan power was not entirely compliant with the air-handler fans not meeting the minimum standard. Also the pump motor efficiencies did not show compliance with the minimum required efficiencies.

The fans for the air-handlers did not meet the required performance determined in the standard. This can be attributed to the oversizing of the units to help provide redundancy to maintain operation 100% of the time. In the hospital, providing ventilation and supply air to the patient rooms is critical and if one air-handler is taken off-line, the others must be able to help provide their share of that missing load. To do this the air-handlers are coupled together and slightly oversized. Although not compliant with Standard 90.1, this oversize was done with good intentions to maintain the design intent.

Pump motor power was also not compliant with ASHRAE Standard 90.1. None of the pumps reached the required minimum efficiency of the standard. The pumps are required to provide redundancy and help share parts of the load when a pump is off-line. This redundancy and need for continuous service attributes to the oversizing of pumps and the resulting low efficiency values.

The South Patient Tower was designed with ASHRAE Standard 90.1 in mind and the results show that the design was compliant. The fan and pump non-compliances can be seen as a design intent to maintain continuous operation of the building. Due to variable frequency drives being put into place on both, the design may show compliance when the building is in operation.

References

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Appendix A

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Appendix B

Ventilation Rate Procedure Calculations

AHU-6

Inova South Patient Tower AHU-6
Kitchen Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft^2)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction	Design OA	Comply Y/N?
CONDIMENTS	Cafeteria		560	8	56.0	7.5	0.18	520.8	0.0	0.0	520.8	1	520.8	2080	0.25	0.38	790.4	Y
HOT BEVERAGES/SERVIN(	Cafeteria		1080	8	108.0	7.5	0.18	1,004.4	0.0	0.0	1,004.4	1	1004.4	3030	0.33	0.38	1151.4	Y
CASH 1	Cafeteria		800	8	80.0	7.5	0.18	744.0	0.0	0.0	744.0	1	744.0	2890	0.26	0.38	1098.2	Y
TOTALS			2440								2269		2269	8000				
													Maximum Zp		0.33			

AHU-1, 2, 3, 4

Inova South Patient Tower AHU-1,2,3,4
Basement Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft^2)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction	Design OA	Comply Y/N?
STORAGE	Storage		1012	8	0.0	0.0	0.12	121.4	0.0	0.0	121.4	1	121.4	300	0.40	0.4	120	N
ELEVATOR LOBBY	Corridor	Corridor	460	8	0.0	0.0	0.06	27.6	2.0	122.7	122.7	1	122.7	250	0.49	0.4	100	N
CORRIDOR	Corridor	Corridor	1600	8	0.0	0.0	0.06	96.0	2.0	426.7	426.7	1	426.7	430	0.99	0.4	172	N
SHELL SPACE	Storage		2400	8	0.0	0.0	0.12	288.0	0.0	0.0	288.0	1	288.0	0	0.00	0.4	0	N
STORAGE	Storage		465	8	0.0	0.0	0.12	55.8	0.0	0.0	55.8	1	55.8	125	0.45	0.4	50	N
MECHROOM 2	Electrical		2000	8	0.0	0.0	0.06	120.0	0.0	0.0	120.0	1	120.0	2000	0.06	0.4	800	Y
FIRE PUMP ROOM	Electrical		700	8	0.0	0.0	0.06	42.0	0.0	0.0	42.0	1	42.0	700	0.06	0.4	280	Y
MAIN ELECTRICAL ROOM	Electrical		542	8	0.0	0.0	0.06	32.5	0.0	0.0	32.5	1	32.5	200	0.16	0.4	80	Y
EMERGENCY ELECTRICAL	Electrical		1240	8	0.0	0.0	0.06	74.4	0.0	0.0	74.4	1	74.4	3260	0.02	0.4	1304	Y
EXIT CORRIDOR	Corridor	Corridor	600	8	0.0	0.0	0.06	36.0	2.0	160.0	160.0	1	160.0	400	0.40	0.4	160	Y
TELECOM 0BT07	Electrical		131	8	0.0	0.0	0.06	7.9	0.0	0.0	7.9	1	7.9	0	0.00	0.4	0	N
TELECOM 0BT11	Electrical		146	8	0.0	0.0	0.06	8.8	0.0	0.0	8.8	1	8.8	0	0.00	0.4	0	N
TOTALS			11296								1460		1460	7665				
													Minimum E..		0.82			
													Floor Max Zp		0.99			

Inova South Patient Tower AHU-1,2,3,4

Ground Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft^2)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction	Design OA	Comply Y/N?
VISITOR ELEVATOR LOBB	Corridor	Corridor	640	8	0.0	0.0	0.06	38.4	2.0	170.6	170.6	1	170.6	385	0.44	0.4	154	N
PATIENT ELEVATOR LOBE	Corridor	Corridor	630	8	0.0	0.0	0.06	37.8	2.0	167.9	167.9	1	167.9	385	0.44	0.4	154	N
CORRIDOR/LOBBY	Corridor	Corridor	1753	8	0.0	0.0	0.06	105.2	2.0	467.5	467.5	0.8	584.3	1060	0.55	0.4	424	N
SHELL SPACE 1	Storage		7400	8	0.0	0.0	0.12	888.0	0.0	0.0	888.0	1	888.0	9920	0.09	0.4	3968	Y
SHELL SPACE 2	Storage		4974	8	0.0	0.0	0.12	596.9	0.0	0.0	596.9	1	596.9	2230	0.27	0.4	892	Y
OFFICE	Office		115	8	0.6	5.0	0.06	9.8	0.0	0.0	9.8	1	9.8	70	0.14	0.4	28	Y
WORKROOM	Office		569	8	2.8	5.0	0.06	48.4	0.0	0.0	48.4	1	48.4	350	0.14	0.4	140	Y
REG 1	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	75	0.12	0.4	30	Y
REG 2	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	75	0.12	0.4	30	Y
LOUNGE	Break Room		114	8	2.9	5.0	0.06	21.1	0.0	0.0	21.1	1	21.1	100	0.21	0.4	40	Y
WAITING ROOM	Corridor	Corridor	240	8	0.0	0.0	0.06	14.4	2.0	64.0	64.0	0.8	80.0	150	0.53	0.4	60	N
SECURITY	Office		144	8	0.7	5.0	0.06	12.2	0.0	0.0	12.2	1	12.2	90	0.14	0.4	36	Y
RECEPTION	Office		252	8	1.3	5.0	0.06	21.4	0.0	0.0	21.4	1	21.4	160	0.13	0.4	64	Y
ROTUNDA	Corridor	Corridor	3019	8	0.0	0.0	0.06	181.1	2.0	805.1	805.1	0.8	1006.3	7250	0.14	0.4	2900	Y
LOBBY	Corridor	Corridor	437	8	0.0	0.0	0.06	26.2	2.0	116.5	116.5	0.8	145.7	1080	0.13	0.4	432	Y
WAITING AREA	Corridor	Corridor	920	8	0.0	0.0	0.06	55.2	2.0	245.3	245.3	0.8	306.6	2040	0.15	0.4	816	Y
ESCALATOR	Corridor	Corridor	608	8	0.0	0.0	0.06	36.5	2.0	162.1	162.1	0.8	202.7	2140	0.09	0.4	856	Y
W/C STORAGE	Storage		181	8	0.0	0.0	0.12	21.7	0.0	0.0	21.7	1	21.7	490	0.04	0.4	196	Y
VOLUNTEERS	Office		483	8	2.4	5.0	0.06	41.1	0.0	0.0	41.1	1	41.1	600	0.07	0.4	240	Y
IT Closet 0GT24	Electrical		124	8	0.0	0.0	0.06	7.4	0.0	0.0	7.4	1	7.4	1640	0.00	0.4	656	Y
MANAGER OFFICE	Office		145	8	0.7	5.0	0.06	12.3	0.0	0.0	12.3	1	12.3	70	0.18	0.4	28	Y
TOTALS			22959								3897		4362	30360				
													Minimum E..		0.88			
													Floor Max Zp		0.55			

Inova South Patient Tower AHU-1,2,3,4

1st Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Design Fraction	Design OA	Comply Y/N?
VISITOR ELEVATOR LOBBY	Corridor	Corridor	485	8	0.0	0.0	0.06	29.1	2.0	129.3	129.3	1	129.3	360	0.36	0.4	144	Y
SEATING AREA 2	Corridor	Corridor	1730	8	0.0	0.0	0.06	103.8	2.0	461.3	461.3	1	461.3	1040	0.44	0.4	416	N
ESCALATOR	Corridor	Corridor	2480	8	0.0	0.0	0.06	148.8	2.0	661.3	661.3	0.8	826.7	3750	0.22	0.4	1500	Y
SEATING AREA 1	Corridor	Corridor	1456	8	0.0	0.0	0.06	87.4	2.0	388.3	388.3	0.8	485.3	880	0.55	0.4	352	N
SHELL SPACE 3	Storage		619	8	0.0	0.0	0.12	74.3	0.0	0.0	74.3	1	74.3	500	0.15	0.4	200	Y
ELEVATOR MACHINE ROO	Elev. Mach.		130	8	0.0	0.0	0.12	15.6	0.0	0.0	15.6	1	15.6	0	0.00	0.4	0	N
CONCOURSE	Corridor	Corridor	1410	8	0.0	0.0	0.06	84.6	2.0	376.0	376.0	0.8	470.0	2420	0.19	0.4	968	Y
PATIENT ELEVATOR LOBB	Corridor	Corridor	666	8	0.0	0.0	0.06	40.0	2.0	177.6	177.6	1	177.6	360	0.49	0.4	144	N
SHELL SPACE 2	Storage		4110	8	0.0	0.0	0.12	493.2	0.0	0.0	493.2	1	493.2	5210	0.09	0.4	2084	Y
JAN CLOSET	Storage		52	8	0.0	0.0	0.12	6.2	0.0	0.0	6.2	1	6.2	30	0.21	0.4	12	Y
SHELL SPACE 1	Storage		1811	8	0.0	0.0	0.12	217.3	0.0	0.0	217.3	1	217.3	4060	0.05	0.4	1624	Y
BALCONY/ELEVATOR LOB	Corridor	Corridor	1345	8	0.0	0.0	0.06	80.7	2.0	358.7	358.7	0.8	448.3	990	0.45	0.4	396	N
TOTALS			13138								2783		3140	14550				
													Minimum E..		0.80			
													Floor Max Zp		0.55			

Inova South Patient Tower AHU-1,2,3,4

2nd Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction	Design OA	Comply Y/N?
VISITOR ELEVATOR LOBBY	Corridor	Corridor	400	8	0.0	0.0	0.06	24.0	2.0	106.7	106.7	1	106.7	213	0.50	0.4	85.3	N
PATIENT ELEVATOR LOBB	Corridor	Corridor	666	8	0.0	0.0	0.06	40.0	2.0	177.6	177.6	1	177.6	355	0.50	0.4	142.1	N
FAMILY CONSULT 02T09	Office		95	8	0.5	5.0	0.06	8.1	0.0	0.0	8.1	1	8.1	86	0.09	0.4	34.2	Y
SHELL SPACE - On-Call	Storage		8916	8	0.0	0.0	0.12	1,069.9	0.0	0.0	1,069.9	1	1069.9	6735	0.16	0.4	2693.8	Y
LOW VOLTAGE 02T13	Electrical		65	8	0.0	0.0	0.06	3.9	0.0	0.0	3.9	1	3.9	49	0.08	0.4	19.6	Y
IT CLOSET / BIOMED	Electrical		95	8	0.0	0.0	0.06	5.7	0.0	0.0	5.7	1	5.7	190	0.03	0.4	76.0	Y
LOW VOLTAGE	Electrical		64	8	0.0	0.0	0.06	3.8	0.0	0.0	3.8	1	3.8	43	0.09	0.4	17.1	Y
ELECTRICAL	Electrical		107	8	0.0	0.0	0.06	6.4	0.0	0.0	6.4	1	6.4	143	0.05	0.4	57.1	Y
IT CLOSET	Electrical		95	8	0.0	0.0	0.06	5.7	0.0	0.0	5.7	1	5.7	190	0.03	0.4	76.0	Y
FAMILY WAITING	Corridor	Corridor	272	8	0.0	0.0	0.06	16.3	2.0	72.5	72.5	0.8	90.7	145	0.63	0.4	58.0	N
TOTALS			10775								1460		1478	8148				
													Minimum E..		0.83			
													Floor Max Zp		0.63			

Inova South Patient Tower AHU-1,2,3,4

3rd Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction n	Design OA	Comply Y/N?
FAMILY CONSULT	Office		193	8	1.0	5.0	0.06	16.4	0.0	0.0	16.4	1	16.4	240	0.07	0.4	96	Y
FAMILY WAITING 2	Corridor	Corridor	230	8	0.0	0.0	0.06	13.8	2.0	61.3	61.3	1	61.3	490	0.13	0.4	196	Y
QUIET WAITING	Corridor	Corridor	104	8	0.0	0.0	0.06	6.2	2.0	27.7	27.7	1	27.7	200	0.14	0.4	80	Y
FAMILY PANTRY	Corridor	Corridor	123	8	0.0	0.0	0.06	7.4	2.0	32.8	32.8	1	32.8	50	0.66	0.4	20	N
MGMT. COORD.	Office		215	8	1.1	5.0	0.06	18.3	0.0	0.0	18.3	1	18.3	360	0.05	0.4	144	Y
PATIENT ROOM 1	Bedroom	Patient Room	290	8	2.9	5.0	0.06	31.9	2.0	77.3	77.3	0.8	96.6	430	0.22	0.4	172	Y
PATIENT ROOM 2	Bedroom	Patient Room	286	8	2.9	5.0	0.06	31.4	2.0	76.2	76.2	0.8	95.2	430	0.22	0.4	172	Y
PATIENT ROOM 3	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.1	490	0.20	0.4	196	Y
PATIENT ROOM 4	Bedroom	Patient Room	293	8	2.9	5.0	0.06	32.2	2.0	78.0	78.0	0.8	97.5	430	0.23	0.4	172	Y
PATIENT ROOM 5	Bedroom	Patient Room	292	8	2.9	5.0	0.06	32.1	2.0	77.9	77.9	0.8	97.4	430	0.23	0.4	172	Y
PATIENT ROOM 6	Bedroom	Patient Room	299	8	3.0	5.0	0.06	32.9	2.0	79.7	79.7	0.8	99.6	430	0.23	0.4	172	Y
FAMILY CONSULT	Office		95	8	0.5	5.0	0.06	8.1	0.0	0.0	8.1	1	8.1	120	0.07	0.4	48	Y
PATIENT ROOM 7	Bedroom	Patient Room	323	8	3.2	5.0	0.06	35.6	2.0	86.2	86.2	0.8	107.7	1050	0.10	0.4	420	Y
PATIENT ROOM 8	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.5	76.5	0.8	95.6	260	0.37	0.4	104	Y
PATIENT ROOM 9	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.3	2.0	78.3	78.3	0.8	97.9	310	0.32	0.4	124	Y
PATIENT ROOM 10	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.3	2.0	78.3	78.3	0.8	97.9	310	0.32	0.4	124	Y
PATIENT ROOM 11	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.5	76.5	0.8	95.6	260	0.37	0.4	104	Y
PATIENT ROOM 12	Bedroom	Patient Room	323	8	3.2	5.0	0.06	35.6	2.0	86.2	86.2	0.8	107.7	1050	0.10	0.4	420	Y
CONFERENCE	Conference		126	8	6.3	5.0	0.06	39.1	0.0	0.0	39.1	1	39.1	300	0.13	0.4	120	Y
PATIENT ROOM 13	Bedroom	Patient Room	302	8	3.0	5.0	0.06	33.2	2.0	80.4	80.4	0.8	100.5	380	0.26	0.4	152	Y
PATIENT ROOM 14	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.2	380	0.26	0.4	152	Y
PATIENT ROOM 15	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.2	380	0.26	0.4	152	Y
PATIENT ROOM 16	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.6	78.6	0.8	98.2	420	0.23	0.4	168	Y
PATIENT ROOM 17	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.6	76.6	0.8	95.8	370	0.26	0.4	148	Y
PATIENT ROOM 18	Bedroom	Patient Room	292	8	2.9	5.0	0.06	32.1	2.0	77.8	77.8	0.8	97.2	370	0.26	0.4	148	Y
STAFF LOUNGE	Break Room		325	8	8.1	5.0	0.06	60.1	0.0	0.0	60.1	0.8	75.2	490	0.15	0.4	196	Y
ON CALL 1	Office		107	8	0.5	5.0	0.06	9.1	0.0	0.0	9.1	1	9.1	230	0.04	0.4	92	Y
ON CALL 2	Office		123	8	0.6	5.0	0.06	10.4	0.0	0.0	10.4	1	10.4	210	0.05	0.4	84	Y
LOBBY	Corridor	Corridor	450	8	0.0	0.0	0.06	27.0	2.0	120.0	120.0	1	120.0	420	0.29	0.4	168	Y
OFFICE	Office		130	8	0.7	5.0	0.06	11.1	0.0	0.0	11.1	1	11.1	70	0.16	0.4	28	Y
EQUIPMENT STORAGE	Storage		316	8	0.0	0.0	0.12	37.9	0.0	0.0	37.9	1	37.9	170	0.22	0.4	68	Y
SOILED HOLDING	Storage		303	8	0.0	0.0	0.12	36.4	0.0	0.0	36.4	1	36.4	310	0.12	0.4	124	Y
CLEAN SUPPLY	Storage		303	8	0.0	0.0	0.12	36.4	0.0	0.0	36.4	1	36.4	170	0.21	0.4	68	Y
OFFICE 1	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	60	0.15	0.4	24	Y
OFFICE 2	Office		117	8	0.6	5.0	0.06	9.9	0.0	0.0	9.9	1	9.9	70	0.14	0.4	28	Y
OFFICE 3	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	60	0.15	0.4	24	Y
TEAM STATION 1	Office		316	8	1.6	5.0	0.06	26.9	0.0	0.0	26.9	1	26.9	190	0.14	0.4	76	Y
ELECTRICAL 1	Electrical		137	8	0.0	0.0	0.06	8.2	0.0	0.0	8.2	1	8.2	550	0.01	0.4	220	Y
LOW VOLTAGE	Electrical		65	8	0.0	0.0	0.06	3.9	0.0	0.0	3.9	1	3.9	100	0.04	0.4	40	Y
TEAM STATION 2	Office		841	8	4.2	5.0	0.06	71.5	0.0	0.0	71.5	1	71.5	450	0.16	0.4	180	Y
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.06	198.0	2.0	880.0	880.0	1	880.0	930	0.95	0.4	372	N
LOCKERS	Office		129	8	0.6	5.0	0.06	11.0	0.0	0.0	11.0	1	11.0	180	0.06	0.4	72	Y
LOBBY	Corridor	Corridor	400	8	0.0	0.0	0.06	24.0	2.0	106.7	106.7	1	106.7	350	0.30	0.4	140	Y
ELECTRICAL 2	Electrical		107	8	0.0	0.0	0.06	6.4	0.0	0.0	6.4	1	6.4	550	0.01	0.4	220	Y
FAMILY WAITING 1	Corridor	Corridor	442	8	0.0	0.0	0.06	26.5	2.0	117.8	117.8	1	117.8	400	0.29	0.4	160	Y
TOTALS			14535								3206		3576	15900				
													Minimum E..		0.79			
													Floor Max. Zp		0.95			

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4th Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction	Design OA	Comply Y/N?
FAMILY CONSULT	Office		193	8	1.0	5.0	0.06	16.4	0.0	0.0	16.4	1	16.4	280	0.06	0.4	112	Y
FAMILY WAITING 1	Corridor	Corridor	230	8	0.0	0.0	0.06	13.8	2.0	61.3	61.3	1	61.3	540	0.11	0.4	216	Y
QUIET WAITING	Corridor	Corridor	104	8	0.0	0.0	0.06	6.2	2.0	27.7	27.7	1	27.7	220	0.13	0.4	88	Y
FAMILY PANTRY	Corridor	Corridor	123	8	0.0	0.0	0.06	7.4	2.0	32.8	32.8	1	32.8	50	0.66	0.4	20	N
MGMT. COORD.	Office		215	8	1.1	5.0	0.06	18.3	0.0	0.0	18.3	1	18.3	400	0.05	0.4	160	Y
PATIENT ROOM 1	Bedroom	Patient Room	290	8	2.9	5.0	0.06	31.9	2.0	77.3	77.3	0.8	96.6	490	0.20	0.4	196	Y
PATIENT ROOM 2	Bedroom	Patient Room	286	8	2.9	5.0	0.06	31.4	2.0	76.2	76.2	0.8	95.2	490	0.19	0.4	196	Y
PATIENT ROOM 3	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.1	560	0.18	0.4	224	Y
PATIENT ROOM 4	Bedroom	Patient Room	293	8	2.9	5.0	0.06	32.2	2.0	78.0	78.0	0.8	97.5	500	0.20	0.4	200	Y
PATIENT ROOM 5	Bedroom	Patient Room	292	8	2.9	5.0	0.06	32.1	2.0	77.9	77.9	0.8	97.4	500	0.19	0.4	200	Y
PATIENT ROOM 6	Bedroom	Patient Room	299	8	3.0	5.0	0.06	32.9	2.0	79.7	79.7	0.8	99.6	500	0.20	0.4	200	Y
FAMILY CONSULT	Office		95	8	0.5	5.0	0.06	8.1	0.0	0.0	8.1	1	8.1	150	0.05	0.4	60	Y
PATIENT ROOM 7	Bedroom	Patient Room	323	8	3.2	5.0	0.06	35.6	2.0	86.2	86.2	0.8	107.7	1050	0.10	0.4	420	Y
PATIENT ROOM 8	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.5	76.5	0.8	95.6	285	0.34	0.4	114	Y
PATIENT ROOM 9	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.3	2.0	78.3	78.3	0.8	97.9	380	0.26	0.4	152	Y
PATIENT ROOM 10	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.3	2.0	78.3	78.3	0.8	97.9	380	0.26	0.4	152	Y
PATIENT ROOM 11	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.5	76.5	0.8	95.6	285	0.34	0.4	114	Y
PATIENT ROOM 12	Bedroom	Patient Room	323	8	3.2	5.0	0.06	35.6	2.0	86.2	86.2	0.8	107.7	1055	0.10	0.4	422	Y
PATIENT ROOM 13	Bedroom	Patient Room	302	8	3.0	5.0	0.06	33.2	2.0	80.4	80.4	0.8	100.5	450	0.22	0.4	180	Y
PATIENT ROOM 14	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.2	440	0.22	0.4	176	Y
PATIENT ROOM 15	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.2	440	0.22	0.4	176	Y
PATIENT ROOM 16	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.6	78.6	0.8	98.2	490	0.20	0.4	196	Y
PATIENT ROOM 17	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.6	76.6	0.8	95.8	440	0.22	0.4	176	Y
PATIENT ROOM 18	Bedroom	Patient Room	292	8	2.9	5.0	0.06	32.1	2.0	77.8	77.8	0.8	97.2	440	0.22	0.4	176	Y
STAFF LOUNGE	Break Room		325	8	8.1	5.0	0.06	60.1	0.0	0.0	60.1	1	60.1	570	0.11	0.4	228	Y
ON CALL 1	Office		107	8	0.5	5.0	0.06	9.1	0.0	0.0	9.1	1	9.1	250	0.04	0.4	100	Y
ON CALL 2	Office		123	8	0.6	5.0	0.06	10.4	0.0	0.0	10.4	1	10.4	240	0.04	0.4	96	Y
VISIT. ELEV. LOBBY	Corridor	Corridor	450	8	0.0	0.0	0.06	27.0	2.0	120.0	120.0	1	120.0	470	0.26	0.4	188	Y
OFFICE	Office		130	8	0.7	5.0	0.06	11.1	0.0	0.0	11.1	1	11.1	100	0.11	0.4	40	Y
EQUIPMENT STORAGE	Storage		316	8	0.0	0.0	0.12	37.9	0.0	0.0	37.9	1	37.9	170	0.22	0.4	68	Y
SOILED HOLDING	Storage		303	8	0.0	0.0	0.12	36.4	0.0	0.0	36.4	1	36.4	310	0.12	0.4	124	Y
CLEAN SUPPLY	Storage		303	8	0.0	0.0	0.12	36.4	0.0	0.0	36.4	1	36.4	170	0.21	0.4	68	Y
OFFICE 1	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	80	0.11	0.4	32	Y
OFFICE 2	Office		117	8	0.6	5.0	0.06	9.9	0.0	0.0	9.9	1	9.9	90	0.11	0.4	36	Y
OFFICE 3	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	80	0.11	0.4	32	Y
TEAM STATION 1	Office		316	8	1.6	5.0	0.06	26.9	0.0	0.0	26.9	1	26.9	230	0.12	0.4	92	Y
ELECTRICAL 1	Electrical		137	8	0.0	0.0	0.06	8.2	0.0	0.0	8.2	1	8.2	550	0.01	0.4	220	Y
LOW VOLTAGE	Electrical		70	8	0.0	0.0	0.06	4.2	0.0	0.0	4.2	1	4.2	110	0.04	0.4	44	Y
IT CLOSET 1/ BIOMED	Electrical		85	8	0.0	0.0	0.06	5.1	0.0	0.0	5.1	1	5.1		0.00	0.4	0	N
TEAM STATION 2	Office		800	8	4.0	5.0	0.06	68.0	0.0	0.0	68.0	1	68.0	480	0.14	0.4	192	Y
CONFERENCE	Conference		130	8	6.5	5.0	0.06	40.3	0.0	0.0	40.3	1	40.3	300	0.13	0.4	120	Y
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.06	198.0	2.0	880.0	880.0	1	880.0	1760	0.50	0.4	704	N
JANITOR	Storage		55	8	0.0	0.0	0.12	6.6	0.0	0.0	6.6	1	6.6	0	0.00	0.4	0	N
LOCKERS	Office		129	8	0.6	5.0	0.06	11.0	0.0	0.0	11.0	1	11.0	180	0.06	0.4	72	Y
PATIENT ELEV. LOBBY	Corridor	Corridor	400	8	0.0	0.0	0.06	24.0	2.0	106.7	106.7	1	106.7	360	0.30	0.4	144	Y
ELECTRICAL 2	Electrical		107	8	0.0	0.0	0.06	6.4	0.0	0.0	6.4	1	6.4	550	0.01	0.4	220	Y
FAMILY WAITING 2	Corridor	Corridor	442	8	0.0	0.0	0.06	26.5	2.0	117.8	117.8	1	117.8	450	0.26	0.4	180	Y
IT CLOSET 2	Electrical		93	8	0.0	0.0	0.06	5.6	0.0	0.0	5.6	1	5.6	0	0.00	0.4	0	N
TOTALS			14736								3221		3576	18315				
													Minimum E..		0.82			
													Floor Max Zp		0.66			

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6th Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction	Design OA	Comply Y/N?
CARITAS	Office		66	8	0.3	5.0	0.06	5.6	0.0	0.0	5.6	1	5.6	90	0.06	0.4	36	Y
IT CLOSET	Electrical		93	8	0.0	0.0	0.06	5.6	0.0	0.0	5.6	1	5.6	0	0.00	0.4	0	N
FAMILY WAITING	Corridor	Corridor	442	8	0.0	0.0	0.06	26.5	2.0	117.8	117.8	1	117.8	450	0.26	0.4	180	Y
ELECTRICAL 2	Electrical		107	8	0.0	0.0	0.06	6.4	0.0	0.0	6.4	1	6.4	0	0.00	0.4	0	N
ELEVATOR LOBBY	Corridor	Corridor	676	8	0.0	0.0	0.06	40.5	2.0	180.1	180.1	1	180.1	540	0.33	0.4	216	Y
ELEVATOR LOBBY	Corridor	Corridor	628	8	0.0	0.0	0.06	37.7	2.0	167.4	167.4	1	167.4	480	0.35	0.4	192	Y
PATIENT ROOM 1	Bedroom	Patient Room	220	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.2	400	0.18	0.4	160	Y
PATIENT ROOM 2	Bedroom	Patient Room	218	8	2.2	5.0	0.06	23.9	2.0	58.1	58.1	0.8	72.6	400	0.18	0.4	160	Y
PATIENT ROOM 3	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	450	0.17	0.4	180	Y
PATIENT ROOM 4	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	450	0.17	0.4	180	Y
PATIENT ROOM 5	Bedroom	Patient Room	219	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.1	440	0.17	0.4	176	Y
PATIENT ROOM 6	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.7	2.0	59.8	59.8	0.8	74.8	510	0.15	0.4	204	Y
PATIENT ROOM 7	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	450	0.17	0.4	180	Y
PATIENT ROOM 8	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	450	0.17	0.4	180	Y
PATIENT ROOM 9	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	450	0.17	0.4	180	Y
ANTE ROOM 1	Bedroom	Patient Room	115	8	1.1	5.0	0.06	12.6	2.0	30.6	30.6	0.8	38.2	250	0.15	0.4	100	Y
PATIENT ROOM 10	Bedroom	Patient Room	229	8	2.3	5.0	0.06	25.2	2.0	61.1	61.1	0.8	76.4	755	0.10	0.4	302	Y
PATIENT ROOM 11	Bedroom	Patient Room	217	8	2.2	5.0	0.06	23.8	2.0	57.8	57.8	0.8	72.2	230	0.31	0.4	92	Y
PATIENT ROOM 12	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	330	0.23	0.4	132	Y
PATIENT ROOM 13	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	330	0.23	0.4	132	Y
PATIENT ROOM 14	Bedroom	Patient Room	214	8	2.1	5.0	0.06	23.5	2.0	57.0	57.0	0.8	71.3	230	0.31	0.4	92	Y
PATIENT ROOM 15	Bedroom	Patient Room	228	8	2.3	5.0	0.06	25.1	2.0	60.8	60.8	0.8	76.0	755	0.10	0.4	302	Y
ANTE ROOM 2	Bedroom	Patient Room	82	8	0.8	5.0	0.06	9.0	2.0	21.8	21.8	0.8	27.3	250	0.11	0.4	100	Y
PATIENT ROOM 16	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	390	0.19	0.4	156	Y
PATIENT ROOM 17	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	390	0.19	0.4	156	Y
PATIENT ROOM 18	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	390	0.19	0.4	156	Y
PATIENT ROOM 19	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	440	0.17	0.4	176	Y
PATIENT ROOM 20	Bedroom	Patient Room	221	8	2.2	5.0	0.06	24.3	2.0	59.0	59.0	0.8	73.7	390	0.19	0.4	156	Y
PATIENT ROOM 21	Bedroom	Patient Room	226	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	390	0.19	0.4	156	Y
PATIENT ROOM 22	Bedroom	Patient Room	226	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	390	0.19	0.4	156	Y
PATIENT ROOM 23	Bedroom	Patient Room	208	8	2.1	5.0	0.06	22.9	2.0	55.5	55.5	0.8	69.4	350	0.20	0.4	140	Y
PATIENT ROOM 24	Bedroom	Patient Room	210	8	2.1	5.0	0.06	23.1	2.0	56.0	56.0	0.8	70.0	350	0.20	0.4	140	Y
TEAM STATION 1/Unit SCT	Office		450	8	2.3	5.0	0.06	38.3	0.0	0.0	38.3	1	38.3	300	0.13	0.4	120	Y
PCD OFFICE	Office		126	8	0.6	5.0	0.06	10.7	0.0	0.0	10.7	1	10.7	90	0.12	0.4	36	Y
EQUIPMENT STORAGE	Storage		190	8	0.0	0.0	0.12	22.8	0.0	0.0	22.8	1	22.8	110	0.21	0.4	44	Y
CLEAN SUPPLY	Storage		240	8	0.0	0.0	0.12	28.8	0.0	0.0	28.8	1	28.8	130	0.22	0.4	52	Y
SOILED HOLDING	Storage		116	8	0.0	0.0	0.12	13.9	0.0	0.0	13.9	1	13.9	100	0.14	0.4	40	Y
ELECTRICAL	Electrical		150	8	0.0	0.0	0.06	9.0	0.0	0.0	9.0	1	9.0	550	0.02	0.4	220	Y
LOW VOLTAGE	Electrical		70	8	0.0	0.0	0.06	4.2	0.0	0.0	4.2	1	4.2	100	0.04	0.4	40	Y
CLOSET/BIO MED	Storage		85	8	0.0	0.0	0.12	10.2	0.0	0.0	10.2	1	10.2	0	0.00	0.4	0	N
PANTRY	Storage		115	8	0.0	0.0	0.12	13.8	0.0	0.0	13.8	1	13.8	50	0.28	0.4	20	Y
MEDS 1	Storage		120	8	0.0	0.0	0.12	14.4	0.0	0.0	14.4	1	14.4	80	0.18	0.4	32	Y
MEDS 2	Storage		107	8	0.0	0.0	0.12	12.9	0.0	0.0	12.9	1	12.9	60	0.21	0.4	24	Y
OFFICE 1	Office		76	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	60	0.11	0.4	24	Y
OFFICE 2	Office		76	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	60	0.11	0.4	24	Y
TEAM STATION 2	Office		238	8	1.2	5.0	0.06	20.2	0.0	0.0	20.2	1	20.2	190	0.11	0.4	76	Y
MEDS 2	Storage		107	8	0.0	0.0	0.12	12.8	0.0	0.0	12.8	1	12.8	60	0.21	0.4	24	Y
FAMILY CONSULT	Office		95	8	0.5	5.0	0.06	8.1	0.0	0.0	8.1	1	8.1	150	0.05	0.4	60	Y
OFF UNIT CARE GIVERS	Office		156	8	0.8	5.0	0.06	13.2	0.0	0.0	13.2	1	13.2	270	0.05	0.4	108	Y
PHYS. DICT	Office		84	8	0.4	5.0	0.06	7.1	0.0	0.0	7.1	1	7.1	150	0.05	0.4	60	Y
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.06	198.0	2.0	880.0	880.0	1	880.0	1700	0.52	0.4	680	N
STORAGE 1	Storage		70	8	0.0	0.0	0.12	8.4	0.0	0.0	8.4	1	8.4	0	0.00	0.4	0	N
STORAGE 2	Storage		70	8	0.0	0.0	0.12	8.4	0.0	0.0	8.4	1	8.4	0	0.00	0.4	0	N
JANITOR CLOSET	Storage		80	8	0.0	0.0	0.12	9.6	0.0	0.0	9.6	1	9.6	0	0.00	0.4	0	N
WORK ROOM	Office		85	8	0.4	5.0	0.06	7.2	0.0	0.0	7.2	1	7.2	50	0.14	0.4	20	Y
TOTALS			13724								3119		3486	16430				
													Minimum E..		0.80			
													Floor Zp		0.52			

Inova South Patient Tower AHU-1,2,3,4

7th Floor Summary

Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	ASHRAE 62.1 Analysis: Occupancy	cfm/person	cfm/area	vent. Req.	ASHRAE 170 Analysis: OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction	Design OA	Comply Y/N?
FAMILY CONSULT	Office		193	8	1.0	5.0	0.06	16.4	0.0	0.0	16.4	1	16.4	240	0.07	0.4	96	Y
FAMILY WAITING 1	Corridor	Corridor	230	8	0.0	0.0	0.06	13.8	2.0	61.3	61.3	1	61.3	490	0.13	0.4	196	Y
QUIET WAITING	Corridor	Corridor	104	8	0.0	0.0	0.06	6.2	2.0	27.7	27.7	1	27.7	200	0.14	0.4	80	Y
FAMILY PANTRY	Corridor	Corridor	123	8	0.0	0.0	0.06	7.4	2.0	32.8	32.8	1	32.8	50	0.66	0.4	20	N
MGMT. COORD.	Office		215	8	1.1	5.0	0.06	18.3	0.0	0.0	18.3	1	18.3	360	0.05	0.4	144	Y
PATIENT ROOM 1	Bedroom	Patient Room	290	8	2.9	5.0	0.06	31.9	2.0	77.3	77.3	0.8	96.6	440	0.22	0.4	176	Y
PATIENT ROOM 2	Bedroom	Patient Room	286	8	2.9	5.0	0.06	31.4	2.0	76.2	76.2	0.8	95.2	440	0.22	0.4	176	Y
PATIENT ROOM 3	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.1	510	0.19	0.4	204	Y
PATIENT ROOM 4	Bedroom	Patient Room	293	8	2.9	5.0	0.06	32.2	2.0	78.0	78.0	0.8	97.5	440	0.22	0.4	176	Y
PATIENT ROOM 5	Bedroom	Patient Room	292	8	2.9	5.0	0.06	32.1	2.0	77.9	77.9	0.8	97.4	440	0.22	0.4	176	Y
PATIENT ROOM 6	Bedroom	Patient Room	299	8	3.0	5.0	0.06	32.9	2.0	79.7	79.7	0.8	99.6	450	0.22	0.4	180	Y
FAMILY CONSULT	Bedroom	Patient Room	95	8	1.0	5.0	0.06	10.5	2.0	25.3	25.3	0.8	31.7	150	0.21	0.4	60	Y
PATIENT ROOM 7	Bedroom	Patient Room	323	8	3.2	5.0	0.06	35.6	2.0	86.2	86.2	0.8	107.7	1050	0.10	0.4	420	Y
PATIENT ROOM 8	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.5	76.5	0.8	95.6	260	0.37	0.4	104	Y
PATIENT ROOM 9	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.3	2.0	78.3	78.3	0.8	97.9	320	0.31	0.4	128	Y
PATIENT ROOM 10	Bedroom	Patient Room	294	8	2.9	5.0	0.06	32.3	2.0	78.3	78.3	0.8	97.9	320	0.31	0.4	128	Y
PATIENT ROOM 11	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.5	76.5	0.8	95.6	260	0.37	0.4	104	Y
PATIENT ROOM 12	Bedroom	Patient Room	323	8	3.2	5.0	0.06	35.6	2.0	86.2	86.2	0.8	107.7	1050	0.10	0.4	420	Y
PATIENT ROOM 13	Bedroom	Patient Room	302	8	3.0	5.0	0.06	33.2	2.0	80.4	80.4	0.8	100.5	390	0.26	0.4	156	Y
PATIENT ROOM 14	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.2	390	0.25	0.4	156	Y
PATIENT ROOM 15	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.5	78.5	0.8	98.2	390	0.25	0.4	156	Y
PATIENT ROOM 16	Bedroom	Patient Room	295	8	2.9	5.0	0.06	32.4	2.0	78.6	78.6	0.8	98.2	440	0.22	0.4	176	Y
PATIENT ROOM 17	Bedroom	Patient Room	287	8	2.9	5.0	0.06	31.6	2.0	76.6	76.6	0.8	95.8	380	0.25	0.4	152	Y
PATIENT ROOM 18	Bedroom	Patient Room	292	8	2.9	5.0	0.06	32.1	2.0	77.8	77.8	0.8	97.2	390	0.25	0.4	156	Y
STAFF LOUNGE	Break Room		325	8	8.1	5.0	0.06	60.1	0.0	0.0	60.1	1	60.1	510	0.12	0.4	204	Y
ON CALL 1	Office		107	8	0.5	5.0	0.06	9.1	0.0	0.0	9.1	1	9.1	230	0.04	0.4	92	Y
ON CALL 2	Office		123	8	0.6	5.0	0.06	10.4	0.0	0.0	10.4	1	10.4	210	0.05	0.4	84	Y
VISIT. ELEV. LOBBY	Corridor	Corridor	450	8	0.0	0.0	0.06	27.0	2.0	120.0	120.0	1	120.0	420	0.29	0.4	168	Y
OFFICE	Office		130	8	0.7	5.0	0.06	11.1	0.0	0.0	11.1	1	11.1	70	0.16	0.4	28	Y
EQUIPMENT STORAGE	Storage		316	8	0.0	0.0	0.12	37.9	0.0	0.0	37.9	1	37.9	170	0.22	0.4	68	Y
SOILED HOLDING	Storage		303	8	0.0	0.0	0.12	36.4	0.0	0.0	36.4	1	36.4	310	0.12	0.4	124	Y
CLEAN SUPPLY	Storage		303	8	0.0	0.0	0.12	36.4	0.0	0.0	36.4	1	36.4	170	0.21	0.4	68	Y
OFFICE 1	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	60	0.15	0.4	24	Y
OFFICE 2	Office		117	8	0.6	5.0	0.06	9.9	0.0	0.0	9.9	1	9.9	70	0.14	0.4	28	Y
OFFICE 3	Office		106	8	0.5	5.0	0.06	9.0	0.0	0.0	9.0	1	9.0	60	0.15	0.4	24	Y
TEAM STATION 1	Office		316	8	1.6	5.0	0.06	26.9	0.0	0.0	26.9	1	26.9	190	0.14	0.4	76	Y
ELECTRICAL 1	Electrical		137	8	0.0	0.0	0.06	8.2	0.0	0.0	8.2	1	8.2	550	0.01	0.4	220	Y
LOW VOLTAGE	Electrical		70	8	0.0	0.0	0.06	4.2	0.0	0.0	4.2	1	4.2	100	0.04	0.4	40	Y
BIO-MED/ IT CLOSET	Electrical		85	8	0.0	0.0	0.06	5.1	0.0	0.0	5.1	1	5.1		0.00	0.4	0	N
TEAM STATION 2	Office		990	8	5.0	5.0	0.06	84.2	0.0	0.0	84.2	1	84.2	530	0.16	0.4	212	Y
CONFERENCE	Conference		210	8	10.5	5.0	0.06	65.1	0.0	0.0	65.1	1	65.1	300	0.22	0.4	120	Y
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.06	198.0	2.0	880.0	880.0	1	880.0	930	0.95	0.4	372	N
JANITOR	Storage		55	8	0.0	0.0	0.12	6.6	0.0	0.0	6.6	1	6.6		0.00	0.4	0	N
LOCKERS	Office		129	8	0.6	5.0	0.06	11.0	0.0	0.0	11.0	1	11.0	180	0.06	0.4	72	Y
PATIENT ELEV. LOBBY	Corridor	Corridor	400	8	0.0	0.0	0.06	24.0	2.0	106.7	106.7	1	106.7	350	0.30	0.4	140	Y
FAMILY WAITING 2	Corridor	Corridor	442	8	0.0	0.0	0.06	26.5	2.0	117.8	117.8	1	117.8	400	0.29	0.4	160	Y
IT CLOSET 2	Electrical		93	8	0.0	0.0	0.06	5.6	0.0	0.0	5.6	1	5.6		0.00	0.4	0	N
STORAGE	Storage		64	8	0.0	0.0	0.12	7.7	0.0	0.0	7.7	1	7.7		0.00	0.4	0	N
STORAGE	Storage		64	8	0.0	0.0	0.12	7.7	0.0	0.0	7.7	1	7.7		0.00	0.4	0	N
TOTALS			15028								3288		3649	15660				
													Minimum Evz		0.78			
													Floor Max Zp		0.95			

Inova South Patient Tower AHU-1,2,3,4

8th Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis								
Room Name	ASHRAE 62.1 Template	Assumed ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	62.1 min vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Zone Outdoor Airflow	Total Supply	Fraction Zp	Design Fraction OA	Design OA	Comply Y/N?
CARITAS	Office		66	8	0.3	5.0	0.06	5.6	0.0	0.0	5.6	1	5.6	90	0.06	0.4	36	Y
IT CLOSET	Electrical		93	8	0.0	0.0	0.06	5.6	0.0	0.0	5.6	1	5.6	0	0.00	0.4	0	N
FAMILY WAITING	Corridor	Corridor	442	8	0.0	0.0	0.06	26.5	2.0	117.8	117.8	1	117.8	400	0.29	0.4	160	Y
ELECTRICAL 2	Electrical		107	8	0.0	0.0	0.06	6.4	0.0	0.0	6.4	1	6.4	0	0.00	0.4	0	N
ELEVATOR LOBBY	Corridor	Corridor	676	8	0.0	0.0	0.06	40.5	2.0	180.1	180.1	1	180.1	390	0.46	0.4	156	N
ELEVATOR LOBBY	Corridor	Corridor	628	8	0.0	0.0	0.06	37.7	2.0	167.4	167.4	1	167.4	390	0.43	0.4	156	N
PATIENT ROOM 1	Bedroom	Patient Room	220	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.2	340	0.22	0.4	136	Y
PATIENT ROOM 2	Bedroom	Patient Room	218	8	2.2	5.0	0.06	23.9	2.0	58.1	58.1	0.8	72.6	340	0.21	0.4	136	Y
PATIENT ROOM 3	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	420	0.18	0.4	168	Y
PATIENT ROOM 4	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	420	0.18	0.4	168	Y
PATIENT ROOM 5	Bedroom	Patient Room	219	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.1	420	0.17	0.4	168	Y
PATIENT ROOM 6	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.7	2.0	59.8	59.8	0.8	74.8	480	0.16	0.4	192	Y
PATIENT ROOM 7	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	420	0.18	0.4	168	Y
PATIENT ROOM 8	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	420	0.18	0.4	168	Y
PATIENT ROOM 9	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	420	0.18	0.4	168	Y
ANTE ROOM 1	Bedroom	Patient Room	115	8	1.1	5.0	0.06	12.6	2.0	30.6	30.6	0.8	38.2	250	0.15	0.4	100	Y
PATIENT ROOM 10	Bedroom	Patient Room	229	8	2.3	5.0	0.06	25.2	2.0	61.1	61.1	0.8	76.4	755	0.10	0.4	302	Y
PATIENT ROOM 11	Bedroom	Patient Room	217	8	2.2	5.0	0.06	23.8	2.0	57.8	57.8	0.8	72.2	200	0.36	0.4	80	Y
PATIENT ROOM 12	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	300	0.25	0.4	120	Y
PATIENT ROOM 13	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	300	0.25	0.4	120	Y
PATIENT ROOM 14	Bedroom	Patient Room	214	8	2.1	5.0	0.06	23.5	2.0	57.0	57.0	0.8	71.3	200	0.36	0.4	80	Y
PATIENT ROOM 15	Bedroom	Patient Room	228	8	2.3	5.0	0.06	25.1	2.0	60.8	60.8	0.8	76.0	755	0.10	0.4	302	Y
ANTE ROOM 2	Bedroom	Patient Room	82	8	0.8	5.0	0.06	9.0	2.0	21.8	21.8	0.8	27.3	250	0.11	0.4	100	Y
PATIENT ROOM 16	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 17	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 18	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 19	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	410	0.18	0.4	164	Y
PATIENT ROOM 20	Bedroom	Patient Room	221	8	2.2	5.0	0.06	24.3	2.0	59.0	59.0	0.8	73.7	360	0.20	0.4	144	Y
PATIENT ROOM 21	Bedroom	Patient Room	226	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	360	0.21	0.4	144	Y
PATIENT ROOM 22	Bedroom	Patient Room	226	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	360	0.21	0.4	144	Y
PATIENT ROOM 23	Bedroom	Patient Room	208	8	2.1	5.0	0.06	22.9	2.0	55.5	55.5	0.8	69.4	290	0.24	0.4	116	Y
PATIENT ROOM 24	Bedroom	Patient Room	210	8	2.1	5.0	0.06	23.1	2.0	56.0	56.0	0.8	70.0	300	0.23	0.4	120	Y
TEAM STATION 1/Unit SCT	Office		450	8	2.3	5.0	0.06	38.3	0.0	0.0	38.3	1	38.3	240	0.16	0.4	96	Y
PCD OFFICE	Office		126	8	0.6	5.0	0.06	10.7	0.0	0.0	10.7	1	10.7	70	0.15	0.4	28	Y
EQUIPMENT STORAGE	Storage		190	8	0.0	0.0	0.12	22.8	0.0	0.0	22.8	1	22.8	110	0.21	0.4	44	Y
CLEAN SUPPLY	Storage		312	8	0.0	0.0	0.12	37.4	0.0	0.0	37.4	1	37.4	100	0.37	0.4	40	Y
SOILED HOLDING	Storage		140	8	0.0	0.0	0.12	16.8	0.0	0.0	16.8	1	16.8	100	0.17	0.4	40	Y
ELECTRICAL	Electrical		150	8	0.0	0.0	0.06	9.0	0.0	0.0	9.0	1	9.0	550	0.02	0.4	220	Y
Low Voltage	Electrical		70	8	0.0	0.0	0.06	4.2	0.0	0.0	4.2	1	4.2	100	0.04	0.4	40	Y
IT CLOSET/BIO MED	Storage		85	8	0.0	0.0	0.12	10.2	0.0	0.0	10.2	1	10.2	0	0.00	0.4	0	N
PANTRY	Storage		115	8	0.0	0.0	0.12	13.8	0.0	0.0	13.8	1	13.8	50	0.28	0.4	20	Y
MEDS	Storage		107	8	0.0	0.0	0.12	12.9	0.0	0.0	12.9	1	12.9	0	0.00	0.4	0	N
OFFICE 1	Office		76	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	50	0.13	0.4	20	Y
OFFICE 2	Office		76	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	50	0.13	0.4	20	Y
TEAM STATION 2	Office		238	8	1.2	5.0	0.06	20.2	0.0	0.0	20.2	1	20.2	190	0.11	0.4	76	Y
MEDS 2	Office		107	8	0.5	5.0	0.06	9.1	0.0	0.0	9.1	1	9.1	60	0.15	0.4	24	Y
FAMILY CONSULT	Office		95	8	0.5	5.0	0.06	8.1	0.0	0.0	8.1	1	8.1	150	0.05	0.4	60	Y
OFF UNIT CARE GIVERS	Office		156	8	0.8	5.0	0.06	13.2	0.0	0.0	13.2	1	13.2	270	0.05	0.4	108	Y
PHYS. DICT	Office		84	8	0.4	5.0	0.06	7.1	0.0	0.0	7.1	1	7.1	150	0.05	0.4	60	Y
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.06	198.0	2.0	880.0	880.0	1	880.0	930	0.95	0.4	372	N
STORAGE 1	Storage		70	8	0.0	0.0	0.12	8.4	0.0	0.0	8.4	1	8.4	0	0.00	0.4	0	N
STORAGE 2	Storage		70	8	0.0	0.0	0.12	8.4	0.0	0.0	8.4	1	8.4	0	0.00	0.4	0	N
JANITOR CLOSET	Storage		80	8	0.0	0.0	0.12	9.6	0.0	0.0	9.6	1	9.6	0	0.00	0.4	0	N
WORK ROOM	Office		85	8	0.4	5.0	0.06	7.2	0.0	0.0	7.2	1	7.2	50	0.14	0.4	20	Y
TOTALS			13700								3112		3479	14340				
													Minimum Evz		0.77			
													Maximum Zp		0.95			

Inova South Patient Tower AHU-1,2,3,4

9th Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft²)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Total Supply	Fraction Zp	Fraction OA	Design OA	Comply Y/N?
CARITAS	Office		66	8	0.3	5.0	0.06	5.6	0.0	0.0	5.6	1	5.6	90	0.06	0.4	36	Y
IT CLOSET	Electrical		93	8	0.0	0.0	0.06	5.6	0.0	0.0	5.6	1	5.6	400	0.01	0.4	160	Y
FAMILY WAITING 2	Corridor	Corridor	442	8	0.0	0.0	0.06	26.5	2.0	117.8	117.8	1	117.8	390	0.30	0.4	156	Y
ELECTRICAL 2	Electrical		107	8	0.0	0.0	0.06	6.4	0.0	0.0	6.4	1	6.4	390	0.02	0.4	156	Y
ELEVATOR LOBBY	Corridor	Corridor	676	8	0.0	0.0	0.06	40.5	2.0	180.1	180.1	1	180.1	825	0.22	0.4	330	Y
ELEVATOR LOBBY	Corridor	Corridor	628	8	0.0	0.0	0.06	37.7	2.0	167.4	167.4	1	167.4	340	0.49	0.4	136	N
PATIENT ROOM 1	Bedroom	Patient Room	220	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.2	420	0.17	0.4	168	Y
PATIENT ROOM 2	Bedroom	Patient Room	218	8	2.2	5.0	0.06	23.9	2.0	58.1	58.1	0.8	72.6	420	0.17	0.4	168	Y
PATIENT ROOM 3	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	420	0.18	0.4	168	Y
PATIENT ROOM 4	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	480	0.16	0.4	192	Y
PATIENT ROOM 5	Bedroom	Patient Room	219	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.1	420	0.17	0.4	168	Y
PATIENT ROOM 6	Bedroom	Patient Room	224	8	2.2	5.0	0.06	24.7	2.0	59.8	59.8	0.8	74.8	420	0.18	0.4	168	Y
PATIENT ROOM 7	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	420	0.18	0.4	168	Y
PATIENT ROOM 8	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	250	0.30	0.4	100	Y
PATIENT ROOM 9	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	825	0.09	0.4	330	Y
ANTE ROOM 1	Bedroom	Patient Room	115	8	1.1	5.0	0.06	12.6	2.0	30.6	30.6	0.8	38.2	200	0.19	0.4	80	Y
PATIENT ROOM 10	Bedroom	Patient Room	229	8	2.3	5.0	0.06	25.2	2.0	61.1	61.1	0.8	76.4	300	0.25	0.4	120	Y
PATIENT ROOM 11	Bedroom	Patient Room	217	8	2.2	5.0	0.06	23.8	2.0	57.8	57.8	0.8	72.2	300	0.24	0.4	120	Y
PATIENT ROOM 12	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	200	0.37	0.4	80	Y
PATIENT ROOM 13	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	825	0.09	0.4	330	Y
PATIENT ROOM 14	Bedroom	Patient Room	214	8	2.1	5.0	0.06	23.5	2.0	57.0	57.0	0.8	71.3	250	0.29	0.4	100	Y
PATIENT ROOM 15	Bedroom	Patient Room	228	8	2.3	5.0	0.06	25.1	2.0	60.8	60.8	0.8	76.0	360	0.21	0.4	144	Y
ANTE ROOM 2	Bedroom	Patient Room	82	8	0.8	5.0	0.06	9.0	2.0	21.8	21.8	0.8	27.3	360	0.08	0.4	144	Y
PATIENT ROOM 16	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 17	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	410	0.18	0.4	164	Y
PATIENT ROOM 18	Bedroom	Patient Room	222	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 19	Bedroom	Patient Room	223	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	360	0.21	0.4	144	Y
PATIENT ROOM 20	Bedroom	Patient Room	221	8	2.2	5.0	0.06	24.3	2.0	59.0	59.0	0.8	73.7	360	0.20	0.4	144	Y
PATIENT ROOM 21	Bedroom	Patient Room	226	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	290	0.26	0.4	116	Y
PATIENT ROOM 22	Bedroom	Patient Room	226	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	825	0.09	0.4	330	Y
PATIENT ROOM 23	Bedroom	Patient Room	208	8	2.1	5.0	0.06	22.9	2.0	55.5	55.5	0.8	69.4	240	0.29	0.4	96	Y
PATIENT ROOM 24	Bedroom	Patient Room	210	8	2.1	5.0	0.06	23.1	2.0	56.0	56.0	0.8	70.0	75	0.93	0.4	30	N
TEAM STATION 1/Unit SCT	Office		450	8	2.3	5.0	0.06	38.3	0.0	0.0	38.3	1	38.3	110	0.35	0.4	44	Y
PCD OFFICE	Office		126	8	0.6	5.0	0.06	10.7	0.0	0.0	10.7	1	10.7	100	0.11	0.4	40	Y
EQUIPMENT STORAGE	Storage		190	8	0.0	0.0	0.12	22.8	0.0	0.0	22.8	1	22.8	100	0.23	0.4	40	Y
CLEAN SUPPLY	Storage		175	8	0.0	0.0	0.12	21.0	0.0	0.0	21.0	1	21.0	550	0.04	0.4	220	Y
SOILED HOLDING	Storage		140	8	0.0	0.0	0.12	16.8	0.0	0.0	16.8	1	16.8	100	0.17	0.4	40	Y
ELECTRICAL	Electrical		150	8	0.0	0.0	0.06	9.0	0.0	0.0	9.0	1	9.0	0	0.00	0.4	0	N
LOW VOLTAGE	Electrical		70	8	0.0	0.0	0.06	4.2	0.0	0.0	4.2	1	4.2	50	0.08	0.4	20	Y
CLOSET/BIO MED	Storage		85	8	0.0	0.0	0.12	10.2	0.0	0.0	10.2	1	10.2	60	0.17	0.4	24	Y
PANTRY	Storage		115	8	0.0	0.0	0.12	13.8	0.0	0.0	13.8	1	13.8	50	0.28	0.4	20	Y
MEDS 2	Storage		107	8	0.0	0.0	0.12	12.9	0.0	0.0	12.9	1	12.9	50	0.26	0.4	20	Y
OFFICE 1	Office		76	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	190	0.03	0.4	76	Y
OFFICE 2	Office		76	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	150	0.04	0.4	60	Y
TEAM STATION 2	Office		238	8	1.2	5.0	0.06	20.2	0.0	0.0	20.2	1	20.2	150	0.13	0.4	60	Y
PHYS. DICT	Office		97	8	0.5	5.0	0.06	8.3	0.0	0.0	8.3	1	8.3	270	0.03	0.4	108	Y
FAMILY CONSULT	Office		95	8	0.5	5.0	0.06	8.1	0.0	0.0	8.1	1	8.1	0	0.00	0.4	0	N
OFF UNIT CARE GIVERS	Office		156	8	0.8	5.0	0.06	13.2	0.0	0.0	13.2	1	13.2	930	0.01	0.4	372	Y
MEDS 1	Storage		120	8	0.0	0.0	0.12	14.4	0.0	0.0	14.4	1	14.4	0	0.00	0.4	0	N
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.06	198.0	2.0	880.0	880.0	1	880.0	0	0.00	0.4	0	N
STORAGE 1	Storage		70	8	0.0	0.0	0.12	8.4	0.0	0.0	8.4	1	8.4	0	0.00	0.4	0	N
STORAGE 2	Storage		70	8	0.0	0.0	0.12	8.4	0.0	0.0	8.4	1	8.4	50	0.17	0.4	20	Y
JANITOR CLOSET	Storage		80	8	0.0	0.0	0.12	9.6	0.0	0.0	9.6	1	9.6	0	0.00	0.4	0	N
WORK ROOM	Office		85	8	0.4	5.0	0.06	7.2	0.0	0.0	7.2	1	7.2	0	0.00	0.4	0	N
TOTALS			13590								3,102		3469	15495				
													Minimum Evz		0.79			
													Floor Max Zp		0.93			

Inova South Patient Tower AHU-1,2,3,4

10th Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis								
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft^2)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Actual Airflow	OA Fraction	Fraction OA	Design OA	Comply Y/N?
CARITAS	Office		66	8	0.3	5.0	0.06	5.6	0.0	0.0	5.6	1	5.6	90	0.06	0.4	36	Y
FAMILY WAITING	Corridor	Corridor	441.9	8	0.0	0.0	0.06	26.5	2.0	117.8	117.8	1	117.8	400	0.29	0.4	160	Y
VISITOR ELEVATOR LOBBY	Corridor	Corridor	675.5	8	0.0	0.0	0.06	40.5	2.0	180.1	180.1	1	180.1	390	0.46	0.4	156	N
PATIENT ELEVATOR LOBB	Corridor	Corridor	627.6	8	0.0	0.0	0.06	37.7	2.0	167.4	167.4	1	167.4	390	0.43	0.4	156	N
PATIENT ROOM 1	Bedroom	Patient Room	219.5	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.2	340	0.22	0.4	136	Y
PATIENT ROOM 2	Bedroom	Patient Room	217.7	8	2.2	5.0	0.06	23.9	2.0	58.1	58.1	0.8	72.6	340	0.21	0.4	136	Y
PATIENT ROOM 3	Bedroom	Patient Room	223.6	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	420	0.18	0.4	168	Y
PATIENT ROOM 4	Bedroom	Patient Room	223.6	8	2.2	5.0	0.06	24.6	2.0	59.6	59.6	0.8	74.5	420	0.18	0.4	168	Y
PATIENT ROOM 5	Bedroom	Patient Room	219.4	8	2.2	5.0	0.06	24.1	2.0	58.5	58.5	0.8	73.1	420	0.17	0.4	168	Y
PATIENT ROOM 6	Bedroom	Patient Room	224.4	8	2.2	5.0	0.06	24.7	2.0	59.8	59.8	0.8	74.8	480	0.16	0.4	192	Y
PATIENT ROOM 7	Bedroom	Patient Room	223.3	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	420	0.18	0.4	168	Y
PATIENT ROOM 8	Bedroom	Patient Room	223.3	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	420	0.18	0.4	168	Y
PATIENT ROOM 9	Bedroom	Patient Room	223.3	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	420	0.18	0.4	168	Y
ANTE ROOM 1	Bedroom	Patient Room	114.6	8	1.1	5.0	0.06	12.6	2.0	30.6	30.6	0.8	38.2	250	0.15	0.4	100	Y
PATIENT ROOM 10	Bedroom	Patient Room	229.2	8	2.3	5.0	0.06	25.2	2.0	61.1	61.1	0.8	76.4	410	0.19	0.4	164	Y
PATIENT ROOM 11	Bedroom	Patient Room	216.7	8	2.2	5.0	0.06	23.8	2.0	57.8	57.8	0.8	72.2	200	0.36	0.4	80	Y
PATIENT ROOM 12	Bedroom	Patient Room	223.2	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	300	0.25	0.4	120	Y
PATIENT ROOM 13	Bedroom	Patient Room	223.2	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	300	0.25	0.4	120	Y
PATIENT ROOM 14	Bedroom	Patient Room	213.8	8	2.1	5.0	0.06	23.5	2.0	57.0	57.0	0.8	71.3	200	0.36	0.4	80	Y
PATIENT ROOM 15	Bedroom	Patient Room	228	8	2.3	5.0	0.06	25.1	2.0	60.8	60.8	0.8	76.0	360	0.21	0.4	144	Y
ANTE ROOM 2	Bedroom	Patient Room	81.8	8	0.8	5.0	0.06	9.0	2.0	21.8	21.8	0.8	27.3	250	0.11	0.4	100	Y
PATIENT ROOM 16	Bedroom	Patient Room	221.9	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 17	Bedroom	Patient Room	221.9	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 18	Bedroom	Patient Room	221.9	8	2.2	5.0	0.06	24.4	2.0	59.2	59.2	0.8	74.0	360	0.21	0.4	144	Y
PATIENT ROOM 19	Bedroom	Patient Room	223.2	8	2.2	5.0	0.06	24.6	2.0	59.5	59.5	0.8	74.4	410	0.18	0.4	164	Y
PATIENT ROOM 20	Bedroom	Patient Room	221.2	8	2.2	5.0	0.06	24.3	2.0	59.0	59.0	0.8	73.7	360	0.20	0.4	144	Y
PATIENT ROOM 21	Bedroom	Patient Room	225.5	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	360	0.21	0.4	144	Y
PATIENT ROOM 22	Bedroom	Patient Room	225.5	8	2.3	5.0	0.06	24.8	2.0	60.1	60.1	0.8	75.2	360	0.21	0.4	144	Y
PATIENT ROOM 23	Bedroom	Patient Room	208.2	8	2.1	5.0	0.06	22.9	2.0	55.5	55.5	0.8	69.4	290	0.24	0.4	116	Y
PATIENT ROOM 24	Bedroom	Patient Room	209.9	8	2.1	5.0	0.06	23.1	2.0	56.0	56.0	0.8	70.0	300	0.23	0.4	120	Y
TEAM STATION 1/Unit SCT	Office		450	8	2.3	5.0	0.06	38.3	0.0	0.0	38.3	1	38.3	240	0.16	0.4	96	Y
PCD OFFICE	Office		126	8	0.6	5.0	0.06	10.7	0.0	0.0	10.7	1	10.7	70	0.15	0.4	28	Y
EQUIPMENT STORAGE	Storage		190	8	0.0	0.0	0.12	22.8	0.0	0.0	22.8	1	22.8	110	0.21	0.4	44	Y
CLEAN SUPPLY	Storage		175	8	0.0	0.0	0.12	21.0	0.0	0.0	21.0	1	21.0	100	0.21	0.4	40	Y
SOILED HOLDING	Storage		140	8	0.0	0.0	0.12	16.8	0.0	0.0	16.8	1	16.8	100	0.17	0.4	40	Y
ELECTRICAL	Electrical		150.3	8	0.0	0.0	0.06	9.0	0.0	0.0	9.0	1	9.0	550	0.02	0.4	220	Y
LOW VOLTAGE	Electrical		70	8	0.0	0.0	0.06	4.2	0.0	0.0	4.2	1	4.2	100	0.04	0.4	40	Y
IT CLOSET/ BIO MED	Electrical		85	8	0.0	0.0	0.06	5.1	0.0	0.0	5.1	1	5.1	180	0.03	0.4	72	Y
PANTRY	Storage		115.3	8	0.0	0.0	0.12	13.8	0.0	0.0	13.8	1	13.8	50	0.28	0.4	20	Y
MEDS	Storage		107.3	8	0.0	0.0	0.12	12.9	0.0	0.0	12.9	1	12.9	50	0.26	0.4	20	Y
OFFICE 1	Office		75.8	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	50	0.13	0.4	20	Y
OFFICE 2	Office		75.8	8	0.4	5.0	0.06	6.4	0.0	0.0	6.4	1	6.4	50	0.13	0.4	20	Y
TEAM STATION 2	Office		237.6	8	1.2	5.0	0.06	20.2	0.0	0.0	20.2	1	20.2	190	0.11	0.4	76	Y
MEDS 2	Office		107	8	0.4	5.0	0.06	7.2	0.0	0.0	7.2	1	7.2	60	0.12	0.4	24	Y
FAMILY CONSULT	Office		95	8	0.5	5.0	0.06	8.1	0.0	0.0	8.1	1	8.1	150	0.05	0.4	60	Y
OFF UNIT CARE GIVERS	Office		155.8	8	0.8	5.0	0.06	13.2	0.0	0.0	13.2	1	13.2	270	0.05	0.4	108	Y
PHYS. DICT	Office		83.5	8	0.4	5.0	0.06	7.1	0.0	0.0	7.1	1	7.1	150	0.05	0.4	60	Y
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.06	198.0	2.0	880.0	880.0	1	880.0	900	0.98	0.4	360	N
Work Room	Office		85	8	0.4	5.0	0.06	7.2	0.0	0.0	7.2	1	7.2	50	0.14	0.4	20	Y
TOTALS			13143.20								3,050.2		3417.4	13800				
													Minimum Evz		0.77			
													Floor Max Zp		0.98			

Inova South Patient Tower AHU-1,2,3,4

11th Floor Summary

					ASHRAE 62.1 Analysis				ASHRAE 170 Analysis									
Room Name	ASHRAE 62.1	ASHRAE 170 Template	Floor Area (ft^2)	Ceiling Ht. (ft)	Occupancy	cfm/person	cfm/area	vent. Req.	OA min. AC/H	170 min. vent. Req.	Min. Vent. Required	Effectiveness	Outdoor Airflow	Actual Airflow	OA Fraction	Fraction OA	Design OA	Comply Y/N?
VISITOR ELEVATOR LOBBY	Corridor	Corridor	480	8	0.0	0.0	0.1	28.8	2.0	128.0	128.0	1	128.0	390	0.33	0.4	156	Y
STAFF LOUNGE	Break Room		270	8	6.8	5.0	0.1	50.0	0.0	0.0	50.0	1	50.0	150	0.33	0.4	60	Y
WORK ROOM	Office		85	8	0.4	5.0	0.1	7.2	0.0	0.0	7.2	1	7.2	50	0.14	0.4	20	Y
PATIENT ELEVATOR LOBBY	Corridor	Corridor	480	8	0.0	0.0	0.1	28.8	2.0	128.0	128.0	1	128.0	390	0.33	0.4	156	Y
PATIENT ROOM 1	Bedroom	Patient Room	219.5	8	2.2	5.0	0.1	24.1	2.0	58.5	58.5	0.8	73.2	410	0.18	0.4	164	Y
PATIENT ROOM 2	Bedroom	Patient Room	217.7	8	2.2	5.0	0.1	23.9	2.0	58.1	58.1	0.8	72.6	390	0.19	0.4	156	Y
PATIENT ROOM 3	Bedroom	Patient Room	223.6	8	2.2	5.0	0.1	24.6	2.0	59.6	59.6	0.8	74.5	380	0.20	0.4	152	Y
PATIENT ROOM 4	Bedroom	Patient Room	223.6	8	2.2	5.0	0.1	24.6	2.0	59.6	59.6	0.8	74.5	380	0.20	0.4	152	Y
PATIENT ROOM 5	Bedroom	Patient Room	219.4	8	2.2	5.0	0.1	24.1	2.0	58.5	58.5	0.8	73.1	360	0.20	0.4	144	Y
PATIENT ROOM 6	Bedroom	Patient Room	224.4	8	2.2	5.0	0.1	24.7	2.0	59.8	59.8	0.8	74.8	400	0.19	0.4	160	Y
PATIENT ROOM 7	Bedroom	Patient Room	223.3	8	2.2	5.0	0.1	24.6	2.0	59.5	59.5	0.8	74.4	370	0.20	0.4	148	Y
PATIENT ROOM 8	Bedroom	Patient Room	223.3	8	2.2	5.0	0.1	24.6	2.0	59.5	59.5	0.8	74.4	380	0.20	0.4	152	Y
PATIENT ROOM 9	Bedroom	Patient Room	223.3	8	2.2	5.0	0.1	24.6	2.0	59.5	59.5	0.8	74.4	380	0.20	0.4	152	Y
ANTE ROOM 1	Bedroom	Patient Room	114.6	8	1.1	5.0	0.1	12.6	2.0	30.6	30.6	0.8	38.2	250	0.15	0.4	100	Y
PATIENT ROOM 10	Bedroom	Patient Room	229.2	8	2.3	5.0	0.1	25.2	2.0	61.1	61.1	0.8	76.4	755	0.10	0.4	302	Y
PATIENT ROOM 11	Bedroom	Patient Room	216.7	8	2.2	5.0	0.1	23.8	2.0	57.8	57.8	0.8	72.2	200	0.36	0.4	80	Y
PATIENT ROOM 12	Bedroom	Patient Room	223.2	8	2.2	5.0	0.1	24.6	2.0	59.5	59.5	0.8	74.4	280	0.27	0.4	112	Y
PATIENT ROOM 13	Bedroom	Patient Room	223.2	8	2.2	5.0	0.1	24.6	2.0	59.5	59.5	0.8	74.4	280	0.27	0.4	112	Y
PATIENT ROOM 14	Bedroom	Patient Room	213.8	8	2.1	5.0	0.1	23.5	2.0	57.0	57.0	0.8	71.3	200	0.36	0.4	80	Y
PATIENT ROOM 15	Bedroom	Patient Room	228	8	2.3	5.0	0.1	25.1	2.0	60.8	60.8	0.8	76.0	755	0.10	0.4	302	Y
ANTE ROOM 2	Bedroom	Patient Room	115	8	1.2	5.0	0.1	12.7	2.0	30.7	30.7	0.8	38.3	250	0.15	0.4	100	Y
PATIENT ROOM 16	Bedroom	Patient Room	221.9	8	2.2	5.0	0.1	24.4	2.0	59.2	59.2	0.8	74.0	300	0.25	0.4	120	Y
PATIENT ROOM 17	Bedroom	Patient Room	221.9	8	2.2	5.0	0.1	24.4	2.0	59.2	59.2	0.8	74.0	320	0.23	0.4	128	Y
PATIENT ROOM 18	Bedroom	Patient Room	221.9	8	2.2	5.0	0.1	24.4	2.0	59.2	59.2	0.8	74.0	320	0.23	0.4	128	Y
PATIENT ROOM 19	Bedroom	Patient Room	223.2	8	2.2	5.0	0.1	24.6	2.0	59.5	59.5	0.8	74.4	340	0.22	0.4	136	Y
PATIENT ROOM 20	Bedroom	Patient Room	221.2	8	2.2	5.0	0.1	24.3	2.0	59.0	59.0	0.8	73.7	310	0.24	0.4	124	Y
PATIENT ROOM 21	Bedroom	Patient Room	225.5	8	2.3	5.0	0.1	24.8	2.0	60.1	60.1	0.8	75.2	330	0.23	0.4	132	Y
PATIENT ROOM 22	Bedroom	Patient Room	225.5	8	2.3	5.0	0.1	24.8	2.0	60.1	60.1	0.8	75.2	330	0.23	0.4	132	Y
PATIENT ROOM 23	Bedroom	Patient Room	208.2	8	2.1	5.0	0.1	22.9	2.0	55.5	55.5	0.8	69.4	330	0.21	0.4	132	Y
PATIENT ROOM 24	Bedroom	Patient Room	209.9	8	2.1	5.0	0.1	23.1	2.0	56.0	56.0	0.8	70.0	370	0.19	0.4	148	Y
TEAM STATION 1/Unit SCT	Office		450	8	2.3	5.0	0.1	38.3	0.0	0.0	38.3	1	38.3	310	0.12	0.4	124	Y
PCD OFFICE	Office		126	8	0.6	5.0	0.1	10.7	0.0	0.0	10.7	1	10.7	100	0.11	0.4	40	Y
EQUIPMENT STORAGE	Storage		190	8	0.0	0.0	0.1	22.8	0.0	0.0	22.8	1	22.8	110	0.21	0.4	44	Y
CLEAN SUPPLY	Storage		312	8	0.0	0.0	0.1	37.4	0.0	0.0	37.4	1	37.4	100	0.37	0.4	40	Y
SOILED HOLDING	Storage		140	8	0.0	0.0	0.1	16.8	0.0	0.0	16.8	1	16.8	100	0.17	0.4	40	Y
ELECTRICAL	Electrical		150.3	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	550	0.00	0.4	220	Y
LOW VOLTAGE	Electrical		70	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	100	0.00	0.4	40	Y
IT CLOSET/BIO MED	Electrical		85	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0	0.00	0.4	0	Y
PANTRY	Storage		115.3	8	0.0	0.0	0.1	13.8	0.0	0.0	13.8	1	13.8	50	0.28	0.4	20	Y
MEDS	Storage		107.3	8	0.0	0.0	0.1	12.9	0.0	0.0	12.9	1	12.9	60	0.21	0.4	24	Y
OFFICE 1	Office		75.8	8	0.4	5.0	0.1	6.4	0.0	0.0	6.4	1	6.4	80	0.08	0.4	32	Y
OFFICE 2	Office		75.8	8	0.4	5.0	0.1	6.4	0.0	0.0	6.4	1	6.4	80	0.08	0.4	32	Y
TEAM STATION 2	Office		237.6	8	1.2	5.0	0.1	20.2	0.0	0.0	20.2	1	20.2	200	0.10	0.4	80	Y
PHYS. DICT 2	Office		97.3	8	0.5	5.0	0.1	8.3	0.0	0.0	8.3	1	8.3	150	0.06	0.4	60	Y
North Corridor	Corridor	Corridor	852	8	0.0	0.0	0.1	51.1	2.0	227.2	227.2	1	227.2	420	0.54	0.4	168	N
OFF UNIT CARE GIVERS	Office		155.8	8	0.8	5.0	0.1	13.2	0.0	0.0	13.2	1	13.2	270	0.05	0.4	108	Y
MEDS 1	Storage		120	8	0.0	0.0	0.1	14.4	0.0	0.0	14.4	1	14.4	0	0.00	0.4	0	N
CORRIDOR	Corridor	Corridor	3300	8	0.0	0.0	0.1	198.0	2.0	880.0	880.0	1	880.0	1200	0.73	0.4	480	N
STORAGE 1	Storage		70	8	0.0	0.0	0.1	8.4	0.0	0.0	8.4	1	8.4	0	0.00	0.4	0	N
STORAGE 2	Storage		70	8	0.0	0.0	0.1	8.4	0.0	0.0	8.4	1	8.4	0	0.00	0.4	0	N
JANITOR CLOSET	Storage		80	8	0.0	0.0	0.1	9.6	0.0	0.0	9.6	1	9.6	0	0.00	0.4	0	N
TOTALS			12986								2968		3338	13690				
													Minimum Evz		0.77			
													Floor Max Zp		0.73			