Technical Report Two

Design Load Estimation, Annual Energy Consumption, and Operating Costs

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Contents

Executive Summary

Oklahoma University Children's Medical Office Building is a 12-story above grade structure that is part of the Oklahoma University Health Services Division. The building under analysis is located in downtown Oklahoma City, Oklahoma and is situated on the university hospital grounds. The building is primarily comprised of office spaces and patient care services similar to a general medical office building. The medical services provided here are only diagnostic doctor care and outpatient care related to routine check-ups. It is important to note that the construction for the building is based on a tenant fit-out plan and not all of the floors are currently occupied.

The purpose of this report is to examine the building through an energy model. The analysis of the building was completed with the use of TRACE 700 software, created and provided by Trane. TRACE is accepted software used widely throughout the building engineering industry. The software is integrated with ASHRAE Standard 90.1, the energy standard for buildings, which makes design decisions within the software, credible and applicable. For this study an energy model was created in TRACE based upon the design criteria from the construction documents and as a result loads, energy consumption, and economic impact results were able to be computed.

Building Overview

The OU Children's MOB is a 337,000 square foot newly constructed building on the OU hospital grounds. The cost of the project is approximately $60 million, and was set for completion in the spring of 2009. The architecture of the building incorporates a standard, brick veneer façade separated visually by large spans of aluminum panels and glass curtain walls to give it a modern appearance. The interior floors are repetitive and feature exterior and interior offices, which are divided by a continuous corridor. Offices and spaces are designated by their corresponding medical use.

Mechanical Systems Overview

The general mechanical layout for the building makes use of an air-handling unit on each of the 11 above-grade floors and 1 basement floor. Each air-handling unit is capable of providing approximately 28 tons of cooling. From the air-handling unit, air is distributed to approximately 40 terminal boxes per floor. All terminal boxes present within the building are intended for variable air volume (VAV). The medical office building uses the plenum space above the rooms for air return and circulation by way of the terminal units and transfer ducts. Additionally, each floor is served by the two mechanical rooms; that which houses the floor's air-handling unit and another at the opposite side of the building were approximately 50% of the

distributed air is discharged from the building. All exhaust air travels up to the roof to be relieved.

Chilled and heating water is distributed through the building after transfer in the main mechanical room, which is served by a central steam heating plant and a chiller plant both located offsite, but on the hospital campus. Currently, nine of the twelve floors are set to be occupied, leaving three floors with AHUs not yet in operation. Furthermore, egress spaces on the unoccupied floors, parking deck, and stairwells are served by fan coil units.

Load Calculation

The loads presented and energy consumed by Oklahoma University Children's MOB was obtained through Trane's load calculation and energy simulation software, TRACE 700. The software makes calculations based on the user input and guideline criteria established by the American Society of Heating, Refrigeration, and Air Condition Engineers (ASHRAE).

Design Conditions

Based upon the weather data and the design documents a general thermostat setting is used, shown in Table 1. This was created as the default for all of the spaces in the building; however, thermostat settings could be changed on a room by room basis if a specific space has required so. For the purposes of this analysis all of the spaces use the thermostat design settings in the following table.

Table 1. Thermostat Setting

Thermostat Design Settings	
Cooling Dry Bulb, °F	75
Heating Dry Bulb, °F	72
Relative Humidity, %RH	50
Cooling Drift Point, °F	81
Heating Drift Point, °F	64

Model Design

The medical office building is a tenant fit-out construction project and thus requires the use of 12 air handling units (AHU). A single air handling unit is used to serve each of floors; one basement floor below the parking garage and 11 floors above the parking deck. Therefore as a building floor is leased out, the air handling unit that serves the floor becomes operable. Currently only three and half floors have not become occupied.

The model for the building defines zones room by room. Since there are a wide variety of rooms, each room was inputted into the software individually as opposed to using block loading. For example, an interior block along the east face of the building envelope may contain everything from an exam room to library to laboratory, thus the need to evaluate each room individually.

Load Assumptions

The loads for the building were based upon the supposed occupancy due to the space types established in the construction documents. Rooms were selected based upon a sufficient amount of space templates created from the design documents, which will be described in more detail later. For rooms where sufficient information could not be gathered from the construction documents, comparable room properties provided by the software (set forth by ASHRAE) were used. The general space characteristics used follow.

Occupancy Assumptions

Occupancy numbers and densities are given for the sixteen general room templates in Table 2. The number and density for each room has been acquired from the interior architectural drawings provide by Miles Associates and from general densities provided by TRACE from ASHRAE literature. Upon creating the individual rooms if a single room varied from a given template then the occupancy was independently input. There are a total of 738 rooms in the building created from the templates displayed below.

Table 2. Common Room Occupancy

Space Templates	Occupancy	
	No. of People	Square Feet per Person
Office	1	-
Conference	-	20
Patient Room	2	-
Basic Storage	0	0
Special Storage	0	0
Equipment Room	2	-
Laboratory	-	33.3
Work	-	143
Break Room	3	-
Copy/Printing	0	0
Reception	-	16.7
Waiting	3	-
Corridor	0	0
Toilet	0	0
Changing/Locker Room	0	0
Library	-	50

Lighting and Equipment Electrical Load Assumptions

The lighting equipment described in the MEP design documents was used for each of the room templates. Generally, the lighting equipment used on each floor for each space was the same and was approximately two watts per square foot. Additionally for rooms where lighting would typically be off for the majority of the day a lower wattage per square foot was used for the individual room, such as janitor closets.

The building in examination is a medical building, which means that the equipment load is generally more than a basic commercial office building. This

plays a significant factor in the load analysis. The majority of the spaces in the building are patient, procedure, and exam rooms which are typically considered to have sufficient densities of mechanical equipment which use electrical power. Laboratories and other special equipment rooms such as X-Ray rooms are also present within the medical office building. General lighting and miscellaneous equipment power densities for the room templates are given in Table 3, below.

Table 3. Space Lighting and Equipment Loads

Space Templates	Lighting Loads	Misc. Equip. Loads
	Watts per Square Foot	Watts per Square Foot
Office	2	1
Conference	2	1
Patient Room	2	2
Basic Storage	1	0
Special Storage	2	2
Equipment Room	2	2
Laboratory	2	1
Work	2	1
Break Room	2	2
Copy/Printing	2	2
Reception	2	1
Waiting	2	0
Corridor	2	0
Toilet	2	0
Changing/Locker Room	2	0
Library	2	2

Construction

The basic construction elements for the building were acquired from the construction documents and entered into the room templates as they applied to each one. Then as each specific room was created, the building envelope materials were applied at the correct angle from North. Much of the office and exam rooms are located at the exterior walls facing north and east. Each of the spaces contained at least one window that was correctly applied to the exterior wall. On the west face of the building, corridors and waiting areas are situated and contain a continuous glass curtain wall along the entire face.

The typical construction assemblies are laid out in the table below. The elements used in the design were as closely matched to those provided by TRACE.

Table 4. Typical Construction Assemblies

Glass	Type	U-Factor, BTU/hr-ft2-oF	Shading Coefficient
Window	Single Clear 1/4"	0.950	0.95
Door	Standard Door	0.200	0.00
Construction	**Type**	**U-Factor, BTU/hr-ft2-oF**	
Slab	4" Light Weight Concrete	0.213	
Roof	8" Heavy Weight Concrete, 4" Insulation	0.065	
Wall	Matal, 2" Insulation	0.130	
Partition	3/4" Gypsum Wall Board Framed	0.388	

Schedules

Occupancy schedules for people, lights, and miscellaneous loads were utilized during normal work hours because Oklahoma University Children's Medical Office Building is mostly an office building. Loads during the day are much higher than at night with off peak hours of 11:00pm to 7:00am used during the weekday.

Calculated Load vs. Design Load Analysis

The calculated loads using Trane's software proved to be much higher than what was previously designed for, as can be seen in Table 5. This can be due several factors that have been accounted for and others which have not. First and foremost, bathrooms, corridors, and waiting areas were all accounted for in the TRACE model. Typically these rooms would not be set to receive a significant amount of design airflow. However, between the exterior spaces and the interior space there is ample corridor and waiting space which makes up a sufficient amount of the total floor area. The architectural drawings used to create the model are poor in regards to distinguishing between corridors and waiting area. In the model, the waiting areas were design to have an occupant density. Additionally, majority of the floors have areas designated for future construction or what is denoted as available or open office space. These spaces were applied as offices in the model.

Table 5. Airflow Comparison

	Design vs. Calculated Airflow		
Unit	Design Airflow (CFM)	Calculated Airflow (CFM)	Error (%)
AHU-0	15000	13008	15.3
AHU-3	25000	44879	44.3
AHU-4	25000	45858	45.5
AHU-5	25000	44715	44.1
AHU-6	25000	45789	45.4
AHU-7	25000	45507	45.1
AHU-8	25000	46078	45.7
AHU-9	25000	42239	40.8
AHU-10	25000	39969	37.5

Energy Calculation and Operating Cost

A full year energy study was also conducted on the Oklahoma University Medical office building. Trane TRACE 700 was once more utilized with the previously mentioned model, designed with thorough examination of the construction documents, to provide simulated energy usage data and utility costs.

The medical office building is on the campus of the OU Hospital system and therefore makes use of a shared heating plant and chiller plant for the building's mechanical purposes. Not much is known about the operation of the off-site plants that supply the building and construction documents for the plants could not be obtained.

This model uses what has been established in TRACE as the default for heating and cooling plants. Additionally, the utility data used for the building was the default electric and gas power rates supplied by the software.

Energy Consumption

It has been noted that the calculated loads for the building were off from the design loads by almost double for some floors, so it is important to realize that the energy simulation provides merely a rough estimate for the building. In the figure located below, the monthly estimated energy consumption for each utility being used by the building is laid out. It can be said that the peaks between the gas and electricity usage are inverse. The directly relates to the heating and cooling of the building. Then, in the second figure it is found that the heating and cooling required for the building consume the most energy.

------- Monthly Energy Consumption -------

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Alternative: 1	**Load Calculations**												
Electric													
On-Pk Cons. (kWh)	77,405	70,445	86,752	81,083	90,713	96,265	95,687	104,466	83,803	84,921	77,496	73,449	1,022,485
Off-Pk Cons. (kWh)	252,219	227,896	233,676	253,523	250,362	241,874	293,915	250,581	256,636	245,103	237,896	262,227	3,005,908
Mid-Pk Cons. (kWh)	129,608	117,644	143,125	127,934	143,599	150,778	145,015	159,510	129,707	137,427	130,107	123,785	1,638,238
On-Pk Demand (kW)	693	733	766	826	855	909	991	945	859	769	708	669	991
Gas													
On-Pk Cons. (therms)	1,078	920	719	265	59	31	0	83	241	475	678	1,063	5,612
Off-Pk Cons. (therms)	7,523	6,739	6,383	5,287	4,722	3,480	3,163	3,237	4,540	5,799	6,414	8,065	65,353
Mid-Pk Cons. (therms)	3,743	3,201	3,378	2,024	1,645	1,368	979	1,402	1,691	2,892	3,571	3,876	29,771
On-Pk Demand (therms/hr)	17	16	15	13	9	1	0	4	12	14	16	17	17
Off-Pk Demand (therms/hr)	26	22	21	19	18	18	18	18	18	20	20	22	26
Mid-Pk Demand (therms/hr)	22	22	20	20	18	17	17	17	18	18	20	22	22

ACADEMIC USE

Energy Consumption

Building	153,052	Btu/(ft2-year)
Source	357,111	Btu/(ft2-year)
Floor Area	192,182	ft2

Figure 1. Monthly Calculated Energy Consumption

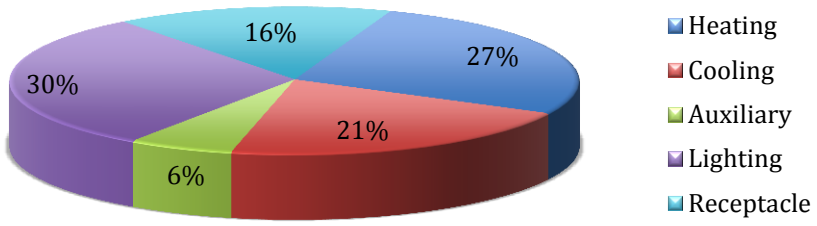

Figure 2. Energy Consumption Breakdown

Energy Comparison

Energy consumption data and utility bills for the Children's Medical Office Building were not provided to be studied. Thus, there is no way of knowing just how comparable the energy simulation data is to the actual. However, it is significant to note that all designed HVAC equipment has not been included in the created TRACE model. Spaces on the ground floor where the parking deck is located contain fan coil units as well as other spaces such as stairwells. This equipment was not modeled, yet should not be neglected because of the pan power draw.

Cost Analysis

Based on the calculated mechanical loads for the building and the energy consumed to meet these loads, simulated operating costs were determined using the default utility rates from Trace. The building utility expenses on a per month basis can be seen in the table below. Again, the building uses both electricity and natural gas.

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
	------- Monthly Utility Costs -------												
Alternative 1													
Electric													
On-Pk Cons. ($)	2,469	2,247	2,767	2,587	2,894	3,071	3,052	3,332	2,673	2,709	2,472	2,343	32,617
Off-Pk Cons. ($)	6,053	5,469	5,608	6,085	6,009	5,805	7,054	6,014	6,159	5,882	5,710	6,293	72,142
Total ($):	8,522	7,717	8,376	8,671	8,902	8,876	10,106	9,346	8,833	8,591	8,182	8,636	104,759
Gas													
On-Pk Cons. ($)	539	460	360	132	30	16	0	41	121	238	339	531	2,806
Monthly Total ($):	9,061	8,177	8,735	8,804	8,932	8,891	10,106	9,388	8,953	8,829	8,521	9,168	107,565

Building Area = 192,182 ft²
Utility Cost Per Area = 0.56 $/ft²

ACADEMIC USE

Figure 3. Monthly Utility Costs

Emissions

Through the energy consumption and building operation simulation it has been determined that the Oklahoma University Hospital is generating nearly 8.5 million pounds of CO_2 per year. This is monumental compared to the SO_2 and NO_x emissions generated by the building, which can be found in the following table.

Table 6. Emissions

	Environmental Impact Analysis	
	GM/year	lbm/year
CO_2	-	8416137.0
SO_2	21063	46.4
NOx	12632	27.8

Summary

The software, Trane TRACE 700, used for this report is generally a pretty accurate tool for modeling building loads, energy consumption, and operating costs when the model created is as closely designed to the actual building as possible. However, in this study many assumptions had to be made due to the lack of information that could be gathered from the construction documents at hand.

Therefore, the results acquired through the building simulation are only a rough estimate. It is still useful, however, to see how the building operates based on the weather date, location, and general building systems of the design.

Going forward, it would be helpful to go back and tweak the model to see how closely I can match my calculated loads to those provided to me in order to better study the building. It would also be useful to converse with the entities providing me the building and see how I have strayed in my model. Furthermore, I can use the results to make design proposals for the future to achieve better building efficiency and reduce costs.

Project Team

- Owner: Oklahoma University Hospital Trust
- Construction Manager: Flintco, Inc.
- Design Architect: Hellmuth, Obata, Kassabaum [HOK]
- Project Architect: Miles Associates
- Structural Engineer: Zahl-Ford, Inc.
- MEP Engineer: ZRDH, P.C.
- Civil Engineer: Smith-Roberts Baldischwiler, Inc.

Appendix A

System Checksums

By ACADEMIC

AHU-0 — **Parallel Fan-Powered VAV**

ACADEMIC USE ONLY

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 19
Outside Air: OADB/WB/HR: 89 / 68 / 76

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	50,795	50,795	17
Glass Solar	0	0	0	0
Glass/Door Cond	0	0	0	0
Wall Cond	22,631	4,198	26,829	9
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	22,631	54,994	77,625	27
Internal Loads				
Lights	102,641	25,660	128,302	44
People	48,222	0	48,222	17
Misc	36,536	0	36,536	13
Sub Total ==>	187,399	25,660	213,059	73
Ceiling Load	26,971	-26,971	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	237,001	53,683	290,684	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 18
OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	0	0
Glass/Door Cond	0	0
Wall Cond	24,267	11
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	24,267	11
Internal Loads		
Lights	102,641	48
People	25,919	12
Misc	36,536	17
Sub Total ==>	165,096	77
Ceiling Load	25,697	12
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	215,060	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-75,787	71.17
Glass Solar	0	0	0.00
Glass/Door Cond	0	0	0.00
Wall Cond	-25,962	-30,697	28.83
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-25,962	-106,483	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-36,022	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-61,984	-106,483	100.00

TEMPERATURES

	Cooling	Heating
SADB	59.4	79.2
Ra Plenum	78.9	66.8
Return	78.9	66.8
Ret/OA	78.9	66.8
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	13,008	8,062
Terminal	13,008	8,062
Main Fan	13,008	4,031
Sec Fan	0	4,031
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	4,031	4,031
Return	13,008	4,031
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	0.60	0.18
cfm/ton	536.98	
ft²/ton	902.42	
Btu/hr·ft²	13.30	-6.32
No. People	104	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	24.2	290.7	268.4	12,986	78.9	63.6	68.0	59.4	56.1	65.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	24.2	290.7								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	21,860		
Part	0		
Int Door	0		
ExFlr	0		
Roof	21,623	0	0
Wall	4,058	0	0
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-138.1	8,062	63.1	79.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-53.8	4,031	59.4	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-138.1			

AHU-3 — **Parallel Fan-Powered VAV**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 18
Outside Air: OADB/WB/HR: 92 / 70 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	409,717	0	409,717	55
Glass/Door Cond	40,959	0	40,959	5
Wall Cond	5,400	1,405	6,805	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	456,076	1,405	457,481	61
Internal Loads				
Lights	109,088	27,272	136,360	18
People	93,928	0	93,928	13
Misc	61,441	0	61,441	8
Sub Total ==>	264,456	27,272	291,728	39
Ceiling Load	3,486	-3,486	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	724,018	25,191	749,209	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 18
OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	409,717	60
Glass/Door Cond	40,959	6
Wall Cond	5,400	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	456,076	67
Internal Loads		
Lights	109,088	16
People	51,336	8
Misc	61,441	9
Sub Total ==>	221,865	33
Ceiling Load	3,486	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		0
OA Preheat Diff.		0
RA Preheat Diff.		0
Additional Reheat		0
Underflr Sup Ht Pkup		0
Supply Air Leakage		0
Grand Total ==>	681,426	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-151,003	-151,003	91.84
Wall Cond	-10,614	-13,425	8.16
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-161,617	-164,428	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-490	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-162,106	-164,428	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.7	77.2
Ra Plenum	75.5	71.9
Return	75.5	71.9
Ret/OA	75.5	71.9
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	44,879	29,470
Terminal	44,879	29,470
Main Fan	44,879	14,735
Sec Fan	0	14,735
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	14,735	14,735
Return	44,879	14,735
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	2.16	0.71
cfm/ton	718.83	
ft²/ton	333.26	
Btu/hr-ft²	36.01	-16.34
No. People	207	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	62.4	749.2	706.6	44,879	75.5	62.5	68.0	60.7	56.9	66.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	62.4	749.2								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	20,807		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	4,396	2,647	60
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-340.1	29,470	66.3	77.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-176.8	14,735	60.7	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-340.1			

AHU-4 — **Parallel Fan-Powered VAV**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 18
Outside Air: OADB/WB/HR: 92 / 70 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	444,118	0	444,118	57
Glass/Door Cond	42,191	0	42,191	5
Wall Cond	5,472	1,458	6,929	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	491,780	1,458	493,237	63
Internal Loads				
Lights	112,563	28,141	140,704	18
People	105,932	0	105,932	14
Misc	43,055	0	43,055	5
Sub Total ==>	261,551	28,141	289,692	37
Ceiling Load	3,620	-3,620	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	756,950	25,979	782,930	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 18
OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	444,118	63
Glass/Door Cond	42,191	6
Wall Cond	5,472	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	491,780	69
Internal Loads		
Lights	112,563	16
People	56,711	8
Misc	43,055	6
Sub Total ==>	212,330	30
Ceiling Load	3,620	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		0
OA Preheat Diff.		0
RA Preheat Diff.		0
Additional Reheat		0
Underflr Sup Ht Pkup		0
Supply Air Leakage		0
Grand Total ==>	707,729	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-155,544	-155,544	92.31
Wall Cond	-10,195	-12,953	7.69
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-165,739	-168,497	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-512	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-166,252	-168,497	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.5	77.6
Ra Plenum	75.5	71.9
Return	75.5	71.9
Ret/OA	75.5	71.9
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	45,858	28,000
Terminal	45,858	28,000
Main Fan	45,858	14,000
Sec Fan	0	14,000
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	14,000	14,000
Return	45,858	14,000
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	2.14	0.65
cfm/ton	702.87	
ft²/ton	328.01	
Btu/hr-ft²	36.58	-15.83
No. People	228	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	65.2	782.9	733.7	45,858	75.5	62.5	68.0	60.5	56.7	66.4
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	65.2	782.9								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	21,401		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	4,414	2,726	62
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-338.9	28,000	66.2	77.6
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-171.5	14,000	60.5	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-338.9			

ACADEMIC USE ONLY

AHU-5 — **Parallel Fan-Powered VAV**

COOLING COIL PEAK — Peaked at Time: Mo/Hr: 7 / 18; Outside Air: OADB/WB/HR: 92 / 70 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	399,983	0	399,983	54
Glass/Door Cond	38,545	0	38,545	5
Wall Cond	5,109	1,344	6,454	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	443,637	1,344	444,981	60
Internal Loads				
Lights	118,177	29,544	147,722	20
People	87,087	0	87,087	12
Misc	61,605	0	61,605	8
Sub Total ==>	266,869	29,544	296,413	40
Ceiling Load	4,069	-4,069	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	714,574	26,820	741,394	100.00

CLG SPACE PEAK — Mo/Hr: 7 / 18; OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	399,983	59
Glass/Door Cond	38,545	6
Wall Cond	5,109	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	443,637	66
Internal Loads		
Lights	118,177	18
People	47,015	7
Misc	61,605	9
Sub Total ==>	226,797	34
Ceiling Load	4,069	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	674,503	100.00

HEATING COIL PEAK — Mo/Hr: Heating Design; OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-142,103	-142,103	91.73
Wall Cond	-10,102	-12,812	8.27
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-152,205	-154,915	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-511	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-152,716	-154,915	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.8	76.9
Ra Plenum	75.6	71.9
Return	75.6	71.9
Ret/OA	75.6	71.9
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	44,715	29,168
Terminal	44,715	29,168
Main Fan	44,715	14,584
Sec Fan	0	14,584
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	14,584	14,584
Return	44,715	14,584
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	1.97	0.64
cfm/ton	723.74	
ft²/ton	367.87	
Btu/hr·ft²	32.62	-14.40
No. People	190	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	61.8	741.4	701.3	44,715	75.6	62.5	68.0	60.8	56.9	66.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	61.8	741.4								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	22,728		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	4,160	2,491	60
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-327.4	29,168	66.4	76.9
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-173.6	14,584	60.8	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-327.4			

AHU-6 — **Parallel Fan-Powered VAV**

COOLING COIL PEAK — Peaked at Time: Mo/Hr: 7 / 18; Outside Air: OADB/WB/HR: 92 / 70 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	421,127	0	421,127	53
Glass/Door Cond	42,723	0	42,723	5
Wall Cond	5,311	1,385	6,697	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	469,162	1,385	470,547	59
Internal Loads				
Lights	117,975	29,494	147,469	19
People	121,406	0	121,406	15
Misc	54,813	0	54,813	7
Sub Total ==>	294,194	29,494	323,688	41
Ceiling Load	3,944	-3,944	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	767,300	26,935	794,235	100.00

CLG SPACE PEAK — Mo/Hr: 7 / 18; OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	421,127	59
Glass/Door Cond	42,723	6
Wall Cond	5,311	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	469,162	66
Internal Loads		
Lights	117,975	17
People	68,073	10
Misc	54,813	8
Sub Total ==>	240,861	34
Ceiling Load	3,944	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	713,967	100.00

HEATING COIL PEAK — Mo/Hr: Heating Design; OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-157,507	-157,507	92.25
Wall Cond	-10,461	-13,241	7.75
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-167,967	-170,748	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-511	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-168,479	-170,748	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.3	77.3
Ra Plenum	75.6	71.9
Return	75.6	71.9
Ret/OA	75.6	71.9
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	45,789	29,766
Terminal	45,789	29,766
Main Fan	45,789	14,883
Sec Fan	0	14,883
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	14,883	14,883
Return	45,789	14,883
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	2.04	0.66
cfm/ton	691.83	
ft²/ton	339.45	
Btu/hr·ft²	35.35	-15.77
No. People	275	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	66.2	794.2	740.9	45,789	75.6	62.5	68.0	60.3	56.7	66.3
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	66.2	794.2								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	22,467		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	4,486	2,761	62
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-354.3	29,766	66.1	77.3
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-184.7	14,883	60.3	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-354.3			

ACADEMIC USE ONLY

AHU-7 — Parallel Fan-Powered VAV

COOLING COIL PEAK — Peaked at Time: Mo/Hr: 7 / 18; Outside Air: OADB/WB/HR: 92 / 70 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	422,161	0	422,161	55
Glass/Door Cond	42,513	0	42,513	6
Wall Cond	5,119	1,331	6,450	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	469,792	1,331	471,124	61
Internal Loads				
Lights	116,280	29,070	145,349	19
People	99,777	0	99,777	13
Misc	54,226	0	54,226	7
Sub Total ==>	270,282	29,070	299,352	39
Ceiling Load	3,841	-3,841	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	743,915	26,561	770,476	100.00

CLG SPACE PEAK — Mo/Hr: 7 / 18; OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	422,161	61
Glass/Door Cond	42,513	6
Wall Cond	5,119	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	469,792	67
Internal Loads		
Lights	116,280	17
People	53,143	8
Misc	54,226	8
Sub Total ==>	223,648	32
Ceiling Load	3,841	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	697,281	100.00

HEATING COIL PEAK — Mo/Hr: Heating Design; OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-156,731	-156,731	92.43
Wall Cond	-10,142	-12,829	7.57
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	
Infiltration	0	0	0.00
Sub Total ==>	-166,873	-169,560	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-486	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-167,358	-169,560	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.6	77.3
Ra Plenum	75.6	71.9
Return	75.6	71.9
Ret/OA	75.6	71.9
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	45,507	29,831
Terminal	45,507	29,831
Main Fan	45,507	14,915
Sec Fan	0	14,915
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	14,915	14,915
Return	45,507	14,915
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	2.06	0.68
cfm/ton	708.76	
ft²/ton	343.36	
Btu/hr·ft²	34.95	-15.85
No. People	214	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	64.2	770.5	723.8	45,507	75.6	62.5	68.0	60.6	56.8	66.5
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	64.2	770.5								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	22,046		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	4,419	2,747	62
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-349.5	29,831	66.3	77.3
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-181.1	14,915	60.6	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-349.5			

AHU-8 — Parallel Fan-Powered VAV

COOLING COIL PEAK — Peaked at Time: Mo/Hr: 7 / 18; Outside Air: OADB/WB/HR: 92 / 70 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	422,594	0	422,594	56
Glass/Door Cond	42,816	0	42,816	6
Wall Cond	5,168	1,358	6,525	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	470,578	1,358	471,936	62
Internal Loads				
Lights	115,777	28,944	144,721	19
People	88,840	0	88,840	12
Misc	53,226	0	53,226	7
Sub Total ==>	257,843	28,944	286,787	38
Ceiling Load	3,780	-3,780	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	0
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	732,201	26,522	758,723	100.00

CLG SPACE PEAK — Mo/Hr: 7 / 18; OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	422,594	61
Glass/Door Cond	42,816	6
Wall Cond	5,168	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	470,578	68
Internal Loads		
Lights	115,777	17
People	48,601	7
Misc	53,226	8
Sub Total ==>	217,604	31
Ceiling Load	3,780	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	691,962	100.00

HEATING COIL PEAK — Mo/Hr: Heating Design; OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-157,849	-157,849	92.44
Wall Cond	-10,179	-12,904	7.56
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-168,028	-170,753	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-485	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-168,513	-170,752	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.9	77.2
Ra Plenum	75.5	71.9
Return	75.5	71.9
Ret/OA	75.5	71.9
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	46,078	30,337
Terminal	46,078	30,337
Main Fan	46,078	15,169
Sec Fan	0	15,169
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	15,169	15,169
Return	46,078	15,169
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	2.09	0.69
cfm/ton	728.78	
ft²/ton	348.02	
Btu/hr·ft²	34.48	-15.87
No. People	196	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	63.2	758.7	718.5	46,078	75.5	62.5	68.0	60.9	57.0	66.7
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	63.2	758.7								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	22,004		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	4,448	2,767	62
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-349.1	30,337	66.4	77.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-179.5	15,169	60.9	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-349.1			

ACADEMIC USE ONLY

AHU-9 — **Parallel Fan-Powered VAV**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 18
Outside Air: OADB/WB/HR: 92 / 70 / 83

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	415,588	0	415,588	62
Glass/Door Cond	38,570	0	38,570	6
Wall Cond	3,319	787	4,106	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	457,476	787	458,263	68
Internal Loads				
Lights	89,437	22,359	111,796	17
People	68,246	0	68,246	10
Misc	34,328	0	34,328	5
Sub Total ==>	192,011	22,359	214,371	32
Ceiling Load	2,514	-2,514	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	
Sup. Fan Heat			0	
Ret. Fan Heat		0	0	
Duct Heat Pkup		0	0	
Underflr Sup Ht Pkup			0	
Supply Air Leakage		0	0	
Grand Total ==>	652,002	20,633	672,635	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 18
OADB: 92

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	415,588	67
Glass/Door Cond	38,570	6
Wall Cond	3,319	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	457,476	74
Internal Loads		
Lights	89,437	14
People	37,451	6
Misc	34,328	6
Sub Total ==>	161,216	26
Ceiling Load	2,514	0
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		0
Exhaust Heat		0
OA Preheat Diff.		0
RA Preheat Diff.		0
Additional Reheat		0
Underflr Sup Ht Pkup		0
Supply Air Leakage		0
Grand Total ==>	621,207	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-142,194	-142,194	94.59
Wall Cond	-6,553	-8,134	5.41
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-148,748	-150,328	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-253	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-149,001	-150,328	100.00

TEMPERATURES

	Cooling	Heating
SADB	61.1	77.2
Ra Plenum	75.5	72.0
Return	75.5	72.0
Ret/OA	75.5	72.0
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	42,239	27,011
Terminal	42,239	27,011
Main Fan	42,239	13,506
Sec Fan	0	13,506
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	13,506	13,506
Return	42,239	13,506
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	2.45	0.78
cfm/ton	753.56	
ft²/ton	307.62	
Btu/hr-ft²	39.01	-17.71
No. People	151	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	56.1	672.6	641.8	42,239	75.5	62.5	68.1	61.1	57.1	67.0
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	56.1	672.6								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	17,243		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	3,552	2,492	70
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-305.3	27,011	66.6	77.2
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-155.6	13,506	61.1	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-305.3			

AHU-10 — **Parallel Fan-Powered VAV**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 17
Outside Air: OADB/WB/HR: 95 / 72 / 88

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	0	0	0
Glass Solar	341,949	0	341,949	52
Glass/Door Cond	41,750	0	41,750	6
Wall Cond	5,220	1,398	6,619	1
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	0		0	0
Sub Total ==>	388,920	1,398	390,318	60
Internal Loads				
Lights	111,676	27,919	139,595	21
People	72,451	0	72,451	11
Misc	52,400	0	52,400	8
Sub Total ==>	236,527	27,919	264,446	40
Ceiling Load	4,077	-4,077	0	0
Ventilation Load	0	0	0	0
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	
Ov/Undr Sizing	0		0	0
Exhaust Heat		0	0	
Sup. Fan Heat			0	
Ret. Fan Heat		0	0	
Duct Heat Pkup		0	0	
Underflr Sup Ht Pkup			0	
Supply Air Leakage		0	0	
Grand Total ==>	629,523	25,241	654,764	100.00

CLG SPACE PEAK

Mo/Hr: 7 / 17
OADB: 95

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	341,949	57
Glass/Door Cond	41,750	7
Wall Cond	5,220	1
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	0	0
Sub Total ==>	388,920	65
Internal Loads		
Lights	111,676	19
People	39,448	7
Misc	52,400	9
Sub Total ==>	203,524	34
Ceiling Load	4,077	1
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing		0
Exhaust Heat		0
OA Preheat Diff.		0
RA Preheat Diff.		0
Additional Reheat		0
Underflr Sup Ht Pkup		0
Supply Air Leakage		0
Grand Total ==>	596,520	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 13

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	0	0.00
Glass Solar	0	0	0.00
Glass/Door Cond	-135,257	-135,257	91.80
Wall Cond	-9,488	-12,075	8.20
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	0	0	0.00
Sub Total ==>	-144,745	-147,331	100.00
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-504	0	0.00
Ventilation Load	0	0	0.00
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-145,249	-147,331	100.00

TEMPERATURES

	Cooling	Heating
SADB	60.9	77.1
Ra Plenum	75.6	71.9
Return	75.6	71.9
Ret/OA	75.6	71.9
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	39,969	26,664
Terminal	39,969	26,664
Main Fan	39,969	13,332
Sec Fan	0	13,332
Nom Vent	0	0
AHU Vent	0	0
Infil	0	0
MinStop/Rh	13,332	13,332
Return	39,969	13,332
Exhaust	0	0
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	0.0	0.0
cfm/ft²	1.85	0.62
cfm/ton	732.53	
ft²/ton	396.34	
Btu/hr-ft²	30.28	-14.00
No. People	159	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	54.6	654.8	621.8	39,969	75.6	62.5	68.0	60.9	57.0	66.8
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	54.6	654.8								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	21,626		
Part	0		
Int Door	0		
ExFlr	0		
Roof	0	0	0
Wall	3,944	2,371	60
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-302.8	26,664	66.4	77.1
Aux Htg	0.0	0	0.0	0.0
Preheat	0.0	0	0.0	0.0
Reheat	-156.5	13,332	60.9	72.0
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-302.8			

ACADEMIC USE ONLY

Appendix B

SYSTEM SUMMARY
DESIGN COOLING CAPACITIES
By ACADEMIC

Alternative 1

Building Airside Systems and Plant Capacities

		Peak Plant Loads								Block Plant Loads								
Plant	System	Main Coil ton	Aux Coil ton	Opt Vent Coil ton	Misc Load ton	Stg 1 Desic Cond ton	Stg 2 Desic Cond ton	Base Utility ton	Peak Total ton	Time Of Peak mo/hr	Main Coil ton	Aux Coil ton	Opt Vent Coil ton	Misc Load ton	Stg 1 Desic Cond ton	Stg 2 Desic Cond ton	Base Utility ton	Block Total ton
Cooling plant - 001		517.9	0.0	0.0	0.0	0.0	0.0	0.0	517.9	7/18	517.4	0.0	0.0	0.0	0.0	0.0	0.0	517.4
	AHU-3	62.4	0.0	0.0	0.0	0.0	0.0	0.0	62.4	7/18	62.4	0.0	0.0	0.0	0.0	0.0	0.0	62.4
	AHU-0	24.2	0.0	0.0	0.0	0.0	0.0	0.0	24.2	7/18	23.7	0.0	0.0	0.0	0.0	0.0	0.0	23.7
	AHU-5	61.8	0.0	0.0	0.0	0.0	0.0	0.0	61.8	7/18	61.8	0.0	0.0	0.0	0.0	0.0	0.0	61.8
	AHU-4	65.2	0.0	0.0	0.0	0.0	0.0	0.0	65.2	7/18	65.2	0.0	0.0	0.0	0.0	0.0	0.0	65.2
	AHU-6	66.2	0.0	0.0	0.0	0.0	0.0	0.0	66.2	7/18	66.2	0.0	0.0	0.0	0.0	0.0	0.0	66.2
	AHU-7	64.2	0.0	0.0	0.0	0.0	0.0	0.0	64.2	7/18	64.2	0.0	0.0	0.0	0.0	0.0	0.0	64.2
	AHU-8	63.2	0.0	0.0	0.0	0.0	0.0	0.0	63.2	7/18	63.2	0.0	0.0	0.0	0.0	0.0	0.0	63.2
	AHU-9	56.1	0.0	0.0	0.0	0.0	0.0	0.0	56.1	7/18	56.1	0.0	0.0	0.0	0.0	0.0	0.0	56.1
	AHU-10	54.6	0.0	0.0	0.0	0.0	0.0	0.0	54.6	7/18	54.6	0.0	0.0	0.0	0.0	0.0	0.0	54.6
Building totals		517.9	0.0	0.0	0.0	0.0	0.0	0.0	517.9		517.4	0.0	0.0	0.0	0.0	0.0	0.0	517.4

Building peak load is 517.9 tons.

Building maximum block load of 517.4 tons occurs in July at hour 18 based on system simulation.

SYSTEM SUMMARY
DESIGN HEATING CAPACITIES
By ACADEMIC

Alternative 1

System Coil Capacities

ACADEMIC USE ONLY

System Description	System Type	Main System Btu/h	Aux System Btu/h	Preheat Btu/h	Reheat Btu/h	Humid. Btu/h	Optional Vent Btu/h	Stg 1 Desic Regen Btu/h	Stg 2 Desic Regen Btu/h	Stg 1 Frost Prevention Btu/h	Stg 2 Frost Prevention Btu/h	Heating Totals Btu/h
AHU-3	Parallel Fan-Powered VAV	-340,085	0	0	-176,813	0	0	0	0	0	0	-340,085
AHU-0	Parallel Fan-Powered VAV	-138,050	0	0	-53,814	0	0	0	0	0	0	-138,050
AHU-5	Parallel Fan-Powered VAV	-327,379	0	0	-173,559	0	0	0	0	0	0	-327,379
AHU-4	Parallel Fan-Powered VAV	-338,863	0	0	-171,485	0	0	0	0	0	0	-338,863
AHU-6	Parallel Fan-Powered VAV	-354,293	0	0	-184,675	0	0	0	0	0	0	-354,293
AHU-7	Parallel Fan-Powered VAV	-349,517	0	0	-181,054	0	0	0	0	0	0	-349,517
AHU-8	Parallel Fan-Powered VAV	-349,127	0	0	-179,491	0	0	0	0	0	0	-349,127
AHU-9	Parallel Fan-Powered VAV	-305,292	0	0	-155,625	0	0	0	0	0	0	-305,292
AHU-10	Parallel Fan-Powered VAV	-302,819	0	0	-156,525	0	0	0	0	0	0	-302,819
Totals		**-2,805,425**	**0**	**0**	**-1,433,040**	**0**	**0**	**0**	**0**	**0**	**0**	**-2,805,425**

Building Plant Capacities

		Peak Loads												
Plant	System	Main Coil MBh	Preheat Coil MBh	Reheat Coil MBh	Humid. Coil MBh	Aux Coil MBh	Opt Vent Coil MBh	Misc Load MBh	Stg 1 Desic. Regen. MBh	Stg 2 Desic. Regen. MBh	Stg 1 Frost Prev. MBh	Stg 2 Frost Prev. MBh	Base Utility MBh	Absorption Load MBh
Heating plant - 002		2,805	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-3	340	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-0	138	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-5	327	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-4	339	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-6	354	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-7	350	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-8	349	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-9	305	0	0	0	0	0	0	0	0	0	0	0	0
	AHU-10	303	0	0	0	0	0	0	0	0	0	0	0	0

Building peak load is 2,805.4 MBh.