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COMILLAS
UNIVERSIDAD PONTIFICIA
ICAI

GRADO EN INGENIERÍA EN TECNOLOGÍAS INDUSTRIALES

TRABAJO FIN DE GRADO

HVAC ENERGY EFFICIENCY IN COORSTEK CENTER FOR APPLIED SCIENCES AND ENGINEERING

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Fdo.: Diego Montalvo Hernández Date: 20/06/2019

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PROJECT SUPERVISOR

Fdo.: Dr. Pankaj Sen Date: 20/06/2019

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EFICIENCIA ENERGÉTICA DE LOS SISTEMAS HVAC EN EL EDIFICIO "*COORSTEK CENTER FOR APPLIED SCIENCE AND ENGINEERING*"

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Director: Sen, Pankaj.

Entidad Colaboradora: Colorado School of Mines

RESUMEN DEL PROYECTO

INTRODUCCIÓN

El calentamiento global y el cambio climático se han convertido en uno de los principales problemas para nuestra sociedad en los últimos años. En un esfuerzo por combatirlos, muchas instituciones educativas (así como otros tipos de propietarios inmobiliarios) en Estados Unidos han establecido programas para analizar la eficiencia energética de sus edificios e intentar determinar maneras para reducir su consumo energético y, consecuentemente, sus emisiones. Entre estas instituciones está *Colorado School of Mines*. Desde hace algunos años, la universidad está implementando una iniciativa para realizar análisis de todos sus edificios para disminuir su consumo energético y minimizar sus emisiones (al mismo tiempo que reducen su huella de carbono e intentan economizar el proceso al máximo).

Nuestro equipo de trabajo, constituido por Cristina Olivié, Jorge Goas y yo, consideró muy interesante esta iniciativa. En un intento de involucrarnos en este proyecto global, conseguimos que nos asignasen el análisis y diseño del *CoosTek Center for Applied Sciences and Engineering* (CoorsTek). Este edificio es el último que ha sido construido en el campus de la universidad, por lo que el proyecto aún no había sido asignado. El principal objetivo del proyecto sería determinar si alguna mejora podría ser implementada en los campos de eficiencia energética, reducción de costes o bien en cuanto al impacto medioambiental de la universidad.

Dado que el equipo está compuesto por tres integrantes, el análisis del edificio también se dividirá en tres. La primera etapa del proyecto consistirá en una primera toma de contacto con el edificio y el posterior análisis de las condiciones actuales. A continuación, con la información obtenida anteriormente, los cálculos de las cargas de cada una de las tres secciones se llevaran a cabo para determinar la eficiencia energética actual de CoorsTek. Cualquier idea de posible mejora o simplificación del proceso serán descritas con detalle. La última fase del estudio consistirá en la descripción de posibles medidas que podrían mejorar el edificio y sus consecuencias tanto económicas como medioambientales.

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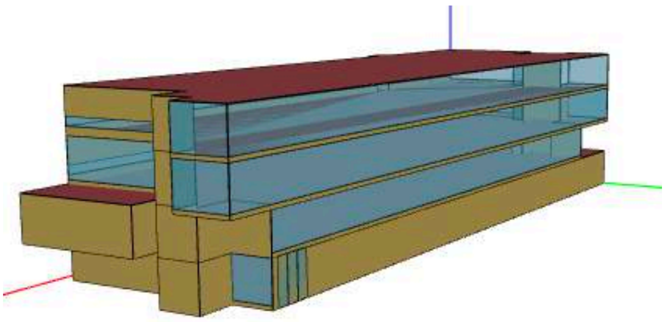
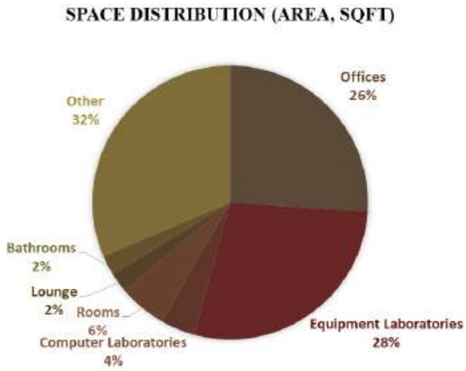
En particular, mi parte del proyecto consiste en al análisis de la eficiencia energética de los sistemas HVAC. Debido a que el edificio goza de una amplia red de sistemas, el análisis se llevará a cabo para uno de ellos en particular. Los resultados podrán ser extrapolados al resto de sistemas posteriormente.

METODOLOGÍA

La primera fase en la realización de este proyecto fue una descripción minuciosa del edificio y del uso de cada una de las habitaciones que lo compone. Una descripción detallada de cada una de las habitaciones de cada piso del edificio fue llevada a cabo. Para hacerlo, los planos arquitectónicos y el programa de simulación OpenStudio fueron utilizados. Los resultados fueron los siguientes:

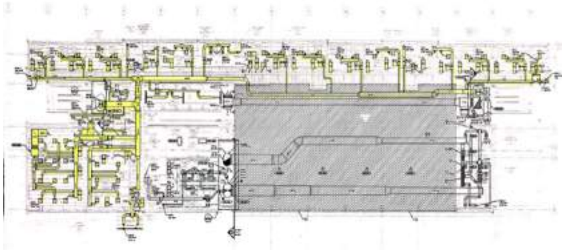
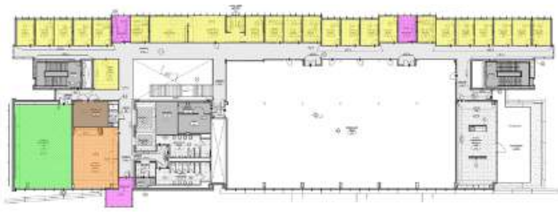




Una vez la descripción del edificio fue completada, el análisis de los cálculos de las cargas dio comienzo. Para ello, se utilizó el informe *ASHRAE Fundamentals Handbook, 2001*. En particular, esta parte del proyecto está basada en el capítulo 29 de este informe, "*Non-Residential Cooling and Heating Load Calculations procedures*".

El primer lugar, el segundo capítulo de mi informa final lleva a cabo un resumen de lo que el capítulo citado anteriormente mencionado dice. Este resumen contiene una descripción detallada de todos los aspectos que hay que tener en cuenta (ocupación, iluminación, motores eléctricos, electrodomésticos, ventanaje, paredes interiores y exteriores, ventilación e infiltración, humedad y otras fuentes de calor) para la realización de los cálculos de las cargas sean precisos. Es decir, en este capítulo no se han tenido en cuenta ninguna de las posteriores simplificaciones que luego se han podido llevar a cabo a la hora de realizar los cálculos debido a las características del edificio. Esto se ha realizado así para describir lo que se debería realmente llevar a cabo en el proceso completo.

El tercer capítulo del informe final del trabajo lleva a cabo el proceso del cálculo de las cargas. En primer lugar, el sistema HVAC que será objeto del estudio. El elegido fue el sistema AHU 3. Aunque este sea uno de los sistemas más grandes del edificio, si principal función es la alimentación de los despachos situados en las diferentes plantas. Desde una perspectiva de diseño, los despachos son muy fáciles de modelar, ya que utilizan, por lo general, los mismos electrodomésticos y luces, y suelen tener ocupaciones con respecto a su espacio muy similares. A continuación, se llevó a cabo la identificación de las habitaciones que este sistema alimenta, con su correspondiente clasificación en distintas categorías (despachos, laboratorios de ordenadores, laboratorios de experimentos, salas de conferencias…). La siguiente imagen muestra como estos dos pasos se llevaron a cabo para el segundo piso (se realizó el mismo análisis en el primer y tercer piso también):

El siguiente paso a seguir fue el análisis y el cálculo de todos los factores que pueden afectar a la carga de refrigeración y que en el peor de los casos el sistema tendría que ser capaz de soportar (dado que calculamos la carga de refrigeración, cogeremos como caso más adverso el 22 de julio):

- Ocupación – Dependiendo del tipo de habitación, se eligió el estado de actividad más razonable para sus ocupantes. El documento de ASHRAE determina la ganancia de calor latente para cada uno de estos estados. Para calcular la ganancia de calor, basta con multiplicar esto valores con las ocupaciones de cada habitación obtenidas de los planos arquitectónicos.
- Iluminación – Debido a múltiples suposiciones descritas en el informe completo, podemos suponer que toda la potencia consumida en una lámpara se convierte posteriormente en calor. Además, aunque una lámpara corriente disipa calor a otros lugares además de al espacio que ilumina, se realizó la suposición de que, al tratarse de un edificio nuevo (y consecuentemente con buen aislamiento), todo el calor iba al interior de este. La información de la potencia consumida en cada lámpara se puede obtener de los cuadros terminales de iluminación de la sección eléctrica de los documentos arquitectónicos.
- Electrodomésticos – La ganancia de calor de los electrodomésticos se calcula multiplicando la potencia consumida por cada aparato y los factores de utilización y de radiación. Estos dos factores son obtenidos del documento de ASHRAE. En cuanto a las potencias consumidas, podían obtenerse para cada habitación de los cuadros terminales de los enchufes de la misma sección eléctrica mencionada anteriormente.
- Ventanaje – la aportación de calor vía radiación y conducción a través de los cristales y los marcos de las ventanas también tiene que ser tenida en cuenta en el cálculo de las ganancias de refrigeración. Para calcularlas, las formulas aprendidas en la asignatura de Transmisión de Calor fueron implementadas.
- Paredes exteriores – Al igual que en las ventanas, las mismas ganancias de calor ocurre a través de las paredes que dan al exterior del edificio. La principal dificultad de esta sección ocurre debido a que la transmisión de calor a través de estas superficies no es instantánea. Es decir, la ganancia de calor que empieza a una hora determinada puede afectar tanto a esa hora como a las posteriores. Por

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ello, se debe realzar un ajuste. El método implementado toma el nombre de *Conductive Time Series* (CTS). Este método sirve para calcular la ganancia de calor en una hora concreta. Para ello, multiplica tanto la ganancia calculada para esa hora como las calculadas para las 23 anteriores por unos índices que indican el porcentaje de cada ganancia que afecta en la hora del cálculo. Estos coeficientes varían en función del material del cual este compuesto la pared analizada.

Una vez concluidos estos cálculos y obtenidas las ganancias de calor de cada tipo, debe realizarse la división de cada una de ellas entre ganancias radiantes y convectivas. Esto es así ya que las ganancias convectivas se convierten en calor de forma instantánea mientras que las radiantes no ocurren de forma inmediata, como ocurría con las ganancias a través de las paredes exteriores. Esta distinción se realizó gracias a información disponible en el documento de ASHRAE. El método para evaluar la parte radiante es denominado *Radiant Time Series*. Similarmente al caso de las paredes exteriores, también aparecen unos índices que reflejan los porcentajes de las ganancias de las últimas 23 horas que están afectando a la ganancia de la hora del cálculo. Por lo tanto, pasamos a tener que calcular la ganancia para cada una de las horas del día en cuestión.

RESULTADOS

Los resultados horarios para las cargas de refrigeración obtenidas para el caso más desfavorable de las cargas mencionadas anteriores quedan recogidos en la siguiente tabla. Los resultados intermedios para cada una de las secciones pueden ser encontradas en el informe completo.

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Local Standard Time (LST)	Cooling Load	Worst-case
0	687547.03	802091.36
1	480175.23	
2	450642.65	
3	438077.79	
4	438077.79	
5	432421.88	
6	432421.88	
7	432421.88	
8	521044.34	
9	685131.60	
10	789384.80	
11	785418.60	
12	802091.36	
13	782363.08	
14	726410.87	
15	632521.31	
16	485316.29	
17	426765.97	
18	424564.54	
19	424564.54	
20	424564.54	
21	424564.54	
22	424564.54	
23	424564.54	

De esta manera, la situación de condiciones más desfavorables se da a las 12 de la mañana para el 22 de julio, con una carga de refrigeración de 802.1 [kW]. Esto representa la máxima ganancia de calor que el sistema tendrá que ser capaz de soportar. Las posibles mejoras descritas a continuación pueden ayudar a reducir este número considerablemente.

POSIBLES MEJORAS

Debido a que CoorsTek es un edificio nuevo, los sistemas HVAC serán considerados como ya óptimos. Con lo cual, para poder mejorar la eficiencia energética del edificio, tendremos que analizar otros elementos.

La primera posible mejora se trata del análisis del sistema de iluminación. Como parte de su trabajo de final de grado, mi compañero Jorge Goas implemento un programa de optimización lineal para analizar la combinación de bombillas, entre las utilizadas actualmente y LEDs, que haría óptimo al sistema de iluminación del edificio. Este problema obtuvo como resultado que con la combinación optima de bombillas en el edificio, el gasto mínimo en el que podría incurrir la escuela en los próximos 25 años sería $3,429,620, ahorrando así en torno a $400,000. Volviendo a mi parte del estudio, a continuación se realizó un análisis de la evolución de la industria de los LEDs en los

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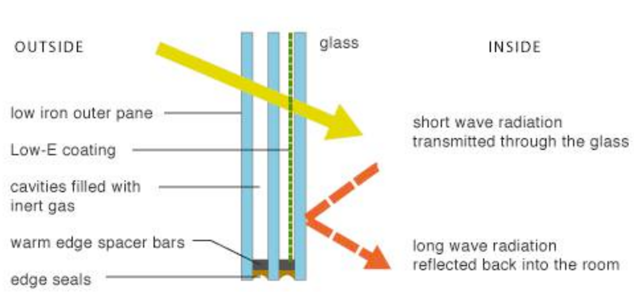
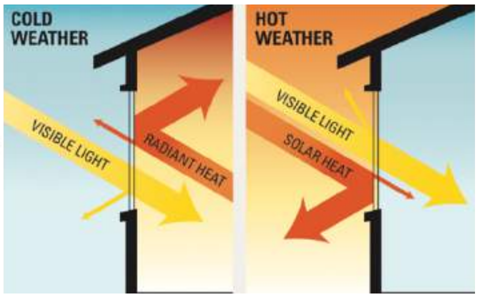
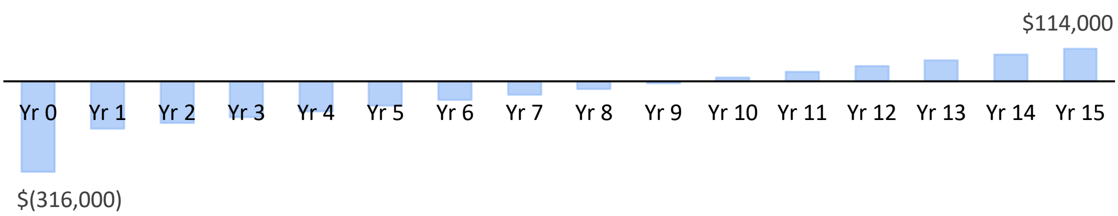
últimos años y como esta evolución ha ayudado a disminuir su impacto medioambiental en grandes cantidades. En el informe se hacen referencia a numerosos informes que mencionan que, de seguir así, la industria de los LEDs acabará dominando el mercado por completo.

La segunda mejora posible se trata de la posibilidad de cambiar el ventanaje del edificio a "*Low-E glass*". Este tipo de ventanas consisten en un cristal triple con un recubrimiento en el panel interior. Esto actúa como una membrana unidireccional que se adapta a las condiciones meteorológicas. Es decir, en invierno deja pasar la radiación solar sin dejar salir el calor del interior del edificio mientras que en verano bloquea esta radiación e impide que el calor entre del exterior. Las siguientes imágenes muestra el funcionamiento de este tipo de ventanas:





Según los cálculos realizados con los datos obtenidos de un fabricante de este tipo de ventanas llamado Vitro, el impacto económico de esta inversión durante la vida útil del producto (15 años) sería el siguiente:



En cuanto al impacto medioambiental de esta posible solución, las nuevas ventanas, gracias a la mejora en las propiedades de transmisividad, la universidad podría llegar a ahorrar 147,884 kWh de electricidad. Esto les ayudaría a disminuir 161 toneladas de CO_2 sus emisiones desde el momento de su implementación. En otras palabras, a lo largo de la vida útil de las ventanas, las emisiones de Colorado School of Mines disminuirían en 2,413 toneladas de CO_2.

La siguiente mejora analizada es la implementación de persianas translucidas para tapar la radiación solar. Estas pueden ayudar a reducir la carga de refrigeración debido a que hacen que rebote parte de la radiación y absorbe otra parte, solo dejando pasar una pequeña porción el interior de la habitación. Por otra parte, también absorbe parte del calor que las ventanas dejan pasar por conducción. La siguiente imagen muestra el funcionamiento de las persianas:

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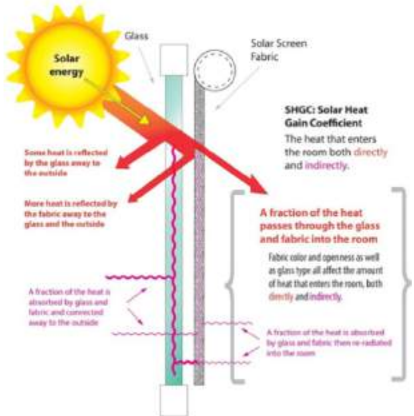

El coste de implementación de estas persianas en todas las ventanas del edificio es alrededor de $170,000. Sin embargo, serían responsables de un ahorro en costes de $53.29/ dia. Por lo tanto, si consideramos que la vida útil de las persianas es la misma que la de las ventanas, la escuela podría llegar a ahorrarse en torno a $120,000 durante este periodo.

Dado que los fabricantes no proporcionan datos sobre los ahorros en emisiones, para calcular el impacto medioambiental de esta mejora realizamos una regla de tres utilizando los datos económicos de esta y de la anterior opción (debido a que el ahorro se debe a una disminución de la energía requerida, entonces las emisiones deberán ser proporcionales a estos datos). Los resultados de este cálculo reflejan que la escuela produciría 173 toneladas de CO_2, lo que supondría una disminución de 2,593 toneladas de CO_2 en el total de su vida útil.

La última posibilidad de mejora discutida en el informe es también la más difusa. Se trate de la variación de la temperatura del interior del edificio para poder utilizar menos aire acondicionado en verano y menos calefacción en invierno. En otras palabras, supondría variar la temperatura para intentar minimizar la diferencia de temperatura entre el interior y el exterior del edificio. Esto podría llegar a suponer grandes ahorros, dado que la energía consumida sería menor, y por lo tanto las emisiones del edificio también. La cantidad de los ahorros producidos sería entonces inversamente proporcional a la diferencia de temperatura entre el interior y el exterior del edificio. Sin embargo, esta opción tiene un gran problema. La universidad debe encontrar un balance entre el ahorro que produce y el bienestar de los ocupantes del edificio. Dado que CoorsTek es una institución de enseñanza e investigación, los ocupantes tienen que ser capaces de realizar su trabajo sin que la temperatura les sea un inconveniente. Por ello, esta sección es puramente cualitativa.

CONCLUSIONES

En general, considero que haber tenido acceso a los planos arquitectónicos y a todo el resto de información acerca del edificio me ha dado la oportunidad de experimentar en primera persona uno de los tipos de trabajo que probablemente realice en el futuro.

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En primer lugar, estudiar y entender los planos mecánicos, arquitectónicos y eléctricos del edificio además de la experiencia del uso de programas de diseño me dio una experiencia de la que aprendí de cara a trabajos en el futuro que puedan tener aspectos similares.

En segundo lugar, aprender a calcular las ganancias de calor para los sistemas mecánicos y entender los factores que se deben tener en cuenta en ellas ha sido un gran proceso de apredizaje en el que ha sido capaz de aplicar muchos de los conceptos aprendidos durante mi etapa de grado en ICAI. Además, he tenido la oportunidad de conocer los diferentes detalles que se dan en los procesos de diseño mecánico en la construcción de edificios destinados a usos comerciales, profesionales o de residencia.

Durante la segunda parte del proyecto, tuve la oportunidad de realizar una extensa tarea de investigación sobre las posibilidades de las que disponen los propietarios de edificios para hacer sus propiedades más respetuosas con el medioambiente a la vez que intentan reducir sus facturas. Como ingeniero de ICAI, me mueve el deseo por el detalle en cualquier proyecto. Es por ello que esta parte me resulto la más interesante de todas. Aunque CoorsTek sea una instalación de vanguardia, he comprobado que, gracias a la evolución tecnológica, siempre hay cabida para alguna mejora. En el análisis de la situación actual (capítulos 2 y 3 de la memoria), la eficiencia energética muestra un rendimiento bastante favorable. Sin embargo, el cuarto capítulo describe como la implementación de pequeñas mejoras pueden ayudar a mejorar el impacto medioambiental del edificio. Estos cambios, aunque inicialmente puedan ser muy costosos, también pueden ayudar a la universidad a ahorrar bastante dinero al final de la vida útil de cada uno de ellos. En cada una de las cuatro posibles mejoras, tuve que buscar información del impacto económico y medioambiental que tendrían en caso de su implementación. Para ello, busqué la mejor opción disponible en el mercado para optimizar ambos campos. El resultado final fue que, suponiendo que la universidad implantase las cuatro mejoras en el edificio, podrían llegar a reducir sus emisiones en 350 toneladas de CO_2 por año a la vez que ahorrarían en torno a $850,000 durante la vida útil de las mismas (en torno a 30 años).

Para concluir, considero que este proyecto me ha permitido tener una gran experiencia en primera persona de cómo funciona un proyecto de diseño y construcción de un edificio. Además, he tenido la oportunidad de familiarizarme con el funcionamiento de los sistemas mecánicos y energéticos de un edificio en la vida real. Por último, este trabajo me ha permitido tratar dos de las principales amenazas que acechan a nuestro planeta en la actualidad: el cambio climático y el calentamiento global. Tener la oportunidad de buscar alternativas que puedan ayudar a que nuestro planeta sea un lugar mejor ha sido una labor muy enriquecedora para mi tanto personalmente como de investigación.

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HVAC ENERGY EFFICIENCY IN COORSTEK CENTER FOR APPLIED SCIENCE AND ENGINEERING

INTRODUCTION

Global warming and climate change have become one of the main issues threatening our society in late years. In an effort to mitigate it, many educational institutions (and many other types of real state owners) in the United States have established programs to analyze the energy efficiency of their buildings and determine ways to try to reduce their consumption and emissions. Such is the case of the Colorado School of Mines. They have several ongoing projects aimed at lowering energy consumption and minimizing emissions (as well as reducing their carbon footprint and economizing its energy profile).

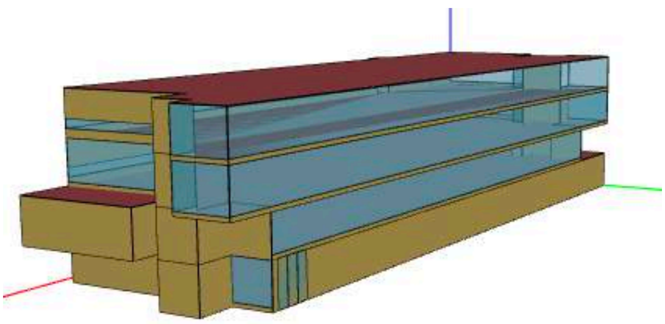
In an attempt to be involved in this global project, our design team chose to analyze CoorsTek Center for Applied Science and Engineering (CoorsTek). This building is the latest built in the university campus, so the study had not yet been conducted. The main objective of the project will be to determine whether any energy efficiency, economic or environmental improvements are feasible and how they can be implemented.

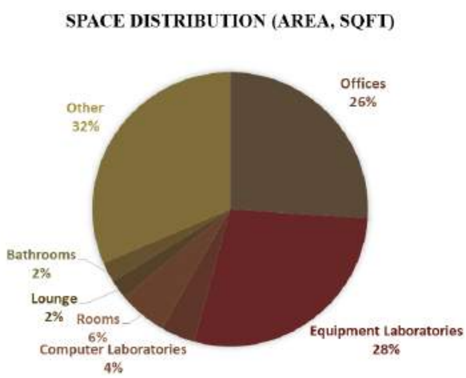
As the team is composed by three members, each one of us will work on a different aspect of the building design. The first stage of the project will be to make all the necessary descriptions and analysis to understand the current state of the building. Then, with the previous information available, load calculations will be performed to determine the building's current energy efficiency in all three fields. Any ideas and solutions resulting from these analyses will be addressed in detail. The last stage will consist in determining whether any environmental or economic improvements can be made to the system.

Particularly, my project will focus in the energy efficiency of the HVAC systems. Since the building has a wide HVAC network, all the analysis will be performed in one of them particularly. The idea is that results could then be extrapolated to the rest of the systems in the building.

METHODOLOGY

The first phase in the completion of this project was a thorough description of the building and the use of all its rooms. A detailed description of all the rooms in the different floors





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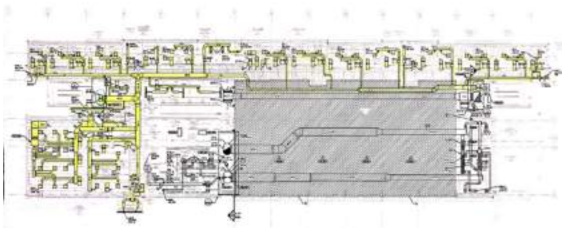
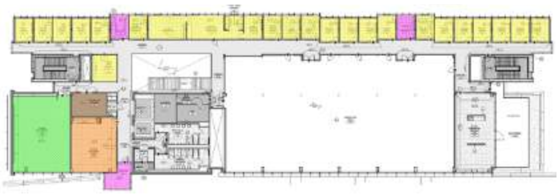
of the building and their use is performed. To do this, the architectural plans and a program called OpenStudio were used. The results were the following:

Once the building has been described, the load calculation analysis begins. For that, the *ASHRAE Fundamentals Handbook, 2001* report is used. In particular, the project is based in chapter 29 of the document, "Non-Residential Cooling and Heating Load Calculations procedures".

First, in Chapter 2 of the report, an overview of what the chapter says is conducted. In this chapter, all the aspects that need to be taken into account (people, lighting, electric motors, appliances, fenestration areas, interior walls, exterior walls, ventilation, infiltration, moisture and other miscellaneous sources) in an accurate load calculation are thoroughly described. This is, some of the assumptions that will be used in later chapters are not taken into account in this one to describe what the full process really needs to be.

Chapter 3 of the report narrates the load calculation process. First, the HVAC system to be analyzed is chosen. For simplicity purposes, the AHU 3 system was chosen. Although it is a pretty large system, it mainly feeds offices. Offices are quite simple to model, since most of them have the same inside and exterior areas and similar occupancy rates and appliances being used. Once the system had been chosen, the rooms being fed by it had to be identified. This can be summarized in the following pictures for the second floor (note the AHU 3 system operated in multiple floors):

The next step would be to analyze all the factors that might affect the cooling load the system would need to be able to handle in the worst-case scenario (Since we are considering the cooling load, we took it to be the 22 of July):

- People – Depending on the type of room, a different state of activity was supposed. The ASHRAE document determines the latent heat gain for humans in each state of activity. Multiplying these values times the occupancy of each room, we get the heat gain.
- Lighting – Due to many assumptions listed in the full report, we were able to assume that all the power consumed in a lamp was converted to heat. Also, although heat from lamps dissipates to other surroundings from the lamp other than the room it is illuminating, since we are calculating for the worst-case scenario, it seems reasonable to assume that all the heat goes to the interior of the room. We were able to obtain the information of the lighting fixtures from the panelboards in the architectural documents.
- Appliances – To determine the amount of heat any appliance gives to the environment, the usage and the radiation factors have to be known. Multiplying

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them times their maximum power (obtained from the panelboards of power outlets), we obtain this heat load. Consequently, this section accounts for the worst-case scenario, since it assumes all the appliances are consuming power at the same time.

- Fenestration areas – The heat input via radiation and conduction through the windows also has to be takin into account. To calculate it, the formulas learnt in Heat transmission were applied.
- Exterior surfaces – The same heat gain as the one mentioned in the previous section occurs through exterior surfaces. The main challenge in this section is to be able to account for the time delay that occurs in the process. To do this, we use the conduction time series. Depending on the type of wall, this method provides a series of coefficients to apply to the heat gains of the analyzed hour and the 23 previous times. These coefficients serve as percentages of the past heat gains that are affecting the analyzed zone in the current hour.

Once calculated, all heat gains have to be divided into convective and radiant portions. This is done with information obtained from the ASHRAE document. The convective portion is translated to heat instantaneously. The radiant portion, as the conductive heat gains previously mentioned, are affected by time delay. In this case, the method used for the calculations of the heat gains is called the Radiant Time Series method. Similarly to what occurs before, there are some coefficients that account for the percentages of the previous heat gains that are affecting in the current hour. The analysis thus becomes hourly for each of the rooms in the indicated date.

RESULTS

The result for the hourly cooling loads obtained for the worst-case scenarios described above are shown in the following table. The results of all the different sources of heat gains can be found in the full report.

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Local Standard Time (LST)	Cooling Load	Worst-case
0	687547.03	802091.36
1	480175.23	
2	450642.65	
3	438077.79	
4	438077.79	
5	432421.88	
6	432421.88	
7	432421.88	
8	521044.34	
9	685131.60	
10	789384.80	
11	785418.60	
12	802091.36	
13	782363.08	
14	726410.87	
15	632521.31	
16	485316.29	
17	426765.97	
18	424564.54	
19	424564.54	
20	424564.54	
21	424564.54	
22	424564.54	
23	424564.54	

Thus, the worst-case scenario is calculated to be the 22nd of July at 12 A.M., with a cooling load of 802.1 [kW]. This represents the maximum power the system currently has to be able to withstand. The improvements described in the following section can significantly reduce this number.

POSSIBLE IMPROVEMENTS

Since the building is brand new, the HVAC systems themselves will be considered to already be optimal. Therefore, other elements have to be looked at to find possible improvements to the energy efficiency.

The first element that was analyzed by our design team was the luminaire system. My colleague Jorge Goas implemented an optimization problem to analyze which of the lighting bulbs should be changed to obtain the most efficient system in the long run. The conclusion was that, with a given combination of lights, the school could potentially end up saving up to $400,000 over the next 25 years, with the optimal cost of the luminaire system being $3,429,620 in that period of time. The report then describes the evolution the LED industry is currently experiencing and how many studies believe these types of fixtures will dominate the market for their economic and environmental benefits.

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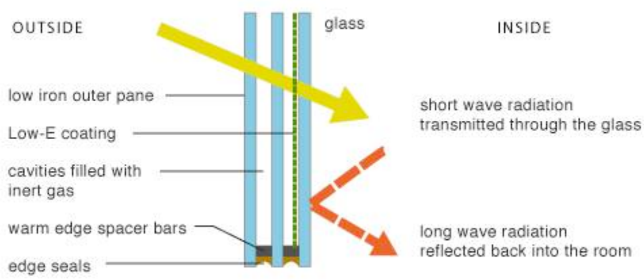
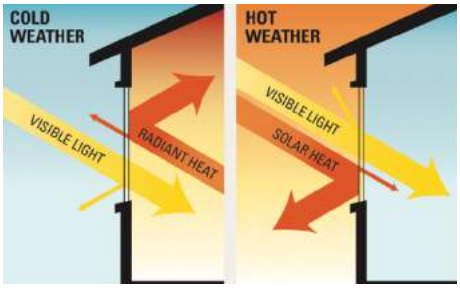
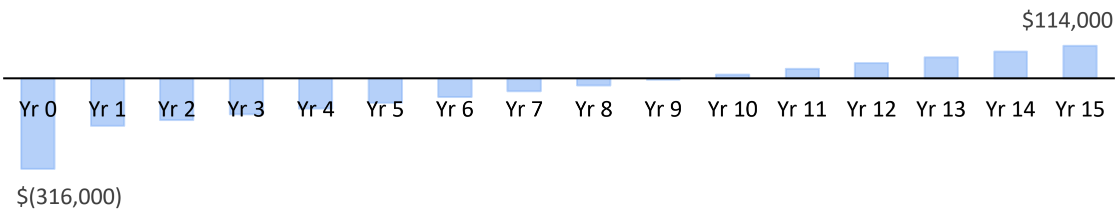
The second possible improvement discussed is the implementation of "*Low-E*" glass. This type of windows consist of triple glazed glasses with a coating in their inner pane. This behaves as a one-way membrane, allowing heat to flow in the desired direction (to heat up the interior during the winter and keep it cool during the summer). The following figures show how this technology works:



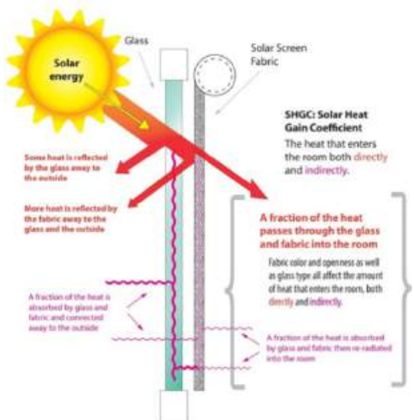


According to some calculations performed with data obtained from Vitro (a window manufacturer), the total economic impact of this investment over its lifespan (15 yrs) is the following:



Regarding the environmental impact of these solution, the new structures, due to their better transmissivity properties, would allow the school to save 147,884 kWh of electricity. This would mean that, from the moment of its implementation, this windows would be responsible for a decrease of 161 tons of CO_2 per year. Thus, this change would mean a decrease of 2,413 tons of CO_2 in the overall lifespan of the new windows.

The next improvement discussed is the implementation of solar screen shades. These can help reduce the cooling load in that they reflect and absorb some of the solar radiation and they also absorb some of the heat that the window conducts inside through its glass. The following image shows how this technology works:



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The cost of their implementation in all the fenestration area of the building would be of approximately $170,000. However, they would account for savings of about $53.29/day. Therefore, through their whole lifespan (15 yrs), they would allow the school to save around $120,000.

Since the manufacturers don't provide accurate data on the emissions savings of these shades, to calculate the environmental impact an approximation involving the savings of the previous section was conducted (since they allow to save the same amount of money due to cooling loads, the amount of energy saved, un thus its emissions, must be proportional). The results reflected that the school would produce 173 tons of CO_2 less per year. This would mean an overall improvement of 2,593 tons of CO_2 in the 15 years lifespan of the shades.

The last possible improvement discussed in the paper is also the most relative one. This option is varying the preset interior temperature to allow for less cooling to be used in the summer and less heating to be used in the winter. In other words, set the temperature so there is always a smaller difference than the current situation with the exterior. This would allow for huge savings, since less energy would need to be spent and, accordingly, would also mean big cut downs of the emissions of the building. The smaller the difference between the interior and exterior temperatures, the bigger the savings. The downside to this option is that you need to find a balance between saving money and improving emissions and the wellbeing of the users of the building. Since CoorsTek is a learning and research facility, people inside have to be able to conduct their work and the school cannot allow the temperature to interfere with it. This is why this section is purely qualitative.

CONCLUSIONS

In general, I believe being able to have access to the architectural documents and all the information regarding the building has provided a great opportunity for us to experience first-hand the type of works that we might perform in the future.

Firstly, understanding mechanical, architectural and electrical floor plans together with the programs implemented for the simulation of the building allowed for an experience that will be of use in any future projects that may bear some resemblance.

Moreover, learning how the heat gains are calculated for mechanical systems and understanding all the factors that have to be taken into account in them has been a great learning process where I have been able to apply some of the concepts learnt during my bachelor's degree. Also, this has been a powerful insight on the actual process of design and construction of commercial and residential buildings in the field of mechanical engineering.

The second part of the project allowed for a wide research experience on what real state owners can do to reduce their electricity costs while also improving their environmental impact. As an ICAI engineer, I have developed a big awareness for detail in any project.

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This is the reason why this part was of special interest for me. Despite CoorsTek being a state-of-the-art building, some improvements can always be introduced. Although its energy efficiency is currently really good, as shown by the load calculations described in Chapter 2 and conducted in Chapter 3 of the report, minor changes can be performed in order to improve the environmental impact of this facility. Although these changes can represent a big initial investment, they can also represent large economic savings at the end of their lifespan. During this stage of the project I was able to research four possible changes to be implemented in CoorsTek. Within each one of them, I found the top of the line product that would imply the biggest decrease in the emissions while boosting the school's economic savings. Altogether, the changes could potentially end up decreasing emissions around 350 tons of CO_2 per year while accounting for over $850,000 in savings in the following 30 years.

To conclude, I believe this project has allowed me to have an amazing opportunity to have a first-hand insight into how real-life design and construction projects work. Also, I have had the chance to gather experience on how the bigger picture of a whole building mechanical and energy systems. Lastly, this project has allowed me to have an approach to two of the main threats we are currently facing: climate change and global warming. Being able to look for possible details that may help our planet has been a great learning experience of what is currently being done to tackle these problems.

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ACKNOWLEDGEMENTS

First of all, I wish to first thank both of the institutions that have allowed me to successfully complete this project. On one hand, Universidad Pontificia de Comillas, has given me the opportunity to finalize my studies in the United States of America and therefore pursue this project there. On the other hand, Colorado School of Mines, has given me the chance to carry out this research, helping in every way possible.

In particular, I would like to thank Dr. PK Sen and Emily Royal for helping me out throughout the whole project. Dr. PK Sen, as my project director, took the time to guide us throughout the whole project and gave me meaningful advice and suggestions. Emily Royal, as the project's PE, continuously helped us with our research and the doubts we had by providing us with answers and insights gained in her work as an engineer.

Lastly, I would like to thank everyone in Colorado School of Mines that helped us to either gather information or help us with our calculations. In particular, I would like to mention Robert Slavik, who provided us with the architectural plans for the building and gave us a field trip to inspect the building and Brian Osman, whose thesis served as a parting point of this project.

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CHAPTER 0 – ANEXO B

INTRODUCTION

The main focus of this design project is to perform the analysis of the energy efficiency and energy conservation of a brand-new (2018) major building at Colorado School of Mines and further evaluation of possible improvements to the design. The building is called the CoorsTek, which is the newest building on campus. This project is a part of a larger study the university has to analyze the campus' microgrid and overall net-zero energy policy for the entire campus in the foreseeable future (2030).

During the design project, my colleagues and I will analyze three different alternatives. We will take into consideration the cost as well as all energy related parameters.

The first step of the project is to do a simulation of the building using a very popular software called Open Studio. Once completed, the analysis of the current energy status of the building will be performed. The last step will be the simulation and design of several different alternatives aimed to improve the performance and energy efficiency.

The final item of the project is to compare its characteristics to those specified in the 'LEED' norm and propose possible improvements.

STATE OF THE ART

To perform the tasks in this design project, the skills learnt in heat transmission and fluid mechanics in the design of Heating, Ventilation and Air Conditioning (HVAC) will be applied. On top of that, new techniques such as Open Studio will also be implemented. For that, the help of the project advisor will be needed.

Additionally, new solutions can be analyzed taking into account results of similar projects conducted in other campus buildings.

The most significant example that will be taken into account is Brian Oldfield's MS thesis (recently defended) named 'Optimal PV and best design for the Colorado School of Mines'.

Also, the help of Dr. Sen's group will be available when required. As part of a bigger project, other buildings in the campus have either already been analyzed or are currently being subjected to study. Consequently, constant communication with the students working on these projects will be established.

Finally, a basic economic analysis of the proposed solutions will be carried out using the abilities learnt during our economy related subjects.

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MOTIVATION

The possibility of taking part in such an interesting project hand to hand with the Colorado School of Mines' team is a great opportunity for me and my colleagues. We first learnt about the project last semester from our current project advisor and sponsor. He was able to convey to us the importance of conducting this analysis for various reasons. The two most appealing to us were the environmental issue and, naturally, the economic impact this project can have for any organization.

On top of that, this project gave me the opportunity to work together with my colleagues from ICAI, each focusing on an area that highly interesting to us and complimentary. For me, to be able to apply the skills learnt through hard work during my entire degree in a project that can have a tangible impact in a community I have lived such as the Mines campus for a year is a great opportunity.

My hope is to do a very good job that this project can be further applied to any of the campus buildings the Universidad Pontificia Comillas has around Madrid.

PROJECT OBJECTIVE

The main objective of this project is to analyze all possible scenarios which can constitute a potential improvement of the current overall energy situation of the CoorsTek building. To meet this final objective, the following intermediate objectives have to be completed:

BRIEF BUILDING DESIGN USING "OPEN STUDIO"

This step mainly helps to illustrate the analysis conducted in the next stages of the project. The following points are taken into account:

i. Dimensioning of the building
ii. Architecture and design specifications
iii. Construction details

ANALYSIS OF THE CURRENT SITUATION

The following steps are followed to complete this section:

i. Building space survey
ii. Heat ventilation analysis
iii. Physical inspection of the current HVAC design and philosophy
iv. Load estimation applied to the air conditioning
v. Major equipment selection analysis

ANALYSIS OF THE HVAC SYSTEMS

The main objective in this section is, after carefully analyzing the current situation (described in the previous sections), to determine the minimum energy requirements the

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building needs and compare those to the situation previously described. The following considerations are to be taken into account:

i. Heat dissipation through the building's surface
ii. Current applicable legal regulations – Including minimum requirements and the LEED's norm
iii. Major equipment selection
iv. Cost estimation
v. Preliminary floor diagram
vi. Preliminary selection of duct sizes
vii. Inlet and oulet locations and sizing of the HVAC system
viii. Preliminary drawing of the major equipment locations in the building

ANALYSIS OF POSSIBLE IMPROVEMENTS

WORK METHODOLOGY

To complete these objectives, the following steps are to be implemented:

PRELIMINARY BUILDING ANALYSIS

A study of the current conditions of the building is conducted. This study includes:

i. Pictures
ii. General description of the building
iii. Description of the use of each particular room – must include observations of any particular source of energy gain (e.g. welding ovens) or loss (e.g. windows)
iv. Description of the occupancy of each room – body heat is a relevant factor when analyzing the energy requirements

BUILDING SIMULATION USING "OPEN STUDIO"

The first step of the simulation is conducted via https://virtualpulse-mines.buildsci.us/. Once all the required information regarding the building is recorded in the webpage, it automatically generates an Open Studio code to simulate the building.

ANALYSIS OF BUILDING'S CURRENT ENERGY SITUATION

Analysis of the heat gains of each room affected by a particular HVAC system to perform a load calculation of the overall system.

ANALYSIS OF POSSIBLE SOLUTIONS

This step is further sub-divided in the following:

i. Brainstorming of possible solutions regarding the heating systems

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ii. Overview of basic environmental implications of each possible solution
iii. Overview of basic economic implications of each possible solution

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CHAPTER 1 – GENERAL DESCRIPTION

The project aimed at the construction of the CoorsTek building in the heart of Colorado School of Mines was started in 2014 by Coorstek (world's leading engineered ceramics manufacturer) and the Coors family. To carry it out, 27 million dollars were donated to build it and to purchase high tech equipment and fund a graduate research fellowship program. Also, the state of Colorado contributed with an additional grant of 14.6 million dollars. The 95000 square feet finished building could only be opened in September 2017 and hosted its first students in January 2018.

The building since has become the milestone of a broad partnership between Colorado School of Mines and the two investors. The building constitutes a world-class facility that supports a broad range of academic and research activities on the Mines campus as well as serves as a focal point for the CoorsTek-Mines research partnership. Among the high-tech equipment Coorstek owns, its proudest possessions is one of the most advanced electron microscopes in the United States.

The building is the home of the physics department and the College of Applied Science and Engineering. However, the building also supports the highly collaborative partnerships among the college's four departments and two interdisciplinary programs: Physics, the Department of Chemistry and Geochemistry, the Department of Chemical and Biological Engineering, the Department of Metallurgical and Materials Engineering, the Materials Science Program and the Nuclear Science and Engineering Program.

The building is also the proud owner of a rare piece of art – the luminous waveforms. This constituted a two-year program hosted by CoorsTek to choose the most innovative piece of art and its designer. The sculpture is made of 240 specially designed aluminum oxide ceramic tiles. This material allowed LEDs to illuminate each tile from behind.

Figure 1: Luminous waveforms in CoorsTek center (Source: Colorado School of Mines)

The piece of art's movement and the patterns displayed by the LEDs are inspired by the laws of physics and activated by the movement of the students below the artwork.

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The building features five floors, including the basement and the rooftop. The distribution of these floors will be analyzed in more detail bellow. Through the whole building, study rooms, common areas and breakout spaces can be found. The architecture philosophy tried to find a balance between making the most out of the available space and having a peaceful and relaxing environment to work and hang out for the students.

The basement of the building is mainly occupied by laboratories. This area is reserved for this use because of the particular requirements most laboratories need, such as moderate lightning or sound and vibration isolation. This floor is built underground. The laboratories in them hold state of the art equipment. Also, the main mechanical and electrical master rooms are held here. A more accurate description of the mechanical and the electrical rooms can be found in APPENDIX A – COORSTEK CENTER FIELD OBSERVATION.

The first floor features a vast open space of full- height glass panels that overlooks the gardens in Kafadar Commons. This open space has chairs and tables for the students to work or rest during their spare time. The main use of the rooms in this floor are labs and Active learning classrooms. The former can host various types of events or activities.

The second and third levels in the building have a common layout. They mainly reserve their spaces for classrooms, laboratories and offices. Two kinds of offices can be found in this facility. Student offices are normally found facing the north and the west faces of the building while faculty offices normally face the gardens in Kafadar Commons.

Lastly, the rooftop is mainly occupied with air filtering facilities. These are mainly needed to filter the air that goes into certain laboratories. As I will describe in the following sections, the process of filtering the air is a potential issue for energy efficiency, as regulations are really tight, and the operations are quite costly. Also, we can find the motor for the industrial elevator that the building has to move large pieces of equipment around.

To get a first approach to our building, an analysis of the architectural plans was conducted. Then, with a beforehand idea obtained, a guided visit to the building allowed us to be able to conduct an accurate description of the facility. To be able to simplify the analysis of the current energy consumption of the building, a division of the spaces into six different categories was carried out: Offices – both graduate and faculty included, open spaces – were open spaces, lounges and corridors are included, laboratories – further divided into computer and equipment labs, rooms – were classrooms and conference rooms are included and bathrooms. The reason to divide the whole building in these six different categories is to model each different group with a common energy consumption profile:

- Offices: A general office will normally have one computer per individual, a couple power outputs, a certain number of lighting units per square feet and the required heating per individual and area.

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- Open spaces: These spaces will normally be though to have only furniture. This is, no permanent computers or machinery will be used in them. Thus, the energy consumption will only come from the heating and the lightning of the rooms.
- Computer laboratories: These rooms tend to have several computers installed to allow the students to work on different tasks. Therefore, the main source of energy consumption for this category will be the power required to run them all. However, this rooms normally have projectors and interactive boards that consume a significant amount of energy as well. Additionally, we will also need to take into account the lightning and the heating of the rooms. This presents a much more complicated case than the first two categories, as heating will be much lower in cold months, but cooling will be significantly higher in worm ones.
- Equipment laboratories: This is probably the hardest category to generalize, as CoorsTek is home to all kinds of laboratories. Naturally, different types of laboratories require different types of machinery and very different conditions. This is especially delicate in the basement labs, as they all need to guarantee different types of conditions for its research to be accurate.
- Rooms: This category will be characterized spaces with one or two computers, a projector, interactive boards and some power outputs. The main uses of these rooms will include classes, conferences, meetings or presentations. Therefore, the occupancy of this category is expected to be much higher than the rest. This will need to be taken into account when analyzing the energy efficiency of the HVAC systems, as a room that is expected to have a lot of assistance could potentially need less heating than others.
- Bathrooms: They constitute their own category as their energy consumption is really specific. It basically consists on lighting, heating and cooling and the required water resources.

Table 1 shows a brief description of what can be found in each floor with regards to the six categories described previously.

	Offices	*Open spaces*	*Computer laboratories*	*Equipment laboratories*	*Rooms*	*Bathrooms*
Basement	*5*	*14*	*0*	*0*	*0*	*2*
Level 1	*0*	*2*	*2*	*2*	*2*	*2*
Level 2	*24*	*3*	*0*	*1*	*3*	*2*
Level 3	*38*	*4*	*0*	*3*	*3*	*2*
TOTAL	*67*	*23*	*2*	*6*	*8*	*8*

Table 1: Spaces in each floor according to the described criteria (Source: Own creation)

This data has been obtained from the architectural plans of the building. Note that, although some spaces inside the same category may have different sizes, the content shown in Table 2 accounts for this change.

Table 2 shows the same data expressed in square footage per category and per level.

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	Offices	*Open spaces*	*Computer laboratories*	*Equipment laboratories*	*Rooms*	*Bathrooms*
Basement	*920*	*8937*	*0*	*0*	*0*	*594*
Level 1	*0*	*1530*	*3617*	*2949*	*960*	*510*
Level 2	*10286*	*9211*	*0*	*729*	*430*	*510*
Level 3	*12167*	*5584*	*0*	*1365*	*700*	*510*
TOTAL	*23373*	*25262*	*3617*	*5043*	*2090*	*2124*

Table 2: Areas [ft^2] in each floor according to the described criteria (Source: Own creation)

The following figures show the analysis that was conducted to divide the rooms in each floor into the described categories:

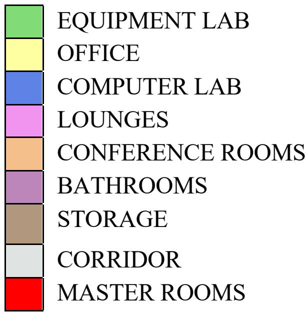

Figure 2: Different room categories in the basement (Source: Architectural plans)

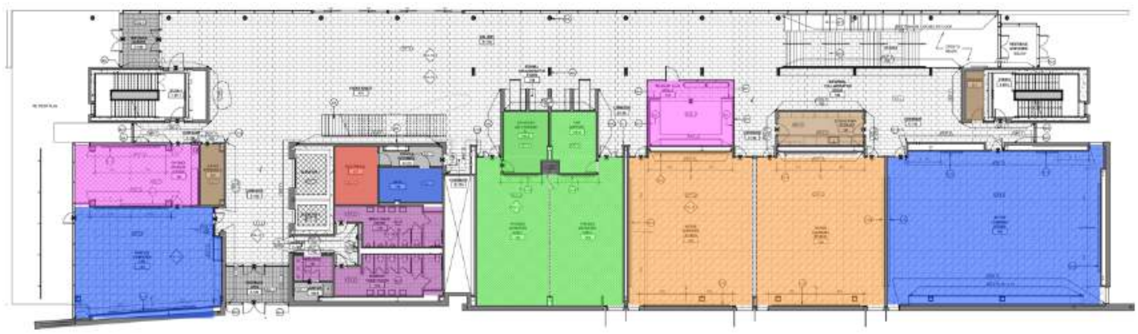

Figure 3: Different categories in the first floor (Source: Architectural plans)

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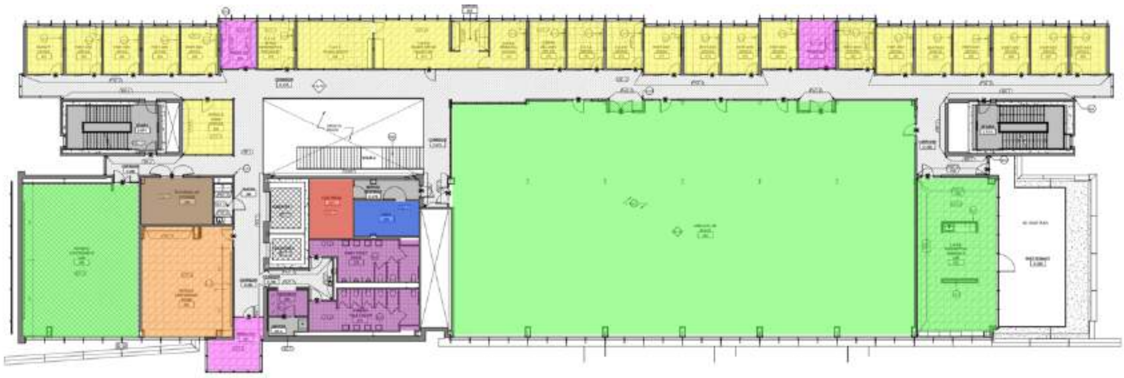
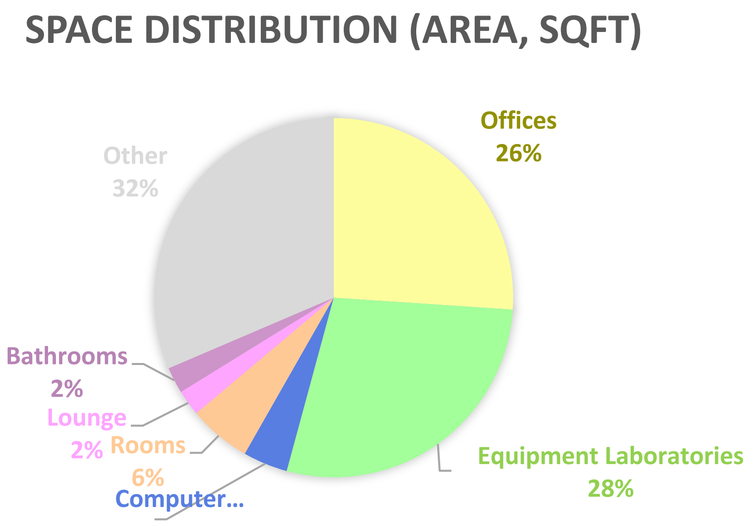


Figure 4: Different categories in the second floor (Source: Architectural plans)

Figure 5: Different categories in the third floor (Source: Architectural plans)

The total area of the building would thus be distributed as follows:



With the dimensions obtained from the structural plans, we are able to obtain the areas of the different floors using the following equations:

$$Basement \rightarrow A_b = (299.5 - 17.5) * (41.5 + 14.5 + 21.5) = 21{,}855\ [ft^2]$$

$$First\ floor \rightarrow A_1 = 299.5 * (41.5 + 14.5 + 21.5) - (26.5 - 8.167) * (14.5 + 5.375) - (15.5 * (41.5 + 21.5 + 14.5) + 15.67 * 5.5 + 14.5 * 19) = 21{,}284\ [ft^2]$$

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$$Second\ floor \rightarrow A_2 = (299.5 - 10.5) * (41.5 + 21.5 + 14.5 + 5.67) - 2 * 21.5 * 12 - 42 * 21 - 41.5 * 20 = 21{,}807\ [ft^2]$$

$$Third\ floor \rightarrow A_3 = (299.5 - 10.5) * (41.5 + 21.5 + 14.5 + 5.67) - 2 * 21.5 * 12 - 10.5 * 41.5 - 41.5 * 20 = 22{,}253\ [ft^2]$$

With these estimations we can calculate the percentages that each of the categories occupies per floor:

	Area	% of total space
Basement	21,885	25%
Level 1	21,284	24.5%
Level 2	21,807	25%
Level 3	22,253	25.5%
TOTAL	87,229	100%

Table 3: Area percentage (Source: Own creation)

With all this information, we can get a general idea of the amount of total energy consumed in each floor that each of the categories will account for.

The basement mainly has equipment labs. As stated before, this category is quite unclear, as different types of labs will have different kinds of machinery and hence, the energy consumption will vary a lot. Nevertheless, this category is one of the most energy consuming, so it seems fair to assume that this floor is one of the most energy demanding in the whole building. Also, since this level is built underground, it has no supply of natural light. Hence, the energy consumption in this floor due to artificial lighting is higher than the other ones.

In Level 1, we have the complete opposite. The vast open spaces combined with the little number of rooms and labs in this floor make it the less consuming one. Its main source of energy demand are the two computer labs. The lighting in this floor won't be an issue, as the large glass façade provides a lot of natural light. However, the properties of this glass might need to be analyzed to guarantee that the amount of heat being released to the exterior is acceptable.

The second level does not constitute a big energy demand at the moment. Currently, we need to analyze the energy consumed by the offices, which constitute almost half of all of the rooms in this floor. However, a big space ($\sim 7000\ ft^2$) is currently being built to hold a lab in the future. When it is finished, it will require a lot of energy. Hence, it is important to conduct a rough analysis with the information available regarding the use this lab when is completely functional.

Similarly, the main demand of energy in the third floor currently comes from the offices. However, it will be quite interesting to analyze the energy consumption of the equipment and computer labs, which also hold a large portion of the floor.

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BREIF BUILDING DESING USING OPENSTUDIO

OpenStudio is a free open-platform software product developed by NREL (national renewable energy laboratory) and the US department of energy. This project emerged when analysis showed that 40% of the US energy was being consumed by buildings around the country. This design software that allows users to support a whole building's energy modeling. To do this, it implements EnergyPlus and advanced daylight analysis using radiance. The purpose of the whole project was to allow anyone involved in the construction industry (from architects and engineers to workers) to manufacture more energy efficient buildings.

OpenStudio has two distinct components: the application suite and the software development platform. The first components' main users are people involved in the design process of a building. On the other hand, the primary users of the software development platform are software developers and researchers. We will therefore only discuss the application suite.

The application suite component of the OpenStudio tool allows us to answer the following questions:

- How much energy is the design going to save?
- How much will this design cost me?

The tool uses an iterative process to answer these questions. In each iteration, it designs the possible improvements, simulates them and plots a graph with the energy efficiency evolution to analyze the results. This allows for ongoing feedback about the energy impact of the decisions made. It also takes into account other factors such as program requirements, costs and building codes.

The application suite component of the OpenStudio tool allows us to answer the following questions:

- How do I develop in OpenStudio?
- Why would I want to develop in OpenStudio?
- How do I optimize a building design using OpenStudio?

The platform allows developers to write code in C++, C# and Ruby. Therefore, the tool allows users to work with the language they feel most comfortable with. It is a cross-platform tool, supporting Windows, Mac and Linux. This allows user to easily share their work.

The platform also allows to produce your own code to sell it afterwards, although it encourages users to make their software available for the community.

One of the main advantages OpenStudio has is that, when working together, the design team and the developers can easily and rapidly make a software to satisfy any special need they have in each of their projects.

We can therefore summarize OpenStudio's benefits in the following:

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- It enhances the speed and quality of user work flows
- It facilitates a better integration among team members
- It provides a rapid feedback on energy performance of design decisions
- It saves energy
- It saves money
- It reduces the carbon footprint

These assets make OpenStudio one of the most commonly used tools in the market.

When designing a new building, the platform allows you to modify the following parameters:

- Weather files
- Schedules
- Construction sets – materials, dimensions…
- People, luminaire, electric equipment, gas equipment, steam equipment…
- Space types
- HVAC systems
- Simulation settings

The tool allows to enter personalized data for each of the spaces inside the building. It allows the user to choose this data either from an existing library or create it from scratch. With this data, the user can easily calculate the heat gains of any space of the building and add them up to calculate the total heat gain.

Since the next section is a detailed overview of how the load calculations are conducted, we will only use the software to create a 3D model of the building. The results are shown in the following figures.

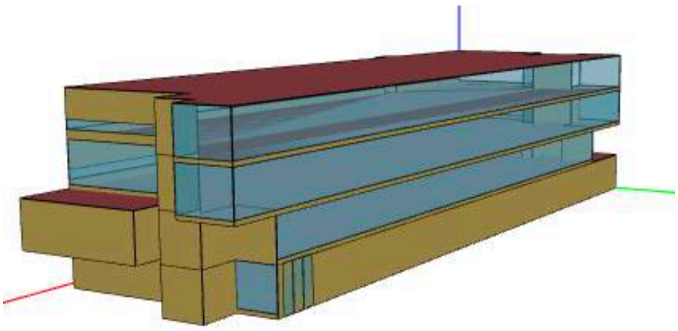

Figure 6: CoorsTek building OpenStudio 3D simulation (Source: OpenStudio)

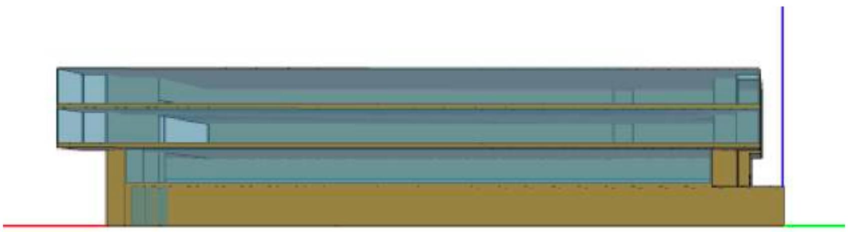

Figure 7: 3D model - North elevation (Source: OpenStudio)

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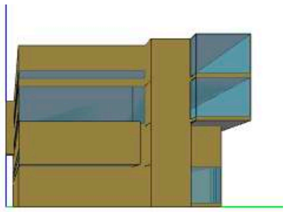

Figure 8: 3D model - West elevation (Source: OpenStudio)

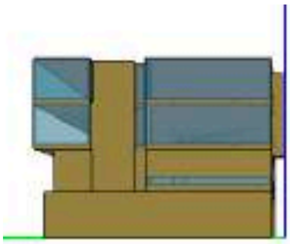

Figure 9: 3D model - East elevation (Source: OpenStudio)

Figure 10: 3D model - South elevation (Source: OpenStudio)

These model shows different types of structures in different colors. The tool allows us to view only certain stories inside the building. When all the other parameters are entered, it also allows to view thermal zones and different types of model set ups.

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CHAPTER 2 – LOAD CALCULATIONS OVERVIEW

In this section, the process to calculate the loads of any HVAC system is explained. In order to understand this process, we first have to understand that there are a lot of variables. HVAC systems are responsible of calculating the temperature and humidity of different rooms and compare them to the standards set by the owners in order to adjust it and meet preferences.

Unlike the electric systems, several different factors can cause a perturbation in the temperature and humidity in a room. These include solar radiation, occupation of the rooms, active equipment, lighting and many more. They all have to be analyzed as described below in order to get an accurate approximation of the loads of the HVAC system.

In order to fully understand the process of load calculations, Chapter 24 of 2001 ASHRAE Fundamentals Handbook is followed. In this chapter all the possible variables that could potentially have an impact on HVAC systems loads in non-residential buildings are thoroughly analyzed. Our building was chosen to be a Non-Residential building. APPENDIX B – CHARACTERISTICS OF RESIDENTIAL BUILDINGS AND HOW THEY RELATE TO THE COORSTEK CENTER explains why this approach was chosen over a Residential building.

The chapter introduces two methods of approaching the load calculation issue: The Heat Balance (HB) method and the Radiant Time Series (RTS) method. The second one is a simplified method directly related to and derived from the HB calculation procedure. Although both methods are different, similar results should be obtained with both options.

The procedures described in this chapter are concerned with a given space or zone in a building. When estimating the loads for a group of spaces (such as might be handled by a single air-handling system, as we will be analyzing) the assembled zones must be analyzed to consider the following:

- Simultaneous effects
- Diversification of heat gains for occupants, lightning or internal load sources
- Ventilation
- Any other unique circumstances

Please note that all figures in this chapter and most of the information discussed below have been obtained from the mentioned chapter of the ASHRAE document.

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COOLING LOAD PRINCIPLES

When analyzing the total cooling capacity of a zoned system, it is important to ensure that it does not surpass the maximum sum of the simultaneous zone loads throughout a design day. However, several considerations are to be taken into account. First, it must handle the peak cooling load for each zone at its individual peak hour. Also, during intermediate seasons, some zones may require heating while others require cooling. It is important to keep in mind that any load calculation can never be more that a good estimate of the actual cooling load.

In HVAC systems design, four related time varying heat flow rates are considered:

1. **Space Heat Gain –** This is the rate at which heat enters and/or is generated inside a space. It may follow any of the two following classifications:

   - Mode of entry – The heat may enter a room via:
     - Solar radiation through transparent surfaces
     - Heat conduction through walls and roof
     - Heat conduction through ceilings
     - Heat generated in the space - by occupants, lights or equipment
     - Energy transfer as a result of ventilation
     - Any other form of heat gain
   - Sensible or latent heat – sensible heat occurs directly via radiation, conduction or convection while latent heat is a result of adding moisture to a room.

2. **Space Cooling Load –** This is the rate at which heat must be removed from the space to maintain a constant space air temperature. An important concept related to this subject is that of *radiant heat gain*. This refers to the time physical objects take to absorb heat coming from outside stimulus (i.e. the sun) and then release it to the air surrounding them. The thermal storage effect is critically important in differentiating between instantaneous heat gain for a given space and its cooling load at that moment.
3. **Space Heat Extraction Rate –** This concept might seem similar to the previous one. However, the rate at which heat is removed from the conditioned space equals the space cooling load only if the room air temperature is held constant. The importance of this concept is of great importance when estimating energy use over time.
4. **Cooling Coil Load -** The rate at which energy is removed at the cooling coil that serves one or more conditioned spaces equals the sum of the instantaneous space cooling loads for all the spaces served by the coil, plus any external loads.

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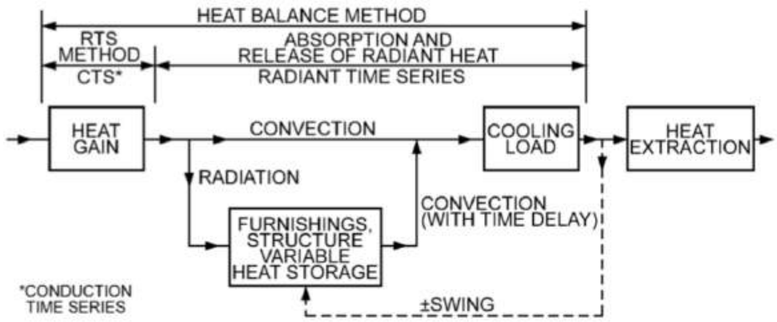

Figure 11: Instantaneous Heat gain vs. Cooling Load (Source: ASHRAE Fundamentals Handbook)

INITIAL DESIGN CONSIDERATIONS

In assembling all the necessary data, the following steps are taken into consideration:

1. Building Considerations – Every aspect related to the physical characteristics of the building (i.e. size, colors…)
2. Configuration – any relevant details regarding the building's surroundings (i.e orientation, external shading…)
3. Outdoor design conditions – All weather-related considerations.
4. Indoor design conditions – Variables regarding indoor temperature and humidity. They will be presented as an acceptable interval.
5. Operating schedules – Schedules for lighting, occupancy, internal equipment and appliances will need to be taken into account.
6. Date and Time – The day and month when the calculations are going to take place will need to be specified. The most reasonable approach would be to choose the date to obtain the peak space cooling load (worst case scenario). This usually happens in the months of December or January.

The data necessary in all the above considerations can be found in the conformed set of construction documents as well as in the ASHRAE files. Additionally, the type of air conditioning system and other considerations are to be taken into account.

HEAT SOURCES AND HEAT GAIN CALCULATION CONCEPTS

Several heat sources can be taken into account when analyzing the load gains sources.

PEOPLE

Different states of activity of human beings produce different quantities of heat and moisture that have to be taken into account for the load calculations.

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Degree of Activity		Total Heat, W		Sensible Heat, W	Latent Heat, W	% Sensible Heat that is Radiant[b]	
		Adult Male	Adjusted, M/F[a]			Low V	High V
Seated at theater	Theater, matinee	115	95	65	30		
Seated at theater, night	Theater, night	115	105	70	35	60	27
Seated, very light work	Offices, hotels, apartments	130	115	70	45		
Moderately active office work	Offices, hotels, apartments	140	130	75	55		
Standing, light work; walking	Department store; retail store	160	130	75	55	58	38
Walking, standing	Drug store, bank	160	145	75	70		
Sedentary work	Restaurant[c]	145	160	80	80		
Light bench work	Factory	235	220	80	140		
Moderate dancing	Dance hall	265	250	90	160	49	35
Walking 4.8 km/h; light machine work	Factory	295	295	110	185		
Bowling[d]	Bowling alley	440	425	170	255		
Heavy work	Factory	440	425	170	255	54	19
Heavy machine work; lifting	Factory	470	470	185	285		
Athletics	Gymnasium	585	525	210	315		

Table 4: Representative rates at which heat and moisture are given off by human beings in different states of activity (Source: ASHRAE Fundamentals Handbook)

The main states of activity that are usually taken into account for educational and research buildings have been highlighted.

LIGHTING

The rate of cooling load due to lighting at any given moment can be quite different from the heat equivalent of power supplied instantaneously to those lights. The following picture shows how the heat from any light source is distributed.

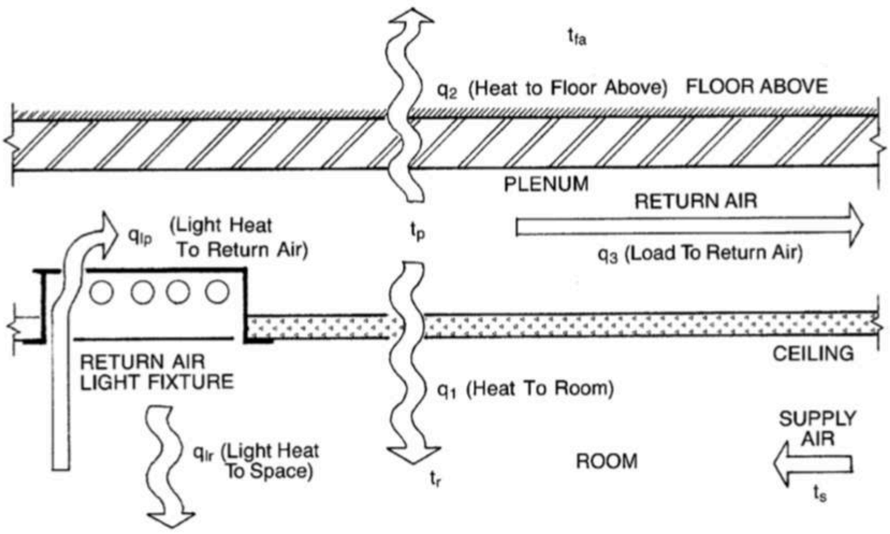

Figure 12: Distribution of heat from light sources (Source: ASHRAE Fundamentals Handbook)

However, for simplicity, we consider that all this heat will go to the room where the light sources are installed. Thus, heat gain to plenum via return air is considered to be negligible. Therefore, the lighting heat gain can be calculated via the following equation:

$$\frac{Watts}{Lamp} = q_{lr} \equiv Lighting\ power\ output\ [W]$$

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However, despite considering the heat produced by each lighting fixture only goes to the analyzed room, we also need to account for the amount of sensible heat gain that power produces. This will be done using the following formula:

$$q_{sens} = q_{lr} * F_u * F_s * CLF_h$$

Where q_{sens} is the sensible heat gain [W], q_{lr} is the lighting output power [W], F_u is the usage factor, F_s is the service allowance factor and CLF_h is the cooling load factor. The service allowance factor is a value that accounts for ballast losses in fluorescent lights and heat returned to return air ceiling plenum. On the other hand, the usage factor accounts for the number of hours the lights are on compared to those when they are off.

Electric Motors

As previously described, CoorsTek is a research facility, and as such it has many laboratories. In them, a lot of machines are operated by electric motors. These have to be considered in the load calculations because, when running, they contribute heavily to the heat gain of those particular laboratories.

The instantaneous heat gain of any machine run by an electric motor contained in a certain space is calculated with the following formula:

$$q_{em} = \frac{P}{E_M} \cdot F_{UM} \cdot F_{LM}$$

Where q_{em} is measured in watts [W], P is the motor power rating [W], E_M is the motor efficiency and F_{UM} and F_{LM} are the motor use and load factor, respectively. The motor load factor is applied when the motor is not run continuously, and the motor load factor represents the fraction of the rated load being delivered under the conditions of the cooling load estimate.

However, when we have a machine inside a room but the motor running it is not in the same space, the formula varies:

$$q_{em} = P \cdot F_{UM} \cdot F_{LM}$$

Lastly, when the motor is inside the space, but the machine isn't running, the formula becomes:

$$q_{em} = P \cdot (\frac{1 - E_M}{E_M}) \cdot F_{UM} \cdot F_{LM}$$

We analyze the different machines and the motors running them to choose which formula to use. The heat gain produced by electric motors is normally equally divided between radiation and convection. For simplicity purposes, since the output of a motor is normally proportional to its load, we will assume F_{LM} to be unity in our calculations. The following table provides efficiency data.

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Motor Name-plate or Rated Horse-power	(kW)	Motor Type	Nominal rpm	Full Load Motor Efficiency, %	A: Motor in, Driven Equipment in, W	B: Motor out, Driven Equipment in, W	C: Motor in, Driven Equipment out, W
					Location of Motor and Driven Equipment with Respect to Conditioned Space or Airstream		
0.05	(0.04)	Shaded pole	1500	35	105	35	70
0.08	(0.06)	Shaded pole	1500	35	170	59	110
0.125	(0.09)	Shaded pole	1500	35	264	94	173
0.16	(0.12)	Shaded pole	1500	35	340	117	223
0.25	(0.19)	Split phase	1750	54	346	188	158
0.33	(0.25)	Split phase	1750	56	439	246	194
0.50	(0.37)	Split phase	1750	60	621	372	249
0.75	(0.56)	3-phase	1750	72	776	557	217
1	(0.75)	3-phase	1750	75	993	747	249
1.5	(1.1)	3-phase	1750	77	1453	1119	334
2	(1.5)	3-phase	1750	79	1887	1491	396
3	(2.2)	3-phase	1750	81	2763	2238	525
5	(3.7)	3-phase	1750	82	4541	3721	817
7.5	(5.6)	3-phase	1750	84	6651	5596	1066
10	(7.5)	3-phase	1750	85	8760	7178	1315
15	(11.2)	3-phase	1750	86	13 009	11 192	1820
20	(14.9)	3-phase	1750	87	17 140	14 913	2230
25	(18.6)	3-phase	1750	88	21 184	18 635	2545
30	(22.4)	3-phase	1750	89	25 110	22 370	2765
40	(30)	3-phase	1750	89	33 401	29 885	3690
50	(37)	3-phase	1750	89	41 900	37 210	4600
60	(45)	3-phase	1750	89	50 395	44 829	5538
75	(56)	3-phase	1750	90	62 115	55 962	6210
100	(75)	3-phase	1750	90	82 918	74 719	8290
125	(93)	3-phase	1750	90	103 430	93 172	10 342
150	(110)	3-phase	1750	91	123 060	111 925	11 075
200	(150)	3-phase	1750	91	163 785	149 135	14 738
250	(190)	3-phase	1750	91	204 805	186 346	18 430

Table 5: Motor efficiencies and related data (Source: ASHRAE Fundamentals Handbook)

APPLIANCES

All electric, gas or steam appliances have to be taken into account to accurately calculate the heat gain of any building. However, as there are many categories of appliances, this section can be quite subjective (since the only available information is usually the nameplate of the tools). A classification of the different appliances that can be found in a building has been made to organize our work.

1. **Cooking appliances –**
   The general equation that calculates the heat gain of any cooking appliance is the following:
   $$q_{sens} = q_{input} \cdot F_U \cdot F_R = q_{input} \cdot F_L$$
   Where q_{sens} is the sensible heat gain [W], q_{input} is the nameplate values of the appliances and F_U and F_R are the usage and radiation loads, respectively. They can both be summarized into F_L, which is the sensible heat gain to the manufacturer's nameplate value.

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2. **Laboratory equipment** – Laboratory equipment's exact load calculation is quite tedious in that its characteristics have big differences depending on the space they are placed in. This can probably be due to the different specifications each laboratory has. The main values of different types of machines can be found in the table below.

Equipment	Nameplate, W	Peak, W	Average, W
Analytical balance	7	7	7
Centrifuge	138	89	87
Centrifuge	288	136	132
Centrifuge	5500	1176	730
Electrochemical analyzer	50	45	44
Electrochemical analyzer	100	85	84
Flame photometer	180	107	105
Fluorescent microscope	150	144	143
Fluorescent microscope	200	205	178
Function generator	58	29	29
Incubator	515	461	451
Incubator	600	479	264
Incubator	3125	1335	1222
Orbital shaker	100	16	16
Oscilloscope	72	38	38
Oscilloscope	345	99	97
Rotary evaporator	75	74	73
Rotary evaporator	94	29	28
Spectronics	36	31	31
Spectrophotometer	575	106	104
Spectrophotometer	200	122	121
Spectrophotometer	N/A	127	125
Spectro fluorometer	340	405	395
Thermocycler	1840	965	641
Thermocycler	N/A	233	198
Tissue culture	475	132	46
Tissue culture	2346	1178	1146

Table 6: Recommended heat gain from typical laboratory equipment (Source: ASHRAE Fundamentals Handbook)

3. **Office equipment** – Numerous researches have been conducted to analyze the results of office equipment and the load heat gain (Wilkins, 1991, Wilkins and McGafiin, 1994, Komor, 1997 and Hosni, 1999). All of these show that results for office equipment can normally be generalized. As with other appliances, the nameplate is usually the only information known. However, experimental results show that a conservative approach would only take into account 50% of that value and real results are even closer to 25%. The following figure shows the results obtained by Wilkins and McGaffin in 1994.

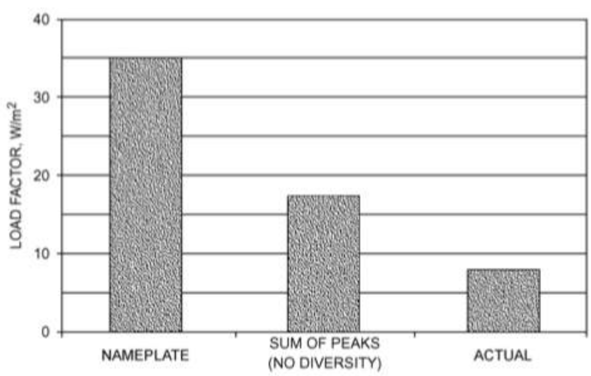

Figure 13: Office equipment load factor comparison (Source: ASHRAE Fundamentals Handbook)

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To analyze the different office appliances, a classification of these has been made to differentiate their characteristics.

a. Computers – Based on the results obtained by Hosni and Wilkins and McGaffin, the following heat gain values can be used for computers using different degrees of safety factors.

	Continuous, W	Energy Saver Mode, W
Computers[a]		
Average value	55	20
Conservative value	65	25
Highly conservative value	75	30
Monitors[b]		
Small monitor (330 to 380 mm)	55	0
Medium monitor (400 to 460 mm)	70	0
Large monitor (480 to 510 mm)	80	0

Table 7: Recommended heat gain from typical computers and monitors (Source: ASHRAE Fundamentals Handbook)

b. Monitors – Their heat gain is dependent on their nominal screen size following the equation:

$$q_{mon} = 0.2 \cdot S - 20$$

Where S is the nominal screen size of the monitor [mm] and q_{mon} is measured in watts [W]. Results for this equation can be compared to the intervals in Table 7.

c. Laser prints and copiers – Their load heat gain has been tested to be highly dependent on the level of throughput for which the printer was designed. The calculations in this section are normally conducted first choosing the value for continuous operation and then applying the appropriate diversity factor. The following table collects data on laser prints.

	Continuous, W	1 page per min., W	Idle, W
Laser Printers			
Small desktop	130	75	10
Desktop	215	100	35
Small office	320	160	70
Large office	550	275	125
Copiers			
Desktop copier	400	85	20
Office copier	1,100	400	300

Table 8: Recommended heat gain from typical laser printers and copiers(Source: ASHRAE Fundamentals Handbook)

d. Miscellaneous office equipment – data for any other appliances that might be found in the building is summarized in the following table.

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Appliance	Maximum Input Rating, W	Recommended Rate of Heat Gain, W
Mail-processing equipment		
Folding machine	125	80
Inserting machine, 3,600 to 6,800 pieces/h	600 to 3300	390 to 2150
Labeling machine, 1,500 to 30,000 pieces/h	600 to 6600	390 to 4300
Postage meter	230	150
Vending machines		
Cigarette	72	72
Cold food/beverage	1150 to 1920	575 to 960
Hot beverage	1725	862
Snack	240 to 275	240 to 275
Other		
Bar code printer	440	370
Cash registers	60	48
Check processing workstation, 12 pockets	4800	2470
Coffee maker, 10 cups	1500	1050 sens., 450 latent
Microfiche reader	85	85
Microfilm reader	520	520
Microfilm reader/printer	1150	1150
Microwave oven, 28 L	600	400
Paper shredder	250 to 3000	200 to 2420
Water cooler, 30 L/h	700	350

Table 9: Recommended heat gain from other office appliances (Source: ASHRAE Fundamentals Handbook)

e. Heat gain per unit area – Depending on the occupancy of the office, an additional heat gain will need to be taken into account. Data regarding load factors and cooling load estimates depending on load densities can be found in APPENDIX I.1 – OFFICE LOAD DENSITY.

HEAT GAIN THROUGH FENESTRATION AREAS

Solar radiation can be considered the main weather-related variable that needs to be taken into account when calculating the cooling load. This calculation can be summarized with the following equations.

$$Q = q_b + q_d + q_c$$

Where Q is the total fenestration heat gain [W] and q_b, q_d and q_c are the direct beam solar gain, diffuse solar heat gain and conductive heat gain, all measured in watts [W]. They can be calculated following the next equations.

$$\begin{cases} q_b = A \cdot E_D \cdot SHGC(\theta) \cdot IAC \\ q_d = A \cdot (E_d + E_r) \cdot \langle SHGC \rangle_D \cdot IAC \\ q_c = U \cdot A \cdot (T_{out} - T_{in}) \end{cases}$$

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Where:

A = window area, m^2
E_D, E_d, and E_r = direct, diffuse, and ground-reflected irradiance, calculated using the equations in Table 14
SHGC(θ) = direct solar heat gain coefficient as a function of incident angle θ; may be interpolated between values in Table 13 of Chapter 30
$\langle SHGC \rangle_D$ = diffuse solar heat gain coefficient (also referred to as hemispherical SHGC); from Table 13 of Chapter 30
T_{in} = inside temperature, °C
T_{out} = outside temperature, °C
U = overall U-factor, including frame and mounting orientation from Table 4 of Chapter 30, W/(m^2·K)
IAC = inside shading attenuation coefficient, = 1.0 if no inside shading device

Figure 14: Solar equations coefficients and units (Source: ASHRAE Fundamentals Handbook)

Additional information regarding fenestration load calculations and the IAC coefficient values can be found in APPENDIX I.4 – SOLAR EQUATIONS AND IAC INDECES. The exterior shading affecting the building would need to be taken into account, but as the building is located in a quite open space, we will consider it to be approximately zero.

HEAT GAIN THROUGH EXTERIOR SURFACES

The calculations needed in this section are derived from the same concepts as the fenestration section. The main difference will be the mass and nature of the wall.

The most important concept regarding this load calculation is the *sol-air temperature*. It is defined to be the outdoor temperature that, neglecting all radiation changes, gives the same rate of heat entry as would the combination of incident solar radiation, radiant energy exchange with the sky and other outdoor surroundings, and convective heat exchange with the outdoor air. It can be calculated with the following equations:

$$\begin{cases} \frac{q}{A} = \alpha \cdot E_t + h_0 \cdot (t_0 - t_0) - \varepsilon \cdot \Delta R \\ \frac{q}{A} = h_0 \cdot (t_e - t_0) \end{cases} \rightarrow \; t_e = t_0 + E_t \cdot \frac{\alpha}{h_0} - \varepsilon \cdot \frac{\Delta R}{h_0}$$

Where t_0 is the outdoor air temperature [ºC], α is the absorptance of surface for solar radiation, E_t is the total solar radiation incident on the surface [W/(m^{2}K)], h_0 is the coefficient of heat transfer by long wave radiation and convection at the outer surface [W/(m^{2}K)], ε is the hemispherical emittance of the surface and ΔR is the difference between long-wave radiation incident on surface from sky and surroundings and radiation emitted by blackbody at outdoor air temperature [W/m^2].

When analyzing horizontal surfaces, a reasonable value for ΔR is 63 [W/m^2]. This value provides a long-wave correction term of approximately 4K. However, for vertical surfaces, it is common to take a value of $\Delta R = 0$, as it is common to consider that the long wave radiation coming from the terrestrial objects is compensated with the short-wave radiation coming from the sky.

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The term α/h_0 takes into account the absorptance of the surface for solar radiation. It can be approximated to be 0.026 for light-colored surfaces and 0.052 for dark-colored ones.

Heat Gain Through Interior Surfaces

As studied in the heat transfer class, when two adjacent elements have different temperatures, a transfer of heat occurs from that with a higher temperature to the other one. This concept applies to the rooms we will be analyzing. The heat transfer rate can be calculated using the convection equation:

$$q = U \cdot A \cdot (T_b - T_i)$$

Where q is the heat transfer rate [W], U is the coefficient of overall heat transfer between adjacent space [W/(m^{2}K)], A is the are separating the concerned sections [m^2], T_b is the temperature in the adjacent space [ºC] and T_i is the temperature in the conditioned space [ºC]. In floors directly in contact with the ground (in our case, the basement), the heat transfer will be considered to be negligible for the cooling load estimates.

Infiltration and Ventilation Heat Gain

Ventilation is defined as the provision of outside air to a room of a building. Depending on the type of room, regulations exist regarding the minimum and maximum amount of air that can be introduced. ASHRAE Std. 62 recommends minimum ventilation rates for most common applications.

Infiltration is the flow of outdoor air into a building through cracks and other unintentional openings and through the normal use of exterior doors. In other words, infiltration can be defined as air leakage into a building. However, we need to take into account that the opposite phenomenon also exists. It is called exfiltration. Both these processes are driven by pressure differences. Infiltration is normally estimated to only occur through windows and doors.

When calculating the ventilation and infiltration values, air mass-based equations are normally used to get steadier results. However, some calculations require volume values. When this occurs, we normally choose to use volume values based in standard conditions. The standard value that we will use will be 1.2 [kg/m^3]. This value corresponds to 16 [ºC] at saturation and 21 [ºC] dry air and a pressure of 1 [atm]. Using these values, we can calculate the following values needed when designing an air-conditioning system.

1. Total heat gain – corresponds to an enthalpy difference for a given airflow. It can be calculated with the following formula:

$$q_t = 1.2 \cdot Q_s \cdot \Delta h$$

2. Sensible heat gain – corresponds to the change of dry-bulb temperature for a given airflow. It follows the formula:

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$$q_s = 1.23 \cdot Q_s \cdot \Delta t$$

Note that this formula is a simplification of the original one. It takes into account a value of W=0.01 that occurs in most ventilation problems.

3. Latent heat gain – corresponds to the change of the humidity ratio for a given airflow. It can be calculated with the following formula:

$$q_l = 1.2 \cdot 2500 \cdot Q_s \cdot \Delta W = 3100 \cdot Q_s \cdot \Delta W$$

In all the above formulas we will consider Q_s to be 1.2 [kg/m^3], as previously described for the standard air volumes.

Latent Heat Gain from Moisture Through Permeable Building Materials

Moisture diffusion through all common building materials is a phenomenon that is always present and therefore has to be taken into account. In most applications, moisture transfer through walls can be neglected. However, when a space is designed to have low moisture in its interior, the heat gains to make this happen can have a big impact in the overall load calculation. This value (in watts) is normally computed by:

$$q_m = M \cdot A \cdot \Delta p_v \cdot (h_g - h_f)$$

Where M is the permeance of the wall assembly [ng/(s·m^2·Pa)], A is the area of the wall surface [m^2], Δp_v is the vapor pressure difference [Pa], h_g is the enthalpy at room conditions [kJ/kg] and h_f is the enthalpy of the water condensed at the cooling coil [kJ/kg]. If we have the particular case when the room temperature is 24 [ºC] and the condensate off coil is 10 [ºC], we can take $h_f = 2500$ [kJ/kg].

The next Figure shows the permeability and permeance values for common building materials.

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Table 9 Typical Water Vapor Permeance and Permeability Values for Common Building Materials[a]

Material	Thickness, mm	Permeance, ng/(s·m^2·Pa)	Resistance[h], TPa·m^2·s/kg	Permeability, ng/(s·m·Pa)	Resistance/m[h], TPa·m·s/kg
Construction Materials					
Concrete (1:2:4 mix)				4.7	0.21
Brick masonry	100	46[f]	0.022		
Concrete block (cored, limestone aggregate)	200	137[f]	0.0073		
Tile masonry, glazed	100	6.9[f]	0.14		
Asbestos cement board	3	220-458[d]	0.0017-0.0035		
With oil-base finishes		17-29[d]	0.0035-0.052		
Plaster on metal lath	19	860[f]	0.0012		
Plaster on wood lath		630[e]	0.0016		
Plaster on plain gypsum lath (with studs)		1140[f]	0.00088		
Gypsum wall board (plain)	9.5	2860[f]	0.00035		
Gypsum sheathing (asphalt impregnated)	13		29[f]	0.038	
Structural insulating board (sheathing quality)				29-73[f]	0.038-0.014
Structural insulating board (interior, uncoated)	13	2860-5150[f]	0.00035-0.00019		
Hardboard (standard)	3.2	630[f]	0.0016		
Hardboard (tempered)	3.2	290[f]	0.0034		
Built-up roofing (hot mopped)		0.0	∞		
Wood, sugar pine				0.58-7.8[f,b]	172.0-131
Plywood (douglas fir, exterior glue)	6.4	40[f]	0.025		
Plywood (douglas fir, interior glue)	6.4	109[f]	0.0092		
Acrylic, glass fiber reinforced sheet	1.4	6.9[f]	0.145		
Polyester, glass fiber reinforced sheet	1.2	2.9[f]	0.345		
Thermal Insulations					
Air (still)				174[f]	0.0057
Cellular glass				0.0[d]	∞
Corkboard				3.0-3.8[d]	0.33-0.26
				14[e]	0.076
Mineral wool (unprotected)				245[e]	0.0059
Expanded polyurethane [R = 1.94 W/(m^2·K)] board stock				0.58-2.3[d]	1.72-0.43
Expanded polystyrene—extruded				1.7[d]	0.57
Expanded polystyrene—bead				2.9-8.4[d]	0.34-0.12
Phenolic foam (covering removed)				38	0.026
Unicellular synthetic flexible rubber foam				0.029[d]	34-4.61
Plastic and Metal Foils and Films[c]					
Aluminum foil	0.025	0.0[d]	∞		
Aluminum foil	0.009	2.9[d]	0.345		
Polyethylene	0.051	9.1[d]	0.110		2133
Polyethylene	0.1	4.6[d]	0.217		2133
Polyethylene	0.15	3.4[d]	0.294		2133
Polyethylene	0.2	2.3[d]	0.435		2133
Polyethylene	0.25	1.7[d]	0.588		2133
Polyvinylchloride, unplasticized	0.051	39[d]	0.026		
Polyvinylchloride, plasticized	0.1	46-80[d]	0.032		
Polyester	0.025	42[d]	0.042		
Polyester	0.09	13[d]	0.075		
Polyester	0.19	4.6[d]	0.22		
Cellulose acetate	0.25	263[d]	0.0035		
Cellulose acetate	3.2	18[d]	0.054		

Figure 15: Permeability and permeance (Source: ASHRAE Fundamentals Handbook)

HEAT GAIN FROM MISCELLANEOUS SOURCES

The factors that normally have to be taken into account for the cooling load are the following:

1. Type of HVAC system
2. Effectiveness of heat exchange surfaces
3. Fan location
4. Duct heat gain or loss
5. Duct leakage
6. Heat-extraction of lighting systems
7. Type of return air system
8. Sequence of controls

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Heat gain from fans

Some fans are used to circulate air through HVAC systems. These fans modify the systems' energy by at least one of the following processes:

- Fan inefficiency causes temperature in the airstream to rise. On average, fans generally have an efficiency of 65%. This is, 35% of the energy that the fan is consuming appears as an instantaneous heat gain to the air inside the HVAC system.
- Static and velocity pressure cause temperature in the airstream to rise. The useful 65% of the energy mentioned above is spread through the pipes, converting to sensible heat. We will assume that the temperature change equivalent of this heat occurs at a single point in the system. This point will depend on the fan's location. If the fan is located upstream of the cooling coil will add it at this point. On the other hand, a fan located downstream of the cooling coil raises the temperature of the air leaving the cooling coil.
- Fan motor and drive's inefficiencies cause the temperature to rise. However, this value is normally relatively small compared to the other two, so we will consider it negligible.

Duct heat gain and leakage

In duct systems that aren't extensive or subjected to rigorous conditions, the only system taken into account for the heat gain or loss is the supply one (the return is considered negligible). The heat gain is normally estimated to be approximately a 1% of the space sensible cooling load. The equivalent temperature reduction is applied to the dry-bulb temperature of the air leaving the coil.

Although air leakage can potentially have a great impact in the heat gain, in well-designed HVAC systems it normally doesn't. This type of systems should never leak more than 3% of the total system airflow. We will therefore consider the fan leak to be 1% of the total system airflow.

RADIANT TIME SERIES (RTS) METHOD

Although the Std. proposes two different methods (the heat balance and the radiant time series method), we only analyze our system using one of them, since the result obtained should be pretty similar. For simplicity reasons, the radiant time series method is chosen. This method is a simplification of the previous one. Therefore, the calculations will be simpler.

The Radiant Time Series method was developed in response to the necessity to have a method that, while not losing its rigorous character, would not need to be iterative. Naturally, this method still quantifies each component's contribution to the total cooling load. This method also inspects the relative impact of different construction and zone types on the result. In simple terms, this method allows to easily apply the engineering

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judgement. Also, this method has been chosen over the heat balance one because of the possibility of computing it with a simple spread sheet rather than having to use a specialized computer program.

RTS Cooling Load Assumptions and Principles

The main assumption used by this method is the steady-periodic conditions. This assumption states that the loads are repeated in a 24 h cyclical basis. This means that the heat gain of a particular component will be the same for each hour of the day over and over again.

As previously described in the COOLING LOAD PRINCIPLES section, most heat sources transmit energy to any system by a combination of convection and radiation. The convection part is assumed to immediately become cooling load. However, the radiation part has to suffer a process before reaching the same status. First, it has to be absorbed by the elements in the space. It is then when, via convection, it becomes cooling load. Thus, the radiant process has a time-delayed effect. The other time delay the radiant time series has to account for is the effect of conduction through opaque massive exterior surfaces.

Overview of the Radiant Time Series Method

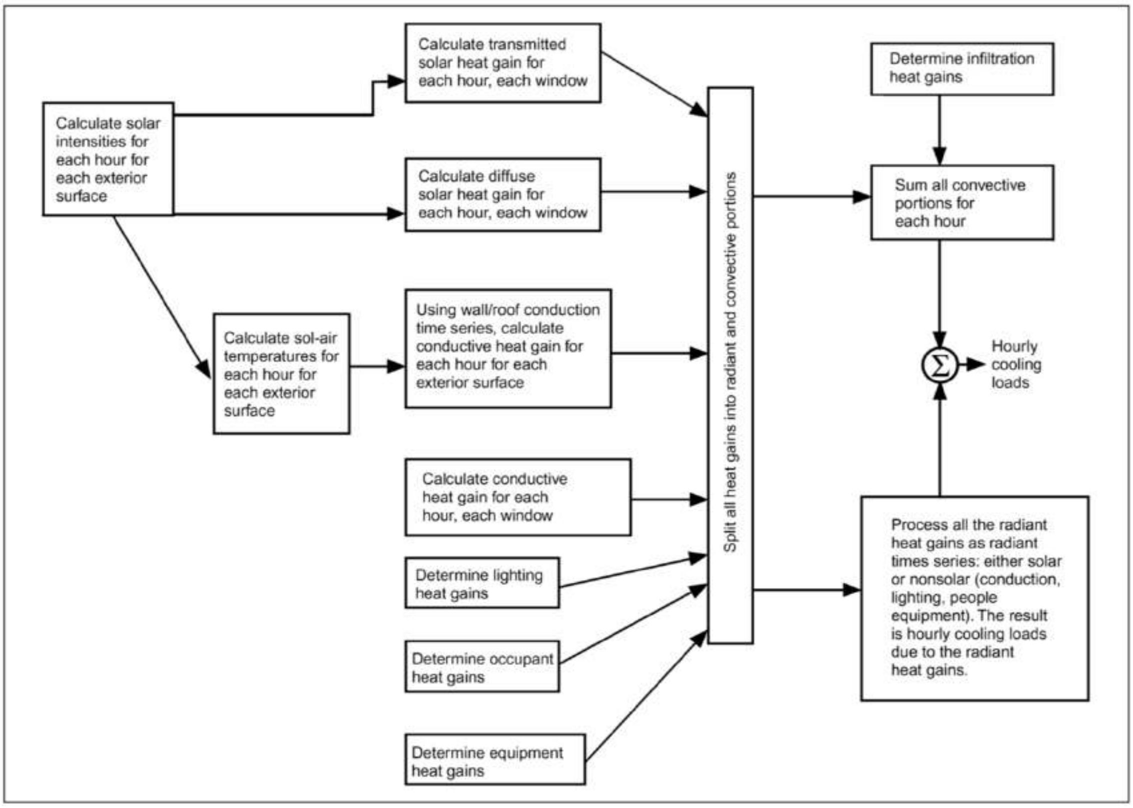

Figure 16: Overview of the RTS method (Source: ASHRAE Fundamentals Handbook)

As we said before, this method has to include the computation of the conductive heat gain, the separation of any type of heat gain into convective and radiant portions and how the former is converted into a cooling load. It therefore has to account for two different

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time delays. It does this by multiplying hourly heat gain by 24 h time series. This multiplication distributes the heat gains over time. The time series coefficients are called radiant and conduction time factors. They represent the percentage of an earlier radiant/ conductive heat gain that becomes cooling load during the current time period.

In conductive time series, the main variables are the wall's construction and the insulation. Insulation is measured with the U factor. Figure 11 shows the conductive time series depending on the type of construction (light to heavy). Figure 12 shows the conductive time series depending on the insolation factor. Radiant time series, however, mainly relies on the type of construction. This is shown in Figure 13.

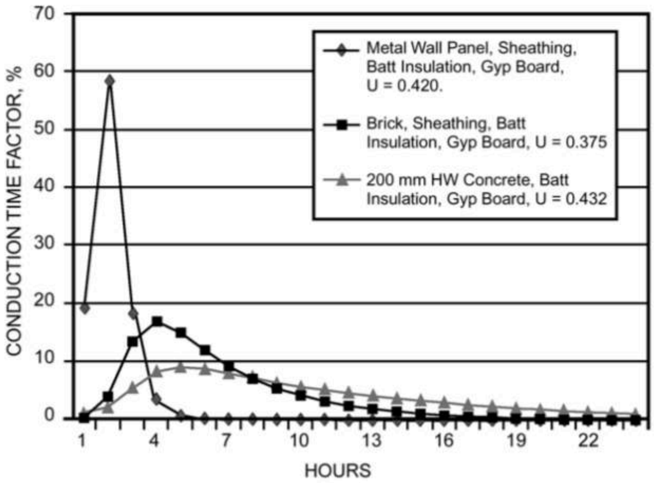

Figure 17: CTS depending on construction (Source: ASHRAE Fundamentals Handbook)

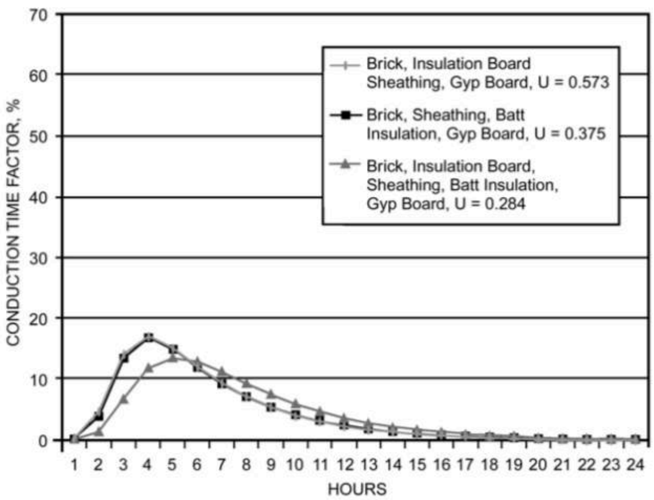

Figure 18: CTS depending on insulation (Source: ASHRAE Fundamentals Handbook)

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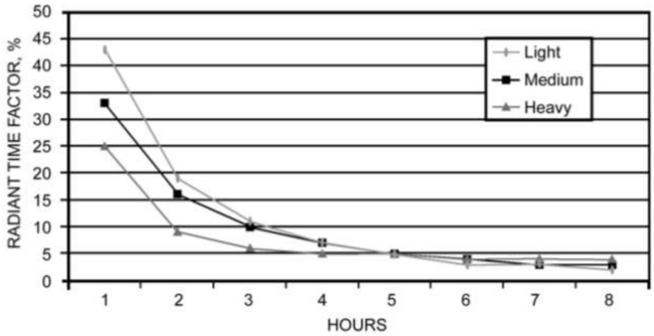

Figure 19: RTS depending on construction type (Source: ASHRAE Fundamentals Handbook)

RADIANT TIME SERIES PROCEDURE

The steps to be followed when using the RTS method are the following:

1. Choose a design day (worst case scenario – usually in the winter months) and calculate its 24-hr. profile heat gain.
2. Differentiate between the radiant and the convective part for each heat gain.
3. Apply the RTS to the radiant part of each heat gain – This allows us to account for the time delay.
4. Sum the instantaneous convective part and all the radiant parts of the heat gains – Thus, we account for the heat gain occurring due to the radian heat gains from past hours.

These steps allow us to calculate the cooling load for each hour for each component in the room. When summing all the components, we can determine the hour with the peak load for the design of the air-conditioning system. This process is especially interesting for rooms with southern exposures (or northern if the building we are analyzing is in the southern hemisphere), since they generally account for more hours of daylight.

The RTS method also accounts for conduction time delay for exteriors walls and roofs. This method assumes steady-periodic heat input conditions. This allows to reformulate the previous conduction transfer functions into periodic response factors. This were further simplified by dividing the 24 -hr. periodic response factors by respective overall U-factor. This constitutes the procedure called the Conductive Time Series (CTS). This procedure allows us to account for the conductive time delay.

The heat input at the exterior of any wall or roof can be calculated with the equation:

$$q_{i,\theta-n} = U \cdot A \cdot (T_{e,\theta-n} - T_{rc})$$

Where $q_{i,\theta-n}$ is the conductive heat input for the surface n hours ago [W], U is the overall heat transfer coefficient for the surface [W/(m^{2}K)], A is the surface area of each exterior wall [m^2], $T_{e,\theta-n}$ is the sol-air temperature n hours ago [ºC] and T_{rc} is the presumed constant room temperature.

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The conductive time series then applies a set of conductions time factors to calculate the heat gain for the current time period and the previous 23-hrs. using the following equation:

$$q_{\theta} = \sum_{n=0}^{23} c_n \cdot q_{i,\theta-n} \text{ ,}\forall i \ \in walls$$

Where q_{θ} is the hourly conductive heat gain for each exterior surface [W], c_n are the conductive time factors and $q_{i,\theta-n}$ are the conductive heat inputs for the surface n hours ago that we previously calculated. The conductive time factors for different types of constructions can be found in APPENDIX I.5 – CONDUCTIVE TIME FACTORS.

The instantaneous cooling load at a given point in time is defined as the rate at which heat energy is convected into the zone air. This convective part of the heat gains is assumed to be instantaneous. However, as we have previously described, two other time delayed factors have to be taken into account (the radiant loads and the conductive ones). Thus, the cooling load for each load component can be calculated by adding the convective part of the heat gain plus the time delayed portion of the heat gains for that hour and the 23 previous ones. The following table shows how heat gain components can be split into convective and radiant portions.

Heat Gain Source	Radiant Heat, %	Convective Heat, %
Transmitted solar, no inside shade	100	0
Window solar, with inside shade	63	37
Absorbed (by fenestration) solar	63	37
Fluorescent lights, suspended, unvented	67	33
Fluorescent lights, recessed, vented to return air	59	41
Fluorescent lights, recessed, vented to return air and supply air	19	81
Incandescent lights	80	20
People	See Table 1	
Conduction, exterior walls	63	37
Conduction, exterior roofs	84	16
Infiltration and ventilation	0	100
Machinery and appliances (see Table 13)	20 to 80	80 to 20

Table 10: Heat gain split for conventional rooms (Source: ASHRAE Fundamentals Handbook)

As in the conductive part of the Radiant Time Series method, the radiant portion of the hourly heat gains can be calculated using radiant time factors. The following formula allows us to calculate the cooling load for a certain time period on the basis of current and past heat gains:

$$Q_{r,\theta} = \sum_{n=0}^{23} r_n \cdot q_{r,\theta-n} \text{ ,}\forall i \ \in walls$$

Where $Q_{r,\theta}$ is the radiant cooling load (Q_r) for the current hour (θ) [W], $q_{r,\theta-n}$ is the radiant heat gain n hours ago [W] and r_n are the radiant time factors. Radiant time factors represent the fraction of the radiant pulse convected to the air n hours ago. Thus, $r_0$accounts for the current hour, r_1 for the last hour and so on. This radiant time factors

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are different for each unique zone and each unique radiant energy distribution function assumption. They depend primarily on the overall size of the construction and the characteristics of the surfaces the radiant heat gains strike. It is important to note that there are two different sets of radiant time factors – those related to solar heat gain and those related to all other types of radiant heat gains. The radiant time factors for different types of constructions can be found in APPENDIX I.5 – CONDUCTIVE TIME FACTORS.

The total cooling load for a particular component in a particular period of time is calculated adding the radiant cooling load calculated with RTS, the conductive cooling load calculated with CTS and the instantaneous convective heat gain.

Heating Load Principles

When calculating heating loads, we use very similar techniques to those described for the cooling loads. However, certain new points have to be taken into account:

- Temperatures outside the analyzed spaces are usually lower than the spaces' temperatures.
- Credit for solar heat gains and/or internal cooling loads should not be included in heating load calculations.
- Thermal storage effect can be ignored.
- Heat losses are considered to be instantaneous
- Heat transfer is essentially carried out by conduction

These points allow this simplified method to evaluate only the 'worst case scenario' that might occur during the heating season. This could be summarized by analyzing the heat gain with no solar effect and before the presence of people/ working equipment.

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CHAPTER 3 – LOAD CALCULATIONS

OVERVIEW AND SYSTEM ELECTION

This chapter will describe the actual load calculations that will be implemented for our system. Since CoorsTek center is a big building, there are many HVAC systems around the whole building. A summary of these systems and the main types of rooms they supply can be found in the mechanical files of the Coorstek architectural document. The air handling units can be summarized in the following systems:

				SUPPLY FAN DATA											
DESIG.	AREA SERVED	MFR	MODEL	CFM TOTAL AT 5,800'	CFM O.A. AT 5,800'	TSP IN. W.C. AT S.L.	ESP IN. W.C. AT S.L.	NO. FAN WHEELS	FAN WHEEL DIA./ TYPE	RPM	BHP/FAN (MAX. BHP TOTAL)	HP/FAN (MAX. HP TOTAL)	VIBRATION ISOLATOR TYPE	CFM TOTAL AT 5,800'	TSP IN. W.C. AT S.L.
AHU-1	LABS	TEMTROL	CUSTOM	38,500	38,500	11.50	4.00	9	18" PLUG	3,764	9.25(83.24)	10 (90)	N/A	N/A	N/A
AHU-2	LABS	TEMTROL	CUSTOM	38,500	38,500	10.30	4.00	9	18" PLUG	3,764	9.25(83.24)	10 (90)	N/A	N/A	N/A
AHU-3	OFFICES/ CLASSROOMS	TEMTROL	CUSTOM	55,000	14,000	7.80	3.00	12	18" PLUG	3,577	7.9(94.75)	10(120)	N/A	55,000	2.60
EAP-1	LABS	TEMTROL	CUSTOM	REFER TO FAN SCHEDULE FOR EF REQUIREMENTS									N/A	N/A	N/A
AHU-4	CLEANROOM	CLEANPAK	CUSTOM	6,630	1,750 (17)	4.80	2.50	2	16" PLUG	3,930	3.55(7.11)	5 (10)	N/A	NA	NA

Table 11: Air Handling Units Schedule (Source: ASHRAE Fundamentals Handbook)

To have an accurate calculation of the overall cooling load we would need to calculate all systems separately and sum their results. This section, however, will focus in only one of them. For simplicity reasons, the chosen system was AHU 3. This decision was made because the main focus of this system are the offices around the whole building. As will be explained in more detail later in this chapter, office rooms are quite simple to model, since the equipment in them can be easily estimated.

The first step once the system has been chosen is to identify what areas of the building is affecting. To do this, we need to look at the mechanical files. We will start in the rooftop and follow the path down until we reach the end of the system. We will only take into account the supply system, since we only care about how much energy the system will have to handle. The following Figures show how this step was carried out.

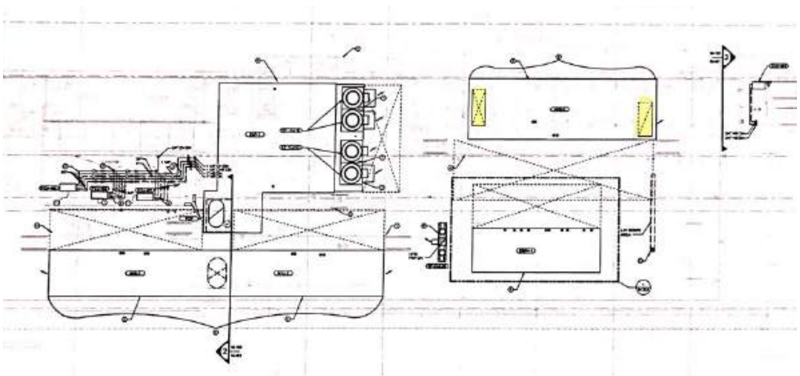

Figure 20: Beginning of AHU3 system in the rooftop (Source: Architectural plans)

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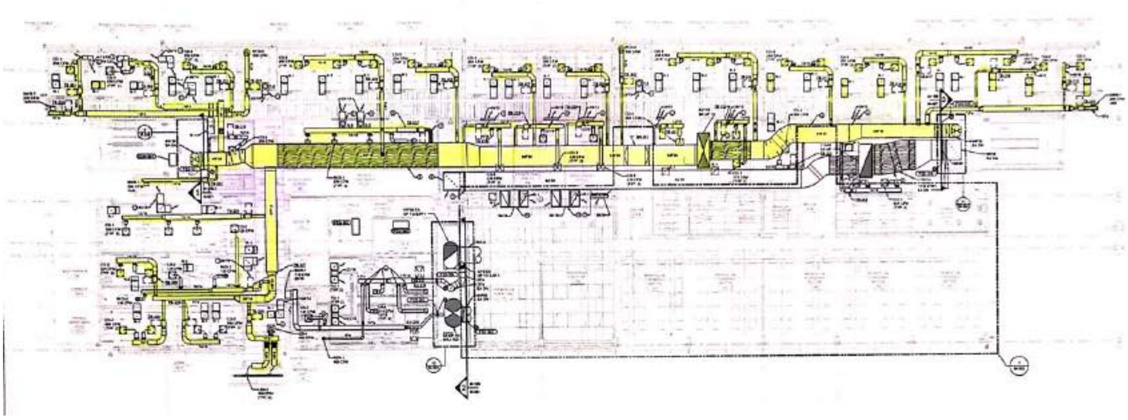

Figure 21: AHU3 system – Third floor (Source: Architectural plans)

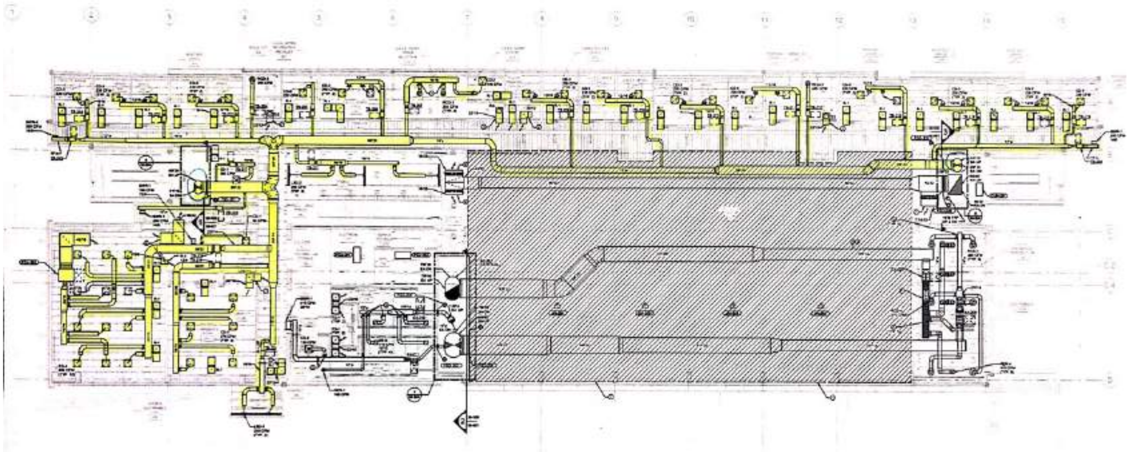

Figure 22: AHU3 system – Second floor (Source: Architectural plans)

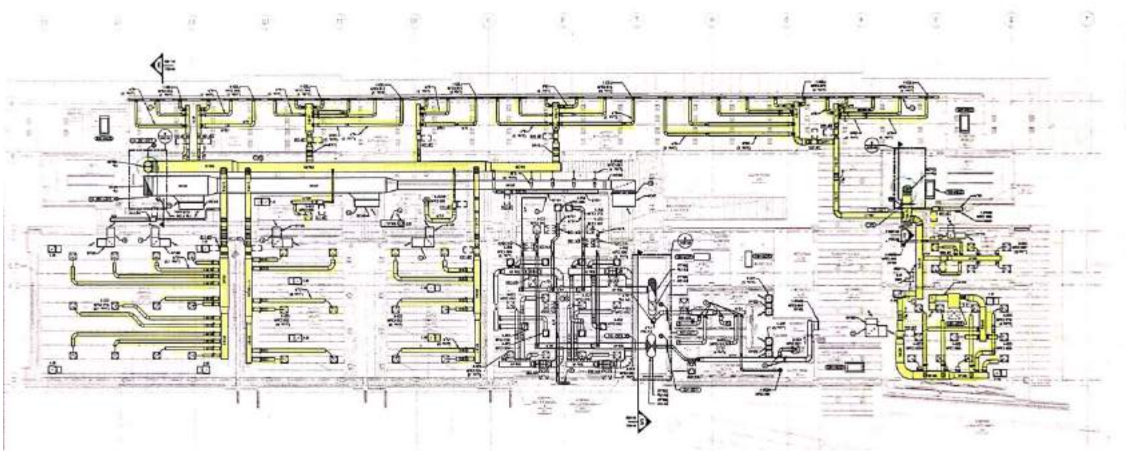

Figure 23: AHU3 system – First floor (Source: Architectural plans)

Hence, we can observe that AHU3 system operates in three levels of the building.

The next step of the calculations will require identifying the spaces that are now affected by the system. This can be easily done observing the above Figures to determine which rooms or corridors have breathers. The following Figures show this rooms matching the same color code used in the CHAPTER 1 – GENERAL DESCRIPTION.

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Figure 24: Rooms affected by AHU3 – Third floor (Source: Architectural plans)

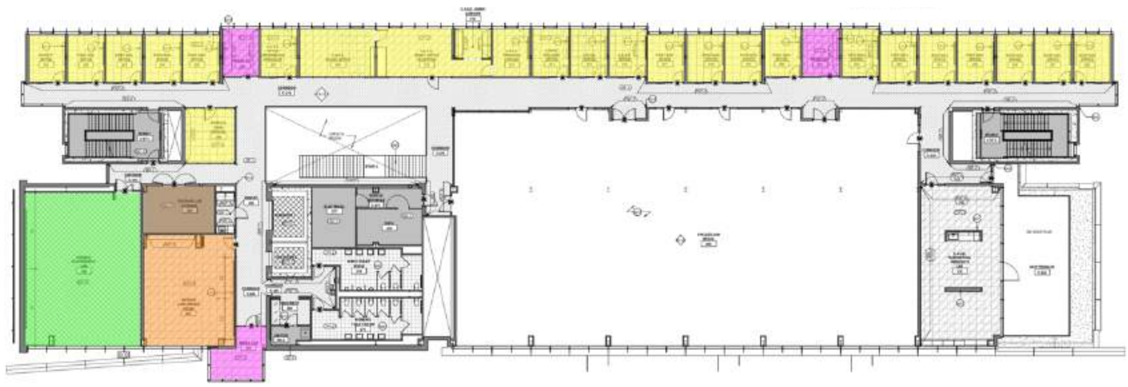

Figure 25: Rooms affected by AHU3 - Second floor (Source: Architectural plans)

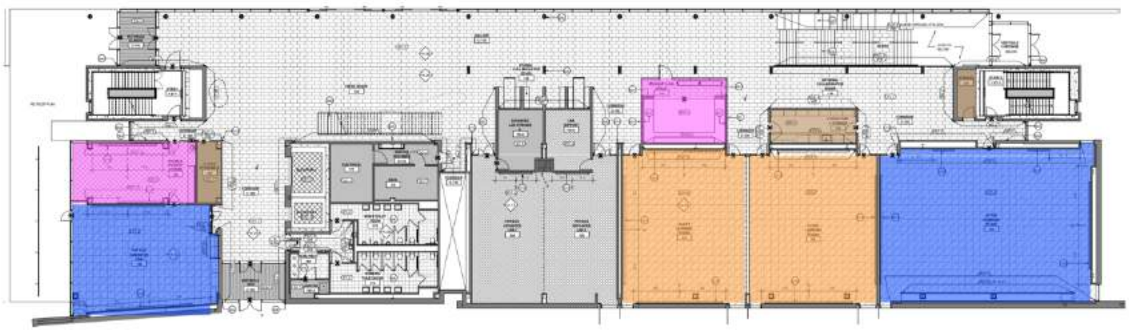

Figure 26: Rooms affected by AHU3 – First floor (Source: Architectural plans)

Once these rooms have been identified, the individual heat gains of all of them have to be calculated. The sum of all these heat gains will constitute the overall heat gain the system will have to be able to handle.

HEAT SOURCES AND HEAT GAIN CALCULATIONS

PEOPLE

Procedure

To perform the heat gains associated to the presence of humans in the selected rooms, we will need information given in the General section of the architectural document. In them, a summary of the expected occupancy load can be found for each room or space.

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The first complication of this section was to determine the occupancy of each individual office. In the documents, data for the whole office section can be found. However, this data includes some corridors and rooms that are not affected by the AHU3 system. Therefore, the data was divided by the full area of this section and then multiplied by the area of each individual office to get the total occupancy load. The results obtained from this calculation were then rounded up to the next integer to perform the load calculations.

Once al the occupancy loads were available, the next step was to determine the state of activity that would be carried out in each room. With data gathered from the ASHRAE document, the total heat per person depending on their state of activity can be obtained. This data can be further divided into Sensible and Latent heats. We are only interested in the sensible heat, since it is the only one that will produce a change in the temperature. This information can be found in the description of the load calculations, under the subsection People. The Assumptions regarding the state of activity of each type of room can be found in the next section.

The total heat gain due to humans in each room can simply be calculated multiplying the total occupancy load times the sensible heat. The results obtained for the whole system can be found under the section Results.

Assumptions

1. First Floor
    - Lounges – Standing, light work; walking
    - Storage rooms – Seated, very light work
    - Computer labs – Moderately active office work
    - Conference rooms - Moderately active office work
2. Second Floor
    - Regular offices – Moderately active office work
    - Student offices – Standing, light work; walking
    - Break out – Light bench work
    - Storage rooms – Seated, very light work
    - Equipment labs – Moderately active office work
    - Conference rooms – Moderately active office work
3. Third Floor
    - Regular offices – Moderately active office work
    - Student offices – Standing, light work; walking
    - Break out – Light bench work
    - Storage rooms – Seated, very light work
    - Equipment labs – Moderately active office work
    - Conference rooms – Moderately active office work

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Results

The overall results obtained for the heat gains caused by humans in the rooms affected by AHU3 in each floor can be summarized in the following table:

	First Floor	Second Floor	Third Floor	TOTAL
Heat gain [W]	29,015	14,470	16,715	60,200

Table 12: Occupancy results (Source: Own creation)

The results can be quite impressive at first. The first floor, despite being the one where less rooms are affected by the AHU3 system, provides almost half of the total heat gain caused by humans. However, this floor contains four big labs that have a big occupancy load. Thus, potentially, it could be an important factor regarding this heat gain. Also, other floors are main composed of offices, which in general allow less occupancy loads.

The Excel file with the intermediate steps and results can be found in APPENDIX LC.1 – PEOPLE LOAD CALCULATIONS.

Office Load Density

Procedure

Additionally, to the load calculations due to humans in the rooms, we also need to add the office density related heat gain. As described in section Heat gain per unit area (Section 27), this heat gain needs to be added per unit area in office buildings due to the density of each space.

AS described in the ASHRAE document, this heat gain accounts for the office building's distribution.

Assumptions

- Medium load densities were chosen for simplicity reasons for the all the rooms placed in the space the due to the fact that each office is approximately. APPENDIX I.1 – OFFICE LOAD DENSITY shows information gathered from ASHRAE regarding office load densities.

Results

The overall results obtained for the heat gains caused by office load densities in the rooms affected by AHU3 in each floor can be summarized in the following table:

	First Floor	Second Floor	Third Floor	TOTAL
Heat gain [W]	7,878	6,412	8,281	22,572

Table 13: Office load density results (Source: Own creation)

The Excel file with the intermediate steps and results can be found in APPENDIX LC.2 – OFFICE DENSITY LOAD CALCULATIONS.

Note that in this Excel file, to convert from ft^2 to m^2, we have used the following relationship:

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$$1\ m^2 = 10.7639\ ft^2$$

LIGHTING

Procedure

As previously mentioned in the Load calculations description, under the subsection Lighting, we have considered negligible the amount of heat from the lighting units that goes everywhere but the air in the room where they are placed. This makes our calculations much simpler.

To calculate the heat gains associated to the lightning implemented in the selected rooms, we will need information given in the Electrical section of the architectural document. In particular, we will look at the pages E-121 to E-123. In them, we can find a detailed description of all the light fixtures present in each room and the panel board that controls the lighting in each room. The annotation of the panelboard specifies the number of the panelboard on top and the number of the appliances in that panelboard present in each room bellow. Thus, two different analysis can be made.

The first method involves annotating all the fixtures in each room. After, with information gathered from the ASHRAE document, we could calculate the heat gain per type of fixture and multiply both numbers to get the total heat gain in each room.

However, a simpler method is available. Considering we have access to the panelboard schedules, we can look at them to get the information of the maximum power that can potentially need to be supplied to each element it controls. In the schedules, this maximum power is expressed in VA.

Nonetheless, we know the power factor in this building is one, so the value in watts is the same. Since we are calculating the worst-case scenario, we can apply these maximum values to get the lighting output power.

To calculate the heat gain due to lighting fixtures, we still need to account for the different factors described previously. The formula to calculate them is the following:

$$q_{sens} = q_{lr} * F_u * F_s * CLF_h$$

As previously described, the service allowance factor can be considered to be a unity since the heat is considered to stay fully in the room. The usage factor accounts of the number of hours the lights are on versus the ones they are off. Since we want to calculate the worst-case scenario, we can assume the lights are on at all times. Hence, the usage factor will also be considered to be a unity. The cooling load factor is the cooling load at a given time compared to the heat gain from earlier in the day. Since we consider the lights are on at all times, this last factor can also be considered to be a unity. Thus, the formula can be rewritten as:

$$q_{sens} = q_{lr}$$

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This means that, in the worst-case scenario, all power consumed by a light fixture is converted via convection to a heat gain.

To calculate the total heat gain in a room due to lighting, we will only need to sum the maximum power noted in the schedules for all the elements in it.

All information regarding the Floors lighting plan and the panelboard schedules can be found in APPENDIX I.2 – LIGHT FIXTURES.

The results obtained for the whole system can be found under the section Results.

Assumptions

- Al heat consumed by the lights is directly transformed via conduction to heat in the room that the light is affecting – no heat goes to the return air or adjacent rooms – Service allowance factor unity
- Lights on at all times – Usage factor unity
- Cooling load factor unity

Results

The overall results obtained for the heat gains caused by lighting in the rooms affected by AHU3 in each floor can be summarized in the following table:

	First Floor	Second Floor	Third Floor	TOTAL
Heat gain [W]	19,664	70,676	110,914	201,254

Table 14: Lighting results (Source: Own creation)

These results make sense because the density of lighting fixture in all rooms is approximately the same. Since the first floor has less area than the others affected and more natural light, it contributes the least to the heat gain. Similarly, the third floor has more rooms supplied by the AHU3 system than the second floor. It seems reasonable to note that the total heat gain due to lighting is almost four times greater than that caused by humans.

The Excel file with the intermediate steps and results can be found in APPENDIX LC.3 – LIGHTING LOAD CALCULATIONS.

APPLIANCES

Procedure

The description of how the load calculations regarding all the appliances present in a room is previously described in the section Appliances. In this section, all the types of appliances that can be present in a non-residential building are listed. For each one of them, the process of calculating its heat gain and the corresponding equation for each case can be found.

Similarly, to the previous section, there are many possible methods to calculate these heat gains.

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The first method would be the most accurate one for each particular moment in time. It involves listing all the appliances in each room. As previously described, these appliances can be divided in:

- Electric motors
- Cooking appliances
- Hospital and laboratory equipment
- Office Equipment

Once this list was completed, we would need to look at the nameplate of all the different appliances and use the corresponding equation to get the value of the heat gain.

This method is the most accurate one. However, it would only be useful if we could assume that the equipment in each room is static. This is, we can assure that no new appliances will be taken into the room nor will old appliances be taken out.

The other two methods involve analyzing the maximum power each receptacle in the room can supply. Like this, we can calculate the maximum power the room can supply in the worst-case-scenario. Information for these two methods can be found in the electrical section of the architectural document. In particular, we will use slides E-101 to E-103. These correspond to the power and systems plans for each floor.

As with lighting, the first of these two methods involve listing all the receptacles in the room and analyzing all of them individually. Information for the amount of power each receptacle can supply can be found in the ASHRAE document.

The third method, as in lighting, involves looking at the panelboards of each room. In the mentioned slides we can see which panelboard operates in each room and the appliances it has connected to it. Looking at the panelboard schedules, we can get the information of the maximum power that can potentially need to be supplied to each element they control. In the schedules, this maximum power is expressed in VA.

Nonetheless, we know the power factor in this building is one, so the value in watts is the same. Since we are calculating the worst-case scenario, we can apply these maximum values to get the power consumed by each receptacle in the worst-case scenario it has been designed for.

In the description section for the heat gains due to appliances, it was explained that each type of appliance has its own equation for calculating its heat gain. Since the panelboards only show the maximum power the receptacle can supply, and not the appliances that each receptacle is most likely to have connected, an assumption is necessary to conduct these calculations. All appliances were modeled as general appliances following the formula:

$$q_{sens} = q_{input} \cdot F_U \cdot F_R = q_{input} \cdot F_L$$

Where q_{sens} is the sensible heat gain [W], q_{input} is the nameplate values of the appliances and F_U and F_R are the usage and radiation loads, respectively. ASHRAE

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document considers that, if the usage factor is unknown, 0.5 can be a good estimation. Since we are calculating the heat gain for the worst-case scenario, we have decided to use 0.7 as usage factor. Similarly, ASHRAE explains that most of the heat produced by the lighting fixtures can be considered to be almost fully convective. Thus, we have chosen our radiation factor to be 0.9. Thus, the calculation can be summarized as:

$$q_{sens} = q_{input} \cdot 0.7 \cdot 0.9 = 0.63 \cdot q_{input}$$

To back up these assumptions, we can also turn to the ASHRAE document. It is there explained that, on average, 34% of heat can be considered to be latent and the remaining 66% sensible for common appliances. Since this is a more accurate value, we will use it of our heat gain calculations. Therefore, the final formula is:

$$q_{sens} = 0.667 \cdot q_{input}$$

To calculate the total heat gain in a room due to the appliances it contains, we will only need to sum the maximum heat gain calculated as described above noted for all the elements in it.

All information regarding the Floors lighting plan and the panelboard schedules can be found in APPENDIX I.3 – APPLIANCES.

The results obtained for the whole system can be found under the section Results.

Assumptions

- Usage factor: $F_U = 0.7$
- Radiation factor: $F_R = 0.9$
- Load factor: $F_L = 0.667$

Results

The overall results obtained for the heat gains caused by appliances in the rooms affected by AHU3 in each floor can be summarized in the following table:

	First Floor	Second Floor	Third Floor	TOTAL
Heat gain [W]	63,919	46,717	49,505	160,140

Table 15: Appliances results (Source: Own creation)

Since the first floor is the one that contains the most labs proportionally to its surface area, it seems reasonable that it also is the one that has the most appliances. Therefore, having the largest heat gain in the first floor seems like a valid result. The other two floors are evenly split.

The Excel file with the intermediate steps and results can be found in APPENDIX LC.4 – APPLIANCES LOAD CALCULATIONS.

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Heat Gain Through Fenestration Areas

Procedure

To perform the heat gains through fenestration areas in the exterior rooms of the building, we will need information given in the General section of the architectural document.

The first task will be to identify the rooms that will be subject to our analysis. The following figures show the rooms in the color code used in previous sections.

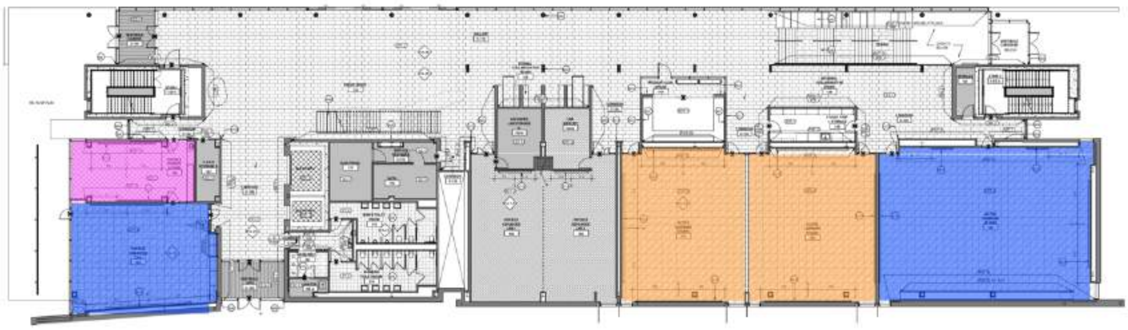

Figure 27: First floor exterior rooms (Source: Architectural plans)

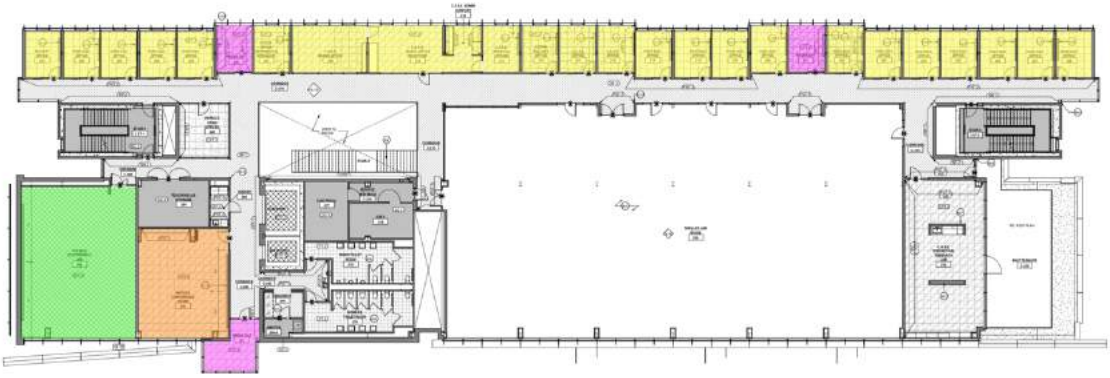

Figure 28: Second floor exterior rooms (Source: Architectural plans)

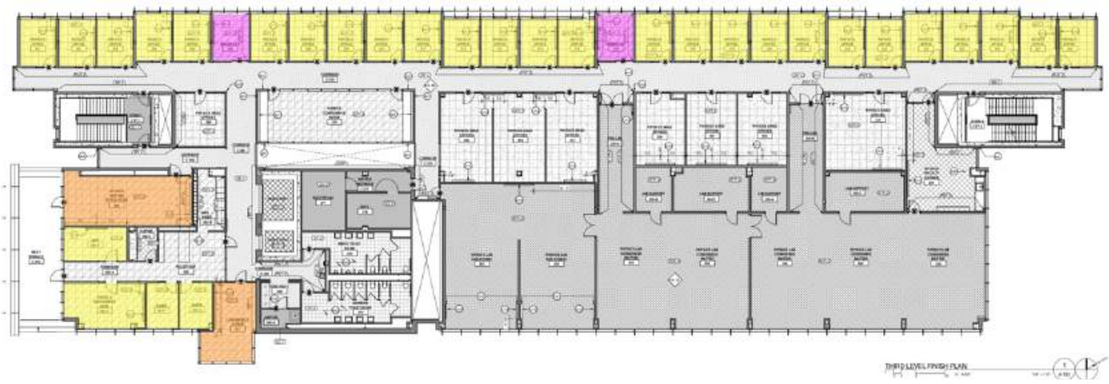

Figure 29: Third floor exterior rooms (Source: Architectural plans)

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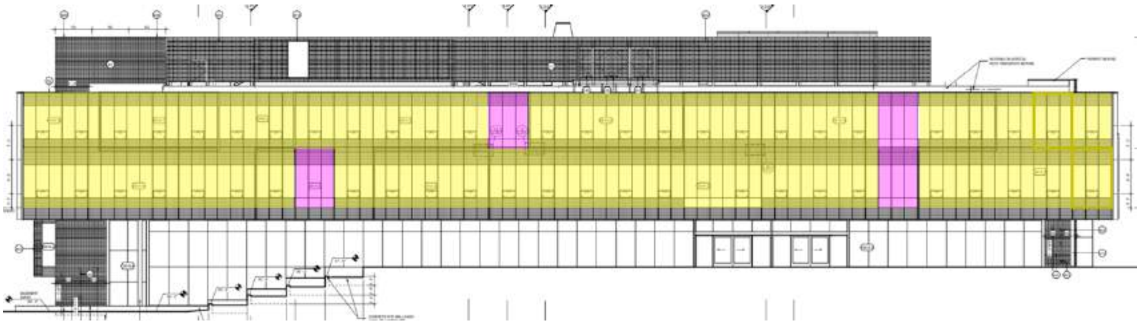

Figure 30: CoorsTek Center - North elevation (Source: Architectural plans)

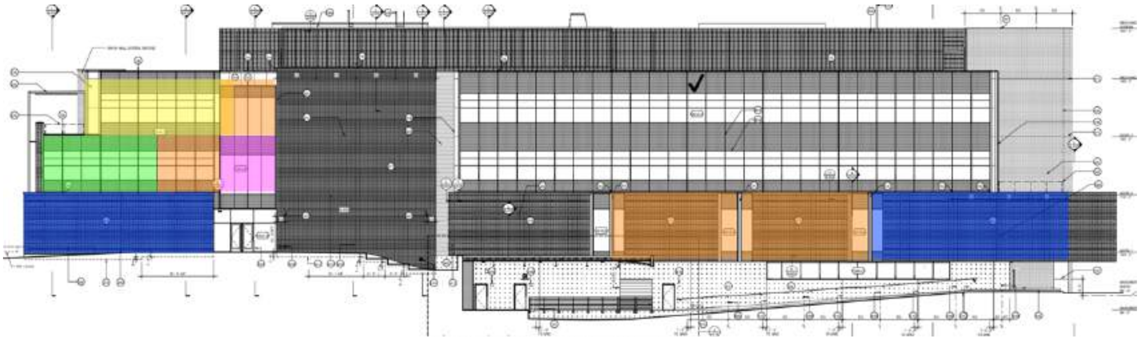

Figure 31: CoorsTek Center - South elevation (Source: Architectural plans)

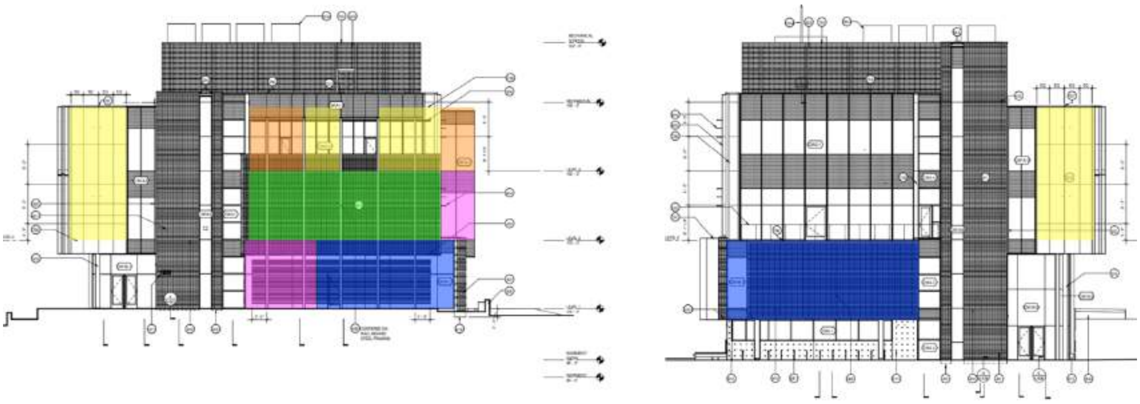

Figure 32: CoorsTek Center - East and West elevations (Source: Architectural plans)

The next step was to calculate the exterior surface of all the rooms and further divide it into wall surfaces and window surfaces. For this, we used the above images together with the structural section of the architectural document. The results are summarized in the excel file in Appendix LC.4. To convert the result to square meters, we used the following formula:

$$1\ m^2 = 10.7639\ ft^2$$

The description of how the load calculations regarding all the appliances present in a room is previously described in the section Heat Gain Through Fenestration Areas. As described, in order to calculate the desired heat gains, we first need to calculate a series of indices. The equations to calculate these indices are the following:

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Table 14 Solar Equations

Solar Angles

All angles are in degrees. The solar azimuth ϕ and the surface azimuth ψ are measured in degrees from south; angles to the east of south are negative, and angles to the west of south are positive. Calculate solar altitude, azimuth, and surface incident angles as follows:

Apparent solar time AST, in decimal hours:

$$AST = LST + ET/60 + (LSM - LON)/15$$

Hour angle H, degrees:

$$H = 15(\text{hours of time from local solar noon}) = 15(AST - 12)$$

Solar altitude β:

$$\sin\beta = \cos L \cos\delta \cos H + \sin L \sin\delta$$

Solar azimuth ϕ:

$$\cos\phi = (\sin\beta \sin L - \sin\delta)/(\cos\beta \cos L)$$

Surface-solar azimuth γ:

$$\gamma = \phi - \psi$$

Incident angle θ:

$$\cos\phi = \cos\beta \cos\gamma \sin\Sigma + \sin\beta \cos\Sigma$$

where

ET = equation of time, decimal minutes
L = latitude
LON = local longitude, decimal degrees of arc
LSM = local standard time meridian, decimal degrees of arc
= 60° for Atlantic Standard Time
= 75° for Eastern Standard Time
= 90° for Central Standard Time
= 105° for Mountain Standard Time
= 120° for Pacific Standard Time
= 135° for Alaska Standard Time
= 150° for Hawaii-Aleutian Standard Time
LST = local standard time, decimal hours
δ = solar declination, °
ψ = surface azimuth, °
Σ = surface tilt from horizontal, horizontal = 0°

Values of ET and δ are given in Table 7 of Chapter 30 for the 21st day of each month.

Direct, Diffuse, and Total Solar Irradiance

Direct normal irradiance E_{DN}

If $\beta > 0$ $\quad E_{DN} = \left[\frac{A}{\exp(B/\sin\beta)}\right] CN$

Otherwise, $\quad E_{DN} = 0$

Surface direct irradiance E_D

If $\cos\theta > 0 \quad E_D = E_{DN}\cos\theta$

Otherwise, $\quad E_D = 0$

Ratio Y of sky diffuse on vertical surface to sky diffuse on horizontal surface

If $\cos\theta > -0.2 \quad Y = 0.55 + 0.437\cos\theta + 0.313\cos^2\theta$

Otherwise, $\quad Y = 0.45$

Diffuse irradiance E_d

Vertical surfaces $\quad E_d = CYE_{DN}$

Surfaces other than vertical $\quad E_d = CE_{DN}(1 + \cos\Sigma)/2$

Ground-reflected irradiance $\quad E_r = E_{DN}(C + \sin\beta)\rho_g(1 - \cos\Sigma)/2$

Total surface irradiance $\quad E_t = E_D + E_d + E_r$

where

A = apparent solar constant
B = atmospheric extinction coefficient
C = sky diffuse factor
CN = clearness number multiplier for clear/dry or hazy/humid locations. See Figure 5 in Chapter 32 of the 1999 *ASHRAE Handbook—Applications* for CN values.
E_d = diffuse sky irradiance
E_r = diffuse ground-reflected irradiance
ρ_g = ground reflectivity

Values of A, B, and C are given in Table 7 of Chapter 30 for the 21st day of each month. Values of ground reflectivity ρ_g are given in Table 10 of Chapter 30.

Figure 33: Solar equations (Source: ASHRAE Fundamentals Handbook)

Values for the equation of time, solar declination, apparent solar constant, atmospheric extinction coefficient, sky diffuse factor and ground reflectivity were obtained from Chapter 30 of the ASHRAE document. The tables where they were obtained can be found in APPENDIX I.4 – SOLAR EQUATIONS AND IAC INDECES.

Latitude and longitude values were obtained from the internet. The surface tilt from horizontal was chosen to be 90º. This helped to cancel some of the terms of the equations.

The clearness number was chosen to be 1 in order to maximize the possible E_{DN}. Since most of the exterior rooms affected by the AHU3 system are the offices in the second and third level, we have chosen the surface azimuth orientation to be north. This is not completely accurate, since some of the exterior surfaces have different orientations, but simplifies the calculations a lot.

To calculate the worst-case scenario values, since the formulas depend on the local standard hour, an analysis of all the hours was conducted and the maximum values for each of the relevant elements was chosen. The local standard hours were enumerated from 0 to 23.

The main objective of these calculations is to obtain the Surface direct irradiance, the diffuse irradiance and the diffuse ground reflected irradiance, as well as the worst-case scenario incident angle. The values obtained were:

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Local Standard Time (LST)	Incident angle (θ)	Surface Direct Irradiance (ED)	Diffuse Irradiance (Ed)	Ground Reflected Irradiance (Er)	Total Surface Irradiance (Et)
0	106.302065	0	0	0	0
1	105.013171	0	0	0	0
2	101.471372	0	0	0	0
3	95.987581	0	0	0	0
4	88.9565505	0	0	0	0
5	80.7732239	0	0	0	0
6	71.7962766	0	0	0	0
7	62.353774	0	0	0	0
8	52.7817436	192.5366305	16.85291717	7.986245011	217.3757927
9	43.5041469	506.4221655	41.05642796	33.19063992	580.6692334
10	35.1929409	679.3173887	52.88547285	53.74946959	785.9523312
11	29.0419239	774.0496696	59.11065968	66.66040958	899.8207389
12	26.800329	803.1594084	61.00505911	70.8192721	934.9837396
13	29.4339213	768.6792128	58.76047578	65.90232047	893.342009
14	35.8297257	668.1245324	52.1412306	52.29347221	772.5592352
15	44.2587944	487.1422735	39.68243282	31.17689416	558.0016005
16	53.5820292	154.8588745	13.67522922	6.000890131	174.5349939
17	63.1575039	0	0	0	0
18	72.5733094	0	0	0	0
19	81.4964283	0	0	0	0
20	89.5972618	0	0	0	0
21	96.5138055	0	0	0	0
22	101.84905	0	0	0	0
23	105.211496	0	0	0	0

Table 16: Solar angles results (Source: Own creation)

The value for the surface direct irradiance stands out. However, with these values we can calculate the desired heat gains following the formulas:

$$\begin{cases} q_b = A \cdot E_D \cdot SHGC(\theta) \cdot IAC \\ q_d = A \cdot (E_d + E_r) \cdot \langle SHGC \rangle_D \cdot IAC \\ q_c = U \cdot A \cdot (T_{out} - T_{in}) \end{cases}$$

Where the total heat gain can be calculated as:

$$Q = q_b + q_d + q_c$$

The IAC index accounts for the inside shading in each room. Since we are calculating worst-case scenario values, we can set this value to a unity. Values for $SHGC(\theta)$ and $\langle SHGC \rangle_D$ were obtained from the ASHRAE document. To get them, the type of windows used in the CoorsTek center was first needed. The only relevant information in the architectural document regarding windows is the following:

WINDOW FRAMING TYPES	
CW1A	4 SIDED SSG, 8" DEEP
CW1B	4 SIDED SSG, 10 1/4" DEEP
CW2	2 SIDED SSG, 8" DEEP
CW3	CAPTURED, 8" DEEP
CW4	CAPTURED, 6" DEEP
CW5	4 SIDED SSG, 5" DEEP
ISF	CENTER-GLAZED 4.5" DEEP
SK-1	METAL FRAMED SKYLIGHT

Figure 34: Window details

The window frames of the offices in the second and third level are all denoted with CW1A framing types. Therefore, similarly to the surface azimuth, this type of framing was chosen for all the rooms for simplicity purposes. When researching it online, the following frame structure was found:

Figure 35: CW1A framing type (Source: Google)

This type of framing consists of two ¼” glass pieces separated by a ½” air space. With this information, the next step should be to look at the tables on chapter 30 of the ASHRAE document. Within the double-glazing window structures, the one with the highest indices values was chosen. Since these values already account for the two glass pieces, we won’t need to multiply their values by two. The U factor values can be found in Table 4 of chapter 30 of the ASHRAE document.

Lastly, to determine the outside temperature for the conductive heat gain, information was gathered from the internet on the temperature of the hottest day of the year in Golden, Colorado. The result was 89ºF. The interior temperature was estimated to be 72ºF. To convert these values to the Celsius scale, the following formula was used:

$$T[ºC] = (T[ºF] - 32) \cdot 5/9$$

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Although exterior shading is a factor that normally has to be take into account for most buildings in the heat gain through fenestration areas, since CoorsTek center is located in the middle of a large open space, we can assume it to be negligible.

All the tables and information mentioned above can be found in APPENDIX I.4 – SOLAR EQUATIONS AND IAC INDECES. The excel file shows the results for each type of rooms. Since there are many rooms that are the same in some of the building floors (such as the north face offices), clusters were made to shorten the calculations. The final results for each type of room were then multiplied by the number of rooms of each cluster.

These values were calculated for each specific room with the index's values calculated above. The results can be found in Appendix LC.5-a – Solar Angles.

Assumptions

- Room types clustered accordingly to their exterior surfaces
- Equation of time: ET = 1.6 decimal minutes
- Local Standard time meridian: LSM = -105º (Mountain Standard Time)
- Local longitude: LON = -105.222º
- Latitude: L = 39.7542º
- Solar declination: δ = -23.45º
- Surface azimuth: ψ = 180º
- Surface tilt from horizontal: Σ = 90º
- Clearness number: CN = 1
- IAC = 1 for all rooms
- Outside temperature: T_{out} = 89ºF
- Inside temperature: T_{in} = 72ºF
- Exterior shading = 0

Results

As described in this section, the load calculations due to heat through fenestration areas are dependent on the incident angle of the sun rays. This angle depends on the hour of the day. Thus, the calculations also depend on the hour. Therefore, it is not possible to calculate the amount of heat the building gains in each of its floors over a day due to this phenomenon like in other sections.

The excel file with the results for the solar angles and the necessary intermediate indices can be found in Appendix LC.5-a – Solar Angles.

The excel file with the results for the load calculations through fenestration areas and the necessary intermediate indices can be found in Appendix LC.5-b – Fenestration Load Calculations.

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Heat Gain through Exterior Surfaces

Procedure

To perform the heat gains associated to the presence of humans in the selected rooms, we will need information given in the General section of the architectural document.

The first step will be to calculate the exterior wall surface of all the rooms. For this, we used Figure 27 to Figure 32 together with the structural section of the architectural document. To calculate them, we can use the overall exterior surface and window surfaces for each room calculated in the previous section and subtract them. To convert the result to square meters, we used the following formula:

$$1\ m^2 = 10.7639\ ft^2$$

The description of the procedure of the load calculations regarding exterior surfaces in a room is previously described in the section Heat Gain Through Exterior Surfaces. As described, in order to calculate the desired heat gains, we first need to calculate the sol air temperature for each hour of the day. The equations to calculate it is the following:

$$t_e = t_0 + E_t \cdot \frac{\alpha}{h_0} - \varepsilon \cdot \frac{\Delta R}{h_0}$$

Where t_0 is the outdoor air temperature [ºC], α is the absorptance of surface for solar radiation, E_t is the total solar radiation incident on the surface [W/(m^{2}K)], h_0 is the coefficient of heat transfer by long wave radiation and convection at the outer surface [W/(m^{2}K)], ε is the hemispherical emittance of the surface and ΔR is the difference between long-wave radiation incident on surface from sky and surroundings and radiation emitted by blackbody at outdoor air temperature [W/m^2].

We therefore have to take into account the values of the indices calculated in the previous section to calculate the sol air temperatures.

The next step is to calculate the conductive heat gain for each hour for each exterior surface. To do this, we can use the following equation:

$$q_{i,\theta-n} = U \cdot A \cdot (T_{e,\theta-n} - T_{rc})$$

Where $q_{i,\theta-n}$ is the conductive heat input for the surface n hours ago [W], U is the overall heat transfer coefficient for the surface [W/(m^{2}K)], A is the surface area of each exterior wall [m^2], $T_{e,\theta-n}$ is the sol-air temperature n hours ago [ºC] and T_{rc} is the presumed constant room temperature.

We can then use the Conductive Time series to calculate the hourly conductive heat gain using these values. The equation that will be implemented to calculate this will be:

$$q_\theta = \sum_{n=0}^{23} c_n \cdot q_{i,\theta-n}\ , \forall i\ \in walls$$

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Where q_θ is the hourly conductive heat gain for each exterior surface [W], c_n are the conduction time factors and $q_{i,\theta-n}$ are the conductive heat inputs for the surface n hours ago that we previously calculated.

All the information regarding the conductive time factors can be found in APPENDIX I.5 – CONDUCTIVE TIME FACTORS. The excel file shows the results for each type of rooms. Since there are many rooms that are the same in some of the building floors (such as the north face offices), clusters were made to shorten the calculations. The final results for each type of room were then multiplied by the number of rooms of each cluster.

This appendix shows a table with the U-factor and the conductive time factors depending on the wall type. All the wall types for the building can be found in the architectural document. For simplicity purposes, we have assumed the metal walls were type 4 walls and the brick walls were all type 17 walls. Although some rooms have more than one material in some of their walls, surfaces were assumed to be made fully from the same material.

Assumptions

- Room types clustered accordingly to their exterior surfaces
- Equation of time: ET = 1.6 decimal minutes
- Local Standard time meridian: LSM = -105º (Mountain Standard Time)
- Local longitude: LON = -105.222º
- Latitude: L = 39.7542º
- Solar declination: δ = -23.45º
- Surface azimuth: ψ = 180º
- Surface tilt from horizontal: Σ = 90º
- Clearness number: CN = 1
- IAC = 1 for all rooms
- Outside temperature: T_{out} = 89ºF
- Inside temperature supposed to be constant
- Inside temperature: T_{in} = 72ºF
- Exterior shading = 0
- Metal walls are Metal wall panels, sheathing, batt insulation, gyp board
- Brick walls are Brick, insulation board, brick
- Uniformity of materials in all of the rooms' walls

Results

The overall results obtained for the heat gains through exterior surfaces in the rooms affected by AHU3 in each floor can be summarized in the following table:

	First Floor	Second Floor	Third Floor	TOTAL
Heat gain [W]	5,257	2,525	1,272	9,054

Table 17: Exterior surfaces results (Source: Own creation)

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Since the rooms in the first floor are the ones that have the least windows, it seems reasonable that the heat gain through their exterior surfaces is the highest.

The excel file with the results for the sol-air temperature and the necessary intermediate indices can be found in Appendix LC.6-a – Sol-Air Temperatures.

The excel file with the results for the heat gain calculations, the conduction time series and the necessary intermediate indices can be found in Appendix LC.6-b – Exterior Walls Load Calculations. In it, the brick walls are differentiated with a B while the metal walls are assigned an M. Depending on the material of the walls, the conductive time factors vary.

Heat Gain through Interior Surfaces

Procedure

To perform the heat gains associated to the presence of humans in the selected rooms, we will need information given in the General section of the architectural document.

The description of the procedure of the load calculations regarding interior surfaces in a room is previously described in the section Heat Gain Through Interior Surfaces. As described, this heat gain is performed via conduction. Since conduction is based upon a difference of temperature, and we are considering the inside temperature to be constant and uniform, in our case this heat gain can also be considered to be negligible.

Note that some rooms, such as laboratories, may require a special temperature different to that set for the other rooms. In these cases, we may need to take it into account. However, the rooms affected by the AHU 3 system are restricted to offices mostly and the labs don't perform any special functions, so the assumptions listed below seem reasonable.

Assumptions

- Room temperatures constant
- Room temperatures uniform through the whole building
- Heat gain through interior surfaces negligible
- Equation of time: ET = 1.6 decimal minutes
- Local Standard time meridian: LSM = 105º (Mountain Standard Time)

RADIANT TIME SERIES (RTS) METHOD

The general outline of the radiant time series is summarized in Figure 16. This picture is also shown below to simplify the explanation of the steps followed in the analysis of the radiant time series for the AHU 3 system.

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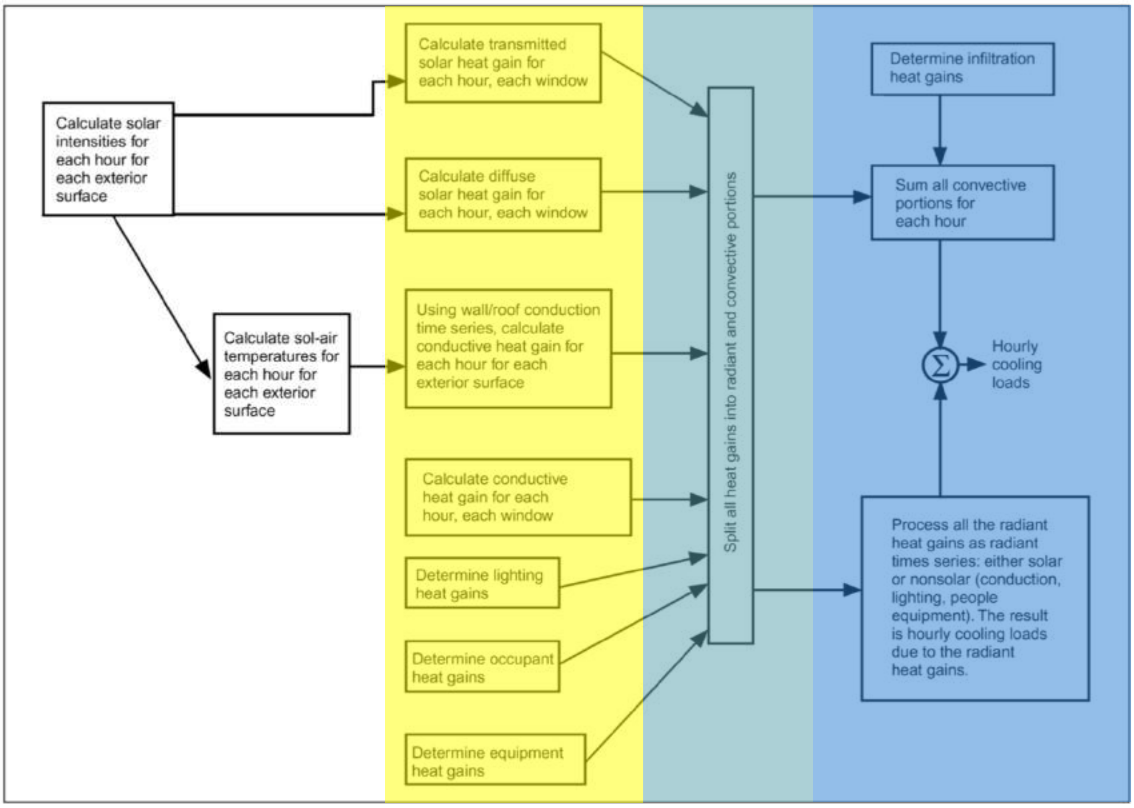

Figure 36: Overview of the RTS method (Source: ASHRAE Fundamentals Handbook)

The first highlighted section (yellow) of the picture shows the first necessary steps to conduct the radiant time series. According to the picture, from the seven sections of the first phase of the RTS method, three of them are calculated for the overall operating hours of the system and four are calculated for each individual hour.

Thus, the three heat gains that don't need to be calculated for each particular hour are the occupancy, the lighting and the equipment heat gains. Their results can be found under the subsection **Results** in the People, Lighting and Appliances sections respectively.

Regarding the transmitted solar heat gain, the diffuse solar heat gain, the conductive heat gain and the wall/ roof conduction time series, the procedure to calculate them can be found in the Heat Gain Through Fenestration Areas and the Heat Gain through Exterior Surfaces sections respectively. Results can be found under the subsection **Results** in both those sections.

As mentioned in those sections, relevant intermediate steps and calculations can be found in APPENDIX LC.5 – FENESTRATION and APPENDIX LC.6 – EXTERIOR WALLS, respectively.

In order to perform the Radiant Time series to the calculated heat gains, the next step (green) is to split them into radiant and convective portions. This needs to be done, as this method only affects the radiant portion of the heat gain and the convective one is considered to be instantly converted to heat in the analyzed space. The results and the intermediate steps can be found in

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APPENDIX LC.7 – RADIANT SPLIT. In it, the assumptions chosen for the radiant portion of each type of heat gain are noted.

The results of these step are then divided into radiant solar and radiant non-solar heat gains. This is important since they both have different RTS coefficients. The chosen RTS coefficients can be found in APPENDIX I.5 – CONDUCTIVE TIME FACTORS.

Finally, the last step (blue) involves adding up all the results from the previous ones. The radiant portions (both solar and non-solar) of the heat gains calculated in the previous step are multiplied by the RTS coefficients to get the hourly radiant heat gain. The results of these calculations are added to the convective portion for each hour in each room to get the hourly heat gains for each analyzed room. These final results can be found in APPENDIX LC.8 – HOURLY COOLING LOADS.

The final step to calculate the worst-case scenario for the AHU-3 system would be to add up the results for all the different rooms for each individual hour of the day. The results are the following:

Local Standard Time (LST)	Cooling Load	Worst-case
0	687547.03	802091.36
1	480175.23	
2	450642.65	
3	438077.79	
4	438077.79	
5	432421.88	
6	432421.88	
7	432421.88	
8	521044.34	
9	685131.60	
10	789384.80	
11	785418.60	
12	802091.36	
13	782363.08	
14	726410.87	
15	632521.31	
16	485316.29	
17	426765.97	
18	424564.54	
19	424564.54	
20	424564.54	
21	424564.54	
22	424564.54	
23	424564.54	

Table 18: Final Load Calculations (Source: Own creation)

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These results show that the worst-case scenario hour will be 12 A.M., having the system to cope then with a cooling load of 802.1 [kW]. This result seems reasonable, since this hour is approximately when it is the hottest outside and thus, the conductive portion of the heat gain is the strongest. Also, the fenestration heat gains were calculated to be the greatest within this time period.

So, in order to have a successful performance, the AHU-3 system will have to be able to cope with at least 802.1 [kW] at a time. However, if certain measures are implemented in the building, this value can be reduced in order to obtain a more efficient building. Some of them will be discussed in the following chapter of this document.

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CHAPTER 4 – ANALYSIS OF POSSIBLE SOLUTIONS

Once the heat gains have been explained and calculated for the AHU3 system, we can analyze the different factors that could potentially be changed in order to improve the energy efficiency of any HVAC system. The points that will be taken into account will be the following:

- Luminaire system
- Window types
- Implementation of shades
- Inside temperature standard variation
- Mechanical systems' efficiency
- Motors' efficiency

The following subsections will further discuss each one of these points. For each one of them, the potential economic and environmental improvements will be described.

LUMINAIRE SYSTEM

Overview

In modern days, people have many choices of energy efficient luminaire systems. The most common ones are Compact Fluorescent Lights (CFLs) and Light-Emitting Diodes (LEDs). These types of lights can cost more initially than normal incandescent lights. However, consuming less energy during their lifetime, they end up being a big source of savings.

Compact fluorescent lights (CFLs) are curved versions of the typical long tube fluorescent lights many buildings usually implement. As a matter of fact, the CoorsTek building currently implements these types of lights. CFL lights work running electricity through a tube that contains argon and mercury vapor. This process produces ultraviolet light that is immediately transformed to visible light.

CFLs consume 70% less energy and last ten times longer than traditional methods of lighting that produce the same amount of light. Their price is about one dollar higher per bulb than traditional lights. However, typical CFL lights pay for themselves in the first nine months of being used. From then on, each bulb will save that 70% of energy that is not being used compared to incandescent lights.

One of the main disadvantages to this technology is that it takes a little to warm up and reach full brightness. Additionally, CFL tubes also contain a small amount of mercury, which is highly detrimental to humans' health.

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Light-emitting diodes are a type of solid-state lighting, or semiconductors, that convert electricity into light. The LED industry is known to be one of the most rapidly developing technologies in the world.

Typical LED lights can help reduce energy bills by consuming up to 75% less energy while lasting from 10 to 25 times longer than traditional lighting methods.

When comparing these two mainstream forms of lighting, the main difference is the time they both last. LED lights can last as long as 5 times the lifetime of any comparable light bulb in the market.

The main disadvantage of LED lights is their cost. They are by far the most expensive bulbs in the market. However, their price has dropped significantly in recent years due to the breakthrough the industry has had during this period of time.

Furthermore, we can explore the option of implementing timers and photocells. They allow the lights to only be on while a human is inside the room or as long as they have been programed to be on for.

Economic Implications

The following table summarizes the cost differences between the three most common lighting bulbs available in the market today.

	Incandescent	**CFL**	**LED**
Approximate cost per bulb [$]	1	2	8
Average lifespan [hours]	1,200	8,000	25,000
Watts used [W]	60	14	10
No. of bulbs need for 25,000 hours of use	21	3	1
Total purchase of bulbs over 23 years [$]	21	6	8
Total cost of electricity used – considering $0.12 per kWh [$]	180	42	30
Total operational cost over 23 years [$]	201	48	38

Table 19: Light Fixtures comparison (Source: Jorge Goas)

This analysis shows that changing of the lights to LEDs can produce savings over 23 years of up to 80% compared to traditional lighting methods and up to 20% compared to CFL lights.

Please note that the following information in this subsection has been obtained from my colleague's Jorge Goas senior design project.

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As part of his senior design project, Jorge Goas conducted an optimization problem to analyze the viability of changing the current fluorescent fixtures for new LED ones. To do this, he used the knowledge we obtained from our class of Advanced Linear Optimization during this semester.

The problem's objective function was divided in two terms. The first one takes into account the current cost of implementing the fluorescent light fixtures and expands it for the following years using a discount rate and assuming an increment in the space that will require energy when the laboratory in the second floor is finished. For it, the current XCEL energy bills were used. The second term takes into account the cost of purchasing the LED fixtures and the energy demand that they will require, with the corresponding discount rate also applied previously. The objective function ends up being as follows:

$$minimize \sum_{y=2019}^{2044} \left[\sum_{m=1}^{12} \left(\sum_{d=1}^{31} \left(\sum_{h=0}^{23} rate_{m,h} * kWh_{y,m,d,h} - \sum_{i=1}^{3} rate_{m,16} * redenergy_i * L_i \right) + DR_m * \left(maxkW_{y,m} - \sum_{i=1}^{3} redpower_i * L_i \right) + fixed \right) + \sum_{i\, \varepsilon I} \left(lreplace_{y,i} * lprice_i * L_i + lreplcost_i * L_i + freplace_{y,i} * fprice_i * F_i + freplcost_i * F_i \right) \right]$$

The full AMPL code is the following:

MOD

```
set I;       # Type of light fixture
set H;       # Hours
set D;       # Days
set M;       # Months
set Y;       # Years

param lprice{i in I};     # Price of buying a LED light fixture i
param fprice{i in I};      # Price of buying a Fluorescent light
fixture i
param fixed;              # Monthly fixed Charge
param rate{m,h};            # Energy rate depending on month and
hour
param DR{m in M};         # Demand Rate depending on the month
param redpower{i in I};     # Reduction of power per LED light
fixture i
param redenergy{i in I}    # Reduction of energy per LED light
fixture i in a day
param lreplcost{i in I};   # Annual cost of replacing a LED light
fixture i
param freplcost{i in I};  # Annual cost of replacing a Fluorescent
light fixture i
param lreplace{y,i}          # LED fixture i needs a replacement
yes(1) or no(0)
```

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```
param freplace{y,i}           # Fluorescent fixture i needs a
replacement yes(1) or no(0)

var L{i in I}>=0;          # LED light fixture i
var F{i in I}>=0;          # Fluorescent light fixture i

sum{y in Y}(sum{m in M}(sum{d in D}((sum{h in
H}(rate[m,h]*(1+escal)^y*kWh)-sum{i in
I}(rate[m,16]*redenergy[i]*L[i]*(1+escal)^y)+DR[m]*(1+escal)^y*(
maxKW-sum{i in I}(redpower[i]*L[i])+fixed*(1+escal)^y\
+sum{i in I}(lreplace[y,i]*lprice[i]*L[i]+sum{i in
I}(lreplcost[i]*L[i]+\
+sum{i in I}(freplace[y,i]*fprice[i]*F[i]+sum{i in
I}(freplcost[i]*F[i])*(1+discrate)^-y);

s.t. C1: L[1]+F[1]/2 = 157;
s.t. C2: L[2]+F[2]/3 = 86;
s.t. C3: L[3]+F[3]/2 = 79;
```

When running the problem, the results obtained for the following 25 years were the following:

```
CPLEX 12.8.0.0: optimal solution; objective 3429617.629
0 dual simplex iterations (0 in phase I)
L [*] :=
1  157
2   86
3   79
;

F [*] :=
1  0
2  0
3  0
;

Cost = 3429620
```

These results show that, in order to minimize the cost of the energy consumed by the luminaire systems over the next 25 years, all the fixtures must be LEDs. The minimum possible cost over this period of time will be of $3,429,620. This would represent a total amount of savings of around $400,000. For this to be possible we will need to have 157 type 1, 86 type 2 and 79 type 3 LED fixtures.

Environmental Impact

Environmental impact from light fixtures is closely related to energy consumption. Hence, as shown in Table 19, LEDs are much better than equivalent incandescent and CFL fixtures.

Compared to traditional incandescent bulbs, LEDs generate less heat during their use, and hence, the cooling costs are lower. This is, most of the energy consumed by the bulb is transformed to light rather than heat to the environment. While incandescent lights release about 90% heat to the environment, LEDs only release about 5%.

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The main advantage of LEDs over CFLs is the amount of energy they use. Although the difference is less than the one with incandescent lights, this still makes a difference in a bulb's lifespan. Another big advantage is the absence of mercury. As mentioned earlier, this mercury can be really harmful to human's health and to the environment.

However, as rare as it may sound, when disposing used bulbs, LEDs currently trail CFLs in safety and economic factors. This is mainly due to the large aluminum heat sinks used in the bulbs. As mentioned previously, the LEDs industry is evolving rapidly to decrease their price and their environmental impact. Two of the main points that are currently being researched are the possibility of making those sinks smaller and improving aluminum recycling. This would allow the sinks to be manufactured from recycled aluminum and thus reduce its lifecycle environmental impact. Presently, some companies have managed to manufacture their sinks from up to 80% of recycled aluminum, so progress is rapidly being made.

The following figure summarizes the environmental impact of the three most common types of bulbs in the market. It further depicts the evolution the LEDs industry is currently undergoing.

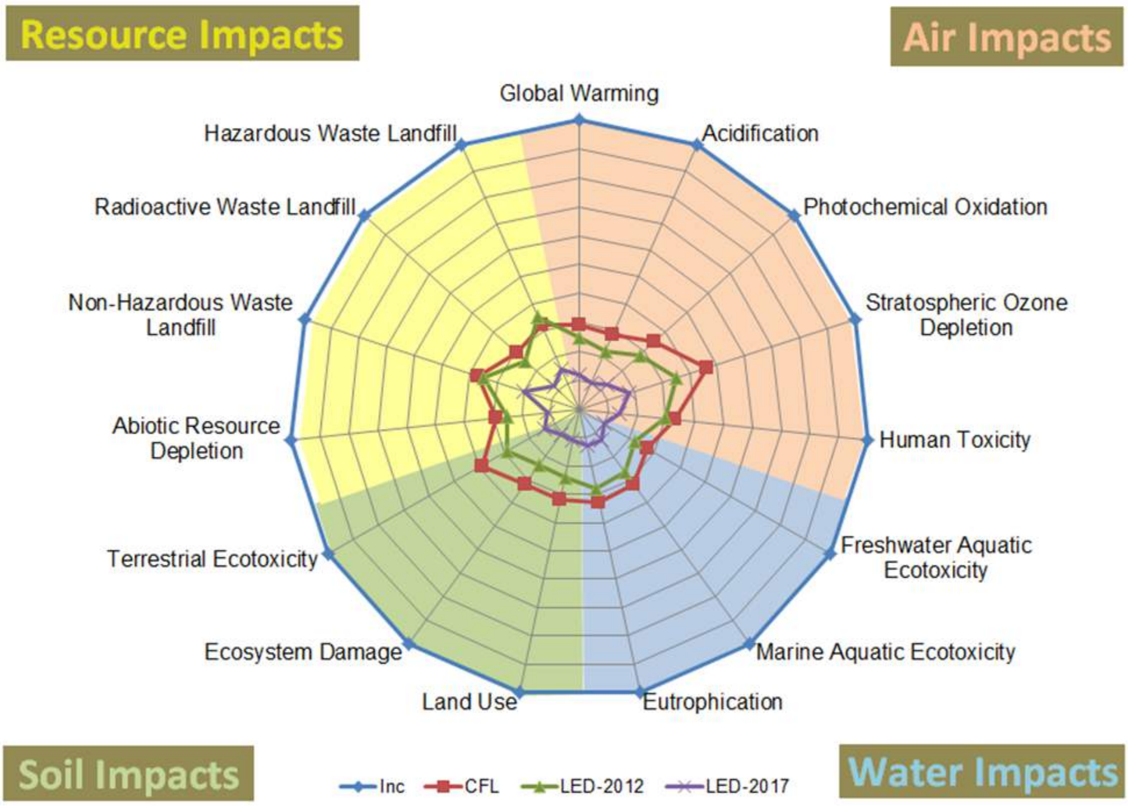

Figure 37: Bulb type's environmental impact (Source: American Energy)

This graph shows how, if the bulbs implemented were to be the most modern in the market, the emissions could potentially be reduced 50% compared to the current state of the building.

As mentioned before, the figure shows how environmentally harmful incandescent bulbs are compared to CFLs and LEDs. CFLs are also worse in any case than LEDs. Finally,

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current LEDs compared to those of five years ago have managed to decrease their emissions by almost half. This comes to show that if the industry continues its expansion, soon we will have a completely environmentally friendly source of light available to us.

A recent research project shows that in 2030, 3 out of 4 light bulbs in the United States will use LED technology. This would imply reducing the country's electricity bill to one third of its actual value and a further reduction in its overall emissions of 1,800 metric tons of carbon dioxide.

WINDOW TYPES

OVERVIEW

A typical building loses around 10% of its energy through its windows. The general energy balance equation in any window is the following:

$$Balance = Heat\ gain - Heat\ loss$$

Hence, to maximize the window's efficiency, we must maximize the heat gain and minimize the losses.

Heat is absorbed through the glazing in two different ways:

- Primary transmittance – directly from radiation from solar energy
- Secondary transmittance – energy absorbed by the glazing and transferred to the interior via convection and radiation

The following image shows these effects and how they are related:

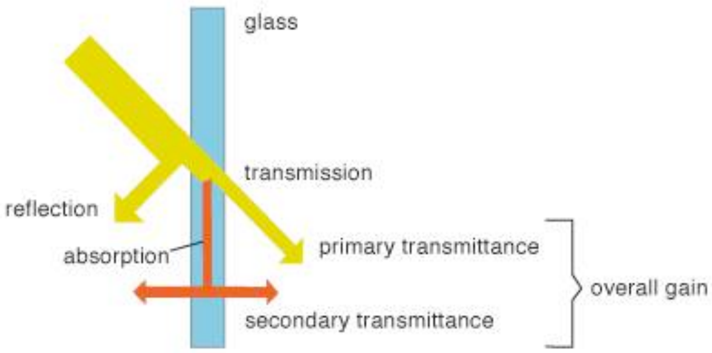

Figure 38: Heat gain sources (Source: PPG performance Glazing)

The main factor ruling heat gain through a window is the G-factor. This basically expresses the fraction of heat from the sun that enters through a window. Thus, what window manufacturers normally focus on is having a large G-factor while controlling the amount of heat that is reradiated from the interior back to the exterior. The G-factor mainly depends on the glass type and the distribution of the fenestration frames.

The main heat loss sources in a window are the following:

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- Radiation through glass panels
- Conduction through glass panels
- Air leakage around opening lights and frame
- Conduction through the window frame

The most important of all these causes is the radiation through the glazing – it accounts for almost 2/3 of the energy loss. The heat lost in the interior of double-glazed windows is determined by the temperature difference between the two sides of the window. It is ruled by the thermal transmittance of the glazing unit, the U-factor. This factor determines the number of watts lost depending on the window surface and temperature difference. The heat lost due to convection in the space between the two glass panes is often considered to be negligible.

The main system to rate different types of glazing units is the BFRC (British Fenestration Rating Council) rating system. It takes into account all the factors that influence the window's performance and rates them on the basis of its energy balance from A to G. The three main indices that it encourages manufacturers to research are the U-factor, the G-factor and the air permeability.

In recent years, the most significant advance in the fenestration industry regarding energy balances has been that of 'Low-E' glass. It stands for low-emissivity glass. This technology consists on a triple glazed window that has a metal or metal oxide coating in the outer face of the inner pane. This acts as a one-way membrane. This is, it allows short wave radiation from the sun to enter the interior of the building while blocking the long wave radiation from the inside of the building to exit. In other words, it maximizes the heat that is kept inside the room.

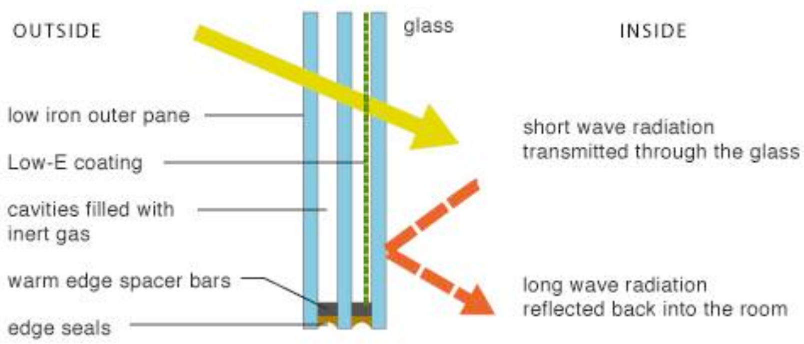

Figure 39: 'Low-E' glass (Source: PPG performance Glazing)

This phenomenon works both ways, as in winter it keeps the interior heat inside and in summer it keeps the solar heat outside.

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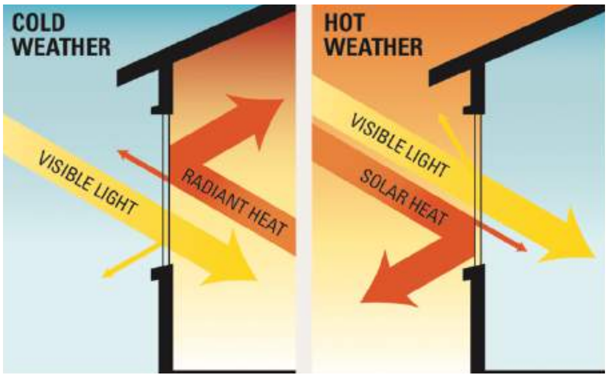

Figure 40: 'Low-E' glass - summer vs. winter (Source: PPG performance Glazing)

Depending on the moment when the coating is applied, 'Low-E' glass can be hard or soft. They both have different properties:

- Hard: Applied while the glass is being manufactured – emissivity between 0.15 and 2
- Soft – Applied after the glass has been manufactures -emissivity between 0.05 and 0.1, lower U-factor and they tend to degrade faster

Other improvements in the industry include gas filled glasses, insulating space bars and low iron glass. However, only the above-mentioned option will be researched in this paper.

ECONOMIC IMPLICATIONS

In this section, the main source of information will be the paper released by VITRO Architectural Glass (formerly PPG Performance Glazings) on their new Solarban 70XL glass. This is a type of Low-E glass. It is described to have the superior solar control characteristics mentioned above. The paper compares this type of glazing to that of a dual pane tinted glazing (as the one used in the CoorsTek center). The upgraded properties and their benefits are as follows:

	Standard Insulating Glass Unit	Solarban® 70XL Insulating Glass Unit	Benefits
Solar Heat Gain Coefficient	0.75	0.27	Transmits 64% less solar energy to help keep homes cooler in the summer and reduce cooling energy costs
Visible Light Transmittance	81%	64%	Allows high level of visible light transmittance and exterior clear glass appearance
U-Value	0.48	0.24	Insulates as much as 50% better than standard clear insulating glass
Ultraviolet Energy	58%	6%	Blocks 94% of UV energy, a common contributor to fabrics, carpet and furniture fading
Damage Weighted Transmittance *	0.74	0.43	Minimizes the total potential for fading damage by 42%

Figure 41: Benefits of Solarban 70XL vs Standard Units (Source: PPG performance Glazing)

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Firstly, this type of glass costs around $200 per square meter. From the load calculations we know that the AHU3 system affects 8,707 ft2 of exterior windows. However, this number is not accurate, as the system does not involve the whole building.

To calculate the exterior surface, we will use the numbers from the VITRO study. It analyzes an eight-story building with q total floor area of 270,000 ft^2. Since our building has a total floor area of 87,229 ft^2, we will consider it to be 1/3 of the one analyzed in the study. The total window surface is then:

$$Total\ Window\ Surface \sim \frac{51{,}000}{3} = 17{,}000\ ft^2 = 1580\ m^2$$

The total initial cost of purchasing the installation would then be:

$$Initial\ Cost \sim 1580\ m^2 \cdot 200\ \frac{\$}{m^2} = 316{,}000\ \$$$

Second, this type of glass constitutes a reduction in HVAC equipment costs. This savings come as cuts in upfront capital cooling equipment's in buildings with large fenestration areas. As shown in pictures and in the CoorsTek building OpenStudio 3D simulation, most of the exterior surfaces of the building are fenestration areas, so this analysis is suitable. The following table summarizes the expenses of each type of glazing system in an office building in different locations.

City	Annual HVAC Operating Expenses		Annual Savings	Total HVAC Equipment Cost		Immediate Equipment Savings	1st Year Savings
	Dual-Pane Tinted	Solarban 70XL		Dual-Pane Tinted	Solarban 70XL		
Atlanta	$680,456	$597,772	$82,684	$2,115,464	$1,697,868	$417,597	$500,281
Boston	$853,450	$756,001	$97,539	$2,326,967	$1,928,086	$398,881	$496,420
Chicago	$417,775	$361,429	$56,346	$2,113,620	$1,710,275	$403,345	$459,691
Denver	$445,402	$383,584	$61,818	$2,170,145	$1,772,006	$398,139	$459,597
Houston	$846,757	$753,455	$93,302	$2,137,152	$1,760,175	$376,977	$470,279
Los Angeles	$684,484	$608,756	$75,728	$2,237,643	$1,819,144	$418,499	$494,227
Mexico City	$758,724	$680,368	$78,356	$2,023,150	$1,655,745	$367,405	$445,761
Ottawa	$472,397	$422,118	$50,279	$2,045,396	$1,695,981	$349,415	$399,694
Philadelphia	$432,511	$381,160	$51,351	$2,107,615	$1,713,032	$394,583	$445,943
Phoenix	$436,554	$390,781	$45,773	$2,178,115	$1,796,710	$381,404	$427,177
St. Louis	$357,048	$304,899	$52,149	$2,209,526	$1,793,386	$416,140	$468,289
Seattle	$337,361	$293,506	$43,855	$1,937,682	$1,591,412	$346,269	$390,124

Figure 42: Economic impact of changing fenestration system (Source: PPG performance Glazing)

This data assumes an eight-story building with around 51,000 ft^2 of windows and 270,000 ft^2 floor area. Since the CoorsTek building has only four stories and a total floor area of around 90,000 ft^2, we will assume that its fenestration area will also be on third of that of the analysis.

Hence, implementing these type of glazing, Colorado School of Mines could potentially save big quantities of money from its deployment:

$$\begin{cases} First\ year: \dfrac{459{,}597}{3} \sim \$150{,}000 \\ Following\ years: \dfrac{61{,}818}{3} \sim \$20{,}000 \end{cases}$$

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Therefore, the change would completely pay for itself in about:

$$Repay\ time = 316{,}000 - 150{,}000 = \frac{166{,}000}{20{,}000} = 8.33 + 1 = 9.33\ years$$

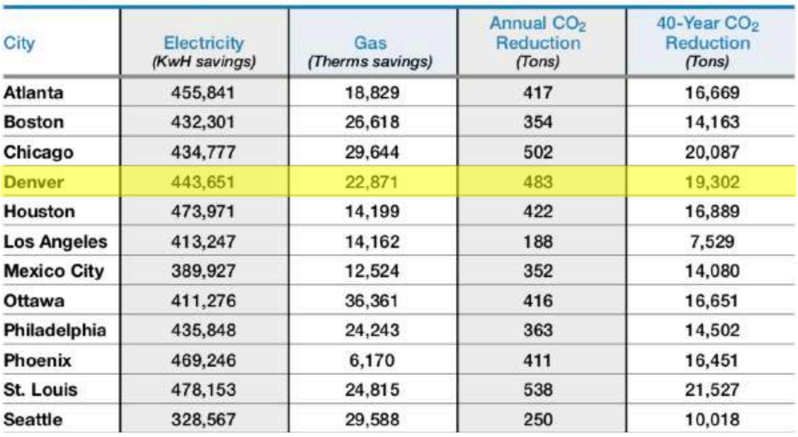
Information of the actual lifespan of the product isn't available online. The only piece of information available was regarding Low-E glasses, so that is the data this last section is based on. All calculations have been conducted for a supposed lifespan of 15 years. Therefore, in the end of the investment's lifetime, Colorado School of Mines could end up saving an approximate amount of:

$$Total\ money\ saved = (15 - 9.33)[years] \cdot 20{,}000 \left[\frac{\$}{year}\right] = 113{,}400\ \$$$

Environmental Impact

Once it has been stablished that it makes sense economically to change the windows of the building, we need to evaluate the environmental implications of this modification.

The following table shows data gathered by the US Department of Energy (DOE) and the Environmental Protection Agency (EPA) regarding the benefits Solarban 70XL can have for an 8-story office building in different locations of the United States in the installation and in following years.



City	Electricity (KwH savings)	Gas (Therms savings)	Annual CO_2 Reduction (Tons)	40-Year CO_2 Reduction (Tons)
Atlanta	455,841	18,829	417	16,669
Boston	432,301	26,618	354	14,163
Chicago	434,777	29,644	502	20,087
Denver	443,651	22,871	483	19,302
Houston	473,971	14,199	422	16,889
Los Angeles	413,247	14,162	188	7,529
Mexico City	389,927	12,524	352	14,080
Ottawa	411,276	36,361	416	16,651
Philadelphia	435,848	24,243	363	14,502
Phoenix	469,246	6,170	411	16,451
St. Louis	478,153	24,815	538	21,527
Seattle	328,567	29,588	250	10,018

Figure 43: Environmental impact of changing fenestration system (Source: PPG performance Glazing)

Since this data is gathered for a three times bigger building than the CoorsTek center, the results would need to be divided by three. The total CO_2 reduction, in tons of CO_2, would be the following:

	Electricity [kWh]	Gas	Annual CO_2 reduction [tons]	15-year CO_2 reduction [tons]
Savings	147,884	7,624	161	2,413

Table 20: Environmental impact of changing fenestration system (Source: Own creation)

So therefore, this investment would make our building more environmentally friendly as well as cheaper to maintain.

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SHADES IMPLEMENTATION

OVERVIEW

Installing shades in all exterior rooms can help reduce the heat radiant heat gain in that the solar radiation is somewhat stopped by them. The three main advantages of installing shades are the following:

- Decrease heat gain through windows
- Reduce cooling costs
- Operate shades to take advantage of heat gain in cold months

Solar screen shades control heat and light by allowing only a small fraction of them to enter the room. Solar, thermal and optical properties depend on the type of fabric that is chosen for the shades.

To understand how shades work, we first need to review how solar radiation produces a heat gain. The spectrum of the sun is divided when it meets the shades as explained in the picture bellow.

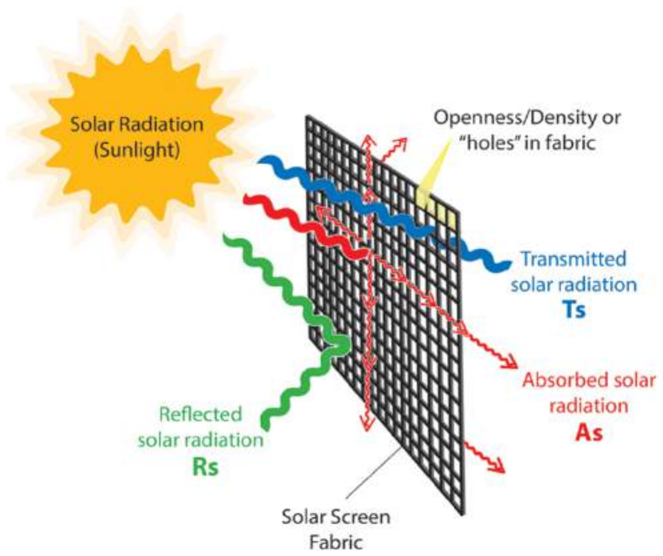

Figure 44: Partition of sunlight in the shades (Source: CraftJack)

So basically, the same two mechanisms of blocking solar radiation as when there were no shades are now present. The equation to describe the phenomenon that occurs in the shades is the following:

$$T_s + R_s + A_s = 100\%\ solar\ radiation$$

Where T_s is the solar transmittance, R_s is the solar reflectance and A_s is the solar absorptance. The solar transmittance is the fraction of the solar energy transmitted through the fabric alone. The solar reflectance is the fraction of the solar energy reflected away by the fabric. The solar absorptance is the fraction of the solar energy absorbed by the fabric.

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A big factor to take into account when choosing a shading system is the openness factor. It accounts for the relative area of the fabric's openings. The smaller this coefficient is, the less solar radiation that passes the fabric. This is good for heat gain, but normally customers choose to have a balance between a good heat gain performance and a good amount of natural light. This amount of visible light is measured by the visible light transmittance. This coefficient is directly related to the openness factor, as described above, but also to the color of the fabrics.

However, the effect of both these phenomena is doubled. The following figure shows how the overall system operates, including the fenestration system.

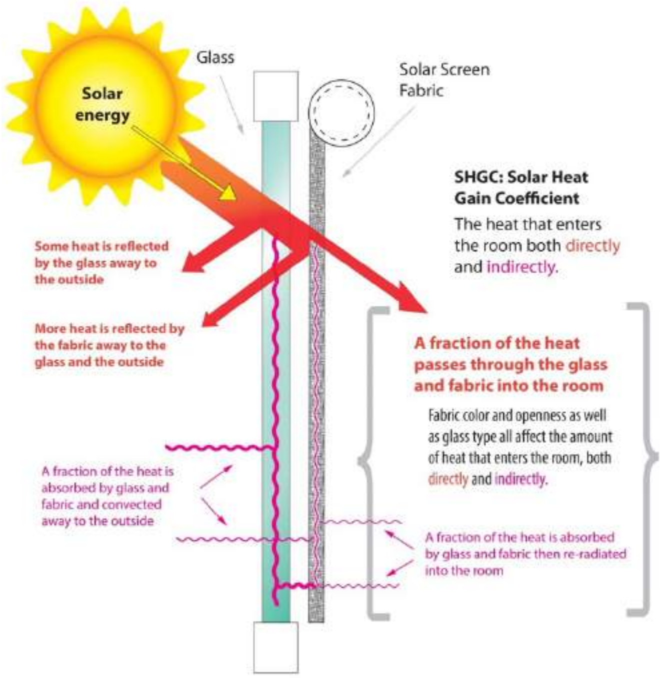

Figure 45: Overall system functioning (Source: CraftJack)

First, solar radiation is reflected by both the glass in the fenestration system and the fabric of the shading system. As previously described, we know that some heat is conducted through the glass and further divided to the air and the interior of the room. The former then meets the shades and the same process is repeated. Hence, in the end, a big part of the heat stays between the shades and the glass and only a small fraction is available to pass to the interior of the room. Lastly, the same conduction process occurs in the fabrics of the shade, dissipating part of it to the same gap between itself and the glass and releasing the rest to the inside of the room.

Having a shading system mainly impacts the heat gain in the inside in that it drastically reduces the solar heat gain coefficient. As previously described in the section Heat Gain Through Fenestration Areas, this coefficient plays a key role in the load calculations regarding all exterior surfaces. Hence, the overall heat gain of the building can be highly reduced when installing the shades.

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Another benefit of this option is that, when having shades installed, the heat gain through fenestration areas is divided as 63% radiant, instead of the 100% of radiant heat gain that we previously had with no shades.

Economic Implications

The economic implications of this option derive from the purchase of the system and the electricity cost reduction that the heat gain reduction can lead to.

The cost of purchasing shades is approximately $10 per square feet. Thus, if Colorado School of Mines was to purchase a shading system to cover all exterior surfaces of the CoorsTek building, the total price would be:

$$Cost = Total\ exterior\ surface \cdot 10 \sim 17{,}000\ ft^2 \cdot 10 \frac{\$}{ft^2} = \$\ 170{,}000$$

If we were to choose an operable shading system, the direct SHGC would be reduced from 0.7 to 0.63. This value would then affect the direct beam solar heat gain by a factor of 0.63/0.7=0.9. Thus, this particular heat gain would be reduced in each of the rooms an amount of 13% each hour of the day.

This amount would further need to be divided into 63% radiant heat gain and 37% convective heat gain. The convective portion would then be immediately converted to heat inside the room and the radiant portion would need to be subjected to the radiant time series.

To calculate the new heat gain, the radiant time series has been applied to the new direct solar heat gain. The partition of this heat gain into radiant and convective portions has also been applied.

Once these new calculations are conducted, the electricity bills have to be research to figure out its cost. We found an average value last year in Colorado of about $0.09/kWh. Thus, the economic savings could be calculated using the following formula:

$$Daily\ savings = (heat\ gain_{old} - heat\ gain_{new})[kW] \cdot 0.09 \left[\frac{\$}{kW}\right]$$
$$= (129756 - 129164) \cdot 0.09 = \$\ 53.29/day$$

Note these calculations have been conducted in the worst-case scenario day for the heat gain. This means the difference would also be the biggest, and thus the savings would be the greatest. Hence, economic-wise, this would be the best-case scenario.

Assuming this value to be constant, we can then calculate the savings for the overall shading system lifespan, which we will consider to be the same as the fenestration system's.

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$$Lifespan\ savings = 53.29\left[\frac{\$}{day}\right] \cdot 365\left[\frac{day}{year}\right] \cdot 15[year] - \$\ 170{,}000$$
$$= \$\ 441{,}613.5 - \$\ 170{,}000 = \$\ 121{,}762.75$$

So, similarly to previous options, despite constituting a big initial investment, this option can help to save money at the end of its lifespan.

ENVIRONMENTAL IMPACT

As in the previous section, the main environmental impact this idea has derived from the heat gain reduction. This causes the CO_2 emissions to drop significantly. Following the same correlation as in the previous section, this reduction in emissions can be calculated as follows:

$$\frac{\$113{,}400}{161\ [\frac{tons}{year}]} = \frac{\$121{,}762.75}{x\ [\frac{tons}{year}]} \rightarrow x = \frac{161}{113{,}400} \cdot 121{,}762.75\ = 172.8[tons/year]$$

Therefore, the lifespan savings would be:

$$Lifespan\ Savings = 172.8\left[\frac{tons}{year}\right] \cdot 15[years] = 2{,}592\ [tons\ of\ \text{CO2}]$$

Besides the environmental impact, having a good shading system can also be very beneficial for human's health. The main advantages it has are:

- Blocks up to 99% of harmful UV rays
- Lowers the risk of skin cancer
- Lowers the risk of many forms of eye damage
- Prevent suppression of the immune system
- Increases visual comfort
- Decreases premature aging of the skin

So, to conclude, this option also provides a good environmental alternative while reducing the university costs.

INSIDE TEMPERATURE STANDARD VARIATION

OVERVIEW

This particular solution is the most cost effective one, as it doesn't require an initial investment. However, it also is the least specific one. Therefore, this section will not include economic implications and environmental impact, since calculating their values depends on many diffuse variables.

Adjusting the standard air temperature inside the building can be done for many rooms. However, there are some laboratories that have several temperature and moisture requirements that need to be met. Since the variation of temperature is only important for

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exterior rooms, we will consider that all rooms can be subject to a change in their temperature.

Changing the temperature of the inside of exterior rooms can impact multiple sources of heat gains. The objective would be to minimize the temperature difference between the interior and the exterior of the building. Thus, we would need to reduce the inside temperature during the winter and increase it during the summer.

The heat gains that would be affected would be:

- The transmitted solar heat gain
- The diffuse solar heat gain
- The conductive heat gain – for both windows and walls

This section is quite diffuse because the adjustment of the temperature comes at a price – its occupant's temperature. The university then has to balance up to what extend they need to save money or improve their emissions. For example, this may be a good measure if they are close to getting to the next level of the LEED norm but need some extra help for it. Anyway, the change could not be too abrupt in order not to bother the occupants up to a point where they cannot fulfill their duties.

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CHAPTER 5 – CONCLUSIONS

METHODOLOGY CONCLUSIONS

This project has allowed me to learn a lot about the mechanical portion of building design. The methodology described in the ASHRAE document is incredibly thorough, covering all the factors that can influence the load calculation in a building. Since each one has different ways of calculating them, I was able to put into practice a lot of concepts learnt in the heat transmission course in ICAI.

Both methods discussed in the ASHRAE document have several points in common. They are both oriented to account for the time delay that the radiant heat gains suffer. To perform the calculations, the radiant time series was chosen over the Heat balance method due to the possibility of performing the calculations without the need of specialized programs. Since the only tool that was used during the project was Excel, the calculations were quite long and tedious to perform. I therefore believe this method lacks practical utility. However, since the purpose of the second and third chapters of the project was to reflect how the load calculations ought to be performed, I believe the usage of this method was the most appropriate one.

When performing this kind of analysis in real life, design engineers have specialized programs to perform the load calculations for a whole building rather than having to analyze all the different systems separately. If such programs are not available, I believe the best accessible tool for everyone would be OpenStudio of any similar program. This project could not be done with OpenStudio due to the short time available. Normally, to gather all the necessary data to perform an analysis with this tool, a larger amount of time is required. The program was therefore only used to perform the 3D simulation shown in Chapter 1. Nonetheless, one of the great things I take away from this learning experience is the ability I've had to become familiar with this tool (besides from the 3D simulation, I was explained how the program works and I was shown the final output of the program for a similar project).

Since the main objective of the project was to try to improve the world we live in, the last section in the paper was the most important for me. Researching all the different ways the building could potentially implement to lower its emissions has made me realize the important role technology and new inventions can play in this matter. Despite CoorsTek being a state of the art building, the research proved that three simple changes can improve substantially the environmental impact of the building while also helping the school reduce their costs. These sections conclude that the environmental impact of the implementations would be:

- Changing the light bulbs to LED's is proved to be a great idea, since its technology has evolved at a high rate over the last couple of years, improving in all aspects their emissions. The potential impact of this change could be as much as cutting in half the emissions caused by the currents bulbs.

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- The change of the types of windows could potentially lower the building's emissions around 161 tons of CO_2 per year, which would constitute a reduction of 2,413 tons of CO_2 during their whole lifespan (15 years).
- The implementation of shades in the building could potentially lower the building's emissions around 173 tons of CO_2 per year, which would constitute a reduction of 2,592 tons of CO_2 during their whole lifespan (15 years).
- The variation of the inside temperature of the building is a diffuse option, since the school has to find the minimum and maximum temperatures they can set at each time of the year to ensure they don't affect the work of the users of the building. However, this option could potentially help a lot reduce the emissions if Mines checks it for optimality.

Although these changes represent a big initial investment, they can end up saving around $650,000 during the whole lifetime of their implementation, which would be around 30 years.

RESULTS CONCLUSIONS

The results obtained in each particular section of Chapter 3 were analyzed to check their order of magnitude. All of them were proven to make sense according to the elements ASHRAE specifies that have to be taken into account in their calculations.

When implementing the radiant time series method, this checking operations of the order of magnitude become impossible to perform, as the calculations become hourly and dependent on the radiant and conductive time factors.

The final results show the worst-case scenario cooling load for the AHU3 system would be at 12 A.M. the 22nd of July. The load that the system would need to handle at this time would be 802.1 kW.

This result, compared to the energy bills can seem a little bit high. However, since we are taking into account the worst-case scenario conditions, it seems reasonable to get a higher number than the one in the bills.

Also, since a lot of simplifications have been made (each specified in the sections of Chapter 2 and Chapter 3 where they were made), this number is probably not the precise result a specialized program would get. However, all simplifications have a plausible explanation and should not alter the final result too much.

The order of magnitude of the results for the Chapter 4 subsections were also checked. To do this, the reference chosen was the minimum cost calculated in my colleague Jorge's AMPL program (which was around $3,500,000). The economic impact for the change of windows and the implementation of shades were calculated to be $113,400 and $121,763 of savings over the respective lifespans of both improvements. These numbers were thought to be quite reasonable considering the initial reference.

With respect to the environmental impact of both improvements, the calculations were approximated, since the only available information was the one shown in the report. The numbers are thus not expected to serve as accurate results rather than a gross approximation of what these implementations could help the school achieve.

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FOR FUTURE RESEARCH PROJECTS

As previously discussed, the methodology used in this project is great to understand all the different factors that need to be taken into account when calculating mechanical cooling loads. However, if the objective of future research projects is to analyze the current situation of a whole building, the implementation of OpenStudio or a similar program will probably be the best option.

Overall, since the objective of this particular project was the above mentioned, my general opinion of the project was really positive in that I have been able to implement many concepts learnt during my degree to a completely new endeavor such as building design.

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CHAPTER 6 – MEDIA

Photo 1: CoorsTek center design simulation

Photo 2: Glass facade from Kafadar Commons

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Photo 3: Glass facade from Kafadar Commons

Photo 4: Glass facade from Kafadar commons

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Photo 5: CoorsTek center from Illinois Street – East elevation

Photo 6: CoorsTek center from Arapahoe Street - West elevation

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Photo 7: CoorsTek center from Illinois Street

Photo 8: West entrance

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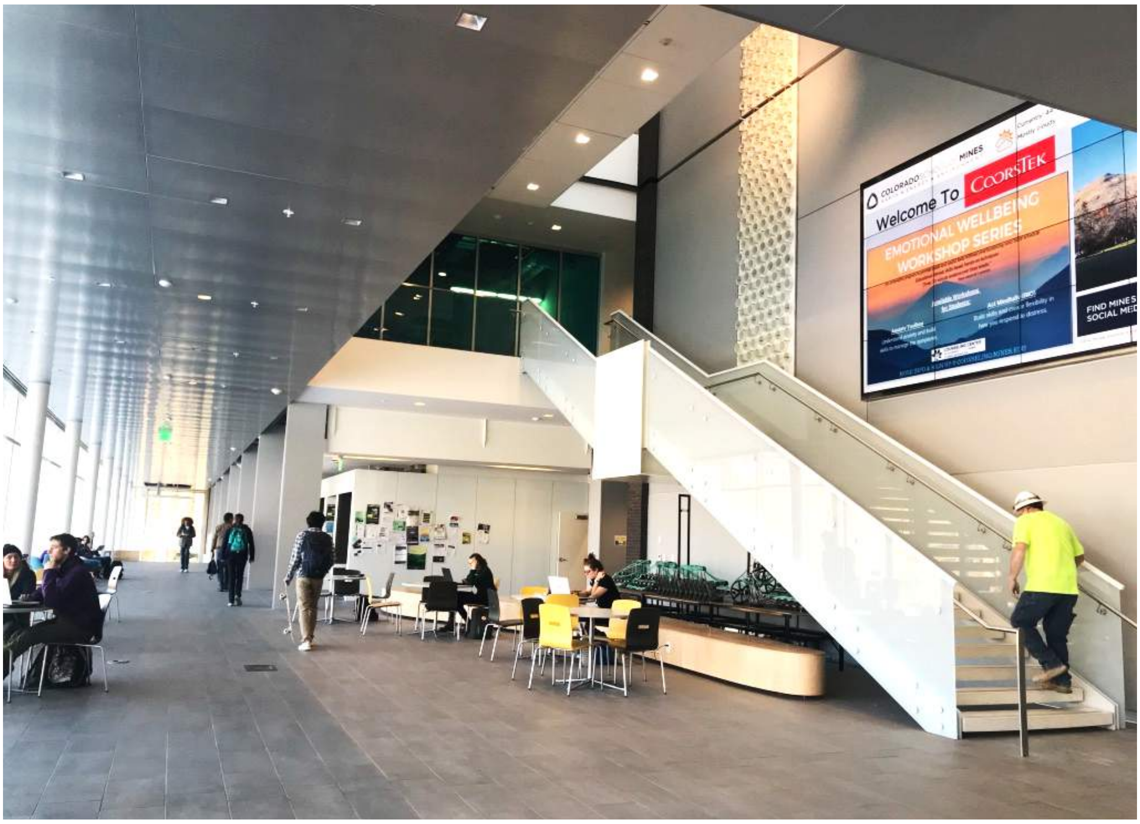

Photo 9: Level 1 open space 1

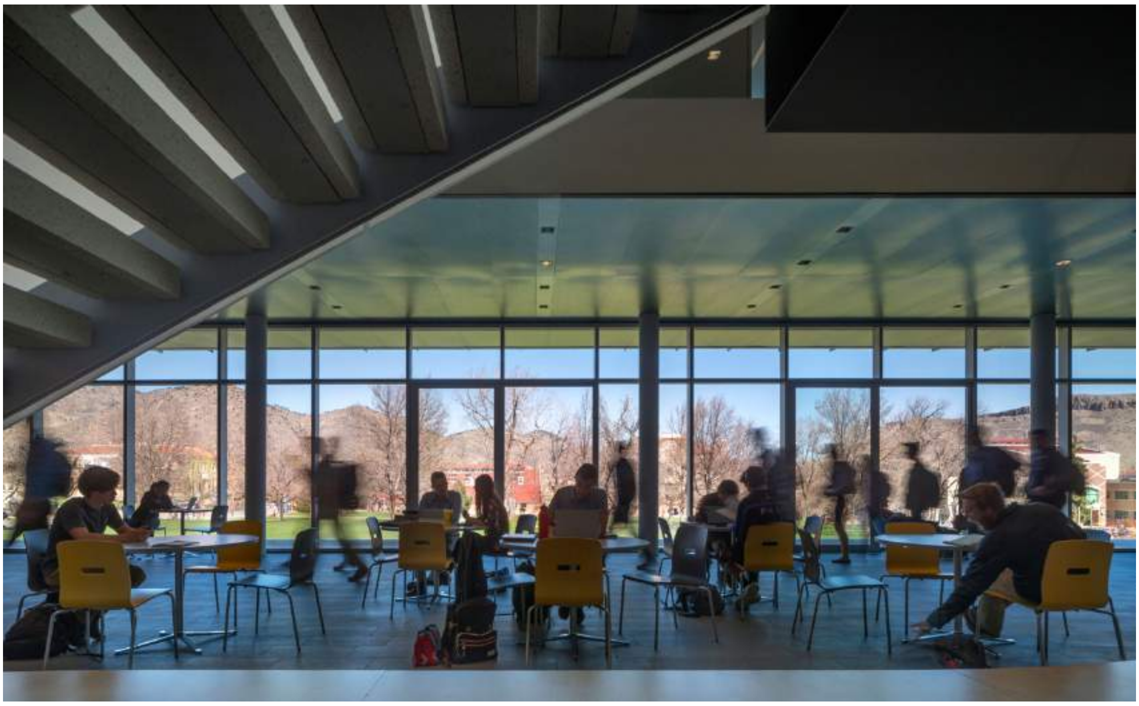

Photo 10: Level 1 open space 2

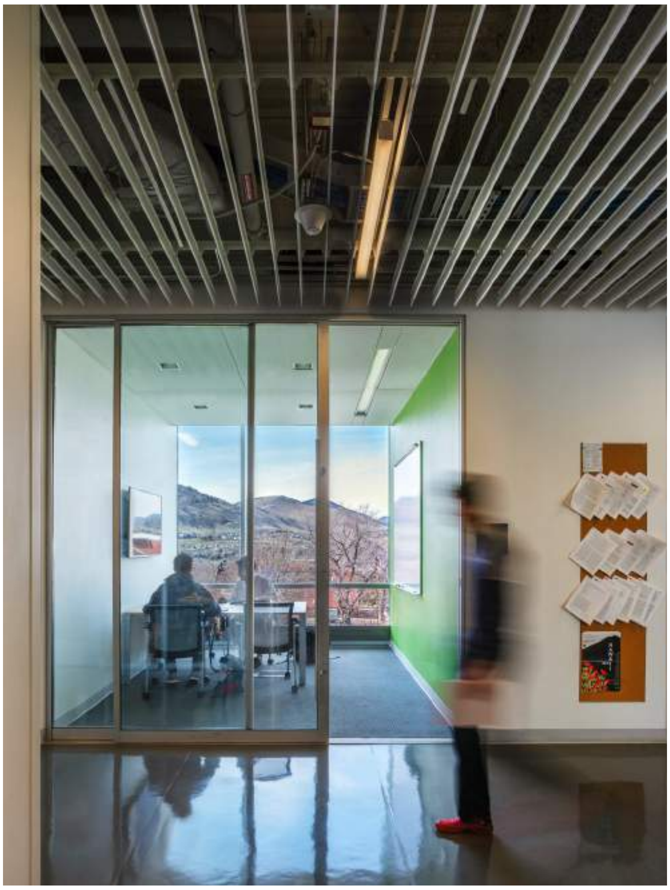

Photo 11: Sencond floor common area

Photo 12: Laboratories 1

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Photo 13: Laboratories 2

Photo 14: First floor active learning studio

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CHAPTER 7 – APPENDICES

APPENDIX A – COORSTEK CENTER FIELD OBSERVATION

We would like to start this appendix thanking Robert Slavik, who kindly guided us through the building, and to Emily Royal, our professor. Their explanations and descriptions of the mechanical and electrical systems were of great help during the whole tour.

INFORMATION

1. Location: CoorsTek center for applied science and engineering
2. Date: Friday, 29th of March 2019
3. Time: 13:30 – 14:30
4. Weather:
   - Cloudy sky
   - Temperature around 50ºF
   - Slight breeze

GENERAL DESCRIPTION

This tour had been targeted in one of our meetings with professor Sen as a must do before starting to do any type of calculations or analysis. This was so important to be able to have a first-hand impression of the entire building. Most of the building is accessible to the public. However, the mechanical and electrical rooms (keystone of our projects) and some of the other facilities were locked. Robert Slavik (Utilities and Plumbing Division Manager) kindly offered to walk with us to observe all those installations.

Prior to our observation tour around the CoorsTek Center, we had the chance to spend some time with our professor Emily Royal. She was able to answer some doubts we had regarding the floor plans. We had time to inspect them quite thoroughly, so we had a good understanding of the building and its layout.

The tour was divided in four stages. The first two stages occurred in the basement. In them, we had the chance to enter the main mechanical and electrical rooms of the building. As analyzed previously in our report, the building has its master rooms in the basement. All aspects of the building regarding mechanical utilities are controlled from one of those rooms. The second one is in control of the electrical utilities. There is only one room in charge of the mechanical aspects in the whole building. The electrical utilities, on the other hand, have a small room in charge of the appliances on each floor. In the third part of our visit we had the chance to enter one of these smaller electrical rooms. Lastly, we visited the rooftop of the building and all the systems that are installed there.

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Prior to starting the guided tour through each stage of the building, we had the chance to see the main transformer that is feeding the building (Figure 13). It was located right next to the building and very close to the master rooms. From there, we moved on to see the electrical master room inside which the main distribution board (Figure 14) was located. That distribution board connects all the panelboards of CoorsTek Center, which in turn feed the numerous loads of the building. In that room, we could also find some panelboards corresponding to the basement and several smaller transformers (Figure 15) that link the different basement panelboards to the main distribution board. Bob also gave us the opportunity to see the internal wiring of the switching unit for the stand-by distribution board. Emily explained to us that the switching unit used three wires for each phase, as it was easier to bend three thinner conductors than a thicker one (Figure 16). Finally, we could also observe some panelboards and transformers corresponding to the emergency and stand-by electrical systems. The emergency electrical system supply power to electrical appliances such as emergency lights, elevators and ventilation. This electrical system is required by law to supply power all the time. On the other hand, the stand-by system is not required to provide power in case of a fault, and it is designed in accordance to the owner requests. Those two systems have a backup power supplied by Marquez's generators located very close to CoorsTek.

The second stage of our tour was the master mechanical room (Figures 1 through 12) of the building. This room has an area of 1667 square feet. As mentioned before, all the mechanical utilities of the building are controlled from this location. The first interesting piece of information Bob told us in this room was that the steam and water systems are shared with those of the Brown Hall building (a nearby university building). Bob and Emily walked us through the room and explained to us the use of the systems installed there. The pipes were all color coded (Figure 8) to clarify what each of them contained. The main systems that we saw were:

- Heating System (Figure 6): It was the yellow system. It was further divided into heating water and steam. Each of these systems had pipes for supply and return. As mentioned before, this system is shared with Brow Hall building. The companies in charge of this system are 'Palmer DCS' and 'Schneider Electric'.
- Fire Sprinkler (Figure 2): It was the red system. The purpose of this system is to provide the appropriate amount of water to extinguish fires before they get the opportunity to grow and spread throughout any of the rooms of the building. CoorsTek uses a dry system compressor from 'General Air Products' company.
- Air Compressor (Figures 1 and 2): It was the blue system. The main purpose of this system was to provide all the labs with the compressed air needed to conduct their experiments. The main compressor in the room is operated by 'Quincy Compressors' but due to continuous issues, a backup compressor operated by 'Atlas Copco' had to be installed.
- Hydraulic System (Figure 5): It was the green system. It was then further divided into several types of pipes. There were domestic, chilled, process CHW, sanitary and

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discharge water pipes. The domestic water had hot and cold-water pipes. All of these systems had supply and return pipes.

- Air quality automatic control for labs

Emily and Bob explained that, to model such a complicated room, architectural firms have 3D models to calculate the space and be able to determine the correct distribution.

Moving on to the next stage, we have a smaller electrical room. This room was much smaller than the master electrical room, and it consisted mostly of panelboards and transformers. In each floor, there were panelboards and transformers that would feed that level. An interesting fact that Emily explained to us was that the panelboards were legally (NEC Code) required not to exceed a certain height. This affected the number of breakers that could be connected to each outlet from the panelboard.

Lastly, we had a chance to visit the rooftop. It is mostly occupied by several types of equipment. However, about 45% of the rooftop area was observed to be unoccupied. This was an interesting fact regarding the possibility of installing PV in the building. Most of the space has occupied by air handling units. This units are used to ensure the outside air used for ventilation is clean. This process is really interesting especially for laboratories that have specific operating conditions. Also regarding laboratories, another large part of the space was used for the laboratories exhaust cooling units and fan. This units allow to control the temperature and humidity of the different laboratories. As explained before, these features can be crucial for many of them. Lastly, the motors that move the two elevators are placed in the roof. All this equipment is surrounded by a metal fence for aesthetic reasons. As mentioned earlier, the equipment placed in the roof does not occupy its whole area, and therefore there would potentially be space for stalling PV plates.

In conclusion, we realized that the building is not only a brand-new building with the latest technology, but also, that every aspect of its design has been carefully studied. From the distribution of the building, making the areas spacious and comfortable, to the brightness entering the building through the wide windows that enclose it, there is not a single detail left to chance. The air quality and the temperature inside the building is very pleasant, and changes of temperatures depending on the rooms or people are unnoticeable. The building provides the perfect environment so that everyone inside it feels comfortable.

MEDIA

Figure 1: General picture 1

Figure 2: Fire sprinkler system

Figure 3: Primal air compressor

Figure 4: Secondary air compressor

Figure 5: Hydraulic system

Figure 6: Heating system


Figure 7: General picture 2


Figure 8: General picture 3

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Figure 9: Compressed air system

Figure 10: Pure water tanks

Figure 11: Lab air controller 1

Figure 12: Lab air controller 2

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Figure 13: CoorsTek Center Transformer "T3"

Figure 14: Main Distribution Board "MDB"

Figure 15: Transformer T-LBM

Figure 16: Wiring connection of switching unit

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APPENDIX B – CHARACTERISTICS OF RESIDENTIAL BUILDINGS AND HOW THEY RELATE TO THE COORSTEK CENTER

According to 2001 ASHRAE Fundamentals Hand Book's Chapter 28 'Residential Heating and Cooling Load Calculations', the following points characterize Residential Buildings:

1. Unlike many other structures, residences are usually occupied and conditioned 24 h per day, virtually every day of the cooling and heating seasons.
    - As an educational and research facility, CoorsTek center is not occupied for 24 hrs./a day.
2. Residential system loads are primarily imposed by heat loss or gain through structural components and by air leakage or ventilation. Internal loads, particularly those from occupants and lights, are small in comparison to those in commercial or industrial structures.
    - CoorsTek, as a research building, has a lot of labs with heavy equipment that will contribute heavily to the building heating load calculations.
3. Most residences are conditioned as a single zone. Unit capacity cannot be redistributed from one area to another as loads change from hour to hour; however, exceptions do occur.
    - CoorsTek center is not conditioned as a single zone, as several labs have strict specification requirement that have to be met to conduct different experiments. Thus, as we do not wish to model the whole building following the same pattern, a different approach has to be taken.
4. Most residential cooling systems use units of relatively small capacity (about 5 to 18 kW cooling, 18 to 32 kW heating). Because loads are largely affected by outside conditions, and few days each season are design days, the unit operates at only partial load during most of the season; thus, an oversized unit is detrimental to good system performance, especially for cooling in areas of high wet-bulb temperature.
    - Heating and cooling loads may not be of small capacity, as several factors have to be looked into in the load calculations (equipment, occupation, schedules, lightning…)
5. Dehumidification occurs during cooling unit operation only, and space condition control is usually limited to use of room thermostats (sensible heat-actuated devices).
6. Multifamily living units are similar to single-family detached houses, but the living units may not all have surfaces exposed in all directions. This affects load calculation.

As several of the above points are not met by the CoorTek building, it seems fair to conclude that CoorsTek should be analyzed as a Non-Residential building to have a more accurate Load Calculation.

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APPENDICES I - INFORMATION

APPENDIX I.1 – OFFICE LOAD DENSITY

Table 11 Recommended Load Factors for Various Types of Offices

Load Density of Office	Load Factor, W/m^2	Description
Light	5.4	Assumes 15.5 m^2/workstation (6.5 workstations per 100 m^2) with computer and monitor at each plus printer and fax. Computer, monitor, and fax diversity 0.67, printer diversity 0.33.
Medium	10.8	Assumes 11.6 m^2/workstation (8.5 workstations per 100 m^2) with computer and monitor at each plus printer and fax. Computer, monitor, and fax diversity 0.75, printer diversity 0.50.
Medium/ Heavy	16.1	Assumes 9.3 m^2/workstation (11 workstations per 100 m^2) with computer and monitor at each plus printer and fax. Computer and monitor diversity 0.75, printer and fax diversity 0.50.
Heavy	21.5	Assumes 7.8 m^2/workstation (13 workstations per 100 m^2) with computer and monitor at each plus printer and fax. Computer and monitor diversity 1.0, printer and fax diversity 0.50.

Source: Wilkins and McGaffin (1994).

Table 12 Cooling Load Estimates for Various Office Load Densities

	Number	Each, W	Total, W	Diversity	Load, W
Light Load Density[a]					
Computers	6	55	330	0.67	220
Monitors	6	55	330	0.67	220
Laser printer—small desk top	1	130	130	0.33	43
Fax machine	1	15	15	0.67	10
Total Area Load					494
Recommended equipment load factor = 5.4 W/m^2					
Medium Load Density[a]					
Computers	8	65	520	0.75	390
Monitors	8	70	560	0.75	420
Laser printer—desk	1	215	215	0.5	108
Fax machine	1	15	15	0.75	11
Total Area Load					929
Recommended equipment load factor = 10.8 W/m^2					
Medium/Heavy Load Density[a]					
Computers	10	65	650	1	650
Monitors	10	70	700	1	700
Laser printer—small office	1	320	320	0.5	160
Facsimile machine	1	30	30	0.5	15
Total Area Load					1525
Recommended equipment load factor = 16.1 W/m^2					
Heavy Load Density[a]					
Computers	12	75	900	1	900
Monitors	12	80	960	1	960
Laser printer-small office	1	320	320	0.5	160
Facsimile machine	1	30	30	0.5	15
Total Area Load					2035
Recommended equipment load factor = 21.5 W/m^2					

Source: Wilkins and McGaffin (1994).
[a] See Table 11 for descriptions of load densities.

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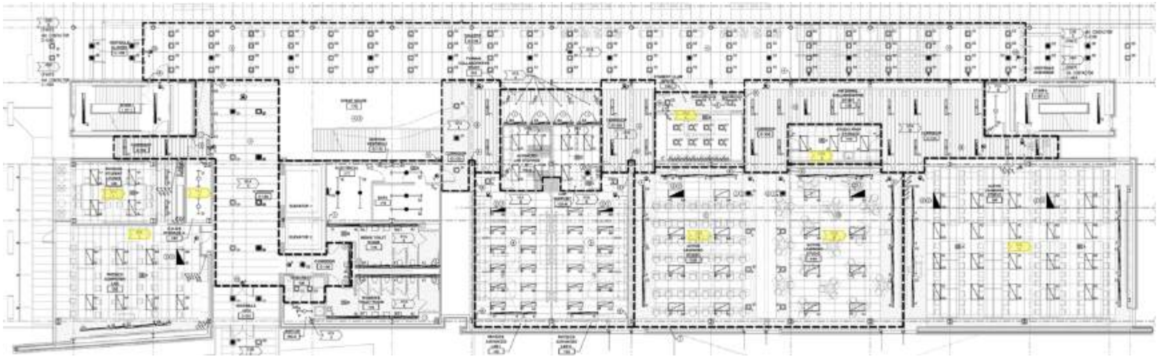
APPENDIX I.2 – LIGHT FIXTURES

The following images show the panelboards and the corresponding elements inside them in each analyzed room.

- First floor Lighting plan (Slide E-120):



- Second floor Lighting plan (Slide E-122):

- Third floor Lighting plan (Slide E-123):

Next, the panelboards with the corresponding elements highlighted are shown.

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FIRST FLOOR

- Panelboard H1A:

PANELBOARD: H1A

MANUFACTURER AND TYPE: SQUARE D – NF
X NEW
EXISTING
BUS RATING = 100 AMPERES
AIC RATING = 14,000 AMPERES
VOLTAGE = 480 Y/ 277V, 3 PHASE, 4 WIRE

X NEUTRAL
X GROUND
MAIN CB RATING:
X MLO
X SURFACE

TVSS
ISO-GROUND
AMPERES
RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
		SPARE	1	20	1	A	2	20	1	LTG – GALLERY, EVENT	2614	L
		SPARE	1	20	3	B	4	20	1	LTG – COMP LAB, CORR 170, 180, T.T. JAN	2429	L
		SPARE	1	20	5	C	6	20	1	LTG – PHYS ADV LABS, CORR 160, CLUB	2545	L
		SPARE	1	20	7	A	8	20	1	LTG – ACTV LEARN 140, 150, STUDIO PREP	2400	L
		SPARE	1	20	9	B	10	20	1	LTG – ACTV LEARN 130, CORR 120, 130	2632	L
		SPARE	1	20	11	C	12	20	1	SPARE		
		SPACE			13	A	14			SPACE		
		SPACE			15	B	16			SPACE		
		SPACE			17	C	18			SPACE		
		SPACE			19	A	20			SPACE		
		SPACE			21	B	22			SPACE		
		SPACE			23	C	24			SPACE		
		SPACE			25	A	26			SPACE		
		SPACE			27	B	28			SPACE		
		SPACE			29	C	30			SPACE		

PHASE LOADING AND BALANCE — CONNECTED LOAD:
A = 5,074 VA
A TO B = 99 %
B = 5,061 VA
B TO C = 50 %
C = 2,545 VA
C TO A = 51 %

LOAD TYPE:
E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		12,620	1.0	12,620	1.25	15,775
REC (R)	1st 10 KVA	–	1.0	–	1.0	–
	REMAINING	–	1.0	–	0.5	–
LARGEST MOTORS (M)		–	1.0	–	1.25	–
REMAINING MOTORS (M)		–	1.0	–	1.0	–
EQUIPMENT (E)		–	1.0	–	1.0	–
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
TOTAL		12,620		12,620		15,775

NEC DEMAND LOAD = 19 A
SPARE CAPACITY = 81 A 81.0 %
TOTAL AVAILABLE = 100 A

NOTES:

SECOND FLOOR

- Panelboard H2A:

PANELBOARD: H2A

MANUFACTURER AND TYPE: SQUARE D – NF
X NEW
EXISTING
BUS RATING = 100 AMPERES
AIC RATING = 14,000 AMPERES
VOLTAGE = 480 Y/ 277V, 3 PHASE, 4 WIRE

X NEUTRAL
X GROUND
MAIN CB RATING:
X MLO
X SURFACE

TVSS
ISO-GROUND
AMPERES
RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
		SPARE	1	20	1	A	2	20	1	LTG – PHYS ELEC 200, COMP, CORR 280, STOR	2229	L
		SPARE	1	20	3	B	4	20	1	LTG – CORR 210, TLT ROOMS	1786	L
		SPARE	1	20	5	C	6	20	1	LTG – WEST OFFICES	2280	L
		SPARE	1	20	7	A	8	20	1	LTG – EAST OFFICES, THED RES 230	2300	L
		SPARE	1	20	9	B	10	20	1	LTG – SHELL SPACE	1120	L
		SPARE	1	20	11	C	12	20	1	SPARE (STUBBED TO SHELL SPACE)		
		SPACE			13	A	14			SPACE		
		SPACE			15	B	16			SPACE		
		SPACE			17	C	18			SPACE		
		SPACE			19	A	20			SPACE		
		SPACE			21	B	22			SPACE		
		SPACE			23	C	24			SPACE		
		SPACE			25	A	26			SPACE		
		SPACE			27	B	28			SPACE		
		SPACE			29	C	30			SPACE		

PHASE LOADING AND BALANCE — CONNECTED LOAD:
A = 4,520 VA
A TO B = 64 %
B = 2,906 VA
B TO C = 78 %
C = 2,280 VA
C TO A = 50 %

LOAD TYPE:
E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		9,715	1.0	9,715	1.25	12,144
REC (R)	1st 10 KVA	–	1.0	–	1.0	–
	REMAINING	–	1.0	–	0.5	–
LARGEST MOTORS (M)		–	1.0	–	1.25	–
REMAINING MOTORS (M)		–	1.0	–	1.0	–
EQUIPMENT (E)		–	1.0	–	1.0	–
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
TOTAL		9,715		9,715		12,144

NEC DEMAND LOAD = 15 A
SPARE CAPACITY = 85 A 85.4 %
TOTAL AVAILABLE = 100 A

NOTES:

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THIRD FLOOR

- Panelboard H3A:

PANELBOARD: H3A

MANUFACTURER AND TYPE: SQUARE D – NF
X NEW
EXISTING
BUS RATING = 100 AMPERES
A/C RATING = 14,000 AMPERES
VOLTAGE = 480 Y/ 277V, 3 PHASE, 4 WIRE

X NEUTRAL
X GROUND
MAIN CB RATING: AMPERES
X MLO
X SURFACE

TVSS
ISO-GROUND
RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
		SPARE	1	20	1	A	2	20	1	LTG – PHYS DEPT OFFICES, CORR 380, TLT	2285	L
		SPARE	1	20	3	B	4	20	1	LTG – CORR 370, CONF., WEST OFFICES	2640	L
		SPARE	1	20	5	C	6	20	1	LTG – EAST OFFICES	2608	L
		SPARE	1	20	7	A	8	20	1	LTG – SUB A LABS, GRAD OFFICES 357-380	2292	L
		SPARE	1	20	9	B	10	20	1	LTG – WEST C.M. LABS, SUPPORT, GRD. OFF	2416	L
		SPARE	1	20	11	C	12	20	1	LTG – EAST C.M. LABS, SUPPORT, GRD. OFF	2854	L
		SPACE			13	A	14	20	1	LTG – ELEV 1 EQ ROOM, SHAFT	224	L
		SPACE			15	B	16			SPACE		
		SPACE			17	C	18			SPACE		
		SPACE			19	A	20			SPACE		
		SPACE			21	B	22			SPACE		
		SPACE			23	C	24			SPACE		
		SPACE			25	A	26			SPACE		
		SPACE			27	B	28			SPACE		
		SPACE			29	C	30			SPACE		

CONNECTED LOAD

PHASE LOADING AND BALANCE

A =		4,801 VA
	A TO B =	95 %
B =		5,056 VA
	B TO C =	96 %
C =		5,262 VA
	C TO A =	91 %

LOAD TYPE

E = EQUIPMENT	M = MOTOR
H = HEATING	P = PANELBOARD
K = KITCHEN EQUIPMENT	R = RECEPTACLE
L = LIGHTING	T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		15,119	1.0	15,119	1.25	18,899
REC (R)	1st 10 KVA	–	1.0	–	1.0	–
	REMAINING	–	1.0	–	0.5	–
LARGEST MOTORS (M)		–	1.0	–	1.25	–
REMAINING MOTORS (M)		–	1.0	–	1.0	–
EQUIPMENT (E)		–	1.0	–	1.0	–
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
	TOTAL	15,119		15,119		18,899

NEC DEMAND LOAD	=	23 A	
SPARE CAPACITY	=	77 A	77.3 %
TOTAL AVAILABLE	=	100 A	

NOTES:

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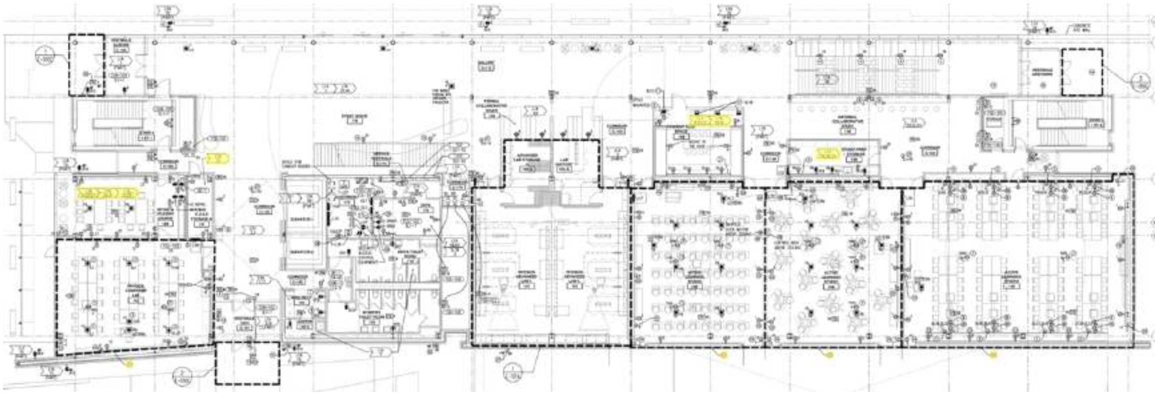
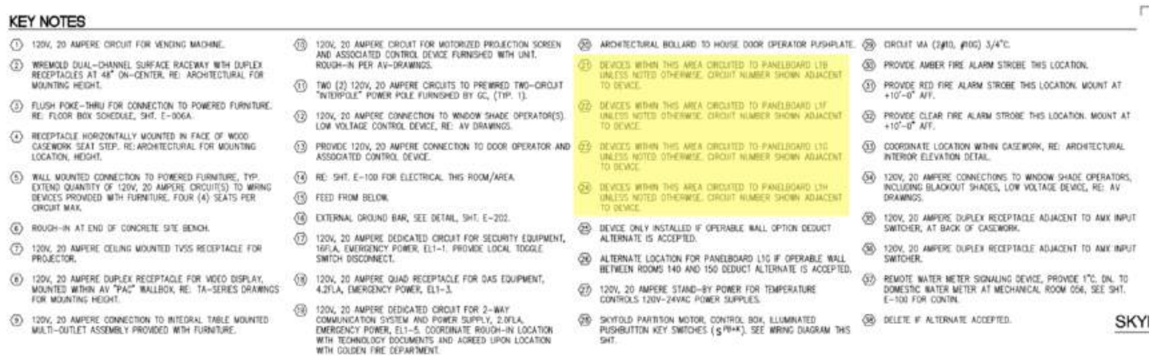
APPENDIX I.3 – APPLIANCES

The following images show the panelboards and the corresponding elements inside them in each analyzed room.

- First Floor Power plan (Slide E-101):



- First Floor Power plant notes:

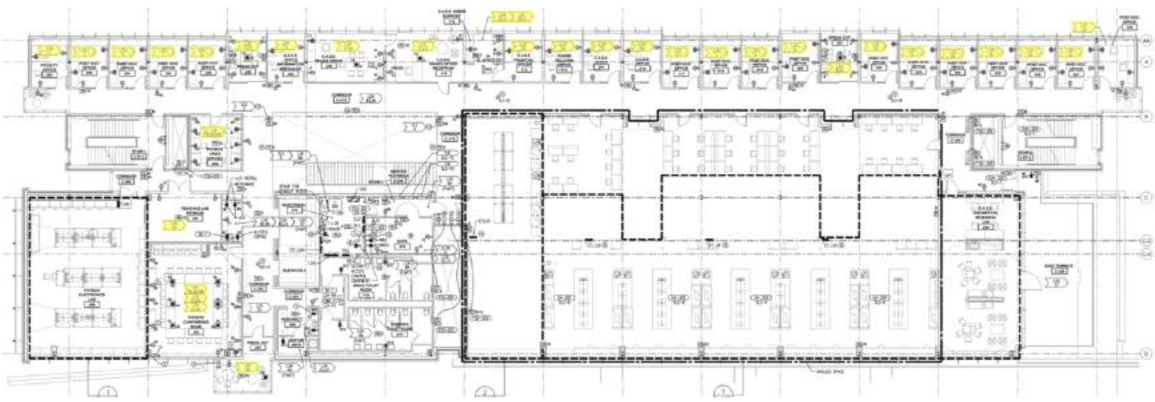


KEY NOTES

1. 120V, 20 AMPERE CIRCUIT FOR VENDING MACHINE.
2. WIREMOLD DUAL-CHANNEL SURFACE RACEWAY WITH DUPLEX RECEPTACLES AT 48" ON-CENTER. RE: ARCHITECTURAL FOR MOUNTING HEIGHT.
3. FLUSH POKE-THRU FOR CONNECTION TO POWERED FURNITURE. RE: FLOOR BOX SCHEDULE, SHT. E-006A.
4. RECEPTACLE HORIZONTALLY MOUNTED IN FACE OF WOOD CASEWORK SEAT STEP. RE: ARCHITECTURAL FOR MOUNTING LOCATION, HEIGHT.
5. WALL MOUNTED CONNECTION TO POWERED FURNITURE, TYP. EXTEND QUANTITY OF 120V, 20 AMPERE CIRCUIT(S) TO WIRING DEVICES PROVIDED WITH FURNITURE. FOUR (4) SEATS PER CIRCUIT MAX.
6. ROUGH-IN AT END OF CONCRETE SITE BENCH.
7. 120V, 20 AMPERE CEILING MOUNTED TVSS RECEPTACLE FOR PROJECTOR.
8. 120V, 20 AMPERE DUPLEX RECEPTACLE FOR VIDEO DISPLAY, MOUNTED WITHIN AV "PAC" WALLBOX, RE: TA-SERIES DRAWINGS FOR MOUNTING HEIGHT.
9. 120V, 20 AMPERE CONNECTION TO INTEGRAL TABLE MOUNTED MULTI-OUTLET ASSEMBLY PROVIDED WITH FURNITURE.
10. 120V, 20 AMPERE CIRCUIT FOR MOTORIZED PROJECTION SCREEN AND ASSOCIATED CONTROL DEVICE FURNISHED WITH UNIT. ROUGH-IN PER AV-DRAWINGS.
11. TWO (2) 120V, 20 AMPERE CIRCUITS TO PREWIRED TWO-CIRCUIT "INTERPOLE" POWER POLE FURNISHED BY GC, (TYP. 1).
12. 120V, 20 AMPERE CONNECTION TO WINDOW SHADE OPERATOR(S). LOW VOLTAGE CONTROL DEVICE, RE: AV DRAWINGS.
13. PROVIDE 120V, 20 AMPERE CONNECTION TO DOOR OPERATOR AND ASSOCIATED CONTROL DEVICE.
14. RE: SHT. E-100 FOR ELECTRICAL THIS ROOM/AREA.
15. FEED FROM BELOW.
16. EXTERNAL GROUND BAR, SEE DETAIL, SHT. E-202.
17. 120V, 20 AMPERE DEDICATED CIRCUIT FOR SECURITY EQUIPMENT, 16FLA, EMERGENCY POWER, EL1-1. PROVIDE LOCAL TOGGLE SWITCH DISCONNECT.
18. 120V, 20 AMPERE QUAD RECEPTACLE FOR DAS EQUIPMENT, 4.2FLA, EMERGENCY POWER, EL1-3.
19. 120V, 20 AMPERE DEDICATED CIRCUIT FOR 2-WAY COMMUNICATION SYSTEM AND POWER SUPPLY, 2.0FLA, EMERGENCY POWER, EL1-5. COORDINATE ROUGH-IN LOCATION WITH TECHNOLOGY DOCUMENTS AND AGREED UPON LOCATION WITH GOLDEN FIRE DEPARTMENT.
20. ARCHITECTURAL BOLLARD TO HOUSE DOOR OPERATOR PUSHPLATE.
21. DEVICES WITHIN THIS AREA CIRCUITED TO PANELBOARD L1B UNLESS NOTED OTHERWISE. CIRCUIT NUMBER SHOWN ADJACENT TO DEVICE.
22. DEVICES WITHIN THIS AREA CIRCUITED TO PANELBOARD L1F UNLESS NOTED OTHERWISE. CIRCUIT NUMBER SHOWN ADJACENT TO DEVICE.
23. DEVICES WITHIN THIS AREA CIRCUITED TO PANELBOARD L1G UNLESS NOTED OTHERWISE. CIRCUIT NUMBER SHOWN ADJACENT TO DEVICE.
24. DEVICES WITHIN THIS AREA CIRCUITED TO PANELBOARD L1H UNLESS NOTED OTHERWISE. CIRCUIT NUMBER SHOWN ADJACENT TO DEVICE.
25. DEVICE ONLY INSTALLED IF OPERABLE WALL OPTION DEDUCT ALTERNATE IS ACCEPTED.
26. ALTERNATE LOCATION FOR PANELBOARD L1G IF OPERABLE WALL BETWEEN ROOMS 140 AND 150 DEDUCT ALTERNATE IS ACCEPTED.
27. 120V, 20 AMPERE STAND-BY POWER FOR TEMPERATURE CONTROLS 120V-24VAC POWER SUPPLIES.
28. SKYFOLD PARTITION MOTOR, CONTROL BOX, ILLUMINATED PUSHBUTTON KEY SWITCHES (S^{PB+K}). SEE WIRING DIAGRAM THIS SHT.
29. CIRCUIT VIA (2#10, #10G) 3/4"C.
30. PROVIDE AMBER FIRE ALARM STROBE THIS LOCATION.
31. PROVIDE RED FIRE ALARM STROBE THIS LOCATION. MOUNT AT +10'-0" AFF.
32. PROVIDE CLEAR FIRE ALARM STROBE THIS LOCATION. MOUNT AT +10'-0" AFF.
33. COORDINATE LOCATION WITHIN CASEWORK, RE: ARCHITECTURAL INTERIOR ELEVATION DETAIL.
34. 120V, 20 AMPERE CONNECTIONS TO WINDOW SHADE OPERATORS, INCLUDING BLACKOUT SHADES, LOW VOLTAGE DEVICE, RE: AV DRAWINGS.
35. 120V, 20 AMPERE DUPLEX RECEPTACLE ADJACENT TO AMX INPUT SWITCHER, AT BACK OF CASEWORK.
36. 120V, 20 AMPERE DUPLEX RECEPTACLE ADJACENT TO AMX INPUT SWITCHER.
37. REMOTE WATER METER SIGNALING DEVICE, PROVIDE 1"C. DN. TO DOMESTIC WATER METER AT MECHANICAL ROOM 056, SEE SHT. E-100 FOR CONTIN.
38. DELETE IF ALTERNATE ACCEPTED.

SKY

- Second Floor Power plan (Slide E-102):



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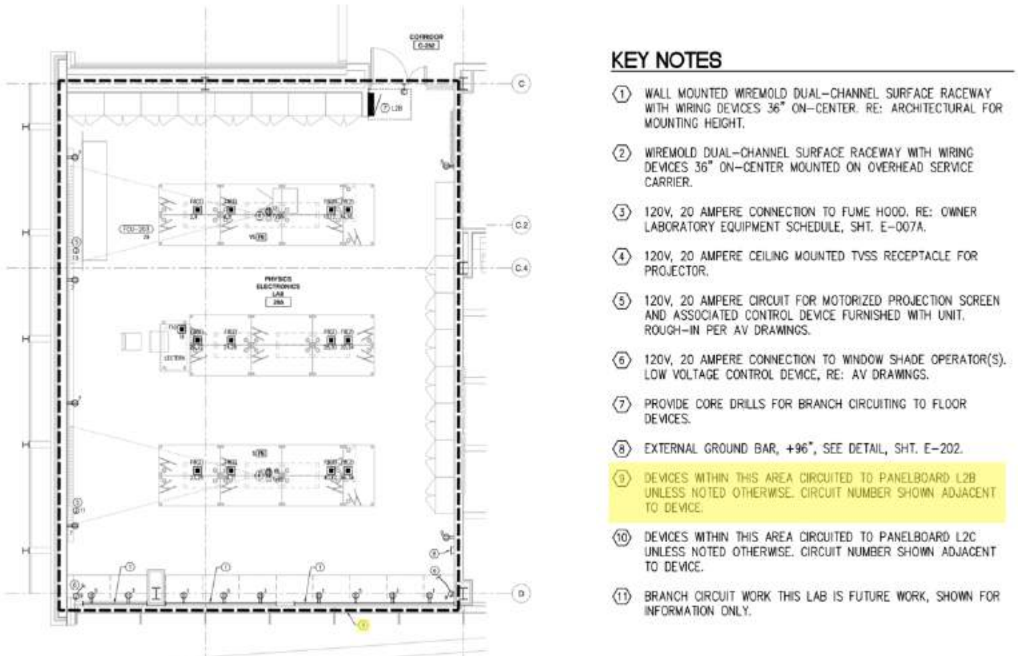
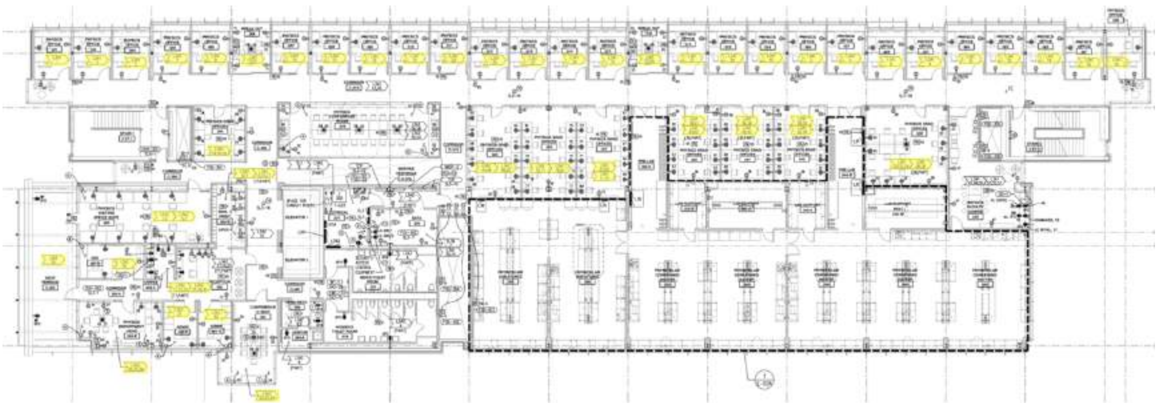
- Enlarged Power plan for Lab-288 (Slide E-102-A):



- Third Floor Power plan (Slide E-103):



Next, the panelboards with the corresponding elements highlighted are shown.

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FIRST FLOOR

- Panelboard L1A:

PANELBOARD: L1A

MANUFACTURER AND TYPE: SQUARE D – NQOD
X NEW
EXISTING
BUS RATING = 225 AMPERES
AIC RATING = 22,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE
X NEUTRAL
X GROUND
MAIN CB RATING:
X MLO
X SURFACE
TVSS
ISO-GROUND
AMPERES
RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	720	GALLERY C-110, N WALL FLOOR RCPT	1	20	1	A	2	20	1	CORR C170/C180/C130, RCPT	1080	R
R	1080	CORR C-180,C-181,C-182,C-185, VEST C-110, RCPT	1	20	3	B	4	20	1	STUDY 159, RCPT	720	R
E	300	CORR C-180, VIDEO DISPLAY	1	20	5	C	6	20	1	STUDY 159, RCPT	720	R
R	900	MENS 178, WOMENS 179, JAN 180-A, RCPT	1	20	7	A	8	20	1	CLUB 149, GEN RCPT, NW POLE VIDEO DSPLY	1080	R
M	480	CORR C-185, EWC-1	1	20	9	B	10	20	1	CLUB 149, NW POLE, SO. WALL WIREWAY RCPT	540	R
E	1200	VEND 180, VENDING MACHINE	1	20	11	C	12	20	1	CLUB 149, SO. WALL WIREWAY RCPT	360	R
E	1200	VEND 180, VENDING MACHINE	1	20	13	A	14	20	1	CLUB 149, NO. DISPLAY PLUGMOLD	900	R
R	720	SW EXTERIOR, RCPT	1	20	15	B	16	20	1	CLUB 149, NO. DISPLAY PLUGMOLD	900	R
		SPARE	1	20	17	C	18	20	1	STAIRS-5 STEP RCPT	720	R
M	200	VEST C-100, AUTO DOORS	1	20	19	A	20	20	1	CORR C120 RCPT	540	R
R	360	CASE STOR 187, RCPT	1	20	21	B	22	20	1	STUDY 138, TABLE RCPT CCT	1080	R
R	900	PHYS STUDENT LOUNGE, RCPT	1	20	23	C	24	20	1	STUDY 138, TABLE RCPT CCT	1080	R
R	720	PHYS STUDENT LOUNGE, FLOOR RCPT	1	20	25	A	26	20	1	STUDIO PREP 129, WIREWAY RCPT	360	R
E	480	PHYS STUDENT LNGE, VIDEO PNL RCPT, SHADES	1	20	27	B	28	20	1	STUDIO PREP 129, WIREWAY RCPT	180	R
K	1660	PHYS STUDENT LOUNGE, CD-1	1	20	29	C	30	20	1	STUDIO PREP 129, SE DED RCPT	1300	E
K	1600	PHYS STUDENT LOUNGE, AC RCPT (COFFEE)	1	20	31	A	32	20	1	NORTH EXTERIOR RCPT	720	R
K	800	PHYS STUDENT LOUNGE, MICROWAVE	1	20	33	B	34	30	1	ELEC 177, FCU-101	2020	M
K	500	PHYS STUDENT LOUNGE, UC REFR	1	20	35	C	36	20	1	SPARE		
R	360	EVENT 170, CTRL STAIR RCPT	1	20	37	A	38	20	1	SPARE		
		SPARE	1	20	39	B	40	20	1	CORR C-185, BF-1	600	M
E	360	EVENT 170, PODIUM FLOOR RCPT	1	20	41	C	42	20	1	SPARE		

CONNECTED LOAD

PHASE LOADING AND BALANCE
A = 10,740 VA
A TO B = 97 %
B = 11,040 VA
B TO C = 96 %
C = 11,500 VA
C TO A = 93 %

LOAD TYPE
E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	10,000	1.0	10,000	1.0	10,000
	REMAINING	8,180	1.0	8,180	0.5	4,090
LARGEST MOTORS (M)		2,020	1.0	2,020	1.25	2,525
REMAINING MOTORS (M)		1,280	1.0	1,280	1.0	1,280
EQUIPMENT (E)		7,240	1.0	7,240	1.0	7,240
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		4,560	1.0	4,560	0.80	3,648
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
TOTAL (SECTIONS 1 AND 2)		33,280		33,280		28,783

NEC DEMAND LOAD = 80 A
SPARE CAPACITY = 145 A 64.5 %
TOTAL AVAILABLE = 225 A

NOTES:

- Panelboard L1B:

PANELBOARD: L1B

MANUFACTURER AND TYPE: SQUARE D – NQOD
X NEW
EXISTING
BUS RATING = 225 AMPERES
AIC RATING = 10,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE
X NEUTRAL 200%
X GROUND
MAIN CB RATING:
X MLO
SURFACE
TVSS
ISO-GROUND
AMPERES
X RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	720	LAB 182, W ROW FLOOR RCPT, NW	1	20	1	A	2	20	1	LAB 182, LECTURN FLOOR RCPT	360	R
R	720	LAB 182, W ROW FLOOR RCPT, NW	1	20	3	B	4	20	1	LAB 182, WEST PROJECTOR	300	E
R	720	LAB 182, W ROW FLOOR RCPT, SW	1	20	5	C	6	20	1	LAB 182, EAST PROJECTOR	300	E
R	720	LAB 182, W ROW FLOOR RCPT, SW	1	20	7	A	8	20	1	LAB 182, WEST SCREEN	500	M
R	720	LAB 182, CTR ROW FLOOR RCPT, N	1	20	9	B	10	20	1	LAB 182, EAST SCREEN	500	M
R	720	LAB 182, CTR ROW FLOOR RCPT, N	1	20	11	C	12	20	1	LAB 182, GEN WALL RCPT, SHADES	900	R
R	720	LAB 182, CTR ROW FLOOR RCPT, S	1	20	13	A	14	20	1	LAB 182, E WALL, AC RCPT, PRINTER	500	E
R	720	LAB 182, CTR ROW FLOOR RCPT, S	1	20	15	B	16	20	1	LAB 182, E WALL, AC RCPT, PRINTER	500	E
R	720	LAB 182, E ROW FLOOR RCPT, NE	1	20	17	C	18	20	1	SPARE		
R	720	LAB 182, E ROW FLOOR RCPT, NE	1	20	19	A	20	20	1	SPARE		
R	720	LAB 182, E ROW FLOOR RCPT, SE	1	20	21	B	22	20	1	SPARE		
R	720	LAB 182, E ROW FLOOR RCPT, SE	1	20	23	C	24	20	1	LAB 182, FCU-103	1030	M
		SPACE			25	A	26			SPACE		
		SPACE			27	B	28			SPACE		
		SPACE			29	C	30			SPACE		
		SPACE			31	A	32			SPACE		
		SPACE			33	B	34			SPACE		
		SPACE			35	C	36			SPACE		
		SPACE			37	A	38			SPACE		
		SPACE			39	B	40			SPACE		
		SPACE			41	C	42			SPACE		

CONNECTED LOAD

PHASE LOADING AND BALANCE
A = 4,240 VA
A TO B = 89 %
B = 4,780 VA
B TO C = 82 %
C = 5,110 VA
C TO A = 83 %

LOAD TYPE
E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	9,900	1.0	9,900	1.0	9,900
	REMAINING	–	1.0	–	0.5	–
LARGEST MOTORS (M)		1,030	1.0	1,030	1.25	1,288
REMAINING MOTORS (M)		1,000	1.0	1,000	1.0	1,000
EQUIPMENT (E)		1,600	1.0	1,600	1.0	1,600
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
TOTAL		13,530		13,530		13,788

NEC DEMAND LOAD = 38 A
SPARE CAPACITY = 87 A 69.4 %
TOTAL AVAILABLE = 125 A

NOTES: 1. REDUCE TO 100% NEUTRAL BUSSING IF ALTERNATE ACCEPTED.

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- Panelboard L1F:

PANELBOARD: L1G

MANUFACTURER AND TYPE: SQUARE D – NQOD
X NEW
EXISTING
BUS RATING = 225 AMPERES
AIC RATING = 10,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE

X NEUTRAL
X GROUND
MAIN CB RATING:
X MLO
SURFACE

TVSS
ISO-GROUND
AMPERES
X RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	900	STUDIO 140, NO/EAST WALL RCPT	1	20	1	A	2	20	1	STUDIO 140, NW FLOOR RCPT	360	R
R	900	STUDIO 140, SO/WEST WALL RCPT	1	20	3	B	4	20	1	STUDIO 140, NE FLOOR RCPT	360	R
E	600	STUDIO 140, EAST WALL PROJECTORS	1	20	5	C	6	20	1	STUDIO 140, WEST CTR FLOOR RCPT	360	R
E	600	STUDIO 140, NORTH WALL PROJECTORS	1	20	7	A	8	20	1	STUDIO 140, EAST CTR FLOOR RCPT	360	R
E	1000	STUDIO 140, EAST WALL SCREENS	1	20	9	B	10	20	1	STUDIO 140, SW FLOOR RCPT	360	R
E	1000	STUDIO 140, NORTH WALL SCREENS	1	20	11	C	12	20	1	STUDIO 140, SE FLOOR RCPT	360	R
E	160	STUDIO 140, WINDOW SHADES	1	20	13	A	14	20	1	STUDIO 140, E AV FLOOR RCPT	360	R
		SPARE	1	20	15	B	16	20	1	SPARE		
		SPARE	1	20	17	C	18	20	1	SPARE		
		SPARE	1	20	19	A	20	20	1	SPARE		
		SPARE	1	20	21	B	22	20	1	SPARE		
		SPARE	1	20	23	C	24	20	1	STUDIO 140, NO AV FLOOR RCPT	360	R
		SPACE			25	A	26			SPACE		
		SPACE			27	B	28			SPACE		
		SPACE			29	C	30			SPACE		
		SPACE			31	A	32			SPACE		
		SPACE			33	B	34			SPACE		
		SPACE			35	C	36			SPACE		
		SPACE			37	A	38	15	3	SKYFOLD PARTITION MOTOR (1-1/2HP ASSUMED)	2490	M
		SPACE			39	B	40			--		
		SPACE			41	C	42			--		

PHASE LOADING AND BALANCE

CONNECTED LOAD
A = 3,570 VA
A TO B = 97 %
B = 3,450 VA
B TO C = 98 %
C = 3,510 VA
C TO A = 98 %

LOAD TYPE
E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	4,680	1.0	4,680	1.0	4,680
	REMAINING	–	1.0	–	0.5	–
LARGEST MOTORS (M)		2,490	1.0	2,490	1.25	3,113
REMAINING MOTORS (M)		–	1.0	–	1.0	–
EQUIPMENT (E)		3,360	1.0	3,360	1.0	3,360
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
	TOTAL	10,530		10,530		11,153

NEC DEMAND LOAD = 31 A
SPARE CAPACITY = 119 A 79.4 %
TOTAL AVAILABLE = 150 A

NOTES:

- Panelboard L1G:

PANELBOARD: L1F

MANUFACTURER AND TYPE: SQUARE D – NQOD
X NEW
EXISTING
BUS RATING = 225 AMPERES
AIC RATING = 10,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE

X NEUTRAL
X GROUND
MAIN CB RATING:
X MLO
SURFACE

TVSS
ISO-GROUND
AMPERES
X RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	900	STUDIO 150, NO/EAST WALL RCPT	1	20	1	A	2	20	1	STUDIO 150, NW FLOOR RCPT	360	R
R	900	STUDIO 150, SO/WEST WALL RCPT	1	20	3	B	4	20	1	STUDIO 150, NE FLOOR RCPT	360	R
E	400	STUDIO 150, WEST WALL PROJECTORS	1	20	5	C	6	20	1	STUDIO 150, WEST CTR FLOOR RCPT	360	R
E	400	STUDIO 150, NORTH WALL PROJECTORS	1	20	7	A	8	20	1	STUDIO 150, EAST CTR FLOOR RCPT	360	R
E	1000	STUDIO 150, WEST WALL SCREENS	1	20	9	B	10	20	1	STUDIO 150, SW FLOOR RCPT	360	R
E	1000	STUDIO 150, NORTH WALL SCREENS	1	20	11	C	12	20	1	STUDIO 150, SE FLOOR RCPT	360	R
E	360	STUDIO 150, WINDOW SHADES	1	20	13	A	14	20	1	STUDIO 150, WEST AV FLOOR RCPT	360	R
		SPARE	1	20	15	B	16	20	1	SPARE		
		SPARE	1	20	17	C	18	20	1	SPARE		
		SPARE	1	20	19	A	20	20	1	SPARE		
		SPARE	1	20	21	B	22	20	1	SPARE		
		SPARE	1	20	23	C	24	20	1	STUDIO 150, NO AV FLOOR RCPT	360	R
		SPACE			25	A	26			SPACE		
		SPACE			27	B	28			SPACE		
		SPACE			29	C	30			SPACE		
		SPACE			31	A	32			SPACE		
		SPACE			33	B	34			SPACE		
		SPACE			35	C	36			SPACE		
		SPACE			37	A	38			SPACE		
		SPACE			39	B	40			SPACE		
		SPACE			41	C	42			SPACE		

PHASE LOADING AND BALANCE

CONNECTED LOAD
A = 2,940 VA
A TO B = 89 %
B = 2,620 VA
B TO C = 98 %
C = 2,680 VA
C TO A = 91 %

LOAD TYPE
E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	4,680	1.0	4,680	1.0	4,680
	REMAINING	–	1.0	–	0.5	–
LARGEST MOTORS (M)		–	1.0	–	1.25	–
REMAINING MOTORS (M)		–	1.0	–	1.0	–
EQUIPMENT (E)		3,560	1.0	3,560	1.0	3,560
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
	TOTAL	8,240		8,240		8,240

NEC DEMAND LOAD = 23 A
SPARE CAPACITY = 127 A 84.8 %
TOTAL AVAILABLE = 150 A

NOTES:

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- Panelboard L1H:

PANELB

MANUFACTURER AND TYPE: SQUARE D – NQOD
X NEW
EXISTING
BUS RATING = 225 AMPERES
AIC RATING = 10,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE

X NEUTRAL
X GROUND
MAIN CB RATING
X MLO
SURFACE

TVSS
ISO-GROUND
AMPERES
X RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	900	STUDIO 130, NO/EAST WALL GEN RCPT	1	20	1	A	2	20	1	STUDIO 130, NW FURNITURE CONNECTION	1600	R
R	1260	STUDIO 130, SO/WEST WALL GEN RCPT, SHADES	1	20	3	B	4	20	1	STUDIO 130, NW FURNITURE CONNECTION	1600	R
R	720	STUDIO 130, SO WALL AC RCPT	1	20	5	C	6	20	1	STUDIO 130, NW FURNITURE CONNECTION	1600	R
R	360	STUDIO 130, LECTURN FLOOR RCPT	1	20	7	A	8	20	1	STUDIO 130, NORTH FURNITURE CONNECTION	1600	R
E	960	STUDIO 130, N/SOUTH WALL VIDEO DISPLAYS	1	20	9	B	10	20	1	STUDIO 130, NORTH FURNITURE CONNECTION	1600	R
E	960	STUDIO 130, SOUTH WALL VIDEO DISPLAYS	1	20	11	C	12	20	1	STUDIO 130, NORTH FURNITURE CONNECTION	1600	R
E	300	STUDIO 130, WEST PROJECTOR	1	20	13	A	14	20	1	STUDIO 130, NORTH FURNITURE CONNECTION	1600	R
E	300	STUDIO 130, EAST PROJECTOR	1	20	15	B	16	20	1	STUDIO 130, NORTH FURNITURE CONNECTION	1600	R
E	1000	STUDIO 130, MOTORIZED SCREENS	1	20	17	C	18	20	1	STUDIO 130, NORTH FURNITURE CONNECTION	1600	R
E	960	STUDIO 130, NORTH WALL VIDEO DISPLAYS	1	20	19	A	20	20	1	STUDIO 130, NE FURNITURE CONNECTION	1600	R
E	960	STUDIO 130, NORTH WALL VIDEO DISPLAYS	1	20	21	B	22	20	1	STUDIO 130, NE FURNITURE CONNECTION	1600	R
		SPARE	1	20	23	C	24	20	1	STUDIO 130, NE FURNITURE CONNECTION	1600	R
		SPARE	1	20	25	A	26	20	1	STUDIO 130, SW FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130, SE FURNITURE CONNECTION	1	20	27	B	28	20	1	STUDIO 130, SW FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130, SE FURNITURE CONNECTION	1	20	29	C	30	20	1	STUDIO 130, SW FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130, SE FURNITURE CONNECTION	1	20	31	A	32	20	1	STUDIO 130, SW FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130, SE FURNITURE CONNECTION	1	20	33	B	34	20	1	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130 SOUTH FURNITURE CONNECTION	1	20	35	C	36	20	1	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130 SOUTH FURNITURE CONNECTION	1	20	37	A	38	20	1	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130 SOUTH FURNITURE CONNECTION	1	20	39	B	40	20	1	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	R
R	1600	STUDIO 130 SOUTH FURNITURE CONNECTION	1	20	41	C	42	20	1	SPARE		

CONNECTED LOAD

PHASE LOADING AND BALANCE	A =	16,920 VA
	A TO B =	87 %
	B =	19,480 VA
	B TO C =	88 %
	C =	17,080 VA
	C TO A =	99 %

LOAD TYPE

E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	10,000	1.0	10,000	1.0	10,000
	REMAINING	38,040	1.0	38,040	0.5	19,020
LARGEST MOTORS (M)		–	1.0	–	1.25	–
REMAINING MOTORS (M)		–	1.0	–	1.0	–
EQUIPMENT (E)		5,440	1.0	5,440	1.0	5,440
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
TOTAL (SECTIONS 1 AND 2)		53,480		53,480		34,460

NEC DEMAND LOAD = 96 A
SPARE CAPACITY = 129 A 57.5 %
TOTAL AVAILABLE = 225 A

NOTES:

SECOND FLOOR

- Panelboard L2A:

PANELBOARD: L2A

MANUFACTURER AND TYPE: SQUARE D – NQOD
X NEW
EXISTING
BUS RATING = 225 AMPERES
AIC RATING = 22,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE

X NEUTRAL
X GROUND
MAIN CB RATING
X MLO
X SURFACE

TVSS
ISO-GROUND
AMPERES
RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	720	OFFICE 201, RCPT	1	20	1	A	2	20	1	OFFICE 218, RCPT	1080	R
R	720	OFFICE 202, RCPT	1	20	3	B	4	20	1	OFFICE 219, RCPT	1080	R
R	720	OFFICE 203, RCPT	1	20	5	C	6	20	1	OFFICE 220, RCPT	1080	R
R	720	OFFICE 204, RCPT	1	20	7	A	8	20	1	BREAKOUT 221, RCPT	720	R
R	720	OFFICE 205, RCPT	1	20	9	B	10	20	1	BREAKOUT 221, FLOOR & VIDEO PANEL RCPT	660	R
R	720	BREAKOUT 206, RCPT	1	20	11	C	12	20	1	OFFICE 222, RCPT	1080	R
R	660	BREAKOUT 206, FLOOR & VIDEO PANEL RCPT	1	20	13	A	14	20	1	OFFICE 223, RCPT	1080	R
R	720	OFFICE 207, RCPT	1	20	15	B	16	20	1	OFFICE 224, RCPT	1080	R
R	900	OFFICE 208, RCPT	1	20	17	C	18	20	1	OFFICE 225, RCPT	1080	R
R	660	OFFICE 208, FLOOR & VIDEO PANEL RCPT	1	20	19	A	20	20	1	OFFICE 226, RCPT	1080	R
R	720	OFFICE 210, RCPT	1	20	21	B	22	20	1	OFFICE 227, RCPT	1080	R
E	500	OFFICE 211, PRINTER	1	20	23	C	24	20	1	OFFICE 228, RCPT	1080	R
R	540	CASE ADMIN SUPPORT 212, RCPT	1	20	25	A	26	20	1	SPARE		
E	1200	CASE ADMIN SUPPORT 212, COPIER	1	20	27	B	28	20	1	SPARE		
K	500	CASE ADMIN SUPPORT 212, UC REFR	1	20	29	C	30	20	1	SPARE		
K	1600	CASE ADMIN SUPPORT 212, COFFEE	1	20	31	A	32	20	1	SPARE		
R	720	OFFICE 213, RCPT	1	20	33	B	34	20	1	SPARE		
R	720	OFFICE 214, RCPT	1	20	35	C	36	20	1	KITCHENETTE, UC REFR	500	K
R	720	OFFICE 215, RCPT	1	20	37	A	38	20	1	KITCHENETTE, MICROWAVE	800	K
R	720	OFFICE 216, RCPT	1	20	39	B	40	20	1	KITCHENETTE, S WALL AC RCPT (COFFEE)	1600	K
R	1080	OFFICE 217, RCPT	1	20	41	C	42	20	1	KITCHENETTE, GD-1	1660	K
R	900	CORRIDOR C-210, EAST RCPT	1	20	43	A	44	20	1	PHYSICS CONF ROOM 282, XX FLOOR RCPT	720	R
R	1080	CORRIDOR C-210 WEST, C-270, RCPT	1	20	45	B	46	20	1	PHYSICS CONF ROOM 282, WEST FLOOR RCPT	720	R
R	180	EAST TERRACE, RCPT	1	20	47	C	48	20	1	PHYSICS CONF ROOM 282, EAST FLOOR RCPT	720	R
R	900	MEN'S 278, WOMEN'S 279, JAN 283-A, RCPT	1	20	49	A	50	20	1	PHYSICS CONF ROOM 282, XX RACK	600	E
M	480	CORRIDOR C-285, EWC-1	1	20	51	B	52	20	1	PHYSICS CONF ROOM 282, VIDEO DISPLAYS	600	E
E	1200	VEND 280, VENDING MACHINE	1	20	53	C	54	20	1	PHYSICS CONF ROOM 282, GEN RCPT, SHADES	900	R
E	1200	VEND 280, VENDING MACHINE	1	20	55	A	56	20	1	PHYSICS CONF ROOM 282, GEN RCPT	720	R
R	1080	CORRIDOR C280, C-282, C-285, RCPT	1	20	57	B	58	20	1	TEACH LAB STOR 284, RCPT	360	R
R	720	BREAKOUT 281, RCPT, SHADES	1	20	59	C	60	20	1	SPARE		
R	1080	PHYS GRAD OFFICE 286, RCPT	1	20	61	A	62	20	1	SPARE		
R	1080	PHYS GRAD OFFICE 286, RCPT	1	20	63	B	64	30	1	ELEC 277, FCU-201	2020	M
R	360	PHYS GRAD OFFICE 286, RCPT	1	20	65	C	66	20	1	ELEC 277, SVC WEST C-275, GEN RCPT	360	R
		SPARE	1	20	67	A	68	20	1	CORR C-285, BF-1	600	M
		SPARE	1	20	69	B	70	20	1	DATA 276, GEN RCPT	1080	R
		SPARE	1	20	71	C	72	30	1	DATA 276, L5-30R RCPT	2500	E
		SPACE			73	A	74			SPACE		
		SPACE			75	B	76			SPACE		
		SPACE			77	C	78			SPACE		
		SPACE			79	A	80			SPACE		
		SPACE			81	B	82			SPACE		
		SPACE			83	C	84			SPACE		
		UNUSABLE	X	X	X	A	X	X	3	(F) PANELBOARD L2A1		P
		UNUSABLE	X	X	X	B	X	X		FEED		
		UNUSABLE	X	X	X	C	X	X		THROUGH		

CONNECTED LOAD

PHASE LOADING AND BALANCE	A =	17,000 VA
	A TO B =	87 %
	B =	19,520 VA
	B TO C =	95 %
	C =	18,560 VA
	C TO A =	92 %

LOAD TYPE

E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	10,000	1.0	10,000	1.0	10,000
	REMAINING	27,620	1.0	27,620	0.5	13,810
LARGEST MOTORS (M)		2,020	1.0	2,020	1.25	2,525
REMAINING MOTORS (M)		1,080	1.0	1,080	1.0	1,080
EQUIPMENT (E)		7,700	1.0	7,700	1.0	7,700
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		6,660	1.0	6,660	0.65	4,329
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
TOTAL (SECTIONS 1 AND 2)		55,080		55,080		39,444

NEC DEMAND LOAD = 109 A
SPARE CAPACITY = 116 A 51.3 %
TOTAL AVAILABLE = 225 A

NOTES:

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- Panelboard L2B:

PANELBOARD: L2B

MANUFACTURER AND TYPE: SQUARE D – NQOD | X NEUTRAL 200% | TVSS
X NEW | X GROUND | ISO-GROUND
EXISTING | MAIN CB | RATING | AMPERES
BUS RATING = 225 AMPERES | X MLO
A/C RATING = 10,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE | SURFACE | X RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	540	LAB 298, S. WALL WIREWAY RCPT	1	20	1	A	2	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
R	540	LAB 298, E. WALL WIREWAY RCPT	1	20	3	B	4	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
R	540	LAB 298, S. WALL WIREWAY RCPT	1	20	5	C	6	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
R	720	LAB 298, W. WALL RCPT	1	20	7	A	8	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
R	500	LAB 298, E. WALL RCPT, WINDOW SHADES	1	20	9	B	10	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
M	500	LAB 298, SOUTH SCREEN	1	20	11	C	12	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
M	500	LAB 298, NORTH SCREEN	1	20	13	A	14	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
E	300	LAB 298, SOUTH PROJECTOR	1	20	15	B	16	20	1	LAB 298, FLR RCPT, NORTH ROW	1080	R
E	300	LAB 298, NORTH PROJECTOR	1	20	17	C	18	20	1	LAB 298, LECTERN FLR RCPT	360	R
R	1080	LAB 298, FLR RCPT, SOUTH ROW	1	20	19	A	20	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	R
R	1080	LAB 298, FLR RCPT, SOUTH ROW	1	20	21	B	22	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	R
R	1080	LAB 298, FLR RCPT, SOUTH ROW	1	20	23	C	24	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	R
R	1080	LAB 298, FLR RCPT, SOUTH ROW	1	20	25	A	26	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	R
		SPARE	1	20	27	B	28	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	R
M	1600	FCU-201	1	20	29	C	30	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	[illegible]
		SPARE	1	20	31	A	32	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	R
		SPARE	1	20	33	B	34	20	1	LAB 298, FLR RCPT, CENTER ROW	1080	R
		SPARE	1	20	35	C	36	20	1	LAB 298, FLR RCPT, SOUTH ROW	1080	R
		SPARE	1	20	37	A	38	20	1	LAB 298, FLR RCPT, SOUTH ROW	1080	R
		SPARE	1	20	39	B	40	20	1	LAB 298, FLR RCPT, SOUTH ROW	1080	R
		SPARE	1	20	41	C	42	20	1	LAB 298, FLR RCPT, SOUTH ROW	1080	R
		SPACE	✓		43	A	44			SPACE		
		SPACE			45	B	46			SPACE		
		SPACE			47	C	48			SPACE		
		SPACE			49	A	50			SPACE		
		SPACE			51	B	52			SPACE		
		SPACE			53	C	54			SPACE		

PHASE LOADING AND BALANCE — CONNECTED LOAD:
A = 11,480 VA; A TO B = 87 %
B = 10,040 VA; B TO C = 92 %
C = 10,860 VA; C TO A = 95 %

LOAD TYPE: E = EQUIPMENT; H = HEATING; K = KITCHEN EQUIPMENT; L = LIGHTING; M = MOTOR; P = PANELBOARD; R = RECEPTACLE; T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	10,000	1.0	10,000	1.0	10,000
	REMAINING	18,100	1.0	18,100	0.5	9050
LARGEST MOTORS (M)		1,600	1.0	1,600	1.25	2,000
REMAINING MOTORS (M)		2,080	1.0	2,080	1.0	2,080
EQUIPMENT (E)		600	1.0	600	1.0	600
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		–	1.0	–	1.00	–
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
	TOTAL	32,380		32,380		23,730

NEC DEMAND LOAD = 66 A
SPARE CAPACITY = 59 A 47.3 %
TOTAL AVAILABLE = 125 A

NOTES: 1. FOR ELECTRONICS BENCH INTEGRAL RECEPTACLES.
2. REDUCE TO 100% NEUTRAL BUSSING IF ALTERNATE ACCEPTED.

THIRD FLOOR

- Panelboard L3A1:

PANELBOARD: L3A1

MANUFACTURER AND TYPE: SQUARE D – NQOD | X NEUTRAL | TVSS
X NEW | X GROUND | ISO-GROUND
EXISTING | MAIN CB | RATING | AMPERES
BUS RATING = 225 AMPERES | X MLO
A/C RATING = 22,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE | X SURFACE | RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	720	OFFICE 301, RCPT	1	20	1	A	2	20	1	OFFICE 320, RCPT	720	R
R	720	OFFICE 302, RCPT	1	20	3	B	4	20	1	OFFICE 321, RCPT	720	R
R	720	OFFICE 303, RCPT	1	20	5	C	6	20	1	OFFICE 322, RCPT	720	R
R	720	OFFICE 304, RCPT	1	20	7	A	8	20	1	OFFICE 323, RCPT	720	R
R	720	OFFICE 305, RCPT	1	20	9	B	10	20	1	OFFICE 324, RCPT	720	R
R	720	BREAKOUT 306, RCPT	1	20	11	C	12	20	1	OFFICE 325, RCPT	720	R
R	960	BREAKOUT 306, FLOOR & VIDEO PANEL RCPT	1	20	13	A	14	20	1	OFFICE 326, RCPT	720	R
R	720	OFFICE 307, RCPT	1	20	15	B	16	20	1	OFFICE 327, RCPT	720	R
R	720	OFFICE 308, RCPT	1	20	17	C	18	20	1	OFFICE 328, RCPT	720	R
R	720	OFFICE 309, RCPT	1	20	19	A	20	20	1	GRAD OFC 338, E WALL RCPT	1080	R
R	720	OFFICE 310, RCPT	1	20	21	B	22	20	1	GRAD OFC 335, S WALL RCPT	1080	R
R	720	OFFICE 311, RCPT	1	20	23	C	24	20	1	GRAD OFC 335, W WALL RCPT	720	R
R	720	OFFICE 312, RCPT	1	20	25	A	26	20	1	GRAD OFC 335, FLOOR RCPT	360	R
R	720	OFFICE 313, RCPT	1	20	27	B	28	20	1	GRAD OFC 338, 345, GEN RCPT	900	R
R	720	OFFICE 314, RCPT	1	20	29	C	30	20	1	GRAD OFC 345, E WALL RCPT	1080	R
R	720	OFFICE 315, RCPT	1	20	31	A	32	20	1	GRAD OFC 345, E & W WALL RCPT	1080	R
R	960	BREAKOUT 316, RCPT	1	20	33	B	34	20	1	GRAD OFC 345, W WALL RCPT	720	R
R	720	BREAKOUT 316, FLOOR & VIDEO PANEL RCPT	1	20	35	C	36	20	1	GRAD OFC 347, 349, GEN RCPT	1080	R
R	720	OFFICE 317, RCPT	1	20	37	A	38	20	1	GRAD OFC 347, E WALL RCPT	1080	R
R	720	OFFICE 318, RCPT	1	20	39	B	40	20	1	GRAD OFC 347, E & W WALL RCPT	1080	R
R	720	OFFICE 319, RCPT	1	20	41	C	42	20	1	GRAD OFC 347, W WALL RCPT	720	R

TYP	VA	LOAD DESCRIPTION	P	CB	CCT	PH	CCT	CB	P	LOAD DESCRIPTION	VA	TYP
R	720	CORR C-310, EAST RCPT	1	20	43	A	44	20	1	SPARE		
R	1080	CORR C-310, WEST RCPT, C-370 RCPT	1	20	45	B	46	20	1	SPARE		
R	900	LOUNGE 330, GEN RCPT	1	20	47	C	48	20	1	SPARE		
K	1660	LOUNGE 330, GD-1	1	20	49	A	50	20	1	SPARE		
K	1600	LOUNGE 330, COFFEE RCPT	1	20	51	B	52	20	1	SPARE		
K	1200	LOUNGE 330, DISHWASHER	1	20	53	C	54	20	1	SPARE		
K	800	LOUNGE 330, MICROWAVE	1	20	55	A	56	20	1	SPARE		
K	500	LOUNGE 330, UC REFR	1	20	57	B	58	20	1	SPARE		
		SPARE	1	20	59	C	60	20	1	SPARE		
R	1080	GRAD OFC 348, E WALL RCPT	1	20	61	A	62	20	1	SPARE		
R	1080	GRAD OFC 348, E & W WALL RCPT	1	20	63	B	64	20	1	SPARE		
R	720	GRAD OFC 349, W WALL RCPT	1	20	65	C	66	20	1	SPARE		
R	1080	GRAD OFC 357, E WALL RCPT	1	20	67	A	68	30	1	ELEC 377, FCU-301	2020	M
R	1080	GRAD OFC 357, E & W WALL RCPT	1	20	69	B	70	30	1	DATA 376, GEN RCPT	1080	R
R	1080	GRAD OFC 357, W WALL RCPT	1	20	71	C	72	30	1	DATA 376, L5-30R RCPT	2500	E
R	720	GRAD OFC 357, W WALL, GEN RCPT	1	20	73	A	74			SPACE		
R	1080	GRAD OFC 359, E WALL RCPT	1	20	75	B	76			SPACE		
R	1080	GRAD OFC 359, E & W WALL RCPT	1	20	77	C	78			SPACE		
R	1080	GRAD OFC 359, W WALL RCPT	1	20	79	A	80			SPACE		
R	720	GRAD OFC 359, W WALL, GEN RCPT	1	20	81	B	82			SPACE		
		SPARE	1	20	83	C	84			SPACE		

PHASE LOADING AND BALANCE — CONNECTED LOAD:
A = 19,900 VA; A TO B = 96 %
B = 19,140 VA; B TO C = 96 %
C = 18,280 VA; C TO A = 92 %

LOAD TYPE: E = EQUIPMENT; H = HEATING; K = KITCHEN EQUIPMENT; L = LIGHTING; M = MOTOR; P = PANELBOARD; R = RECEPTACLE; T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	10,000	1.0	10,000	1.0	10,000
	REMAINING	37,040	1.0	37,040	0.5	18,520
LARGEST MOTORS (M)		2,020	1.0	2,020	1.25	2,525
REMAINING MOTORS (M)		–	1.0	–	1.0	–
EQUIPMENT (E)		2,500	1.0	2,500	1.0	2,500
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		5,760	1.0	5,760	0.70	4,032
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
	TOTAL (SECTIONS 1 AND 2)	57,320		57,320		37,577

NEC DEMAND LOAD = 104 A
SPARE CAPACITY = 121 A 53.6 %
TOTAL AVAILABLE = 225 A

NOTES:

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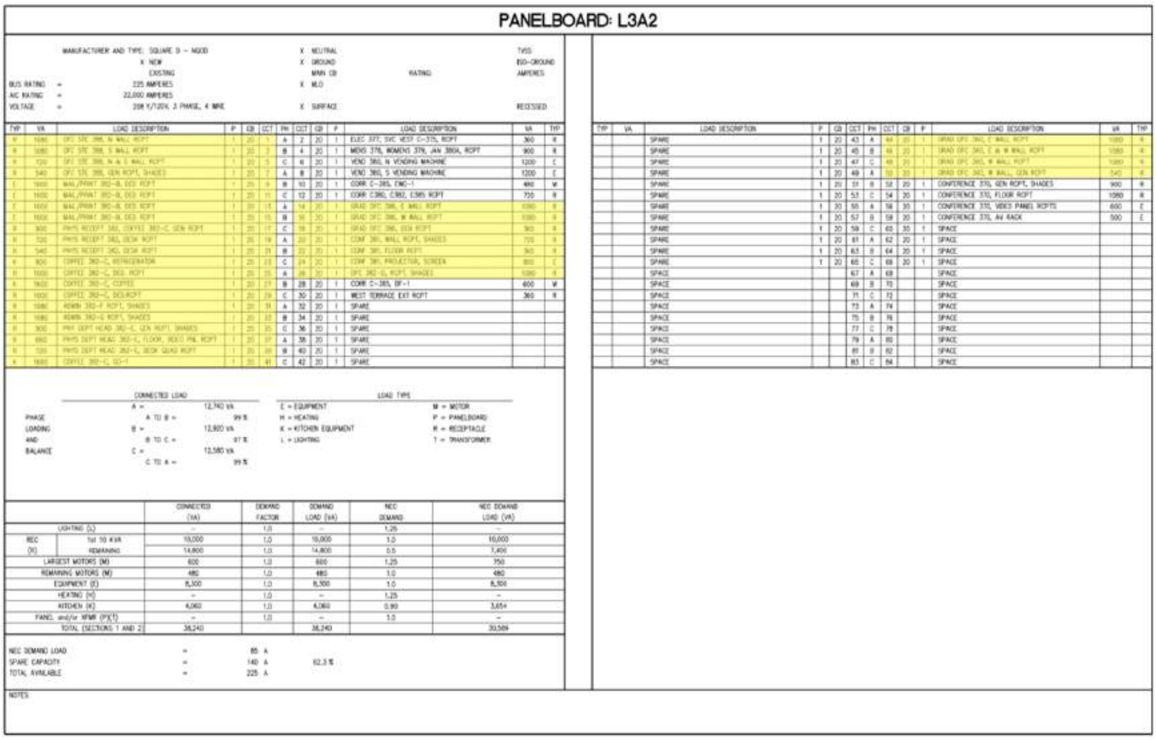
- Panelboard L3A2:



PANELBOARD: L3A2

MANUFACTURER AND TYPE: SQUARE D – NQOD
X NEW
EXISTING
BUS RATING = 225 AMPERES
A/C RATING = 22,000 AMPERES
VOLTAGE = 208 Y/120V, 3 PHASE, 4 WIRE
X NEUTRAL
X GROUND
MAIN CB RATING
X MLO
X SURFACE
TVSS
ISO-GROUND
AMPERES
RECESSED

TYP	VA	LOAD DESCRIPTION	P	CB	CKT	PH	CKT	CB	P	LOAD DESCRIPTION	VA	TYP
R	1080	OFC STE 388, N WALL RCPT	1	20	1	A	2	20	1	ELEC 377, SVC VEST C-375, RCPT	360	R
R	1080	OFC STE 388, S WALL RCPT	1	20	3	B	4	20	1	MENS 378, WOMENS 379, JAN 380A, RCPT	900	R
R	720	OFC STE 388, N & S WALL RCPT	1	20	5	C	6	20	1	VEND 380, N VENDING MACHINE	1200	E
R	540	OFC STE 388, GEN RCPT, SHADES	1	20	7	A	8	20	1	VEND 380, S VENDING MACHINE	1200	E
E	1600	MAIL/PRINT 382-B, DED RCPT	1	20	9	B	10	20	1	CORR C-385, EWC-1	480	M
E	1600	MAIL/PRINT 382-B, DED RCPT	1	20	11	C	12	20	1	CORR C380, C382, C385 RCPT	720	R
E	1600	[illegible]	1	20	13	A	14	20	1	GRAD OFC 386, E WALL RCPT	1080	R
E	1600	[illegible]	1	20	15	B	16	20	1	GRAD OFC 386, W WALL RCPT	1080	R
R	900	PHYS RECEPT 382, COFFEE 382-C, GEN RCPT	1	20	17	C	18	20	1	GRAD OFC 386, GEN RCPT	360	R
R	720	PHYS RECEPT 382, DESK RCPT	1	20	19	A	20	20	1	CONF 381, WALL RCPT, SHADES	720	R
R	540	PHYS RECEPT 382, DESK RCPT	1	20	21	B	22	20	1	CONF 381, FLOOR RCPT	360	R
K	900	COFFEE 382-C, REFRIGERATOR	1	20	23	C	24	20	1	CONF 381, PROJECTOR, SCREEN	800	E
R	1000	COFFEE 382-C, DED RCPT	1	20	25	A	26	20	1	OFC 382-D, RCPT, SHADES	1080	R
K	1600	COFFEE 382-C, COFFEE	1	20	27	B	28	20	1	CORR C-385, EF-1	600	M
R	1000	COFFEE 382-C, DED RCPT	1	20	29	C	30	20	1	WEST TERRACE EXT RCPT	360	R
R	1080	ADMIN 382-F RCPT, SHADES	1	20	31	A	32	20	1	SPARE		
R	1080	ADMIN 382-G RCPT, SHADES	1	20	33	B	34	20	1	SPARE		
R	900	PHY DEPT HEAD 382-E, GEN RCPT, SHADES	1	20	35	C	36	20	1	SPARE		
R	660	PHYS DEPT HEAD 382-E, FLOOR, VIDEO PNL RCPT	1	20	37	A	38	20	1	SPARE		
R	720	PHYS DEPT HEAD 382-E, DESK QUAD RCPT	1	20	39	B	40	20	1	SPARE		
K	1600	COFFEE 382-C, DD-1	1	20	41	C	42	20	1	SPARE		

TYP	VA	LOAD DESCRIPTION	P	CB	CKT	PH	CKT	CB	P	LOAD DESCRIPTION	VA	TYP
		SPARE	1	20	43	A	44	20	1	GRAD OFC 383, E WALL RCPT	1080	R
		SPARE	1	20	45	B	46	20	1	GRAD OFC 383, E & W WALL RCPT	1080	R
		SPARE	1	20	47	C	48	20	1	GRAD OFC 383, W WALL RCPT	1080	R
		SPARE	1	20	49	A	50	20	1	GRAD OFC 383, W WALL, GEN RCPT	540	R
		SPARE	1	20	51	B	52	20	1	CONFERENCE 370, GEN RCPT, SHADES	900	R
		SPARE	1	20	53	C	54	20	1	CONFERENCE 370, FLOOR RCPT	1080	R
		SPARE	1	20	55	A	56	20	1	CONFERENCE 370, VIDEO PANEL RCPTS	600	E
		SPARE	1	20	57	B	58	20	1	CONFERENCE 370, AV RACK	500	E
		SPARE	1	20	59	C	60	20	1	SPACE		
		SPARE	1	20	61	A	62	20	1	SPACE		
		SPARE	1	20	63	B	64	20	1	SPACE		
		SPARE	1	20	65	C	66	20	1	SPACE		
		SPACE			67	A	68			SPACE		
		SPACE			69	B	70			SPACE		
		SPACE			71	C	72			SPACE		
		SPACE			73	A	74			SPACE		
		SPACE			75	B	76			SPACE		
		SPACE			77	C	78			SPACE		
		SPACE			79	A	80			SPACE		
		SPACE			81	B	82			SPACE		
		SPACE			83	C	84			SPACE		

CONNECTED LOAD
PHASE LOADING AND BALANCE
A = 12,740 VA
A TO B = 99 %
B = 12,920 VA
B TO C = 97 %
C = 12,580 VA
C TO A = 99 %

LOAD TYPE
E = EQUIPMENT
H = HEATING
K = KITCHEN EQUIPMENT
L = LIGHTING
M = MOTOR
P = PANELBOARD
R = RECEPTACLE
T = TRANSFORMER

		CONNECTED (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	NEC DEMAND	NEC DEMAND LOAD (VA)
LIGHTING (L)		–	1.0	–	1.25	–
REC (R)	1st 10 KVA	10,000	1.0	10,000	1.0	10,000
	REMAINING	14,800	1.0	14,800	0.5	7,400
LARGEST MOTORS (M)		600	1.0	600	1.25	750
REMAINING MOTORS (M)		480	1.0	480	1.0	480
EQUIPMENT (E)		8,300	1.0	8,300	1.0	8,300
HEATING (H)		–	1.0	–	1.25	–
KITCHEN (K)		4,060	1.0	4,060	0.90	3,654
PANEL and/or XFMR (P)(T)		–	1.0	–	1.0	–
TOTAL (SECTIONS 1 AND 2)		38,240		38,240		30,584

NEC DEMAND LOAD = 85 A
SPARE CAPACITY = 140 A 62.3 %
TOTAL AVAILABLE = 225 A

NOTES:

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APPENDIX I.4 – SOLAR EQUATIONS AND IAC INDECES

Table 14 Solar Equations

Solar Angles

All angles are in degrees. The solar azimuth ϕ and the surface azimuth ψ are measured in degrees from south; angles to the east of south are negative, and angles to the west of south are positive. Calculate solar altitude, azimuth, and surface incident angles as follows:

Apparent solar time AST, in decimal hours:

$$AST = LST + ET/60 + (LSM - LON)/15$$

Hour angle H, degrees:

$$H = 15(\text{hours of time from local solar noon}) = 15(AST - 12)$$

Solar altitude β:

$$\sin\beta = \cos L \cos\delta \cos H + \sin L \sin\delta$$

Solar azimuth ϕ:

$$\cos\phi = (\sin\beta \sin L - \sin\delta)/(\cos\beta \cos L)$$

Surface-solar azimuth γ:

$$\gamma = \phi - \psi$$

Incident angle θ:

$$\cos\phi = \cos\beta \cos\gamma \sin\Sigma + \sin\beta \cos\Sigma$$

where

ET = equation of time, decimal minutes
L = latitude
LON = local longitude, decimal degrees of arc
LSM = local standard time meridian, decimal degrees of arc
= 60° for Atlantic Standard Time
= 75° for Eastern Standard Time
= 90° for Central Standard Time
= 105° for Mountain Standard Time
= 120° for Pacific Standard Time
= 135° for Alaska Standard Time
= 150° for Hawaii-Aleutian Standard Time
LST = local standard time, decimal hours
δ = solar declination, °
ψ = surface azimuth, °
Σ = surface tilt from horizontal, horizontal = 0°

Values of ET and δ are given in Table 7 of Chapter 30 for the 21st day of each month.

Direct, Diffuse, and Total Solar Irradiance

Direct normal irradiance E_{DN}

If $\beta > 0$ $\quad E_{DN} = \left[\dfrac{A}{\exp(B/\sin\beta)}\right]CN$

Otherwise, $\quad E_{DN} = 0$

Surface direct irradiance E_D

If $\cos\theta > 0$ $\quad E_D = E_{DN}\cos\theta$

Otherwise, $\quad E_D = 0$

Ratio Y of sky diffuse on vertical surface to sky diffuse on horizontal surface

If $\cos\theta > -0.2$ $\quad Y = 0.55 + 0.437\cos\theta + 0.313\cos^2\theta$

Otherwise, $\quad Y = 0.45$

Diffuse irradiance E_d

Vertical surfaces $\quad E_d = CYE_{DN}$

Surfaces other than vertical $\quad E_d = CE_{DN}(1 + \cos\Sigma)/2$

Ground-reflected irradiance $\quad E_r = E_{DN}(C + \sin\beta)\rho_g(1 - \cos\Sigma)/2$

Total surface irradiance $\quad E_t = E_D + E_d + E_r$

where

A = apparent solar constant
B = atmospheric extinction coefficient
C = sky diffuse factor
CN = clearness number multiplier for clear/dry or hazy/humid locations. See Figure 5 in Chapter 32 of the 1999 *ASHRAE Handbook—Applications* for CN values.
E_d = diffuse sky irradiance
E_r = diffuse ground-reflected irradiance
ρ_g = ground reflectivity

Values of A, B, and C are given in Table 7 of Chapter 30 for the 21st day of each month. Values of ground reflectivity ρ_g are given in Table 10 of Chapter 30.

Table 7 Extraterrestrial Solar Irradiance and Related Data

	E_o, W/m²	Equation of Time, min	Declination, degrees	*A* W/m²	*B* (Dimensionless Ratios)	*C*
Jan	1416	−11.2	−20.0	1230	0.142	0.058
Feb	1401	−13.9	−10.8	1215	0.144	0.060
Mar	1381	−7.5	0.0	1186	0.156	0.071
Apr	1356	1.1	11.6	1136	0.180	0.097
May	1336	3.3	20.0	1104	0.196	0.121
June	1336	−1.4	23.45	1088	0.205	0.134
July	1336	−6.2	20.6	1085	0.207	0.136
Aug	1338	−2.4	12.3	1107	0.201	0.122
Sep	1359	7.5	0.0	1151	0.177	0.092
Oct	1380	15.4	−10.5	1192	0.160	0.073
Nov	1405	13.8	−19.8	1221	0.149	0.063
Dec	1417	1.6	−23.45	1233	0.142	0.057

Note: Data are for 21st day of each month during the base year of 1964.

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Fig. 10 Solar Angles for Vertical and Horizontal Surfaces

Table 9 Surface Orientations and Azimuths, Measured from South

Orientation	N	NE	E	SE	S	SW	W	NW
Surface azimuth ψ	180°	−135°	−90°	−45°	0	45°	90°	135°

Table 10 Solar Reflectances of Foreground Surfaces

	Incident Angle					
Foreground Surface	**20°**	**30°**	**40°**	**50°**	**60°**	**70°**
New concrete	0.31	0.31	0.32	0.32	0.33	0.34
Old concrete	0.22	0.22	0.22	0.23	0.23	0.25
Bright green grass	0.21	0.22	0.23	0.25	0.28	0.31
Crushed rock	0.20	0.20	0.20	0.20	0.20	0.20
Bitumen and gravel roof	0.14	014	0.14	0.14	0.14	0.14
Bituminous parking lot	0.09	0.09	0.10	0.10	0.11	0.12

Adapted from Threlkeld (1962)

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Table 13 Visible Transmittance (T_v), Solar Heat Gain Coefficient (SHGC), Solar Transmittance (T), Front Reflectance (R^f), Back Reflectance (R^b), and Layer Absorptances (A_n^f) for Glazing and Window Systems (*Continued*)

	Glazing System				Center-of-Glazing Properties: Incidence Angles							Total Window SHGC at Normal Incidence: Aluminum		Total Window SHGC at Normal Incidence: Other Frames		Total Window T_v at Normal Incidence: Aluminum		Total Window T_v at Normal Incidence: Other Frames	
ID	Glass Thick., mm		Center Glazing T_v		Normal 0.00	40.00	50.00	60.00	70.00	80.00	Hemis., Diffuse	Operable	Fixed	Operable	Fixed	Operable	Fixed	Operable	Fixed
1l	6	SS on CLR 20%	0.20	SHGC	0.31	0.30	0.30	0.28	0.24	0.16	0.28	0.28	0.29	0.24	0.27	0.17	0.18	0.15	0.17
				T	0.15	0.15	0.14	0.13	0.11	0.06	0.13								
				R^f	0.21	0.22	0.23	0.26	0.34	0.54	0.25								
				R^b	0.38	0.38	0.39	0.41	0.48	0.64	0.41								
				A_1^f	0.64	0.64	0.63	0.61	0.56	0.40	0.60								
1m	6	SS on GRN 14%	0.12	SHGC	0.25	0.25	0.24	0.23	0.21	0.14	0.23	0.23	0.24	0.19	0.22	0.10	0.11	0.09	0.10
				T	0.06	0.06	0.06	0.06	0.04	0.03	0.06								
				R^f	0.14	0.14	0.16	0.19	0.27	0.49	0.18								
				R^b	0.44	0.44	0.45	0.47	0.52	0.67	0.46								
				A_1^f	0.80	0.80	0.78	0.76	0.68	0.48	0.75								
1n	6	TI on CLR 20%	0.20	SHGC	0.29	0.29	0.28	0.27	0.23	0.15	0.27	0.27	0.27	0.22	0.26	0.17	0.18	0.15	0.17
				T	0.14	0.13	0.13	0.12	0.09	0.06	0.12								
				R^f	0.22	0.22	0.24	0.26	0.34	0.54	0.26								
				R^b	0.40	0.40	0.42	0.44	0.50	0.65	0.43								
				A_1^f	0.65	0.65	0.64	0.62	0.57	0.40	0.62								
1o	6	TI on CLR 30%	0.30	SHGC	0.39	0.38	0.37	0.35	0.30	0.20	0.35	0.35	0.36	0.30	0.34	0.26	0.27	0.22	0.26
				T	0.23	0.22	0.21	0.19	0.16	0.09	0.20								
				R^f	0.15	0.15	0.17	0.20	0.28	0.50	0.19								
				R^b	0.32	0.33	0.34	0.36	0.43	0.60	0.36								
				A_1^f	0.63	0.65	0.64	0.62	0.57	0.40	0.62								
Uncoated Double Glazing																			
5a	3	CLR CLR	0.81	SHGC	0.76	0.74	0.71	0.64	0.50	0.26	0.66	0.67	0.69	0.56	0.66	0.69	0.72	0.59	0.70
				T	0.70	0.68	0.65	0.58	0.44	0.21	0.60								
				R^f	0.13	0.14	0.16	0.23	0.36	0.61	0.21								
				R^b	0.13	0.14	0.16	0.23	0.36	0.61	0.21								
				A_1^f	0.10	0.11	0.11	0.12	0.13	0.13	0.11								
				A_2^f	0.07	0.08	0.08	0.08	0.07	0.05	0.07								
5b	6	CLR CLR	0.78	SHGC	0.70	0.67	0.64	0.58	0.45	0.23	0.60	0.61	0.63	0.52	0.61	0.66	0.69	0.57	0.68
				T	0.61	0.58	0.55	0.48	0.36	0.17	0.51								
				R^f	0.11	0.12	0.15	0.20	0.33	0.57	0.18								
				R^b	0.11	0.12	0.15	0.20	0.33	0.57	0.18								
				A_1^f	0.17	0.18	0.19	0.20	0.21	0.20	0.19								
				A_2^f	0.11	0.12	0.12	0.12	0.10	0.07	0.11								
5c	3	BRZ CLR	0.62	SHGC	0.62	0.60	0.57	0.51	0.39	0.20	0.53	0.55	0.57	0.46	0.54	0.53	0.55	0.45	0.54
				T	0.55	0.51	0.48	0.42	0.31	0.14	0.45								
				R^f	0.09	0.10	0.12	0.16	0.27	0.49	0.15								
				R^b	0.12	0.13	0.15	0.21	0.35	0.59	0.19								
				A_1^f	0.30	0.33	0.34	0.36	0.37	0.34	0.33								
				A_2^f	0.06	0.06	0.06	0.06	0.05	0.03	0.06								
5d	6	BRZ CLR	0.47	SHGC	0.49	0.46	0.44	0.39	0.31	0.17	0.41	0.44	0.46	0.37	0.43	0.40	0.42	0.35	0.41
				T	0.38	0.35	0.32	0.27	0.20	0.08	0.30								
				R^f	0.07	0.08	0.09	0.13	0.22	0.44	0.12								
				R^b	0.10	0.11	0.13	0.19	0.31	0.55	0.17								
				A_1^f	0.48	0.51	0.52	0.53	0.53	0.45	0.50								
				A_2^f	0.07	0.07	0.07	0.07	0.06	0.04	0.07								
5e	3	GRN CLR	0.75	SHGC	0.60	0.57	0.54	0.49	0.38	0.20	0.51	0.53	0.55	0.45	0.53	0.63	0.66	0.54	0.65
				T	0.52	0.49	0.46	0.40	0.30	0.13	0.43								
				R^f	0.09	0.10	0.12	0.16	0.27	0.50	0.15								
				R^b	0.12	0.13	0.15	0.21	0.35	0.60	0.19								
				A_1^f	0.34	0.37	0.38	0.39	0.39	0.35	0.37								
				A_2^f	0.05	0.05	0.05	0.04	0.04	0.03	0.04								
5f	6	GRN CLR	0.68	SHGC	0.49	0.46	0.44	0.39	0.31	0.17	0.41	0.43	0.45	0.37	0.43	0.57	0.60	0.49	0.59
				T	0.39	0.36	0.33	0.29	0.21	0.09	0.31								
				R^f	0.08	0.08	0.10	0.14	0.23	0.45	0.13								
				R^b	0.10	0.11	0.13	0.19	0.31	0.55	0.17								
				A_1^f	0.49	0.51	0.05	0.53	0.52	0.43	0.50								
				A_2^f	0.05	0.05	0.05	0.05	0.04	0.03	0.05								

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Table 4 U-Factors for Various Fenestration Products in W/(m^2·K)

Product Type	Glass Only		Vertical Installation									
			Operable (including sliding and swinging glass doors)					Fixed				
Frame Type / ID Glazing Type	Center of Glass	Edge of Glass	Aluminum Without Thermal Break	Aluminum With Thermal Break	Reinforced Vinyl/ Aluminum Clad Wood	Wood/ Vinyl	Insulated Fiberglass/ Vinyl	Aluminum Without Thermal Break	Aluminum With Thermal Break	Reinforced Vinyl/ Aluminum Clad Wood	Wood/ Vinyl	Insulated Fiberglass/ Vinyl
Single Glazing												
1 3.2 mm glass	*5.91*	*5.91*	7.24	6.12	5.14	5.05	4.61	6.42	6.07	5.55	5.55	5.35
2 6.4 mm acrylic/polycarbonate	*5.00*	*5.00*	6.49	5.43	4.51	4.42	4.01	5.60	5.25	4.75	4.75	4.58
3 3.2 mm acrylic/polycarbonate	*5.45*	*5.45*	6.87	5.77	4.82	4.73	4.31	6.01	5.66	5.15	5.15	4.97
Double Glazing												
4 6.4 mm air space	*3.12*	*3.63*	4.93	3.70	3.25	3.13	2.77	3.94	3.56	3.19	3.17	3.04
5 12.7 mm air space	*2.73*	*3.36*	4.62	3.42	3.00	2.87	2.53	3.61	3.22	2.86	2.84	2.72
6 6.4 mm argon space	*2.90*	*3.48*	4.75	3.54	3.11	2.98	2.63	3.75	3.37	3.00	2.98	2.85
7 12.7 mm argon space	*2.56*	*3.24*	4.49	3.30	2.89	2.76	2.42	3.47	3.08	2.73	2.70	2.58
Double Glazing, *e* = 0.60 on surface 2 or 3												
8 6.4 mm air space	*2.95*	*3.52*	4.80	3.58	3.14	3.02	2.67	3.80	3.41	3.05	3.03	2.90
9 12.7 mm air space	*2.50*	*3.20*	4.45	3.26	2.85	2.73	2.39	3.42	3.03	2.68	2.66	2.54
10 6.4 mm argon space	*2.67*	*3.32*	4.58	3.38	2.96	2.84	2.49	3.56	3.17	2.82	2.80	2.67
11 12.7 mm argon space	*2.33*	*3.08*	4.31	3.13	2.74	2.62	2.28	3.28	2.89	2.54	2.52	2.40
Double Glazing, *e* = 0.40 on surface 2 or 3												
12 6.4 mm air space	*2.78*	*3.40*	4.66	3.46	3.03	2.91	2.56	3.66	3.27	2.91	2.89	2.76
13 12.7 mm air space	*2.27*	*3.04*	4.27	3.09	2.70	2.58	2.25	3.23	2.84	2.49	2.47	2.35
14 6.4 mm argon space	*2.44*	*3.16*	4.40	3.21	2.81	2.69	2.35	3.37	2.98	2.63	2.61	2.49
15 12.7 mm argon space	*2.04*	*2.88*	4.09	2.93	2.55	2.43	2.10	3.04	2.65	2.31	2.29	2.17
Double Glazing, *e* = 0.20 on surface 2 or 3												
16 6.4 mm air space	*2.56*	*3.24*	4.49	3.30	2.89	2.76	2.42	3.47	3.08	2.73	2.70	2.58
17 12.7 mm air space	*1.99*	*2.83*	4.05	2.89	2.52	2.39	2.07	2.99	2.60	2.26	2.24	2.13
18 6.4 mm argon space	*2.16*	*2.96*	4.18	3.01	2.63	2.51	2.17	3.13	2.74	2.40	2.38	2.26
19 12.7 mm argon space	*1.70*	*2.62*	3.83	2.68	2.33	2.21	1.89	2.75	2.36	2.03	2.01	1.90
Double Glazing, *e* = 0.10 on surface 2 or 3												
20 6.4 mm air space	*2.39*	*3.12*	4.36	3.17	2.78	2.65	2.32	3.32	2.93	2.59	2.56	2.45
21 12.7 mm air space	*1.82*	*2.71*	3.92	2.77	2.41	2.28	1.96	2.84	2.45	2.12	2.10	1.99
22 6.4 mm argon space	*1.99*	*2.83*	4.05	2.89	2.52	2.39	2.07	2.99	2.60	2.26	2.24	2.13
23 12.7 mm argon space	*1.53*	*2.49*	3.70	2.56	2.22	2.10	1.79	2.60	2.21	1.89	1.86	1.76
Double Glazing, *e* = 0.05 on surface 2 or 3												
24 6.4 mm air space	*2.33*	*3.08*	4.31	3.13	2.74	2.62	2.28	3.28	2.89	2.54	2.52	2.40
25 12.7 mm air space	*1.70*	*2.62*	3.83	2.68	2.33	2.21	1.89	2.75	2.36	2.03	2.01	1.90
26 6.4 mm argon space	*1.87*	*2.75*	3.96	2.81	2.44	2.32	2.00	2.89	2.50	2.17	2.15	2.03
27 12.7 mm argon space	*1.42*	*2.41*	3.61	2.48	2.15	2.02	1.71	2.50	2.11	1.79	1.77	1.67
Triple Glazing												
28 6.4 mm air space	*2.16*	*2.96*	4.11	2.89	2.51	2.45	2.16	3.10	2.73	2.38	2.33	2.25
29 12.7 mm air space	*1.76*	*2.67*	3.80	2.60	2.25	2.19	1.91	2.76	2.39	2.05	2.01	1.93
30 6.4 mm argon space	*1.93*	*2.79*	3.94	2.73	2.36	2.30	2.01	2.90	2.54	2.19	2.15	2.07
31 12.7 mm argon space	*1.65*	*2.58*	3.71	2.52	2.17	2.12	1.84	2.66	2.30	1.96	1.91	1.84
Triple Glazing, *e* = 0.20 on surface 2,3,4, or 5												
32 6.4 mm air space	*1.87*	*2.75*	3.89	2.69	2.32	2.27	1.98	2.86	2.49	2.15	2.10	2.03
33 12.7 mm air space	*1.42*	*2.41*	3.54	2.36	2.02	1.97	1.70	2.47	2.10	1.77	1.73	1.66
34 6.4 mm argon space	*1.59*	*2.54*	3.67	2.48	2.13	2.08	1.80	2.61	2.25	1.91	1.87	1.80
35 12.7 mm argon space	*1.25*	*2.28*	3.40	2.23	1.91	1.86	1.59	2.32	1.96	1.63	1.59	1.52
Triple Glazing, *e* = 0.20 on surfaces 2 or 3 and 4 or 5												
36 6.4 mm air space	*1.65*	*2.58*	3.71	2.52	2.17	2.12	1.84	2.66	2.30	1.96	1.91	1.84
37 12.7 mm air space	*1.14*	*2.19*	3.31	2.15	1.84	1.78	1.52	2.23	1.86	1.54	1.49	1.43
38 6.4 mm argon space	*1.31*	*2.32*	3.45	2.27	1.95	1.90	1.62	2.37	2.01	1.68	1.63	1.56
39 12.7 mm argon space	*0.97*	*2.05*	3.18	2.03	1.72	1.67	1.41	2.08	1.71	1.39	1.35	1.29
Triple Glazing, *e* = 0.10 on surfaces 2 or 3 and 4 or 5												
40 6.4 mm air space	*1.53*	*2.49*	3.63	2.44	2.10	2.05	1.77	2.57	2.20	1.86	1.82	1.75
41 12.7 mm air space	*1.02*	*2.10*	3.22	2.07	1.76	1.71	1.45	2.13	1.76	1.44	1.40	1.33
42 6.4 mm argon space	*1.19*	*2.23*	3.36	2.19	1.87	1.82	1.55	2.27	1.91	1.58	1.54	1.47
43 12.7 mm argon space	*0.80*	*1.92*	3.05	1.90	1.61	1.56	1.30	1.93	1.57	1.25	1.21	1.15
Quadruple Glazing, *e* = 0.10 on surfaces 2 or 3 and 4 or 5												
44 6.4 mm air spaces	*1.25*	*2.28*	3.40	2.23	1.91	1.86	1.59	2.32	1.96	1.63	1.59	1.52
45 12.7 mm air spaces	*0.85*	*1.96*	3.09	1.94	1.65	1.60	1.34	1.98	1.62	1.30	1.26	1.19
46 6.4 mm argon spaces	*0.97*	*2.05*	3.18	2.03	1.72	1.67	1.41	2.08	1.71	1.39	1.35	1.29
47 12.7 mm argon spaces	*0.68*	*1.83*	2.96	1.82	1.54	1.48	1.23	1.84	1.47	1.16	1.11	1.05
48 6.4 mm krypton spaces	*0.68*	*1.83*	2.96	1.82	1.54	1.48	1.23	1.84	1.47	1.16	1.11	1.05

Notes:

1. All heat transmission coefficients in this table include film resistances and are based on winter conditions of −18°C outdoor air temperature and 21 °C indoor air temperature, with 6.7 m/s outdoor air velocity and zero solar flux. With the exception of single glazing, small changes in the indoor and outdoor temperatures will not significantly affect overall U-factors. The coefficients are for vertical position except skylight values, which are for 20° from horizontal with heat flow up.

2. Glazing layer surfaces are numbered from the outdoor to the indoor. Double, triple, and quadruple refer to the number of glazing panels. All data are based on 3 mm glass, unless otherwise noted. Thermal conductivities are: 0.917 W/(m·K) for glass, and 0.19 W/(m·K) for acrylic and polycarbonate.

3. Standard spacers are metal. Edge-of-glass effects assumed to extend over the 65 mm band around perimeter of each glazing unit.

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APPENDIX I.5 – CONDUCTIVE TIME FACTORS

Table 20 Wall Conduction Time Series (CTS)

	CURTAIN WALLS			STUD WALLS				EIFS			BRICK WALLS									
Wall Number =	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
U-factor, W/(m²·K)	0.428	0.429	0.428	0.419	0.417	0.406	0.413	0.668	0.305	0.524	0.571	0.377	0.283	0.581	0.348	0.628	0.702	0.514	0.581	0.389
Total *R*	2.3	2.3	2.3	2.4	2.4	2.5	2.4	1.5	3.3	1.9	1.7	2.7	3.5	1.7	2.9	1.6	1.4	1.9	1.7	2.6
Mass, kg/m²	31.0	20.9	80.0	25.5	84.6	25.6	66.7	36.6	38.3	130.9	214.1	214.7	215.8	290.6	304.0	371.7	391.5	469.3	892.2	665.1
Thermal Capacity, W/(m²·K)	8.5	5.4	19.0	7.0	20.5	9.3	17.1	10.2	10.6	33.2	49.2	49.3	49.7	66.6	70.6	89.1	86.7	108.0	218.4	161.5
Hour	**Conduction Time Factors, %**																			
0	18	25	8	19	6	7	5	11	2	1	0	0	0	1	2	2	1	3	4	3
1	58	57	45	59	42	44	41	50	25	2	5	4	1	1	2	2	1	3	4	3
2	20	15	32	18	33	32	34	26	31	6	14	13	7	2	2	2	3	3	4	3
3	4	3	11	3	13	12	13	9	20	9	17	17	12	5	3	4	6	3	4	4
4	0	0	3	1	4	4	4	3	11	9	15	15	13	8	5	5	7	3	4	4
5	0	0	1	0	1	1	2	1	5	9	12	12	13	9	6	6	8	4	4	4
6	0	0	0	0	1	0	1	0	3	8	9	9	11	9	7	6	8	4	4	5
7	0	0	0	0	0	0	0	0	2	7	7	7	9	9	7	7	8	5	4	5
8	0	0	0	0	0	0	0	0	1	6	5	5	7	8	7	7	8	5	4	5
9	0	0	0	0	0	0	0	0	0	6	4	4	6	7	7	6	7	5	4	5
10	0	0	0	0	0	0	0	0	0	5	3	3	5	7	6	6	6	5	4	5
11	0	0	0	0	0	0	0	0	0	5	2	2	4	6	6	6	6	5	5	5
12	0	0	0	0	0	0	0	0	0	4	2	2	3	5	5	5	5	5	5	5
13	0	0	0	0	0	0	0	0	0	4	1	2	2	4	5	5	4	5	5	5
14	0	0	0	0	0	0	0	0	0	3	1	2	2	4	5	5	4	5	5	5
15	0	0	0	0	0	0	0	0	0	3	1	1	1	3	4	4	3	5	4	4
16	0	0	0	0	0	0	0	0	0	3	1	1	1	3	4	4	3	5	4	4
17	0	0	0	0	0	0	0	0	0	2	1	1	1	2	3	4	3	4	4	4
18	0	0	0	0	0	0	0	0	0	2	0	0	1	2	3	3	2	4	4	4
19	0	0	0	0	0	0	0	0	0	2	0	0	1	2	3	3	2	4	4	4
20	0	0	0	0	0	0	0	0	0	2	0	0	0	1	3	3	2	4	4	4
21	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	2	1	4	4	4
22	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	2	1	4	4	3
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3	4	3
Total Percentage	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Layer ID from outside to inside (see Table 22)	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01	F01
	F09	F08	F10	F08	F10	F11	F07	F06	F06	F06	M01	M01	M01	M01	M01	M01	M01	M01	M01	M01
	F04	F04	F04	G03	G03	G02	G03	I01	I01	I01	F04	F04	F04	F04	F04	F04	F04	F04	F04	F04
	I02	I02	I02	I04	I04	I04	I04	G03	G03	G03	I01	G03	I01	I01	M03	I01	I01	I01	I01	M15
	F04	F04	F04	G01	G01	G04	G01	F04	I04	M03	G03	I04	G03	M03	I04	M05	M01	M13	M16	I04
	G01	G01	G01	F02	F02	F02	F02	G01	G01	F04	F04	G01	I04	F02	G01	G01	F02	F04	F04	G01
	F02	F02	F02	0	0	0	0	F02	F02	G01	G01	F02	G01	0	F02	F02	0	G01	G01	F02
	0	0	0	0	0	0	0	0	0	F02	F02	0	F02	0	0	0	0	F02	F02	0

Wall Number Descriptions

1. Spandrel glass, insulation board, gyp board
2. Metal wall panel, insulation board, gyp board
3. 25 mm stone, insulation board, gyp board
4. Metal wall panel, sheathing, batt insulation, gyp board
5. 25 mm stone, sheathing, batt insulation, gyp board
6. Wood siding, sheathing, batt insulation, 13 mm wood
7. 25 mm stucco, sheathing, batt insulation, gyp board
8. EIFS finish, insulation board, sheathing, gyp board
9. EIFS finish, insulation board, sheathing, batt insulation, gyp board
10. EIFS finish, insulation board, sheathing, 200 mm LW CMU, gyp board
11. Brick, insulation board, sheathing, gyp board
12. Brick, sheathing, batt insulation, gyp board
13. Brick, insulation board, sheathing, batt insulation, gyp board
14. Brick, insulation board, 200 mm LW CMU
15. Brick, 200 mm LW CMU, batt insulation, gyp board
16. Brick, insulation board, 200 mm HW CMU, gyp board
17. Brick, insulation board, brick
18. Brick, insulation board, 200 mm LW concrete, gyp board
19. Brick, insulation board, 300 mm HW concrete, gyp board
20. Brick, 200 mm HW concrete, batt insulation, gyp board

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APPENDIX I.6 – RADIANT TIME FACTORS

Table 24 Representative Nonsolar RTS Values for Light to Heavy Construction

	Light						Medium						Heavy						Interior Zones					
	With Carpet			No Carpet			With Carpet			No Carpet			With Carpet			No Carpet			Light		Medium		Heavy	
% Glass	10%	50%	90%	10%	50%	90%	10%	50%	90%	10%	50%	90%	10%	50%	90%	10%	50%	90%	With Carpet	No Carpet	With Carpet	No Carpet	With Carpet	No Carpet
Hour	Radiant Time Factor, %																							
0	47	50	53	41	43	46	46	49	52	31	33	35	34	38	42	22	25	28	46	40	46	31	33	21
1	19	18	17	20	19	19	18	17	16	17	16	15	9	9	9	10	9	9	19	20	18	17	9	9
2	11	10	9	12	11	11	10	9	8	11	10	10	6	6	5	6	6	6	11	12	10	11	6	6
3	6	6	5	8	7	7	6	5	5	8	7	7	4	4	4	5	5	5	6	8	6	8	5	5
4	4	4	3	5	5	5	4	3	3	6	5	5	4	4	4	5	5	4	4	5	3	6	4	5
5	3	3	2	4	3	3	2	2	2	4	4	4	4	3	3	4	4	4	3	4	2	4	4	4
6	2	2	2	3	3	2	2	2	2	4	3	3	3	3	3	4	4	4	2	3	2	4	3	4
7	2	1	1	2	2	2	1	1	1	3	3	3	3	3	3	4	4	4	2	2	1	3	3	4
8	1	1	1	1	1	1	1	1	1	3	2	2	3	3	3	4	3	3	1	1	1	3	3	4
9	1	1	1	1	1	1	1	1	1	2	2	2	3	3	2	3	3	3	1	1	1	2	3	3
10	1	1	1	1	1	1	1	1	1	2	2	2	3	2	2	3	3	3	1	1	1	2	3	3
11	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	1	1	1	2	2	3
12	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3	3	1	1	1	1	2	3
13	1	1	1	0	1	0	1	1	1	1	1	1	2	2	2	3	3	2	1	1	1	1	2	3
14	0	0	1	0	1	0	1	1	1	1	1	1	2	2	2	3	2	2	1	0	1	1	2	3
15	0	0	1	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	0	0	1	1	2	3
16	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	0	0	1	1	2	3
17	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	0	0	1	1	2	2
18	0	0	0	0	0	0	1	1	1	1	1	1	2	2	1	2	2	2	0	0	1	1	2	2
19	0	0	0	0	0	0	0	1	0	0	1	1	2	2	1	2	2	2	0	0	1	0	2	2
20	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	2	2	2	0	0	0	0	2	2
21	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	2	2	2	0	0	0	0	2	2
22	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	2	2	2	0	0	0	0	1	2
23	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	1	0	0	0	0	1	2
	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 25 Representative Solar RTS Values for Light to Heavy Construction

	Light						Medium						Heavy					
	With Carpet			No Carpet			With Carpet			No Carpet			With Carpet			No Carpet		
% Glass	10%	50%	90%	10%	50%	90%	10%	50%	90%	10%	50%	90%	10%	50%	90%	10%	50%	90%
Hour	Radiant Time Factor, %																	
0	53	55	56	44	45	46	52	54	55	28	29	29	47	49	51	26	27	28
1	17	17	17	19	20	20	16	16	15	15	15	15	11	12	12	12	13	13
2	9	9	9	11	11	11	8	8	8	10	10	10	6	6	6	7	7	7
3	5	5	5	7	7	7	5	4	4	7	7	7	4	4	3	5	5	5
4	3	3	3	5	5	5	3	3	3	6	6	6	3	3	3	4	4	4
5	2	2	2	3	3	3	2	2	2	5	5	5	2	2	2	4	4	4
6	2	2	2	3	2	2	2	1	1	4	4	4	2	2	2	3	3	3
7	1	1	1	2	2	2	1	1	1	4	3	3	2	2	2	3	3	3
8	1	1	1	1	1	1	1	1	1	3	3	3	2	2	2	3	3	3
9	1	1	1	1	1	1	1	1	1	3	3	3	2	2	2	3	3	3
10	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3
11	1	1	1	1	1	1	1	1	1	2	2	2	2	2	1	3	3	2
12	1	1	1	1	1	0	1	1	1	2	2	2	2	1	1	2	2	2
13	1	1	0	1	0	0	1	1	1	2	2	2	2	1	1	2	2	2
14	1	0	0	0	0	0	1	1	1	1	1	1	2	1	1	2	2	2
15	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2
16	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2
17	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2
18	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2
19	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2
20	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	2	2	2
21	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	2
22	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1
23	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1
	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

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APPENDICES LC – LOAD CALCULATIONS

APPENDIX LC.1 – PEOPLE LOAD CALCULATIONS

FLOOR	ROOM NAME	ROOM NUMBER	ROOM TYPE	AREA [ft2]	OCCUPANT LOAD FACTOR	TOTAL OCCUPANT LOAD	TOTAL OCCUPANT LOAD USED	PRIMARY STATE	TOTAL HEAT PER PERSON [W]	SENSIBLE HEAT PER PERSON [W]	WORST CASE SCENARIO ENERGY [W]	TOTAL
FIRST	PHYSICS STUDENT LOUNGE	188	LOUNGE	558	0.066667	37.20	40	Standing, light work; walking	160	75	3000	29015
	C.A.S.E. STORAGE A	187	STORAGE	106	0.003333	0.35	1	Seated, very light work	130	70	70	
	PHYSICS COMPUTER LAB	182	COMPUTER LAB	1146	0.050000	57.30	58	Moderately actieve office work	140	75	4350	
	STUDENT CLUB SPACE	149	LOUNGE	403	0.020000	8.06	10	Standing, light work; walking	160	75	750	
	ACTIVE LEARNING STUDIO	150	CONFERENCE ROOM	1453	0.020000	29.06	73	Moderately actieve office work	140	75	5475	
	ACTIVE LEARNING STUDIO	140	CONFERENCE ROOM	1496	0.050000	74.80	75	Moderately actieve office work	140	75	5625	
	STUDIO PREP STORAGE	139	STORAGE	219	0.050000	10.95	1	Seated, very light work	130	70	70	
	ACTIVE LEARNING STUDIO	130	COMPUTER LAB	2471	0.050000	123.55	129	Moderately actieve office work	140	75	9675	
SECO…	FACULTY OFFICE	201	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	14470
	POST DOC OFFICE	202	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	203	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	204	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	205	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	C.A.S.E. OFFICE INFORMATION ANALYST	207	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	C.A.S.E. DEAN'S OFFICE	208	OFFICE	266	0.010597	2.82	7	Moderately actieve office work	140	75	525	
	C.A.S.E. DEAN'S OFFICE RECEPTION	210	OFFICE	299	0.010597	3.17	5	Moderately actieve office work	140	75	375	
	C.A.S.E. ADMIN SUPPORT	212	OFFICE	100	0.010597	1.06	3	Moderately actieve office work	140	75	225	
	C.A.S.E. FINANCIAL OFFICER	213	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	COORS FELLOW OFFICE	214	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	C.A.S.E. OFFICE	215	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	C.A.S.E. OFFICE	216	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	217	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	218	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	

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FLOOR	ROOM NAME	ROOM NUMBER	ROOM TYPE	AREA [ft2]	OCCUPANT LOAD FACTOR	TOTAL OCCUPANT LOAD	TOTAL OCCUPANT LOAD USED	PRIMARY STATE	TOTAL HEAT PER PERSON [W]	SENSIBLE HEAT PER PERSON [W]	WORST CASE SCENARIO ENERGY [W]	TOTAL
N D	POST DOC OFFICE	219	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	220	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	222	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	223	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	224	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	225	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	226	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	227	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	POST DOC OFFICE	228	OFFICE	133	0.010597	1.41	3	Moderately actieve office work	140	75	225	
	PHYSICS GRAD OFFICES	286	OFFICE	225	0.010597	2.38	7	Standing, light work; walking	160	75	525	
	BREAK OUT	221	LOUNGE	132	0.068182	9.00	9	Light bench work	235	80	720	
	BREAK OUT	206	LOUNGE	133	0.067669	9.00	9	Light bench work	235	80	720	
	TEACHING LAB STORAGE	284	STORAGE	247	0.003333	0.82	1	Seated, very light work	130	70	70	
	PHYSICS ELECTRONICS LAB	288	EQUIPMENT LAB	1302	0.020000	26.04	26	Moderately actieve office work	140	75	1950	
	PHYSICS CONFERENCE ROOM	282	CONFERENCE ROOM	729	0.066667	48.60	49	Moderately actieve office work	140	75	3675	
	BREAK OUT	281	LOUNGE	165	0.066667	11.00	12	Light bench work	235	80	960	
	PHYSICS OFFICE	301	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	302	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	303	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	304	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	305	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	307	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	308	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	309	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	310	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	311	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	

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FLOOR	ROOM NAME	ROOM NUMBER	ROOM TYPE	AREA [ft2]	OCCUPANT LOAD FACTOR	TOTAL OCCUPANT LOAD	TOTAL OCCUPANT LOAD USED	PRIMARY STATE	TOTAL HEAT PER PERSON [W]	SENSIBLE HEAT PER PERSON [W]	WORST CASE SCENARIO ENERGY [W]	TOTAL
THIRD	PHYSICS OFFICE	312	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	16715
	PHYSICS OFFICE	313	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	314	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	315	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	317	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	318	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	319	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	320	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	321	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	322	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	323	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	324	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	325	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	326	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	327	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS OFFICE	328	OFFICE	133	0.010032	1.33	3	Moderately actieve office work	140	75	225	
	PHYSICS GRAD OFFICES	338	OFFICE	451.5	0.010032	4.53	15	Standing, light work; walking	160	75	1125	
	PHYSICS GRAD OFFICES	345	OFFICE	276.5	0.010032	2.77	10	Standing, light work; walking	160	75	750	
	PHYSICS GRAD OFFICES	347	OFFICE	276.5	0.010032	2.77	10	Standing, light work; walking	160	75	750	
	PHYSICS GRAD OFFICES	349	OFFICE	276.5	0.010032	2.77	10	Standing, light work; walking	160	75	750	
	PHYSICS GRAD OFFICES	357	OFFICE	325.5	0.010032	3.27	12	Standing, light work; walking	160	75	900	
	PHYSICS GRAD OFFICES	359	OFFICE	325.5	0.010032	3.27	12	Standing, light work; walking	160	75	900	
	PHYSICS GRAD OFFICES	360	OFFICE	325.5	0.010032	3.27	12	Standing, light work; walking	160	75	900	
	PHYSICS GRAD OFFICES	386	OFFICE	225	0.010032	2.26	7	Standing, light work; walking	160	75	525	
	BREAK OUT	316	LOUNGE	133	0.067669	9.00	9	Light bench work	235	80	720	
	BREAK OUT	306	LOUNGE	133	0.067669	9.00	9	Light bench work	235	80	720	

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FLOOR	ROOM NAME	ROOM NUMBER	ROOM TYPE	AREA [ft2]	OCCUPANT LOAD FACTOR	TOTAL OCCUPANT LOAD	TOTAL OCCUPANT LOAD USED	PRIMARY STATE	TOTAL HEAT PER PERSON [W]	SENSIBLE HEAT PER PERSON [W]	WORST CASE SCENARIO ENERGY [W]	TOTAL
	PHYSICS VISITING OFFICE SUITE	388	OFFICE	473	0.010571	5.00	5	Seated, very light work	130	70	350	
	MAIL + PRINT	382-B	COMPUTER LAB	1302	0.010753	14.00	14	Standing, light work; walking	160	75	1050	
	ADH	382-D	OFFICE									
	COFFEE	382-C	LOUNGE									
	PHYSICS DEPARTMENT HEAD	382-E	OFFICE									
	ADMIN	382-F	OFFICE									
	ADMIN	382-G	OFFICE									
	CONFERENCE 10 SEAT	381	CONFERENCE ROOM	272	0.069853	19.00	19	Moderately actieve office work	140	75	1425	
TOTAL												**60200**

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APPENDIX LC.2 – OFFICE DENSITY LOAD CALCULATIONS

FLOOR	ROOM NAME	ROOM NUMBER	ROOM TYPE	AREA [ft2]	AREA [m2]	LOAD FACTOR [W/m2]	TOTAL HEAT GAIN [W]	TOTAL
FIRST	PHYSICS STUDENT LOUNGE	188	LOUNGE	558	51.84	10.8	559.87	7878.33
	C.A.S.E. STORAGE A	187	STORAGE	106	9.85	10.8	106.36	
	PHYSICS COMPUTER LAB	182	COMPUTER LAB	1146	106.47	10.8	1149.84	
	STUDENT CLUB SPACE	149	LOUNGE	403	37.44	10.8	404.35	
	ACTIVE LEARNING STUDIO	150	CONFERENCE ROOM	1453	134.99	10.8	1457.87	
	ACTIVE LEARNING STUDIO	140	CONFERENCE ROOM	1496	138.98	10.8	1501.02	
	STUDIO PREP STORAGE	139	STORAGE	219	20.35	10.8	219.73	
	ACTIVE LEARNING STUDIO	130	COMPUTER LAB	2471	229.56	10.8	2479.29	
SECOND	FACULTY OFFICE	201	OFFICE	133	12.36	10.8	133.45	6412.43
	POST DOC OFFICE	202	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	203	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	204	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	205	OFFICE	133	12.36	10.8	133.45	
	C.A.S.E. OFFICE INFORMATION ANALYST	207	OFFICE	133	12.36	10.8	133.45	
	C.A.S.E. DEAN'S OFFICE	208	OFFICE	266	24.71	10.8	266.89	
	C.A.S.E. DEAN'S OFFICE RECEPTION	210	OFFICE	299	27.78	10.8	300.00	
	C.A.S.E. ADMIN SUPPORT	212	OFFICE	100	9.29	10.8	100.34	
	C.A.S.E. FINANCIAL OFFICER	213	OFFICE	133	12.36	10.8	133.45	
	COORS FELLOW OFFICE	214	OFFICE	133	12.36	10.8	133.45	
	C.A.S.E. OFFICE	215	OFFICE	133	12.36	10.8	133.45	
	C.A.S.E. OFFICE	216	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	217	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	218	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	219	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	220	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	222	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	223	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	224	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	225	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	226	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	227	OFFICE	133	12.36	10.8	133.45	
	POST DOC OFFICE	228	OFFICE	133	12.36	10.8	133.45	
	PHYSICS GRAD OFFICES	286	OFFICE	225	20.90	10.8	225.75	
	BREAK OUT	221	LOUNGE	132	12.26	10.8	132.44	
	BREAK OUT	206	LOUNGE	133	12.36	10.8	133.45	
	TEACHING LAB STORAGE	284	STORAGE	247	22.95	10.8	247.83	
	PHYSICS ELECTRONICS LAB	288	EQUIPMENT LAB	1302	120.96	10.8	1306.37	
	PHYSICS CONFERENCE ROOM	282	CONFERENCE ROOM	729	67.73	10.8	731.44	
	BREAK OUT	281	LOUNGE	165	15.33	10.8	165.55	
	PHYSICS OFFICE	301	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	302	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	303	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	304	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	305	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	307	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	308	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	309	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	310	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	311	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	312	OFFICE	133	12.36	10.8	133.45	

FLOOR	ROOM NAME	ROOM NUMBER	ROOM TYPE	AREA [ft2]	AREA [m2]	LOAD FACTOR [W/m2]	TOTAL HEAT GAIN [W]	TOTAL
THIRD	PHYSICS OFFICE	313	OFFICE	133	12.36	10.8	133.45	8281.18
	PHYSICS OFFICE	314	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	315	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	317	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	318	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	319	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	320	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	321	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	322	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	323	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	324	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	325	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	326	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	327	OFFICE	133	12.36	10.8	133.45	
	PHYSICS OFFICE	328	OFFICE	133	12.36	10.8	133.45	
	PHYSICS GRAD OFFICES	338	OFFICE	451.5	41.95	10.8	453.01	
	PHYSICS GRAD OFFICES	345	OFFICE	276.5	25.69	10.8	277.43	
	PHYSICS GRAD OFFICES	347	OFFICE	276.5	25.69	10.8	277.43	
	PHYSICS GRAD OFFICES	349	OFFICE	276.5	25.69	10.8	277.43	
	PHYSICS GRAD OFFICES	357	OFFICE	325.5	30.24	10.8	326.59	
	PHYSICS GRAD OFFICES	359	OFFICE	325.5	30.24	10.8	326.59	
	PHYSICS GRAD OFFICES	360	OFFICE	325.5	30.24	10.8	326.59	
	PHYSICS GRAD OFFICES	386	OFFICE	225	20.90	10.8	225.75	
	BREAK OUT	316	LOUNGE	133	12.36	10.8	133.45	
	BREAK OUT	306	LOUNGE	133	12.36	10.8	133.45	
	PHYSICS VISITING OFFICE SUITE	388	OFFICE	473	43.94	10.8	474.59	
	MAIL + PRINT	382-B	COMPUTER LAB	1302	120.96	10.8	1306.37	
	ADH	382-D	OFFICE					
	COFFEE	382-C	LOUNGE					
	PHYSICS DEPARTMENT HEAD	382-E	OFFICE					
	ADMIN	382-F	OFFICE					
	ADMIN	382-G	OFFICE					
	CONFERENCE 10 SEAT	381	CONFERENCE ROOM	272	25.27	10.8	272.91	
TOTAL								**22571.95**

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APPENDIX LC.3 – LIGHTING LOAD CALCULATIONS

FLOOR	ROOM NAME	ROOM NUMBER	PANELBOARD	EQUIPMENT #	EQUIPMENT NAME	SUMMARY OF LIGHT FIXTURES	ENERGY [VA]	POWER FACTOR	ENERGY [W]	TOTAL
FIRST	PHYSICS STUDENT LOUNGE	188	H1A	4	LTG - COMP LAB, CORR 170,180, TLT, JAN	4xA1, 2xF1, 2xU1	2429	1.0	2429	19664
	C.A.S.E. STORAGE A	187		4	LTG - COMP LAB, CORR 170,180, TLT, JAN	2xS1	2429	1.0	2429	
	PHYSICS COMPUTER LAB	182		4	LTG - COMP LAB, CORR 170,180, TLT, JAN	8xA1, 2xG3, 2xG4	2429	1.0	2429	
	STUDENT CLUB SPACE	149		6	LTG - PHYS ADV LABS, CORR 160, CLUB	8xD1, 3xD5, 8xU1, 2xN1	2545	1.0	2545	
	ACTIVE LEARNING STUDIO	150		8	LTG - ACT LEARN 140, 140, STUDIO PREP	2xG1, 1xG2, 4xG3, 8xA2, 4xD1	2400	1.0	2400	
	ACTIVE LEARNING STUDIO	140		8	LTG - ACT LEARN 140, 140, STUDIO PREP	2xG1, 1xG2, 4xG3, 8xA2, 4xD1	2400	1.0	2400	
	STUDIO PREP STORAGE	139		8	LTG - ACTV LEARN 140, 140, STUDIO PREP	3xA1	2400	1.0	2400	
	ACTIVE LEARNING STUDIO	130		10	LTG - ACTV LEARN 130, CORR 120, 130	8xG3, 20xA2	2632	1.0	2632	
	FACULTY OFFICE	201		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	POST DOC OFFICE	202		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	POST DOC OFFICE	203		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	POST DOC OFFICE	204		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	POST DOC OFFICE	205		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	C.A.S.E. OFFICE INFORMATION ANALYST	207		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	C.A.S.E. DEAN'S OFFICE	208		6	LTG - WEST OFFICES	3xA2	2280	1.0	2280	
	C.A.S.E. DEAN'S OFFICE RECEPTION	210		6	LTG - WEST OFFICES	7xD1	2280	1.0	2280	
	C.A.S.E. ADMIN SUPPORT	212		6	LTG - WEST OFFICES	1xA1	2280	1.0	2280	
	C.A.S.E. FINANCIAL OFFICER	213		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	COORS FELLOW OFFICE	214		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	C.A.S.E. OFFICE	215		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	C.A.S.E. OFFICE	216		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	POST DOC OFFICE	217		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	POST DOC OFFICE	218		6	LTG - WEST OFFICES	2xA1	2280	1.0	2280	
	POST DOC OFFICE	219		8	LTG - EAST OFFICES, THEO RES 230	2xA1	2300	1.0	2300	

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FLOOR	ROOM NAME	ROOM NUMBER	PANELBOARD	EQUIPMENT #	EQUIPMENT NAME	SUMMARY OF LIGHT FIXTURES	ENERGY [VA]	POWER FACTOR	ENERGY [W]	TOTAL
SECOND	POST DOC OFFICE	220	H2A	8	LTG - EAST OFFICES, THEO RES 231	2xA1	2300	1.0	2300	70676
	POST DOC OFFICE	222		8	LTG - EAST OFFICES, THEO RES 232	2xA1	2300	1.0	2300	
	POST DOC OFFICE	223		8	LTG - EAST OFFICES, THEO RES 233	2xA1	2300	1.0	2300	
	POST DOC OFFICE	224		8	LTG - EAST OFFICES, THEO RES 234	2xA1	2300	1.0	2300	
	POST DOC OFFICE	225		8	LTG - EAST OFFICES, THEO RES 235	2xA1	2300	1.0	2300	
	POST DOC OFFICE	226		8	LTG - EAST OFFICES, THEO RES 236	2xA1	2300	1.0	2300	
	POST DOC OFFICE	227		8	LTG - EAST OFFICES, THEO RES 237	2xA1	2300	1.0	2300	
	POST DOC OFFICE	228		8	LTG - EAST OFFICES, THEO RES 238	2xA1	2300	1.0	2300	
	PHYSICS GRAD OFFICES	286		6	LTG - WEST OFFICES	2xA2	2280	1.0	2280	
	BREAK OUT	206		6	LTG - WEST OFFICES	4xD1	2280	1.0	2280	
	BREAK OUT	221		8	LTG - EAST OFFICES, THEO RES 235	4xD1	2300	1.0	2300	
	TEACHING LAB STORAGE	284		2	LTG - PHYS ELEC 288, CONF, CORR 280, STOR	3xS2, 1xD2, 4xU1	2229	1.0	2229	
	PHYSICS ELECTRONICS LAB	288		2	LTG - PHYS ELEC 288, CONF, CORR 280, STOR	12xA2	2229	1.0	2229	
	PHYSICS CONFERENCE ROOM	282		2	LTG - PHYS ELEC 288, CONF, CORR 280, STOR	9xA1, 4xD7	2229	1.0	2229	
	BREAK OUT	281		2	LTG - PHYS ELEC 288, CONF, CORR 280, STOR	5xD5	2229	1.0	2229	
	PHYSICS OFFICE	301		4	LTG - CORR 370, CONF, WEST OFFICES	2xA1	2640	1.0	2640	
	PHYSICS OFFICE	302		4	LTG - CORR 370, CONF, WEST OFFICES	2xA1	2640	1.0	2640	
	PHYSICS OFFICE	303		4	LTG - CORR 370, CONF, WEST OFFICES	2xA1	2640	1.0	2640	
	PHYSICS OFFICE	304		4	LTG - CORR 370, CONF, WEST OFFICES	2xA1	2640	1.0	2640	
	PHYSICS OFFICE	305		4	LTG - CORR 370, CONF, WEST OFFICES	2xA1	2640	1.0	2640	
	PHYSICS OFFICE	307		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	308		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	309		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	

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FLOOR	ROOM NAME	ROOM NUMBER	PANELBOARD	EQUIPMENT #	EQUIPMENT NAME	SUMMARY OF LIGHT FIXTURES	ENERGY [VA]	POWER FACTOR	ENERGY [W]	TOTAL
THIRD	PHYSICS OFFICE	310	H3A	6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	110914
	PHYSICS OFFICE	311		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	312		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	313		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	314		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	315		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	317		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	318		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	319		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	320		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	321		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	322		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	323		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	324		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	325		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	326		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	327		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS OFFICE	328		6	LTG - EAST OFFICES	2xA1	2608	1.0	2608	
	PHYSICS GRAD OFFICES	338		12	LTG - EAST C.M. LABS, SUPPORT, GRD. OFFICES	6xA5	2654	1.0	2654	
	PHYSICS GRAD OFFICES	345		10	LTG - WEST C.M. LABS, SUPPORT, GRD. OFFICES	3xA2	2416	1.0	2416	
	PHYSICS GRAD OFFICES	347		10	LTG - WEST C.M. LABS, SUPPORT, GRD. OFFICES	3xA2	2416	1.0	2416	
	PHYSICS GRAD OFFICES	349		10	LTG - WEST C.M. LABS, SUPPORT, GRD. OFFICES	3xA2	2416	1.0	2416	
	PHYSICS GRAD OFFICES	357		8	LTG - SUB A LABS, GRAD OFFICES 357-360	3xA2	2292	1.0	2292	
	PHYSICS GRAD OFFICES	359		8	LTG - SUB A LABS, GRAD OFFICES 357-360	3xA2	2292	1.0	2292	
	PHYSICS GRAD OFFICES	360		8	LTG - SUB A LABS, GRAD OFFICES 357-360	3xA2	2292	1.0	2292	
	PHYSICS GRAD OFFICES	386		4	LTG - CORR 370, CONF, WEST OFFICES	2xA2	2640	1.0	2640	
	BREAK OUT	316		4	LTG - CORR 370, CONF, WEST OFFICES	4xD1	2640	1.0	2640	
	BREAK OUT	306		6	LTG - EAST OFFICES	4xD1	2608	1.0	2608	
	PHYSICS VISITING OFFICE SUITE	388		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	5xA2	2285	1.0	2285	

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FLOOR	ROOM NAME	ROOM NUMBER	PANELBOARD	EQUIPMENT #	EQUIPMENT NAME	SUMMARY OF LIGHT FIXTURES	ENERGY [VA]	POWER FACTOR	ENERGY [W]	TOTAL
	MAIL + PRINT	382-B		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	2xA1	2285	1.0	2285	
	ADH	382-D		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	2xA1	2285	1.0	2285	
	COFFEE	382-C		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	1xA1	2285	1.0	2285	
	PHYSICS DEPARTMENT HEAD	382-E		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	4xA1	2285	1.0	2285	
	ADMIN	382-F		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	2xA1	2285	1.0	2285	
	ADMIN	382-G		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	2xA1	2285	1.0	2285	
	CONFERENCE 10 SEAT	381		2	LTG - PHYS DEPT OFFICES, CORR 380, TLT	7xD2	2285	1.0	2285	
					TOTAL					201254

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APPENDIX LC.4 – APPLIANCES LOAD CALCULATIONS

FLOOR	ROOM NAME	ROOM NUMBER	PANELBOARD	EQUIPMENT #	EQUIPMENT NAME	ENERGY [VA]	POWER FACTOR	ENERGY [W]	USAGE FACTOR Fu	RADIATION FACTOR Fr	CALCULATED LOAD FACTOR Fl	USED LOAD FACTOR Fl	HEAT GAIN [W]	TOTAL HEAT GAIN [W]	TOTAL
	PHYSICS STUDENT LOUNGE	188	L1A	23	RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600	4442	
				25	FLOOR RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
				27	VIDEO PANEL RCPT	480	1.0	480	0.7	0.90	0.63	0.67	320		
				29	GD-1	1660	1.0	1660	0.7	0.90	0.63	0.67	1107		
				31	AC RCPT (COFFEE)	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				33	MICROWAVE	800	1.0	800	0.7	0.90	0.63	0.67	534		
				35	UC REFR	500	1.0	500	0.7	0.90	0.63	0.67	334		
	C.A.S.E. STORAGE A	187		21	RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240	240	
	PHYSICS COMPUTER LAB	182	L1B	1	LAB 182, W ROW FLOOR RCPT, NW	720	1.0	720	0.7	0.90	0.63	0.67	480	9025	
				3	LAB 182, W ROW FLOOR RCPT, NW	720	1.0	720	0.7	0.90	0.63	0.67	480		
				5	LAB 182, W ROW FLOOR RCPT, SW	720	1.0	720	0.7	0.90	0.63	0.67	480		
				7	LAB 182, W ROW FLOOR RCPT, SW	720	1.0	720	0.7	0.90	0.63	0.67	480		
				9	LAB 182, CTRL ROW FLOOR RCPT, N	720	1.0	720	0.7	0.90	0.63	0.67	480		
				11	LAB 182, CTRL ROW FLOOR RCPT, N	720	1.0	720	0.7	0.90	0.63	0.67	480		
				13	LAB 182, CTRL ROW FLOOR RCPT, S	720	1.0	720	0.7	0.90	0.63	0.67	480		
				15	LAB 182, CTRL ROW FLOOR RCPT, S	720	1.0	720	0.7	0.90	0.63	0.67	480		
				17	LAB 182, E ROW FLOOR RCPT, NE	720	1.0	720	0.7	0.90	0.63	0.67	480		
				19	LAB 182, E ROW FLOOR RCPT, NE	720	1.0	720	0.7	0.90	0.63	0.67	480		
				21	LAB 182, E ROW FLOOR RCPT, SE	720	1.0	720	0.7	0.90	0.63	0.67	480		
				23	LAB 182, E ROW FLOOR RCPT, SE	720	1.0	720	0.7	0.90	0.63	0.67	480		
				2	LAB 182, LECTURN FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				4	LAB 182, WEST PROJECTOR	300	1.0	300	0.7	0.90	0.63	0.67	200		
				6	LAB 182, EAST PROJECTOR	300	1.0	300	0.7	0.90	0.63	0.67	200		
				8	LAB 182, WEST SCREEN	500	1.0	500	0.7	0.90	0.63	0.67	334		
				10	LAB 182, EAST SCREEN	500	1.0	500	0.7	0.90	0.63	0.67	334		
				12	LAB 182, GEN WALL RCPT, SHADES	900	1.0	900	0.7	0.90	0.63	0.67	600		
				14	LAB 182, E WALL, AC RCPT, PRINTER	500	1.0	500	0.7	0.90	0.63	0.67	334		
				16	LAB 182, E WALL, AC RCPT, PRINTER	500	1.0	500	0.7	0.90	0.63	0.67	334		
				24	LAB 182, FCU-103	1030	1.0	1030	0.7	0.90	0.63	0.67	687		
	STUDENT CLUB SPACE	149	L1A	8	GEN RCPT, NW POLE VIDEO DISPLAY	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2521	
				10	NW POLE, SO. WALL WIREWAY RECEPTICLE	540	1.0	540	0.7	0.90	0.63	0.67	360		
				12	SO. WALL WIREWAY RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				14	NO. DISPLAY PLUGMOLD	900	1.0	900	0.7	0.90	0.63	0.67	600		
				16	NO. DISPLAY PLUGMOLD	900	1.0	900	0.7	0.90	0.63	0.67	600		

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FIRST	ACTIVE LEARNING STUDIO	150	L1F	1	STUDIO 150, NO/ EAST WALL RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600	5496	63919
				3	STUDIO 150, SO/ WEST WALL RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600		
				5	STUDIO 150, NORTH WALL PROJECTORS	600	1.0	600	0.7	0.90	0.63	0.67	400		
				7	STUDIO 150, WEST WALL PROJECTORS	600	1.0	600	0.7	0.90	0.63	0.67	400		
				9	STUDIO 150, NORTH WALL SCREENS	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				11	STUDIO 150, WEST WALL SCREENS	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				13	STUDIO 150, WINDOW SHADES	360	1.0	360	0.7	0.90	0.63	0.67	240		
				2	STUDIO 150, NW FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				4	STUDIO 150, NE FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				6	STUDIO 150, WEST CTR FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				8	STUDIO 150, EAST CTR FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				10	STUDIO 150, SW FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				12	STUDIO 150, SE FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				14	STUDIO 150, WEST AV FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				24	STUDIO 150, NO AV FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
	ACTIVE LEARNING STUDIO	140	L1G	1	STUDIO 150, NO/ EAST WALL RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600	5363	
				3	STUDIO 150, SO/ WEST WALL RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600		
				5	STUDIO 150, NORTH WALL PROJECTORS	600	1.0	600	0.7	0.90	0.63	0.67	400		
				7	STUDIO 150, EAST WALL PROJECTORS	600	1.0	600	0.7	0.90	0.63	0.67	400		
				9	STUDIO 150, NORTH WALL SCREENS	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				11	STUDIO 150, EAST WALL SCREENS	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				13	STUDIO 150, WINDOW SHADES	160	1.0	160	0.7	0.90	0.63	0.67	107		
				2	STUDIO 150, NW FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				4	STUDIO 150, NE FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				6	STUDIO 150, WEST CTR FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				8	STUDIO 150, EAST CTR FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				10	STUDIO 150, SW FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				12	STUDIO 150, SE FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				14	STUDIO 150, EAST AV FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				24	STUDIO 150, NO AV FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
	STUDIO PREP STORAGE	139	L1A	26	WIREWAY RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240	1161	
				28	WIREWAY RCPT	180	1.0	180	0.7	0.90	0.63	0.67	120		

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				30	SE DED RCPT	1200	1.0	1200	0.7	0.90	0.63	0.67	800		
	ACTIVE LEARNING STUDIO	130	L1H	1	STUDIO 130, NO/ EAST WALL GEN RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600	35671	
				3	STUDIO 130, SO/ WEST WALL GEN RCPT, SHADES	1260	1.0	1260	0.7	0.90	0.63	0.67	840		
				5	STUDIO 130, SO WALL AC RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
				7	STUDIO 130, LECTURN FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				9	STUDIO 130, NSOUTH WALL VIDEO DISPLAYS	960	1.0	960	0.7	0.90	0.63	0.67	640		
				11	STUDIO 130, SOUTH WALL VIDEO DISPLAYS	960	1.0	960	0.7	0.90	0.63	0.67	640		
				13	STUDIO 130, WEST PROJECTOR	300	1.0	300	0.7	0.90	0.63	0.67	200		
				15	STUDIO 130, EAST PROJECTOR	300	1.0	300	0.7	0.90	0.63	0.67	200		
				17	STUDIO 130, MOTORIZED SCREENS	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				19	STUDIO 130, NORTH WALL VIDEO DISPLAYS	960	1.0	960	0.7	0.90	0.63	0.67	640		
				21	STUDIO 130, NORTH WALL VIDEO DISPLAYS	960	1.0	960	0.7	0.90	0.63	0.67	640		
				27	STUDIO 130, SE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				29	STUDIO 130, SE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				31	STUDIO 130, SE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				33	STUDIO 130, SE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				35	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				37	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				39	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				41	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				2	STUDIO 130, NW FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				4	STUDIO 130, NW FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				6	STUDIO 130, NW FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				8	STUDIO 130, NORTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				10	STUDIO 130, NORTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		

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				12	STUDIO 130, NORTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				14	STUDIO 130, NORTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				16	STUDIO 130, NORTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				18	STUDIO 130, NORTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				20	STUDIO 130, NE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				22	STUDIO 130, NE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				24	STUDIO 130, NE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				26	STUDIO 130, NE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				28	STUDIO 130, NE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				30	STUDIO 130, NE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				32	STUDIO 130, NE FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				34	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				36	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				38	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				40	STUDIO 130, SOUTH FURNITURE CONNECTION	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
	FACULTY OFFICE	201		1	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	POST DOC OFFICE	202		3	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	POST DOC OFFICE	203		5	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	POST DOC OFFICE	204		7	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	POST DOC OFFICE	205		9	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	C.A.S.E. OFFICE INFORMATION ANALYST	207		15	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	C.A.S.E. DEAN'S OFFICE	208		17	RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600	1041	
				19	FLOOR AND VIDEO PANEL RCPT	660	1.0	660	0.7	0.90	0.63	0.67	440		
	C.A.S.E. DEAN'S OFFICE RECEPTION	210		21	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	814	
				23	PRINTER	500	1.0	500	0.7	0.90	0.63	0.67	334		
	C.A.S.E. ADMIN SUPPORT	212		25	RCPT	540	1.0	540	0.7	0.90	0.63	0.67	360	2561	
				27	COPIER	1200	1.0	1200	0.7	0.90	0.63	0.67	800		

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SECOND	[illegible]		L2A	29	UC REFR	500	1.0	500	0.7	0.90	0.63	0.67	334		46717
				31	COFFEE	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
	C.A.S.E. FINANCIAL OFFICER	213		33	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	COORS FELLOW OFFICE	214		35	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	C.A.S.E. OFFICE	215		37	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	C.A.S.E. OFFICE	216		39	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	POST DOC OFFICE	217		41	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	218		2	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	219		4	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	220		6	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	222		12	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	223		14	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	224		16	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	225		18	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	226		20	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	227		22	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	POST DOC OFFICE	228		24	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	PHYSICS GRAD OFFICES	286		61	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	1681	
				63	RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				65	RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
	BREAK OUT	206		11	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	920	
				13	FLOOR AND VIDEO PANEL RCPT	660	1.0	660	0.7	0.90	0.63	0.67	440		
	BREAK OUT	221		8	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	920	
				10	FLOOR AND VIDEO PANEL RCPT	660	1.0	660	0.7	0.90	0.63	0.67	440		
	TEACHING LAB STORAGE	284		58	RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240	240	
				1	LAB 288, S WALL WIREWAY RCPT	540	1.0	540	0.7	0.90	0.63	0.67	360		
				3	LAB 288, S WALL WIREWAY RCPT	540	1.0	540	0.7	0.90	0.63	0.67	360		
				5	LAB 288, S WALL WIREWAY RCPT	540	1.0	540	0.7	0.90	0.63	0.67	360		
				7	LAB 288, W WALL RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
				9	LAB 288, E WALL RCPT, WINDOW SHADES	560	1.0	560	0.7	0.90	0.63	0.67	374		
				11	LAB 288, SOUTH SCREEN	500	1.0	500	0.7	0.90	0.63	0.67	334		
				13	LAB 288, NORTH SCREEN	500	1.0	500	0.7	0.90	0.63	0.67	334		
				15	LAB 288, SOUTH PROJECTOR	300	1.0	300	0.7	0.90	0.63	0.67	200		
				17	LAB 288, NORTH PROJECTOR	300	1.0	300	0.7	0.90	0.63	0.67	200		
				19	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				21	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				23	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				25	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				29	FCU-203	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				2	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		

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	PHYSICS ELECTRONICS LAB	288	L2B	4	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720	22078	
				6	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				8	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				10	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				12	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				14	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				16	LAB 288, FLR RCPT, NORTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				18	LAB 288, LECTERN FLR RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				20	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				22	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				24	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				26	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				28	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				30	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				32	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				34	LAB 288, FLR RCPT, CENTER ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				36	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				38	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				40	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				42	LAB 288, FLR RCPT, SOUTH ROW	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
	PHYSICS CONFERENCE ROOM	282	L2A	44	AV FLOOR RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	3255	
				46	WEST FLOOR RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
				48	EAST FLOOR RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
				50	AV RACKS	500	1.0	500	0.7	0.90	0.63	0.67	334		
				52	VIDEO DISPLAYS	600	1.0	600	0.7	0.90	0.63	0.67	400		
				54	GEN RCPT, SHADES	900	1.0	900	0.7	0.90	0.63	0.67	600		
				56	GEN RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
	BREAK OUT	281		59	RCPT, SHADES	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	301		1	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	302		3	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	303		5	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	304		7	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	305		9	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	307		15	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	308		17	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	309		19	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	310		21	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	311		23	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	312		25	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	313		27	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	

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FLOOR	ROOM NAME	ROOM NUMBER	PANELBOARD	EQUIPMENT #	EQUIPMENT NAME	ENERGY [VA]	POWER FACTOR	ENERGY [W]	USAGE FACTOR Fu	RADIATION FACTOR Fr	CALCULATED LOAD FACTOR Fl	USED LOAD FACTOR Fl	HEAT GAIN [W]	TOTAL HEAT GAIN [W]	TOTAL
THIRD	PHYSICS OFFICE	314	L3A1	29	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	49505
	PHYSICS OFFICE	315		31	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	317		37	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	318		39	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	319		41	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	320		2	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	321		4	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	322		6	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	323		8	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	324		10	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	325		12	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	326		14	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	327		16	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS OFFICE	328		18	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	480	
	PHYSICS GRAD OFFICES	338		20	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2761	
				22	S WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				24	W WALL RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
				26	FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				28	345, GEN RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600		
	PHYSICS GRAD OFFICES	345		28	345, GEN RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600	2521	
				30	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				32	E & W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				34	W WALL RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
	PHYSICS GRAD OFFICES	347		36	349, GEN RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2641	
				38	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				40	E & W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				42	W WALL RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
	PHYSICS GRAD OFFICES	349		36	349, GEN RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2641	
				61	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				63	E & W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				65	W WALL RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
	PHYSICS GRAD OFFICES	357		67	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2641	
				69	E & W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				71	W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				73	W WALL, GEN RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
	PHYSICS GRAD OFFICES	359		75	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2641	
				77	E & W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				79	W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				81	W WALL, GEN RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
	PHYSICS GRAD OFFICES	360	L3A2	44	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2521	
				46	E & W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				48	W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				50	W WALL, GEN RCPT	540	1.0	540	0.7	0.90	0.63	0.67	360		
	PHYSICS GRAD OFFICES	386		14	E WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	1681	
				16	W WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				18	GEN RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
	BREAK OUT	306	L3A1	11	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	920	
				13	FLOOR AND VIDEO PANEL RCPT	660	1.0	660	0.7	0.90	0.63	0.67	440		
	BREAK OUT	316		33	RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480	920	
				35	FLOOR AND VIDEO PANEL RCPT	660	1.0	660	0.7	0.90	0.63	0.67	440		
	PHYSICS VISITING OFFICE SUITE	388		1	N WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720	2281	
				3	S WALL RCPT	1080	1.0	1080	0.7	0.90	0.63	0.67	720		
				5	N & S RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
				7	GEN RCPT, SHADES	540	1.0	540	0.7	0.90	0.63	0.67	360		
	MAIL + PRINT	382-B		9	DED RCPT	1000	1.0	1000	0.7	0.90	0.63	0.67	667	3268	
				11	DED RCPT	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				13	DED RCPT	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				15	DED RCPT	1000	1.0	1000	0.7	0.90	0.63	0.67	667		

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FLOOR	ROOM NAME	ROOM NUMBER	PANELBOARD	EQUIPMENT #	EQUIPMENT NAME	ENERGY [VA]	POWER FACTOR	ENERGY [W]	USAGE FACTOR Fu	RADIATION FACTOR Fr	CALCULATED LOAD FACTOR Fl	USED LOAD FACTOR Fl	HEAT GAIN [W]	TOTAL HEAT GAIN [W]	TOTAL
			L3A2	17	COFFEE 382-C, GEN RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600		
	ADH	382-D		26	RCPT, SHADES	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	COFFEE	382-C		17	COFFEE 382-C, GEN RCPT	900	1.0	900	0.7	0.90	0.63	0.67	600	4642	
				23	REFRIGERATOR	800	1.0	800	0.7	0.90	0.63	0.67	534		
				25	DED RCPT	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				27	COFFEE	1600	1.0	1600	0.7	0.90	0.63	0.67	1067		
				29	DED RCPT	1000	1.0	1000	0.7	0.90	0.63	0.67	667		
				41	GD-1	1660	1.0	1660	0.7	0.90	0.63	0.67	1107		
	PHYSICS DEPARTMENT HEAD	382-E		35	GEN RCPT, SHADES	900	1.0	900	0.7	0.90	0.63	0.67	600	1521	
				37	FLOOR AND VIDEO PANEL RCPT	660	1.0	660	0.7	0.90	0.63	0.67	440		
				39	DESK QUAD RCPT	720	1.0	720	0.7	0.90	0.63	0.67	480		
	ADMIN	382-F		31	RCPT, SHADES	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	ADMIN	382-G		33	RCPT, SHADES	1080	1.0	1080	0.7	0.90	0.63	0.67	720	720	
	CONFERENCE 10 SEAT	381		20	WALL RCPT, SHADES	720	1.0	720	0.7	0.90	0.63	0.67	480	1254	
				22	FLOOR RCPT	360	1.0	360	0.7	0.90	0.63	0.67	240		
				24	PROJECTOR, SCREEN	800	1.0	800	0.7	0.90	0.63	0.67	534		
							TOTAL								160140

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APPENDIX LC.5 – FENESTRATION

APPENDIX LC.5-A – SOLAR ANGLES

Local Standard Time (LST)	Equation of Time [ET]	Local Estándar meridian (LSM)	Local Longitude (LON)	Aparent Solar Time (AST)	Hour Angle (H)	Latitude (L)	Solar declination (δ)
0	1.6	-105	-105.230484	0.042032267	-179.36952	39.754185	-23.45
1	1.6	-105	-105.230484	1.042032267	-164.36952	39.754185	-23.45
2	1.6	-105	-105.230484	2.042032267	-149.36952	39.754185	-23.45
3	1.6	-105	-105.230484	3.042032267	-134.36952	39.754185	-23.45
4	1.6	-105	-105.230484	4.042032267	-119.36952	39.754185	-23.45
5	1.6	-105	-105.230484	5.042032267	-104.36952	39.754185	-23.45
6	1.6	-105	-105.230484	6.042032267	-89.369516	39.754185	-23.45
7	1.6	-105	-105.230484	7.042032267	-74.369516	39.754185	-23.45
8	1.6	-105	-105.230484	8.042032267	-59.369516	39.754185	-23.45
9	1.6	-105	-105.230484	9.042032267	-44.369516	39.754185	-23.45
10	1.6	-105	-105.230484	10.04203227	-29.369516	39.754185	-23.45
11	1.6	-105	-105.230484	11.04203227	-14.369516	39.754185	-23.45
12	1.6	-105	-105.230484	12.04203227	0.630484	39.754185	-23.45
13	1.6	-105	-105.230484	13.04203227	15.630484	39.754185	-23.45
14	1.6	-105	-105.230484	14.04203227	30.630484	39.754185	-23.45
15	1.6	-105	-105.230484	15.04203227	45.630484	39.754185	-23.45
16	1.6	-105	-105.230484	16.04203227	60.630484	39.754185	-23.45
17	1.6	-105	-105.230484	17.04203227	75.630484	39.754185	-23.45
18	1.6	-105	-105.230484	18.04203227	90.630484	39.754185	-23.45
19	1.6	-105	-105.230484	19.04203227	105.630484	39.754185	-23.45
20	1.6	-105	-105.230484	20.04203227	120.630484	39.754185	-23.45
21	1.6	-105	-105.230484	21.04203227	135.630484	39.754185	-23.45
22	1.6	-105	-105.230484	22.04203227	150.630484	39.754185	-23.45
23	1.6	-105	-105.230484	23.04203227	165.630484	39.754185	-23.45

Sin (β)	Solar altitude (β)	cos(ϕ)	Solar azimuth (ϕ)	Surface azimuth (ψ)	Surface-solar azimuth (γ)	cos(θ)	Incident angle (θ)	A	B
-0.9597421	-73.6871023	-0.9993539	177.940337	180	-2.059662875	-0.28070129	106.302065	1233	0.142
-0.9337024	-69.0195084	-0.7234773	136.342324	180	-43.65767571	-0.25904109	105.013171	1233	0.142
-0.8613752	-59.4713467	-0.3915164	113.04889	180	-66.95111016	-0.19887829	101.471372	1233	0.142
-0.7476896	-48.390638	-0.1570863	99.0378141	180	-80.96218588	-0.1043129	95.987581	1233	0.142
-0.600393	-36.8980467	0.02277167	88.6951665	180	-91.30483352	0.018210623	88.9565505	1233	0.142
-0.4295234	-25.437315	0.17755547	79.7725948	180	-100.2274052	0.16034249	80.7732239	1233	0.142
-0.2467253	-14.2838141	0.32236233	71.194151	180	-108.805849	0.312396652	71.7962766	1233	0.142
-0.0644561	-3.69562205	0.46497777	62.2912166	180	-117.7087834	0.46401087	62.353774	1233	0.142
0.1048629	6.019267792	0.60820612	52.5400938	180	-127.4599062	0.604852885	52.7817436	1233	0.142
0.24969281	14.45933513	0.74905065	41.4917908	180	-138.5082092	0.725324548	43.5041469	1233	0.142
0.36016375	21.11025307	0.87600543	28.8358084	180	-151.1641916	0.817215912	35.1929409	1233	0.142
0.42874732	25.38808793	0.96772313	14.5968277	180	-165.4031723	0.874264733	29.0419239	1233	0.142
0.45076964	26.7930741	0.99993605	0.64797828	180	-179.3520217	0.892583229	26.800329	1233	0.142
0.42472995	25.13357106	0.96200563	15.8446268	180	-164.1553732	0.870923025	29.4339213	1233	0.142
0.35240279	20.6343511	0.86633712	29.9642609	180	-150.0357391	0.810760227	35.8297257	1233	0.142
0.23871715	13.81083796	0.73751708	42.4796636	180	-137.5203364	0.716194831	44.2587944	1233	0.142
0.09142052	5.245333684	0.59616784	53.4040705	180	-126.5959295	0.593671311	53.5820292	1233	0.142
-0.0794491	-4.55690007	0.45297132	63.0655188	180	-116.9344812	0.451539445	63.1575039	1233	0.142
-0.2622472	-15.2034441	0.31034721	71.9198439	180	-108.0801561	0.299485283	72.5733094	1233	0.142
-0.4445164	-26.3924016	0.16507691	80.4982975	180	-99.50170251	0.147871065	81.4964283	1233	0.142
-0.6138353	-37.8673432	0.00890391	89.4898368	180	-90.51016316	0.007029049	89.5972618	1233	0.142
-0.7586653	-49.3466708	-0.1741304	100.028059	180	-79.97194076	-0.11344261	96.5138055	1233	0.142
-0.8691362	-60.358415	-0.4151744	114.530301	180	-65.4696994	-0.20533398	101.84905	1233	0.142
-0.9377198	-69.6720799	-0.7552918	139.050869	180	-40.94913075	-0.2623828	105.211496	1233	0.142

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C	Direct normal Irradiance (EDN)	Surface Direct Irradiance (ED)	Y	Diffuse irradiance (Ed)	ro g	Ground Reflected Irradiance (Er)	Total Surface Irradiance (Et)
0.057	0	0	0.45	0	0.31	0	0
0.057	0	0	0.45	0	0.31	0	0
0.057	0	0	0.47547014	0	0.31	0	0
0.057	0	0	0.50782107	0	0.31	0	0
0.057	0	0	0.55806184	0	0.31	0	0
0.057	0	0	0.62811681	0	0.31	0	0
0.057	0	0	0.71706353	0	0.31	0	0
0.057	0	0	0.82016356	0	0.31	0	0
0.057	318.3197686	192.5366305	0.92883083	16.85291717	0.31	7.986245011	217.3757927
0.057	698.2007809	506.4221655	1.03163478	41.05642796	0.31	33.19063992	580.6692334
0.057	831.2581523	679.3173887	1.11615785	52.88547285	0.31	53.74946959	785.9523312
0.057	885.3721763	774.0496696	1.17129174	59.11065968	0.31	66.66040958	899.8207389
0.057	899.8145852	803.1594084	1.18942748	61.00505911	0.31	70.8192721	934.9837396
0.057	882.602929	768.6792128	1.16800603	58.76047578	0.31	65.90232047	893.342009
0.057	824.0716678	668.1245324	1.11004718	52.1412306	0.31	52.29347221	772.5592352
0.057	680.1812199	487.1422735	1.02352581	39.68243282	0.31	31.17689416	558.0016005
0.057	260.8495164	154.8588745	0.91974984	13.67522922	0.31	6.000890131	174.5349939
0.057	0	0	0.81113964	0	0.31	0	0
0.057	0	0	0.70894849	0	0.31	0	0
0.057	0	0	0.62146367	0	0.31	0	0
0.057	0	0	0.55308716	0	0.31	0	0
0.057	0	0	0.50445365	0	0.31	0	0
0.057	0	0	0.45	0	0.31	0	0
0.057	0	0	0.45	0	0.31	0	0

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APPENDIX LC.5-B – FENESTRATION LOAD CALCULATIONS

FLOOR	ROOM	EXTERIOR SURFACE (M2)	LST	ED	Ed	Er	SHGC teta	SHGC D	U	Tout	Tin	QUANTITY	qb (Direct solar heat gain) - all radiant	qd (Difuse solar heat gain)	qd radiant	qd convective	qc (Conductive heat gain)	qc radiant	qc convective	Q	Convective TOTAL	Radiant TOTAL
FIRST	PHYSICS STUDENT LOUNGE	18.16	0	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	1	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	2	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	3	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	4	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	5	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	6	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	7	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	8	192.54	16.85	7.99	0.68	0.60	1.56	36.67	22.22	1	2377.93	270.69	170.53	100.15	934.32	588.62	345.70	3582.94	445.85	3137.08
		18.16	9	506.42	41.06	33.19	0.68	0.60	1.56	36.67	22.22	1	6254.59	809.11	509.74	299.37	934.32	588.62	345.70	7998.02	645.07	7352.95
		18.16	10	679.32	52.89	53.75	0.68	0.60	1.56	36.67	22.22	1	8389.94	1162.06	732.10	429.96	934.32	588.62	345.70	10486.31	775.66	9710.66
		18.16	11	774.05	59.11	66.66	0.68	0.60	1.56	36.67	22.22	1	9559.93	1370.59	863.47	507.12	934.32	588.62	345.70	11864.85	852.82	11012.09
		18.16	12	803.16	61.01	70.82	0.68	0.60	1.56	36.67	22.22	1	9919.45	1436.56	905.03	531.53	934.32	588.62	345.70	12290.33	877.23	11413.11
		18.16	13	768.68	58.76	65.90	0.68	0.60	1.56	36.67	22.22	1	9493.60	1358.52	855.87	502.65	934.32	588.62	345.70	11786.44	848.35	10938.09
		18.16	14	668.12	52.14	52.29	0.68	0.60	1.56	36.67	22.22	1	8251.70	1138.08	716.99	421.09	934.32	588.62	345.70	10324.10	766.79	9557.31
		18.16	15	487.14	39.68	31.18	0.68	0.60	1.56	36.67	22.22	1	6016.47	772.19	486.48	285.71	934.32	588.62	345.70	7722.98	631.41	7091.57
		18.16	16	154.86	13.68	6.00	0.68	0.60	1.56	36.67	22.22	1	1912.59	214.42	135.09	79.34	934.32	588.62	345.70	3061.33	425.03	2636.30
		18.16	17	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	18	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	19	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	20	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	21	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	22	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
		18.16	23	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	934.32	588.62	345.70	934.32	345.70	588.62
	PHYSICS COMPUTER LAB	36.32	0	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	1	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	2	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	3	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	4	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	5	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	6	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	7	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	8	192.54	16.85	7.99	0.68	0.60	1.56	36.67	22.22	1	4755.64	541.35	341.05	200.30	1868.55	1177.19	691.36	7165.54	891.66	6273.88
		36.32	9	506.42	41.06	33.19	0.68	0.60	1.56	36.67	22.22	1	12508.60	1618.15	1019.43	598.71	1868.55	1177.19	691.36	15995.30	1290.08	14705.22
		36.32	10	679.32	52.89	53.75	0.68	0.60	1.56	36.67	22.22	1	16779.10	2324.01	1464.13	859.88	1868.55	1177.19	691.36	20971.66	1551.25	19420.42
		36.32	11	774.05	59.11	66.66	0.68	0.60	1.56	36.67	22.22	1	19118.99	2741.06	1726.87	1014.19	1868.55	1177.19	691.36	23728.60	1705.56	22023.04
		36.32	12	803.16	61.01	70.82	0.68	0.60	1.56	36.67	22.22	1	19837.99	2872.99	1809.98	1063.01	1868.55	1177.19	691.36	24579.53	1754.37	22825.16
		36.32	13	768.68	58.76	65.90	0.68	0.60	1.56	36.67	22.22	1	18986.34	2716.91	1711.65	1005.26	1868.55	1177.19	691.36	23571.80	1696.62	21875.18
		36.32	14	668.12	52.14	52.29	0.68	0.60	1.56	36.67	22.22	1	16502.64	2276.06	1433.92	842.14	1868.55	1177.19	691.36	20647.25	1533.51	19113.74
		36.32	15	487.14	39.68	31.18	0.68	0.60	1.56	36.67	22.22	1	12032.39	1544.31	972.92	571.40	1868.55	1177.19	691.36	15445.25	1262.76	14182.49
		36.32	16	154.86	13.68	6.00	0.68	0.60	1.56	36.67	22.22	1	3825.01	428.82	270.16	158.66	1868.55	1177.19	691.36	6122.38	850.03	5272.35
		36.32	17	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	18	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	19	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	20	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	21	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	22	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
		36.32	23	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1868.55	1177.19	691.36	1868.55	691.36	1177.19
	ACTIVE LEARNING STUDIO	13.25	0	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	1	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	2	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	3	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	4	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	5	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	6	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	7	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	8	192.54	16.85	7.99	0.68	0.60	1.56	36.67	22.22	2	3470.61	395.07	248.89	146.18	1363.65	859.10	504.55	5229.33	650.72	4578.60
		13.25	9	506.42	41.06	33.19	0.68	0.60	1.56	36.67	22.22	2	9128.63	1180.90	743.97	436.93	1363.65	859.10	504.55	11673.18	941.48	10731.69
		13.25	10	679.32	52.89	53.75	0.68	0.60	1.56	36.67	22.22	2	12245.19	1696.03	1068.50	627.53	1363.65	859.10	504.55	15304.87	1132.08	14172.79
		13.25	11	774.05	59.11	66.66	0.68	0.60	1.56	36.67	22.22	2	13952.81	2000.40	1260.25	740.15	1363.65	859.10	504.55	17316.85	1244.70	16072.15
		13.25	12	803.16	61.01	70.82	0.68	0.60	1.56	36.67	22.22	2	14477.53	2096.67	1320.90	775.77	1363.65	859.10	504.55	17937.85	1280.32	16657.53
		13.25	13	768.68	58.76	65.90	0.68	0.60	1.56	36.67	22.22	2	13856.00	1982.77	1249.14	731.62	1363.65	859.10	504.55	17202.42	1238.17	15964.24
		13.25	14	668.12	52.14	52.29	0.68	0.60	1.56	36.67	22.22	2	12043.43	1661.04	1046.45	614.58	1363.65	859.10	504.55	15068.12	1119.13	13948.98
		13.25	15	487.14	39.68	31.18	0.68	0.60	1.56	36.67	22.22	2	8781.09	1127.02	710.02	417.00	1363.65	859.10	504.55	11271.76	921.55	10350.21
		13.25	16	154.86	13.68	6.00	0.68	0.60	1.56	36.67	22.22	2	2791.44	312.95	197.16	115.79	1363.65	859.10	504.55	4468.04	620.34	3847.70
		13.25	17	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	18	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	19	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	20	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	21	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	22	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
		13.25	23	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1363.65	859.10	504.55	1363.65	504.55	859.10
	ACTIVE LEARNING STUDIO	11.44	0	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	1	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	2	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	3	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	4	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	5	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	6	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	7	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	8	192.54	16.85	7.99	0.68	0.60	1.56	36.67	22.22	1	1498.12	170.53	107.44	63.10	588.63	370.84	217.79	2257.29	280.89	1976.40
		11.44	9	506.42	41.06	33.19	0.68	0.60	1.56	36.67	22.22	1	3940.45	509.75	321.14	188.61	588.63	370.84	217.79	5038.83	406.40	4632.43
		11.44	10	679.32	52.89	53.75	0.68	0.60	1.56	36.67	22.22	1	5285.75	732.11	461.23	270.88	588.63	370.84	217.79	6606.49	488.67	6117.81
		11.44	11	774.05	59.11	66.66	0.68	0.60	1.56	36.67	22.22	1	6022.86	863.49	544.00	319.49	588.63	370.84	217.79	7474.97	537.28	6937.69
		11.44	12	803.16	61.01	70.82	0.68	0.60	1.56	36.67	22.22	1	6249.36	905.05	570.18	334.87	588.63	370.84	217.79	7743.04	552.66	7190.37
		11.44	13	768.68	58.76	65.90	0.68	0.60	1.56	36.67	22.22	1	5981.07	855.88	539.20	316.68	588.63	370.84	217.79	7425.58	534.47	6891.11
		11.44	14	668.12	52.14	52.29	0.68	0.60	1.56	36.67	22.22	1	5198.66	717.00	451.71	265.29	588.63	370.84	217.79	6504.29	483.08	6021.20
		11.44	15	487.14	39.68	31.18	0.68	0.60	1.56	36.67	22.22	1	3790.44	486.49	306.49	180.00	588.63	370.84	217.79	4865.56	397.79	4467.76
		11.44	16	154.86	13.68	6.00	0.68	0.60	1.56	36.67	22.22	1	1204.95	135.09	85.11	49.98	588.63	370.84	217.79	1928.67	267.78	1660.89
		11.44	17	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	18	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	19	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	20	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	21	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	22	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		11.44	23	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	1	0.00	0.00	0.00	0.00	588.63	370.84	217.79	588.63	217.79	370.84
		28.59	0	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	1	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	2	0.00	0.00	0.00	0.68	0.60	1.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00

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FLOOR	ROOM	EXTERIOR SURFACE [M2]	LST	ED	Ed	Er	SHGCteta	SHGCD	U	Tout	Tin	QUANTITY	qb (Direct solar heat gain) - all radiant	qd (Diffuse solar heat gain)	qd radiant	qd convective	qc (Conductive heat gain)	qc radiant	qc convective	Q	Convective TOTAL	Radiant TOTAL
SECOND	CORNER OFFICE	28.59	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	2	7485.80	852.13	536.84	315.29	2941.26	1853.00	1088.27	11279.19	1403.55	9875.64
		28.59	9	506.42	41.06	33.10	0.68	0.60	3.56	36.67	22.22	2	19689.64	2547.10	1604.68	942.43	2941.26	1853.00	1088.27	25178.00	2030.70	23147.31
		28.59	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	2	26411.78	3658.20	2304.66	1353.53	2941.26	1853.00	1088.27	33011.24	2441.80	30569.44
		28.59	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	2	30094.86	4314.67	2718.25	1596.43	2941.26	1853.00	1088.27	37350.90	2684.70	34666.20
		28.59	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	2	31226.75	4522.34	2849.07	1673.26	2941.26	1853.00	1088.27	38690.35	2761.53	35928.81
		28.59	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	2	29886.16	4276.65	2694.29	1582.36	2941.26	1853.00	1088.27	37104.08	2670.63	34433.45
		28.59	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	2	25976.61	3582.71	2257.11	1325.60	2941.26	1853.00	1088.27	32500.58	2413.87	30086.71
		28.59	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	2	18940.04	2430.88	1531.46	899.43	2941.26	1853.00	1088.27	24312.18	1987.69	22324.49
		28.59	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	2	6020.90	675.00	425.25	249.75	2941.26	1853.00	1088.27	9637.16	1338.02	8299.14
		28.59	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
	FACULTY OFFICE	8.56	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	24	26894.59	3061.48	1928.73	1132.75	10567.21	6657.34	3909.87	40523.28	5042.62	35480.67
		8.56	9	506.42	41.06	33.10	0.68	0.60	3.56	36.67	22.22	24	70739.87	9151.10	5765.19	3385.91	10567.21	6657.34	3909.87	90458.19	7295.78	83162.41
		8.56	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	24	94890.84	13142.97	8280.07	4862.90	10567.21	6657.34	3909.87	118601.02	8772.77	109828.26
		8.56	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	24	108123.58	15501.53	9765.97	5735.57	10567.21	6657.34	3909.87	134192.32	9645.44	124546.89
		8.56	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	24	112189.79	16247.61	10235.99	6011.62	10567.21	6657.34	3909.87	139004.61	9921.48	129083.13
		8.56	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	24	107373.40	15364.94	9679.91	5685.03	10567.21	6657.34	3909.87	133305.55	9594.90	123710.66
		8.56	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	24	93327.36	12871.78	8109.22	4762.56	10567.21	6657.34	3909.87	116766.36	8672.43	108093.93
		8.56	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	24	68046.75	8733.55	5502.14	3231.41	10567.21	6657.34	3909.87	87347.52	7141.28	80206.23
		8.56	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	24	21631.55	2425.12	1527.83	897.29	10567.21	6657.34	3909.87	34623.89	4807.16	29816.72
		8.56	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
	BREAK OUT	11.27	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	2	2951.55	335.98	211.67	124.31	1159.70	730.61	429.09	4447.24	553.40	3893.84
		11.27	9	506.42	41.06	33.10	0.68	0.60	3.56	36.67	22.22	2	7763.37	1004.29	632.70	371.59	1159.70	730.61	429.09	9927.36	800.68	9126.68
		11.27	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	2	10413.82	1442.38	908.70	533.68	1159.70	730.61	429.09	13015.90	962.77	12053.13
		11.27	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	2	11866.05	1701.22	1071.77	629.45	1159.70	730.61	429.09	14726.98	1058.54	13668.43
		11.27	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	2	12312.30	1783.10	1123.35	659.75	1159.70	730.61	429.09	15255.10	1088.84	14166.26
		11.27	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	2	11783.72	1686.23	1062.32	623.90	1159.70	730.61	429.09	14629.66	1052.99	13576.66
		11.27	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	2	10242.24	1412.62	889.95	522.67	1159.70	730.61	429.09	12814.56	951.76	11862.80
		11.27	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	2	7467.81	958.47	603.83	354.63	1159.70	730.61	429.09	9585.98	783.72	8802.26
		11.27	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	2	2373.96	266.15	167.67	98.47	1159.70	730.61	429.09	3799.81	527.56	3272.24
		11.27	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
		11.27	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1159.70	730.61	429.09	1159.70	429.09	730.61
	PHYSICS ELECTRONICS LAB	26.54	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	3475.34	395.61	249.23	146.37	1365.51	860.27	505.24	5236.46	651.61	4584.84
		26.54	9	506.42	41.06	33.10	0.68	0.60	3.56	36.67	22.22	1	9141.07	1182.51	744.98	437.53	1365.51	860.27	505.24	11689.09	942.77	10746.32
		26.54	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	12261.88	1698.35	1069.96	628.39	1365.51	860.27	505.24	15325.74	1133.63	14192.11
		26.54	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	13971.83	2003.12	1261.97	741.16	1365.51	860.27	505.24	17340.46	1246.39	16094.07
		26.54	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	14497.27	2099.53	1322.70	776.83	1365.51	860.27	505.24	17962.31	1282.06	16680.24
		26.54	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	13874.89	1985.47	1250.85	734.62	1365.51	860.27	505.24	17225.87	1239.86	15986.01
		26.54	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	12059.85	1663.30	1047.88	615.42	1365.51	860.27	505.24	15088.66	1120.66	13968.00
		26.54	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	8793.06	1128.56	710.99	417.57	1365.51	860.27	505.24	11287.13	922.80	10364.32
		26.54	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	2795.25	313.38	197.43	115.95	1365.51	860.27	505.24	4474.13	671.19	3852.94
		26.54	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		26.54	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1365.51	860.27	505.24	1365.51	505.24	860.27
		13.51	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94

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FLOOR	ROOM	EXTERIOR SURFACE (M2)	LST	ED	Ed	Er	SHGCteta	SHGCD	U	Tout	Tin	QUANTITY	qb (Direct solar heat gain) - all radiant	qd (Difuse solar heat gain)	qd radiant	qd convective	qc (Conductive heat gain)	qc radiant	qc convective	Q	Convective TOTAL	Radiant TOTAL
	PHYSICS CONFERENCE ROOM	13.51	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	1769.22	201.39	126.88	74.52	695.15	437.94	257.20	2665.76	331.72	2334.04
		13.51	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	4653.51	601.99	379.25	222.74	695.15	437.94	257.20	5950.65	479.94	5470.71
		13.51	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	6242.24	864.59	544.69	319.90	695.15	437.94	257.20	7801.98	577.10	7224.88
		13.51	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	7112.74	1019.74	642.44	377.31	695.15	437.94	257.20	8827.03	634.51	8193.12
		13.51	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	7380.23	1068.82	673.36	395.46	695.15	437.94	257.20	9144.20	652.67	8491.53
		13.51	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	7063.39	1010.76	636.78	373.98	695.15	437.94	257.20	8769.29	631.18	8138.11
		13.51	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	6139.39	846.75	533.45	313.30	695.15	437.94	257.20	7681.29	570.50	7110.79
		13.51	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	4476.35	574.52	361.95	212.57	695.15	437.94	257.20	5746.02	469.78	5276.24
		13.51	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	1423.00	159.53	100.51	59.03	695.15	437.94	257.20	2277.68	316.23	1961.45
		13.51	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
		13.51	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	695.15	437.94	257.20	695.15	257.20	437.94
	BREAK OUT	31.37	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	4107.10	467.52	294.54	172.98	1613.73	1016.65	597.08	6188.34	770.06	5418.28
		31.37	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	10802.75	1397.47	880.41	517.06	1613.73	1016.65	597.08	13813.95	1114.14	12699.80
		31.37	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	14490.86	2007.07	1264.46	742.62	1613.73	1016.65	597.08	18111.66	1339.70	16771.97
		31.37	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	16511.64	2367.25	1491.37	875.88	1613.73	1016.65	597.08	20492.62	1472.96	19019.66
		31.37	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	17132.60	2481.19	1563.15	918.04	1613.73	1016.65	597.08	21227.51	1515.12	19712.39
		31.37	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	16397.08	2346.39	1478.23	868.17	1613.73	1016.65	597.08	20357.20	1465.24	18891.96
		31.37	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	14252.10	1965.66	1238.37	727.29	1613.73	1016.65	597.08	17831.49	1324.37	16507.12
		31.37	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	10391.48	1333.71	840.24	493.47	1613.73	1016.65	597.08	13338.91	1090.55	12248.36
		31.37	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	3303.37	370.34	233.32	137.03	1613.73	1016.65	597.08	5287.44	734.11	4553.34
		31.37	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
		31.37	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1613.73	1016.65	597.08	1613.73	597.08	1016.65
	CORNER OFFICE	28.59	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	2	7485.80	852.13	536.84	315.29	2941.26	1853.00	1088.27	11279.19	1403.55	9875.64
		28.59	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	2	19689.64	2547.10	1604.68	942.43	2941.26	1853.00	1088.27	25178.00	2030.70	23147.31
		28.59	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	2	26411.79	3658.20	2304.66	1353.53	2941.26	1853.00	1088.27	33011.24	2441.80	30569.44
		28.59	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	2	30094.96	4314.67	2718.25	1596.43	2941.26	1853.00	1088.27	37350.90	2684.70	34666.20
		28.59	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	2	31226.75	4522.34	2849.07	1673.26	2941.26	1853.00	1088.27	38690.15	2761.53	35928.83
		28.59	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	2	29886.16	4276.65	2694.29	1582.36	2941.26	1853.00	1088.27	37104.08	2670.63	34433.45
		28.59	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	2	25976.63	3582.71	2257.11	1325.60	2941.26	1853.00	1088.27	32500.58	2413.87	30086.71
		28.59	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	2	18940.04	2430.86	1531.46	899.43	2941.26	1853.00	1088.27	24312.18	1987.69	22324.49
		28.59	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	2	6020.90	675.00	425.25	249.75	2941.26	1853.00	1088.27	9637.16	1338.02	8299.14
		28.59	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
		28.59	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	2941.26	1853.00	1088.27	2941.26	1088.27	1853.00
	FACULTY OFFICE	8.56	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	24	26894.59	3061.48	1928.73	1132.75	10567.21	6657.34	3909.87	40523.28	5042.62	35480.67
		8.56	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	24	70739.87	9151.10	5765.19	3385.91	10567.21	6657.34	3909.87	90458.19	7295.78	83162.41
		8.56	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	24	94890.84	13142.97	8280.07	4862.90	10567.21	6657.34	3909.87	118601.02	8772.77	109828.26
		8.56	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	24	108123.58	15501.53	9765.97	5735.57	10567.21	6657.34	3909.87	134192.32	9645.44	124546.89
		8.56	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	24	112189.79	16247.61	10235.99	6011.62	10567.21	6657.34	3909.87	139004.61	9921.48	129083.13
		8.56	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	24	107373.40	15364.04	9679.91	5685.03	10567.21	6657.34	3909.87	133305.55	9594.90	123710.66
		8.56	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	24	93327.36	12871.78	8109.22	4762.56	10567.21	6657.34	3909.87	116766.36	8672.43	108093.93
		8.56	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	24	68046.75	8733.55	5502.14	3231.41	10567.21	6657.34	3909.87	87347.52	7141.28	80206.23
		8.56	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	24	21631.55	2425.12	1527.83	897.29	10567.21	6657.34	3909.87	34623.89	4807.16	29816.72
		8.56	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		8.56	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	24	0.00	0.00	0.00	0.00	10567.21	6657.34	3909.87	10567.21	3909.87	6657.34
		10.57	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	2	2767.16	314.99	198.45	116.55	1087.25	684.97	402.28	4169.40	518.83	3650.57

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FLOOR	ROOM	EXTERIOR SURFACE [M2]	LST	ED	Ed	Er	SHGCteta	SHGCD	U	Tout	Tin	QUANTITY	qb (Direct solar heat gain) - all radiant	qd (Difuse solar heat gain)	qd radiant	qd convective	qc (Conductive heat gain)	qc radiant	qc convective	Q	Convective TOTAL	Radiant TOTAL
THIRD	BREAK OUT	10.57	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	2	7278.36	941.55	593.18	348.37	1087.25	684.97	402.28	9307.16	750.66	8556.50
		10.57	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	2	9763.23	1352.27	851.93	500.34	1087.25	684.97	402.28	12202.74	902.62	11300.12
		10.57	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	2	11124.73	1594.94	1004.81	590.13	1087.25	684.97	402.28	13806.92	992.41	12814.51
		10.57	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	2	11543.10	1671.70	1053.17	618.53	1087.25	684.97	402.28	14302.05	1020.81	13281.24
		10.57	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	2	11047.55	1580.88	995.96	584.93	1087.25	684.97	402.28	13715.68	987.21	12728.47
		10.57	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	2	9602.36	1324.37	834.35	490.02	1087.25	684.97	402.28	12013.98	892.30	11121.68
		10.57	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	2	7001.26	898.59	566.11	332.48	1087.25	684.97	402.28	8987.10	734.76	8252.34
		10.57	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	2	2225.65	249.52	157.20	92.32	1087.25	684.97	402.28	3562.42	494.60	3067.81
		10.57	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
		10.57	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	2	0.00	0.00	0.00	0.00	1087.25	684.97	402.28	1087.25	402.28	684.97
	PHYSICS VISITING OFFICE SUITE	10.67	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	1396.35	158.95	100.14	58.81	548.64	345.65	203.00	2103.94	261.81	1842.13
		10.67	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	3672.77	475.12	299.33	175.79	548.64	345.65	203.00	4696.53	378.79	4317.74
		10.67	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	4926.67	682.37	429.90	252.48	548.64	345.65	203.00	6157.69	455.48	5702.22
		10.67	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	5613.71	804.83	507.04	297.79	548.64	345.65	203.00	6967.18	500.79	6466.40
		10.67	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	5824.83	843.57	531.45	312.12	548.64	345.65	203.00	7217.03	515.12	6701.92
		10.67	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	5574.76	797.74	502.58	295.16	548.64	345.65	203.00	6921.14	498.16	6422.98
		10.67	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	4845.50	668.30	421.03	247.27	548.64	345.65	203.00	6062.44	450.27	5612.17
		10.67	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	3532.95	453.44	285.67	167.77	548.64	345.65	203.00	4535.03	370.77	4164.26
		10.67	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	1123.10	125.91	79.32	46.59	548.64	345.65	203.00	1797.65	249.59	1548.07
		10.67	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
		10.67	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	548.64	345.65	203.00	548.64	203.00	345.65
	ADH	6.52	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	853.26	97.13	61.19	35.94	335.26	211.21	124.04	1285.64	159.98	1125.66
		6.52	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	2244.29	290.33	182.91	107.42	335.26	211.21	124.04	2869.88	231.47	2638.41
		6.52	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	3010.51	416.97	262.69	154.28	335.26	211.21	124.04	3762.74	278.32	3484.41
		6.52	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	3430.33	491.80	309.84	181.97	335.26	211.21	124.04	4257.39	306.01	3951.37
		6.52	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	3559.33	515.47	324.75	190.72	335.26	211.21	124.04	4410.06	314.77	4095.29
		6.52	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	3406.53	487.47	307.10	180.36	335.26	211.21	124.04	4229.25	304.41	3924.84
		6.52	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	2960.90	408.37	257.27	151.10	335.26	211.21	124.04	3704.53	275.14	3429.39
		6.52	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	2158.85	277.08	174.56	102.52	335.26	211.21	124.04	2771.19	226.56	2544.62
		6.52	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	686.28	76.94	48.47	28.47	335.26	211.21	124.04	1098.48	152.51	945.97
		6.52	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
		6.52	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	335.26	211.21	124.04	335.26	124.04	211.21
	PHYSICS DEPARTMENT HEAD	26.00	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	3403.79	387.46	244.10	143.36	1337.39	842.56	494.83	5128.64	638.19	4490.44
		26.00	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	8952.86	1158.17	729.64	428.52	1337.39	842.56	494.83	11448.41	923.36	10525.06
		26.00	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	12009.41	1663.38	1047.93	615.45	1337.39	842.56	494.83	15010.18	1110.28	13899.90
		26.00	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	13684.15	1961.88	1235.98	725.90	1337.39	842.56	494.83	16983.42	1220.73	15762.69
		26.00	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	14198.77	2056.30	1295.47	760.83	1337.39	842.56	494.83	17592.46	1255.67	16336.80
		26.00	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	13589.21	1944.50	1225.09	719.50	1337.39	842.56	494.83	16871.19	1214.33	15656.86
		26.00	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	11811.54	1629.06	1026.31	602.75	1337.39	842.56	494.83	14777.98	1097.59	13680.40
		26.00	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	8612.02	1105.32	696.35	408.97	1337.39	842.56	494.83	11054.73	903.80	10150.92
		26.00	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	2737.70	306.92	193.36	113.56	1337.39	842.56	494.83	4382.01	608.40	3773.61
		26.00	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		26.00	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1337.39	842.56	494.83	1337.39	494.83	842.56
		6.98	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	913.47	103.98	65.51	38.47	358.91	226.11	132.80	1376.36	171.27	1205.09
		6.98	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	2402.66	310.81	195.81	115.00	358.91	226.11	132.80	3072.38	247.80	2824.59
		6.98	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	3222.94	446.40	281.23	165.17	358.91	226.11	132.80	4028.25	297.96	3730.28
		6.98	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	3672.38	526.50	331.70	194.81	358.91	226.11	132.80	4557.80	327.60	4230.20

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FLOOR	ROOM	EXTERIOR SURFACE [M2]	LST	ED	Ed	Er	SHGCteta	SHGCD	U	Tout	Tin	QUANTITY	qb (Direct solar heat gain) - all radiant	qd (Difuse solar heat gain)	qd radiant	qd convective	qc (Conductive heat gain)	qc radiant	qc convective	Q	Convective TOTAL	Radiant TOTAL
	[illegible]	6.98	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	3810.49	551.84	347.66	204.18	358.91	226.11	132.80	4721.25	336.98	4384.27
		6.98	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	3646.90	521.87	328.78	193.09	358.91	226.11	132.80	4527.68	325.89	4201.79
		6.98	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	3169.83	437.19	275.43	161.76	358.91	226.11	132.80	3965.93	294.56	3671.38
		6.98	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	2311.19	296.63	186.88	109.75	358.91	226.11	132.80	2966.73	242.55	2724.18
		6.98	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	734.71	82.37	51.89	30.48	358.91	226.11	132.80	1175.99	163.27	1012.72
		6.98	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
		6.98	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	358.91	226.11	132.80	358.91	132.80	226.11
	ADMIN 2	3.75	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	491.00	55.89	35.21	20.68	192.92	121.54	71.38	739.81	92.06	647.75
		3.75	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	1291.45	167.07	105.25	61.81	192.92	121.54	71.38	1651.44	133.19	1518.24
		3.75	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	1732.36	239.94	151.16	88.78	192.92	121.54	71.38	2165.22	160.16	2005.06
		3.75	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	1973.94	283.00	178.29	104.71	192.92	121.54	71.38	2449.86	176.09	2273.77
		3.75	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	2048.18	296.62	186.87	109.75	192.92	121.54	71.38	2537.72	181.13	2356.59
		3.75	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	1960.25	280.51	176.72	103.79	192.92	121.54	71.38	2433.67	175.17	2258.51
		3.75	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	1703.82	234.99	148.04	86.95	192.92	121.54	71.38	2131.73	158.33	1973.40
		3.75	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	1242.29	159.44	100.45	58.99	192.92	121.54	71.38	1594.65	130.37	1464.27
		3.75	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	394.91	44.27	27.89	16.38	192.92	121.54	71.38	632.11	87.76	544.34
		3.75	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
		3.75	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	192.92	121.54	71.38	192.92	71.38	121.54
	CONFERENCE 10 SEAT	33.26	0	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	1	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	2	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	3	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	4	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	5	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	6	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	7	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	8	192.54	16.85	7.99	0.68	0.60	3.56	36.67	22.22	1	4354.47	495.68	312.28	183.40	1710.93	1077.88	633.04	6561.08	816.44	5744.64
		33.26	9	506.42	41.06	33.19	0.68	0.60	3.56	36.67	22.22	1	11453.41	1481.64	933.44	548.21	1710.93	1077.88	633.04	14645.99	1181.25	13464.73
		33.26	10	679.32	52.89	53.75	0.68	0.60	3.56	36.67	22.22	1	15363.67	2127.96	1340.62	787.35	1710.93	1077.88	633.04	19202.56	1420.39	17782.17
		33.26	11	774.05	59.11	66.66	0.68	0.60	3.56	36.67	22.22	1	17506.17	2509.84	1581.20	928.64	1710.93	1077.88	633.04	21726.93	1561.68	20165.25
		33.26	12	803.16	61.01	70.82	0.68	0.60	3.56	36.67	22.22	1	18164.52	2630.63	1657.30	973.33	1710.93	1077.88	633.04	22506.08	1606.38	20899.71
		33.26	13	768.68	58.76	65.90	0.68	0.60	3.56	36.67	22.22	1	17384.71	2487.72	1567.26	920.46	1710.93	1077.88	633.04	21583.15	1553.50	20029.86
		33.26	14	668.12	52.14	52.29	0.68	0.60	3.56	36.67	22.22	1	15110.53	2084.06	1312.96	771.10	1710.93	1077.88	633.04	18905.51	1404.14	17501.37
		33.26	15	487.14	39.68	31.18	0.68	0.60	3.56	36.67	22.22	1	11017.37	1414.04	890.85	523.19	1710.93	1077.88	633.04	14142.34	1156.24	12986.10
		33.26	16	154.86	13.68	6.00	0.68	0.60	3.56	36.67	22.22	1	3502.34	392.65	247.37	145.28	1710.93	1077.88	633.04	5605.92	778.32	4827.59
		33.26	17	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	18	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	19	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	20	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	21	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	22	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88
		33.26	23	0.00	0.00	0.00	0.68	0.60	3.56	36.67	22.22	1	0.00	0.00	0.00	0.00	1710.93	1077.88	633.04	1710.93	633.04	1077.88

APPENDIX LC.6 – EXTERIOR WALLS

APPENDIX LC.6-A – SOL-AIR TEMPERATURES

Local Standard Time (LST)	Equation of Time [ET]	Local Estándar meridian (LSM)	Local Longitude (LON)	Aparent Solar Time (AST)	Hour Angle (H)	Latitude (L)	Solar declination (δ)	Sin (β)	Solar altitude (β)
0	1.6	-105	-105.230484	0.042032267	-179.36952	39.754185	-23.45	-0.9597421	-73.6871023
1	1.6	-105	-105.230484	1.042032267	-164.36952	39.754185	-23.45	-0.9337024	-69.0195084
2	1.6	-105	-105.230484	2.042032267	-149.36952	39.754185	-23.45	-0.8613752	-59.4713467
3	1.6	-105	-105.230484	3.042032267	-134.36952	39.754185	-23.45	-0.7476896	-48.390638
4	1.6	-105	-105.230484	4.042032267	-119.36952	39.754185	-23.45	-0.600393	-36.8980467
5	1.6	-105	-105.230484	5.042032267	-104.36952	39.754185	-23.45	-0.4295234	-25.437315
6	1.6	-105	-105.230484	6.042032267	-89.369516	39.754185	-23.45	-0.2467253	-14.2838141
7	1.6	-105	-105.230484	7.042032267	-74.369516	39.754185	-23.45	-0.0644561	-3.69562205
8	1.6	-105	-105.230484	8.042032267	-59.369516	39.754185	-23.45	0.1048629	6.019267792
9	1.6	-105	-105.230484	9.042032267	-44.369516	39.754185	-23.45	0.24969281	14.45933513
10	1.6	-105	-105.230484	10.04203227	-29.369516	39.754185	-23.45	0.36016375	21.11025307
11	1.6	-105	-105.230484	11.04203227	-14.369516	39.754185	-23.45	0.42874732	25.38808793
12	1.6	-105	-105.230484	12.04203227	0.630484	39.754185	-23.45	0.45076964	26.7930741
13	1.6	-105	-105.230484	13.04203227	15.630484	39.754185	-23.45	0.42472995	25.13357106
14	1.6	-105	-105.230484	14.04203227	30.630484	39.754185	-23.45	0.35240279	20.6343511
15	1.6	-105	-105.230484	15.04203227	45.630484	39.754185	-23.45	0.23871715	13.81083796
16	1.6	-105	-105.230484	16.04203227	60.630484	39.754185	-23.45	0.09142052	5.245333684
17	1.6	-105	-105.230484	17.04203227	75.630484	39.754185	-23.45	-0.0794491	-4.55690007
18	1.6	-105	-105.230484	18.04203227	90.630484	39.754185	-23.45	-0.2622472	-15.2034441
19	1.6	-105	-105.230484	19.04203227	105.630484	39.754185	-23.45	-0.4445164	-26.3924016
20	1.6	-105	-105.230484	20.04203227	120.630484	39.754185	-23.45	-0.6138353	-37.8673432
21	1.6	-105	-105.230484	21.04203227	135.630484	39.754185	-23.45	-0.7586653	-49.3466708
22	1.6	-105	-105.230484	22.04203227	150.630484	39.754185	-23.45	-0.8691362	-60.358415
23	1.6	-105	-105.230484	23.04203227	165.630484	39.754185	-23.45	-0.9377198	-69.6720799

cos(ϕ)	Solar azimuth (ϕ)	Surface azimuth (ψ)	Surface-solar azimuth (γ)	cos(θ)	Incident angle (θ)	A	B	C	Direct normal Irradiance (EDN)	Surface Direct Irradiance (ED)
-0.9993539	177.940337	180	-2.059662875	-0.28070129	106.302065	1233	0.142	0.057	0	0
-0.7234773	136.342324	180	-43.65767571	-0.25904109	105.013171	1233	0.142	0.057	0	0
-0.3915164	113.04889	180	-66.95111016	-0.19887829	101.471372	1233	0.142	0.057	0	0
-0.1570863	99.0378141	180	-80.96218588	-0.1043129	95.987581	1233	0.142	0.057	0	0
0.02277167	88.6951665	180	-91.30483352	0.018210623	88.9565505	1233	0.142	0.057	0	0
0.17755547	79.7725948	180	-100.2274052	0.16034249	80.7732239	1233	0.142	0.057	0	0
0.32236233	71.194151	180	-108.805849	0.312396652	71.7962766	1233	0.142	0.057	0	0
0.46497777	62.2912166	180	-117.7087834	0.46401087	62.353774	1233	0.142	0.057	0	0
0.60820612	52.5400938	180	-127.4599062	0.604852885	52.7817436	1233	0.142	0.057	318.3197686	192.5366305
0.74905065	41.4917908	180	-138.5082092	0.725324548	43.5041469	1233	0.142	0.057	698.2007809	506.4221655
0.87600543	28.8358084	180	-151.1641916	0.817215912	35.1929409	1233	0.142	0.057	831.2581523	679.3173887
0.96772313	14.5968277	180	-165.4031723	0.874264733	29.0419239	1233	0.142	0.057	885.3721763	774.0496696
0.99993605	0.64797828	180	-179.3520217	0.892583229	26.800329	1233	0.142	0.057	899.8145852	803.1594084
0.96200563	15.8446268	180	-164.1553732	0.870923025	29.4339213	1233	0.142	0.057	882.602929	768.6792128
0.86633712	29.9642609	180	-150.0357391	0.810760227	35.8297257	1233	0.142	0.057	824.0716678	668.1245324
0.73751708	42.4796636	180	-137.5203364	0.716194831	44.2587944	1233	0.142	0.057	680.1812199	487.1422735
0.59616784	53.4040705	180	-126.5959295	0.593671311	53.5820292	1233	0.142	0.057	260.8495164	154.8588745
0.45297132	63.0655188	180	-116.9344812	0.451539445	63.1575039	1233	0.142	0.057	0	0
0.31034721	71.9198439	180	-108.0801561	0.299485283	72.5733094	1233	0.142	0.057	0	0
0.16507691	80.4982975	180	-99.50170251	0.147871065	81.4964283	1233	0.142	0.057	0	0
0.00890391	89.4898368	180	-90.51016316	0.007029049	89.5972618	1233	0.142	0.057	0	0
-0.1741304	100.028059	180	-79.97194076	-0.11344261	96.5138055	1233	0.142	0.057	0	0
-0.4151744	114.530301	180	-65.4696994	-0.20533398	101.84905	1233	0.142	0.057	0	0
-0.7552918	139.050869	180	-40.94913075	-0.2623828	105.211496	1233	0.142	0.057	0	0

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Y	Diffuse irradiance (Ed)	ro g	Ground Reflected Irradiance (Er)	Total Surface Irradiance (Et)	Tout	α/h_0	Sol-air temperature
0.45	0	0.31	0	0	31.667	0.052	31.667
0.45	0	0.31	0	0	31.667	0.052	31.667
0.47547014	0	0.31	0	0	31.667	0.052	31.667
0.50782107	0	0.31	0	0	31.667	0.052	31.667
0.55806184	0	0.31	0	0	31.667	0.052	31.667
0.62811681	0	0.31	0	0	31.667	0.052	31.667
0.71706353	0	0.31	0	0	31.667	0.052	31.667
0.82016356	0	0.31	0	0	31.667	0.052	31.667
0.92883083	16.85291717	0.31	7.986245011	217.3757927	31.667	0.052	42.97054122
1.03163478	41.05642796	0.31	33.19063992	580.6692334	31.667	0.052	61.86180013
1.11615785	52.88547285	0.31	53.74946959	785.9523312	31.667	0.052	72.53652122
1.17129174	59.11065968	0.31	66.66040958	899.8207389	31.667	0.052	78.45767842
1.18942748	61.00505911	0.31	70.8192721	934.9837396	31.667	0.052	80.28615446
1.16800603	58.76047578	0.31	65.90232047	893.342009	31.667	0.052	78.12078447
1.11004718	52.1412306	0.31	52.29347221	772.5592352	31.667	0.052	71.84008023
1.02352581	39.68243282	0.31	31.17689416	558.0016005	31.667	0.052	60.68308323
0.91974984	13.67522922	0.31	6.000890131	174.5349939	31.667	0.052	40.74281968
0.81113964	0	0.31	0	0	31.667	0.052	31.667
0.70894849	0	0.31	0	0	31.667	0.052	31.667
0.62146367	0	0.31	0	0	31.667	0.052	31.667
0.55308716	0	0.31	0	0	31.667	0.052	31.667
0.50445365	0	0.31	0	0	31.667	0.052	31.667
0.45	0	0.31	0	0	31.667	0.052	31.667
0.45	0	0.31	0	0	31.667	0.052	31.667

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APPENDIX LC.6-B – EXTERIOR WALLS LOAD CALCULATIONS

FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
FIRST	PHYSICS STUDENT LOUNGE	B	5.620639359	0	31.667	0.702	22.22	37.27492238	1.00%	0.372749224	97.7083578	1	97.70835782	5256.54
				1	31.667	0.702	22.22	37.27492238	1.00%	0.372749224				
				2	31.667	0.702	22.22	37.27492238	3.00%	1.118247671				
				3	31.667	0.702	22.22	37.27492238	6.00%	2.236495343				
				4	31.667	0.702	22.22	37.27492238	7.00%	2.609244567				
				5	31.667	0.702	22.22	37.27492238	8.00%	2.98199379				
				6	31.667	0.702	22.22	37.27492238	8.00%	2.98199379				
				7	31.667	0.702	22.22	37.27492238	8.00%	2.98199379				
				8	42.97054122	0.702	22.22	81.87517871	8.00%	6.550014297				
				9	61.86180013	0.702	22.22	156.414208	7.00%	10.94899456				
				10	72.53652122	0.702	22.22	198.5333358	6.00%	11.91200015				
				11	78.45767842	0.702	22.22	221.8963796	6.00%	13.31378278				
				12	80.28615446	0.702	22.22	229.1109771	5.00%	11.45554885				
				13	78.12078447	0.702	22.22	220.5671009	4.00%	8.822684035				
				14	71.84008023	0.702	22.22	195.7853963	4.00%	7.831415853				
				15	60.68308323	0.702	22.22	151.7633579	3.00%	4.552900736				
				16	40.74281968	0.702	22.22	73.08528272	3.00%	2.192558482				
				17	31.667	0.702	22.22	37.27492238	3.00%	1.118247671				
				18	31.667	0.702	22.22	37.27492238	2.00%	0.745498448				
				19	31.667	0.702	22.22	37.27492238	2.00%	0.745498448				
				20	31.667	0.702	22.22	37.27492238	2.00%	0.745498448				
				21	31.667	0.702	22.22	37.27492238	1.00%	0.372749224				
				22	31.667	0.702	22.22	37.27492238	1.00%	0.372749224				
				23	31.667	0.702	22.22	37.27492238	1.00%	0.372749224				
	PHYSICS COMPUTER LAB	B	73.59024146	0	31.667	0.702	22.22	488.0353217	1.00%	4.880353217	1279.2818	1	1279.281801	
				1	31.667	0.702	22.22	488.0353217	1.00%	4.880353217				
				2	31.667	0.702	22.22	488.0353217	3.00%	14.64105965				
				3	31.667	0.702	22.22	488.0353217	6.00%	29.2821193				
				4	31.667	0.702	22.22	488.0353217	7.00%	34.16247252				
				5	31.667	0.702	22.22	488.0353217	8.00%	39.04282574				
				6	31.667	0.702	22.22	488.0353217	8.00%	39.04282574				
				7	31.667	0.702	22.22	488.0353217	8.00%	39.04282574				
				8	42.97054122	0.702	22.22	1071.980212	8.00%	85.75841694				
				9	61.86180013	0.702	22.22	2047.90925	7.00%	143.3536475				
				10	72.53652122	0.702	22.22	2599.369072	6.00%	155.9621443				
				11	78.45767842	0.702	22.22	2905.258122	6.00%	174.3154873				
				12	80.28615446	0.702	22.22	2999.717833	5.00%	149.9858917				
				13	78.12078447	0.702	22.22	2887.854063	4.00%	115.5141625				
				14	71.84008023	0.702	22.22	2563.390687	4.00%	102.5356275				
				15	60.68308323	0.702	22.22	1987.016322	3.00%	59.61048967				
				16	40.74281968	0.702	22.22	956.8953385	3.00%	28.70686015				
				17	31.667	0.702	22.22	488.0353217	3.00%	14.64105965				
				18	31.667	0.702	22.22	488.0353217	2.00%	9.760706435				
				19	31.667	0.702	22.22	488.0353217	2.00%	9.760706435				
				20	31.667	0.702	22.22	488.0353217	2.00%	9.760706435				
				21	31.667	0.702	22.22	488.0353217	1.00%	4.880353217				
				22	31.667	0.702	22.22	488.0353217	1.00%	4.880353217				
				23	31.667	0.702	22.22	488.0353217	1.00%	4.880353217				
				0	31.667	0.702	22.22	262.0537944	1.00%	2.620537944				
				1	31.667	0.702	22.22	262.0537944	1.00%	2.620537944				
				2	31.667	0.702	22.22	262.0537944	3.00%	7.861613832				
				3	31.667	0.702	22.22	262.0537944	6.00%	15.72322766				
				4	31.667	0.702	22.22	262.0537944	7.00%	18.34376561				
				5	31.667	0.702	22.22	262.0537944	8.00%	20.96430355				
				6	31.667	0.702	22.22	262.0537944	8.00%	20.96430355				
				7	31.667	0.702	22.22	262.0537944	8.00%	20.96430355				
				8	42.97054122	0.702	22.22	575.6068659	8.00%	46.04854927				
				9	61.86180013	0.702	22.22	1099.638419	7.00%	76.97468931				

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FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
				10	72.53652122	0.702	22.22	1395.748418	6.00%	83.74490509				
	ACTIVE LEARNING STUDIO	B	39.51476695	11	78.45767842	0.702	22.22	1559.997567	6.00%	93.59985403	686.918826	2	1373.837651	
				12	80.28615446	0.702	22.22	1610.718334	5.00%	80.5359167				
				13	78.12078447	0.702	22.22	1550.652343	4.00%	62.0260937				
				14	71.84008023	0.702	22.22	1376.429586	4.00%	55.05718346				
				15	60.68308323	0.702	22.22	1066.941559	3.00%	32.00824676				
				16	40.74281968	0.702	22.22	513.8112819	3.00%	15.41433846				
				17	31.667	0.702	22.22	262.0537944	3.00%	7.861613832				
				18	31.667	0.702	22.22	262.0537944	2.00%	5.241075888				
				19	31.667	0.702	22.22	262.0537944	2.00%	5.241075888				
				20	31.667	0.702	22.22	262.0537944	2.00%	5.241075888				
				21	31.667	0.702	22.22	262.0537944	1.00%	2.620537944				
				22	31.667	0.702	22.22	262.0537944	1.00%	2.620537944				
				23	31.667	0.702	22.22	262.0537944	1.00%	2.620537944				
				0	31.667	0.702	22.22	955.9067872	1.00%	9.559067872				
				1	31.667	0.702	22.22	955.9067872	1.00%	9.559067872				
				2	31.667	0.702	22.22	955.9067872	3.00%	28.67720361				
				3	31.667	0.702	22.22	955.9067872	6.00%	57.35440723				
				4	31.667	0.702	22.22	955.9067872	7.00%	66.9134751				
				5	31.667	0.702	22.22	955.9067872	8.00%	76.47254297				
				6	31.667	0.702	22.22	955.9067872	8.00%	76.47254297				
				7	31.667	0.702	22.22	955.9067872	8.00%	76.47254297				
				8	42.97054122	0.702	22.22	2099.670074	8.00%	167.9736059				
				9	61.86180013	0.702	22.22	4011.206288	7.00%	280.7844402				
				10	72.53652122	0.702	22.22	5091.341605	6.00%	305.4804963				
	ACTIVE LEARNING STUDIO	B	144.14	11	78.45767842	0.702	22.22	5690.481475	6.00%	341.4288885	2505.7083	1	2505.7083	
				12	80.28615446	0.702	22.22	5875.498163	5.00%	293.7749082				
				13	78.12078447	0.702	22.22	5656.39243	4.00%	226.2556972				
				14	71.84008023	0.702	22.22	5020.871332	4.00%	200.8348533				
				15	60.68308323	0.702	22.22	3891.936309	3.00%	116.7580893				
				16	40.74281968	0.702	22.22	1874.255219	3.00%	56.22765656				
				17	31.667	0.702	22.22	955.9067872	3.00%	28.67720361				
				18	31.667	0.702	22.22	955.9067872	2.00%	19.11813574				
				19	31.667	0.702	22.22	955.9067872	2.00%	19.11813574				
				20	31.667	0.702	22.22	955.9067872	2.00%	19.11813574				
				21	31.667	0.702	22.22	955.9067872	1.00%	9.559067872				
				22	31.667	0.702	22.22	955.9067872	1.00%	9.559067872				
				23	31.667	0.702	22.22	955.9067872	1.00%	9.559067872				
				0	31.667	0.419	22.22	29.22780104	19.00%	5.553282198				
				1	31.667	0.419	22.22	29.22780104	59.00%	17.24440262				
				2	31.667	0.419	22.22	29.22780104	18.00%	5.261004188				
				3	31.667	0.419	22.22	29.22780104	3.00%	0.876834031				
				4	31.667	0.419	22.22	29.22780104	1.00%	0.29227801				
				5	31.667	0.419	22.22	29.22780104	0.00%	0				
				6	31.667	0.419	22.22	29.22780104	0.00%	0				
				7	31.667	0.419	22.22	29.22780104	0.00%	0				
				8	42.97054122	0.419	22.22	64.19950146	0.00%	0				
				9	61.86180013	0.419	22.22	122.646623	0.00%	0				
				10	72.53652122	0.419	22.22	155.6728349	0.00%	0				
	CORNER OFFICE	M	7.383940765	11	78.45767842	0.419	22.22	173.9921325	0.00%	0	29.227801	2	58.45560208	
				12	80.28615446	0.419	22.22	179.6492018	0.00%	0				
				13	78.12078447	0.419	22.22	172.949826	0.00%	0				
				14	71.84008023	0.419	22.22	153.5181362	0.00%	0				
				15	60.68308323	0.419	22.22	118.9998247	0.00%	0				
				16	40.74281968	0.419	22.22	57.30721799	0.00%	0				
				17	31.667	0.419	22.22	29.22780104	0.00%	0				
				18	31.667	0.419	22.22	29.22780104	0.00%	0				
				19	31.667	0.419	22.22	29.22780104	0.00%	0				

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FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
				20	31.667	0.419	22.22	29.22780104	0.00%	0				
				21	31.667	0.419	22.22	29.22780104	0.00%	0				
				22	31.667	0.419	22.22	29.22780104	0.00%	0				
				23	31.667	0.419	22.22	29.22780104	0.00%	0				
				0	31.667	0.419	22.22	27.90026755	19.00%	5.301050835				
				1	31.667	0.419	22.22	27.90026755	59.00%	16.46115786				
				2	31.667	0.419	22.22	27.90026755	18.00%	5.022048159				
				3	31.667	0.419	22.22	27.90026755	3.00%	0.837008027				
				4	31.667	0.419	22.22	27.90026755	1.00%	0.279002676				
				5	31.667	0.419	22.22	27.90026755	0.00%	0				
				6	31.667	0.419	22.22	27.90026755	0.00%	0				
				7	31.667	0.419	22.22	27.90026755	0.00%	0				
				8	42.97054122	0.419	22.22	61.28354524	0.00%	0				
				9	61.86180013	0.419	22.22	117.075985	0.00%	0				
				10	72.53652122	0.419	22.22	148.6021387	0.00%	0				
	FACULTY OFFICE	M	7.048560466	11	78.45767842	0.419	22.22	166.0893696	0.00%	0	27.9002676	24	669.6064213	
				12	80.28615446	0.419	22.22	171.4894935	0.00%	0				
				13	78.12078447	0.419	22.22	165.0944049	0.00%	0				
				14	71.84008023	0.419	22.22	146.5453069	0.00%	0				
				15	60.68308323	0.419	22.22	113.5948251	0.00%	0				
				16	40.74281968	0.419	22.22	54.70431088	0.00%	0				
				17	31.667	0.419	22.22	27.90026755	0.00%	0				
				18	31.667	0.419	22.22	27.90026755	0.00%	0				
				19	31.667	0.419	22.22	27.90026755	0.00%	0				
				20	31.667	0.419	22.22	27.90026755	0.00%	0				
				21	31.667	0.419	22.22	27.90026755	0.00%	0				
				22	31.667	0.419	22.22	27.90026755	0.00%	0				
				23	31.667	0.419	22.22	27.90026755	0.00%	0				
				0	31.667	0.419	22.22	17.16232354	19.00%	3.260841472				
				1	31.667	0.419	22.22	17.16232354	59.00%	10.12577089				
				2	31.667	0.419	22.22	17.16232354	18.00%	3.089218236				
				3	31.667	0.419	22.22	17.16232354	3.00%	0.514869706				
				4	31.667	0.419	22.22	17.16232354	1.00%	0.171623235				
				5	31.667	0.419	22.22	17.16232354	0.00%	0				
				6	31.667	0.419	22.22	17.16232354	0.00%	0				
				7	31.667	0.419	22.22	17.16232354	0.00%	0				
				8	42.97054122	0.419	22.22	37.69741738	0.00%	0				
				9	61.86180013	0.419	22.22	72.01708473	0.00%	0				
				10	72.53652122	0.419	22.22	91.40980379	0.00%	0				
	BREAK OUT	M	4.335789073	11	78.45767842	0.419	22.22	102.1667441	0.00%	0	17.1623235	2	34.32464707	
				12	80.28615446	0.419	22.22	105.4885286	0.00%	0				
				13	78.12078447	0.419	22.22	101.5547104	0.00%	0				
				14	71.84008023	0.419	22.22	90.14458249	0.00%	0				
				15	60.68308323	0.419	22.22	69.87571489	0.00%	0				
				16	40.74281968	0.419	22.22	33.65032541	0.00%	0				
				17	31.667	0.419	22.22	17.16232354	0.00%	0				
				18	31.667	0.419	22.22	17.16232354	0.00%	0				
				19	31.667	0.419	22.22	17.16232354	0.00%	0				
				20	31.667	0.419	22.22	17.16232354	0.00%	0				
				21	31.667	0.419	22.22	17.16232354	0.00%	0				
				22	31.667	0.419	22.22	17.16232354	0.00%	0				
SECOND				23	31.667	0.419	22.22	17.16232354	0.00%	0				2525.46
				0	31.667	0.702	22.22	564.1186753	1.00%	5.641186753				
				1	31.667	0.702	22.22	564.1186753	1.00%	5.641186753				
				2	31.667	0.702	22.22	564.1186753	3.00%	16.92356026				
				3	31.667	0.702	22.22	564.1186753	6.00%	33.84712052				
				4	31.667	0.702	22.22	564.1186753	7.00%	39.48830727				
				5	31.667	0.702	22.22	564.1186753	8.00%	45.12949402				

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FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
	PHYSICS ELECTRONICS LAB	B	85.06275606	6	31.667	0.702	22.22	564.1186753	8.00%	45.12949402	1478.71829	1	1478.718287	
				7	31.667	0.702	22.22	564.1186753	8.00%	45.12949402				
				8	42.97054122	0.702	22.22	1239.098955	8.00%	99.12791637				
				9	61.86180013	0.702	22.22	2367.172624	7.00%	165.7020837				
				10	72.53652122	0.702	22.22	3004.603503	6.00%	180.2762102				
				11	78.45767842	0.702	22.22	3358.179809	6.00%	201.4907885				
				12	80.28615446	0.702	22.22	3467.365527	5.00%	173.3682763				
				13	78.12078447	0.702	22.22	3338.062505	4.00%	133.5225002				
				14	71.84008023	0.702	22.22	2963.016188	4.00%	118.5206475				
				15	60.68308323	0.702	22.22	2296.786658	3.00%	68.90359974				
				16	40.74281968	0.702	22.22	1106.072669	3.00%	33.18218006				
				17	31.667	0.702	22.22	564.1186753	3.00%	16.92356026				
				18	31.667	0.702	22.22	564.1186753	2.00%	11.28237351				
				19	31.667	0.702	22.22	564.1186753	2.00%	11.28237351				
				20	31.667	0.702	22.22	564.1186753	2.00%	11.28237351				
				21	31.667	0.702	22.22	564.1186753	1.00%	5.641186753				
				22	31.667	0.702	22.22	564.1186753	1.00%	5.641186753				
				23	31.667	0.702	22.22	564.1186753	1.00%	5.641186753				
	PHYSICS CONFERENCE ROOM	B	12.5	0	31.667	0.702	22.22	82.897425	1.00%	0.82897425	217.298139	1	217.298139	
				1	31.667	0.702	22.22	82.897425	1.00%	0.82897425				
				2	31.667	0.702	22.22	82.897425	3.00%	2.48692275				
				3	31.667	0.702	22.22	82.897425	6.00%	4.9738455				
				4	31.667	0.702	22.22	82.897425	7.00%	5.80281975				
				5	31.667	0.702	22.22	82.897425	8.00%	6.631794				
				6	31.667	0.702	22.22	82.897425	8.00%	6.631794				
				7	31.667	0.702	22.22	82.897425	8.00%	6.631794				
				8	42.97054122	0.702	22.22	182.0859992	8.00%	14.56687994				
				9	61.86180013	0.702	22.22	347.8567962	7.00%	24.34997573				
				10	72.53652122	0.702	22.22	441.5274737	6.00%	26.49164842				
				11	78.45767842	0.702	22.22	493.4856281	6.00%	29.60913769				
				12	80.28615446	0.702	22.22	509.5305054	5.00%	25.47652527				
				13	78.12078447	0.702	22.22	490.5293837	4.00%	19.62117535				
				14	71.84008023	0.702	22.22	435.416204	4.00%	17.41664816				
				15	60.68308323	0.702	22.22	337.5135553	3.00%	10.12540666				
				16	40.74281968	0.702	22.22	162.5377427	3.00%	4.876132281				
				17	31.667	0.702	22.22	82.897425	3.00%	2.48692275				
				18	31.667	0.702	22.22	82.897425	2.00%	1.6579485				
				19	31.667	0.702	22.22	82.897425	2.00%	1.6579485				
				20	31.667	0.702	22.22	82.897425	2.00%	1.6579485				
				21	31.667	0.702	22.22	82.897425	1.00%	0.82897425				
				22	31.667	0.702	22.22	82.897425	1.00%	0.82897425				
				23	31.667	0.702	22.22	82.897425	1.00%	0.82897425				
	BREAK OUT	M	16.9397709	0	31.667	0.419	22.22	67.05257658	19.00%	12.73998955	67.0525766	1	67.05257658	
				1	31.667	0.419	22.22	67.05257658	59.00%	39.56102018				
				2	31.667	0.419	22.22	67.05257658	18.00%	12.06946378				
				3	31.667	0.419	22.22	67.05257658	3.00%	2.011577297				
				4	31.667	0.419	22.22	67.05257658	1.00%	0.670525766				
				5	31.667	0.419	22.22	67.05257658	0.00%	0				
				6	31.667	0.419	22.22	67.05257658	0.00%	0				
				7	31.667	0.419	22.22	67.05257658	0.00%	0				
				8	42.97054122	0.419	22.22	147.2824446	0.00%	0				
				9	61.86180013	0.419	22.22	281.3681422	0.00%	0				
				10	72.53652122	0.419	22.22	357.1347933	0.00%	0				
				11	78.45767842	0.419	22.22	399.1617698	0.00%	0				
				12	80.28615446	0.419	22.22	412.1398612	0.00%	0				
				13	78.12078447	0.419	22.22	396.770576	0.00%	0				
				14	71.84008023	0.419	22.22	352.1916195	0.00%	0				
				15	60.68308323	0.419	22.22	273.0018877	0.00%	0				

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FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
				16	40.74281968	0.419	22.22	131.4706028	0.00%	0				
				17	31.667	0.419	22.22	67.05257658	0.00%	0				
				18	31.667	0.419	22.22	67.05257658	0.00%	0				
				19	31.667	0.419	22.22	67.05257658	0.00%	0				
				20	31.667	0.419	22.22	67.05257658	0.00%	0				
				21	31.667	0.419	22.22	67.05257658	0.00%	0				
				22	31.667	0.419	22.22	67.05257658	0.00%	0				
				23	31.667	0.419	22.22	67.05257658	0.00%	0				
	CORNER OFFICE	M	7.383940765	0	31.667	0.419	22.22	29.22780104	19.00%	5.553282198	29.227801	2	58.45560208	
				1	31.667	0.419	22.22	29.22780104	59.00%	17.24440262				
				2	31.667	0.419	22.22	29.22780104	18.00%	5.261004188				
				3	31.667	0.419	22.22	29.22780104	3.00%	0.876834031				
				4	31.667	0.419	22.22	29.22780104	1.00%	0.29227801				
				5	31.667	0.419	22.22	29.22780104	0.00%	0				
				6	31.667	0.419	22.22	29.22780104	0.00%	0				
				7	31.667	0.419	22.22	29.22780104	0.00%	0				
				8	42.97054122	0.419	22.22	64.19950146	0.00%	0				
				9	61.86180013	0.419	22.22	122.646623	0.00%	0				
				10	72.53652122	0.419	22.22	155.6728349	0.00%	0				
				11	78.45767842	0.419	22.22	173.9921325	0.00%	0				
				12	80.28615446	0.419	22.22	179.6492018	0.00%	0				
				13	78.12078447	0.419	22.22	172.949826	0.00%	0				
				14	71.84008023	0.419	22.22	153.5181362	0.00%	0				
				15	60.68308323	0.419	22.22	118.9998247	0.00%	0				
				16	40.74281968	0.419	22.22	57.30721799	0.00%	0				
				17	31.667	0.419	22.22	29.22780104	0.00%	0				
				18	31.667	0.419	22.22	29.22780104	0.00%	0				
				19	31.667	0.419	22.22	29.22780104	0.00%	0				
				20	31.667	0.419	22.22	29.22780104	0.00%	0				
				21	31.667	0.419	22.22	29.22780104	0.00%	0				
				22	31.667	0.419	22.22	29.22780104	0.00%	0				
				23	31.667	0.419	22.22	29.22780104	0.00%	0				
	FACULTY OFFICE	M	7.048560466	0	31.667	0.419	22.22	27.90026755	19.00%	5.301050835	27.9002676	24	669.6064213	
				1	31.667	0.419	22.22	27.90026755	59.00%	16.46115786				
				2	31.667	0.419	22.22	27.90026755	18.00%	5.022048159				
				3	31.667	0.419	22.22	27.90026755	3.00%	0.837008027				
				4	31.667	0.419	22.22	27.90026755	1.00%	0.279002676				
				5	31.667	0.419	22.22	27.90026755	0.00%	0				
				6	31.667	0.419	22.22	27.90026755	0.00%	0				
				7	31.667	0.419	22.22	27.90026755	0.00%	0				
				8	42.97054122	0.419	22.22	61.28354524	0.00%	0				
				9	61.86180013	0.419	22.22	117.075985	0.00%	0				
				10	72.53652122	0.419	22.22	148.6021387	0.00%	0				
				11	78.45767842	0.419	22.22	166.0893696	0.00%	0				
				12	80.28615446	0.419	22.22	171.4894935	0.00%	0				
				13	78.12078447	0.419	22.22	165.0944049	0.00%	0				
				14	71.84008023	0.419	22.22	146.5453069	0.00%	0				
				15	60.68308323	0.419	22.22	113.5948251	0.00%	0				
				16	40.74281968	0.419	22.22	54.70431088	0.00%	0				
				17	31.667	0.419	22.22	27.90026755	0.00%	0				
				18	31.667	0.419	22.22	27.90026755	0.00%	0				
				19	31.667	0.419	22.22	27.90026755	0.00%	0				
				20	31.667	0.419	22.22	27.90026755	0.00%	0				
				21	31.667	0.419	22.22	27.90026755	0.00%	0				
				22	31.667	0.419	22.22	27.90026755	0.00%	0				
				23	31.667	0.419	22.22	27.90026755	0.00%	0				
				0	31.667	0.419	22.22	16.08852913	19.00%	3.056820536				
				1	31.667	0.419	22.22	16.08852913	59.00%	9.492232189				

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FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
	BREAK OUT	M	4.064511933	2	31.667	0.419	22.22	16.08852913	18.00%	2.895935244	16.0885291	2	32.17705827	
				3	31.667	0.419	22.22	16.08852913	3.00%	0.482655874				
				4	31.667	0.419	22.22	16.08852913	1.00%	0.160885291				
				5	31.667	0.419	22.22	16.08852913	0.00%	0				
				6	31.667	0.419	22.22	16.08852913	0.00%	0				
				7	31.667	0.419	22.22	16.08852913	0.00%	0				
				8	42.97054122	0.419	22.22	35.33880459	0.00%	0				
				9	61.86180013	0.419	22.22	67.51119471	0.00%	0				
				10	72.53652122	0.419	22.22	85.6905703	0.00%	0				
				11	78.45767842	0.419	22.22	95.77448161	0.00%	0				
				12	80.28615446	0.419	22.22	98.88843206	0.00%	0				
				13	78.12078447	0.419	22.22	95.20074093	0.00%	0				
				14	71.84008023	0.419	22.22	84.50451005	0.00%	0				
				15	60.68308323	0.419	22.22	65.50380386	0.00%	0				
				16	40.74281968	0.419	22.22	31.54492686	0.00%	0				
				17	31.667	0.419	22.22	16.08852913	0.00%	0				
				18	31.667	0.419	22.22	16.08852913	0.00%	0				
				19	31.667	0.419	22.22	16.08852913	0.00%	0				
				20	31.667	0.419	22.22	16.08852913	0.00%	0				
				21	31.667	0.419	22.22	16.08852913	0.00%	0				
				22	31.667	0.419	22.22	16.08852913	0.00%	0				
				23	31.667	0.419	22.22	16.08852913	0.00%	0				
	PHYSICS VISITING OFFICE SUITE	B	10.237925	0	31.667	0.702	22.22	67.89580959	1.00%	0.678958096	177.974564	1	177.974564	
				1	31.667	0.702	22.22	67.89580959	1.00%	0.678958096				
				2	31.667	0.702	22.22	67.89580959	3.00%	2.036874288				
				3	31.667	0.702	22.22	67.89580959	6.00%	4.073748575				
				4	31.667	0.702	22.22	67.89580959	7.00%	4.752706671				
				5	31.667	0.702	22.22	67.89580959	8.00%	5.431664767				
				6	31.667	0.702	22.22	67.89580959	8.00%	5.431664767				
				7	31.667	0.702	22.22	67.89580959	8.00%	5.431664767				
				8	42.97054122	0.702	22.22	149.1346243	8.00%	11.93076994				
				9	61.86180013	0.702	22.22	284.9065432	7.00%	19.94345802				
				10	72.53652122	0.702	22.22	361.6260129	6.00%	21.69756077				
				11	78.45767842	0.702	22.22	404.181508	6.00%	24.25089048				
				12	80.28615446	0.702	22.22	417.3228079	5.00%	20.8661404				
				13	78.12078447	0.702	22.22	401.7602433	4.00%	16.07040973				
				14	71.84008023	0.702	22.22	356.6206753	4.00%	14.26482701				
				15	60.68308323	0.702	22.22	276.4350773	3.00%	8.293052318				
				16	40.74281968	0.702	22.22	133.1239376	3.00%	3.993718127				
				17	31.667	0.702	22.22	67.89580959	3.00%	2.036874288				
				18	31.667	0.702	22.22	67.89580959	2.00%	1.357916192				
				19	31.667	0.702	22.22	67.89580959	2.00%	1.357916192				
				20	31.667	0.702	22.22	67.89580959	2.00%	1.357916192				
				21	31.667	0.702	22.22	67.89580959	1.00%	0.678958096				
				22	31.667	0.702	22.22	67.89580959	1.00%	0.678958096				
				23	31.667	0.702	22.22	67.89580959	1.00%	0.678958096				
				0	31.667	0.702	22.22	41.49513506	1.00%	0.414951351				
				1	31.667	0.702	22.22	41.49513506	1.00%	0.414951351				
				2	31.667	0.702	22.22	41.49513506	3.00%	1.244854052				
				3	31.667	0.702	22.22	41.49513506	6.00%	2.489708103				
				4	31.667	0.702	22.22	41.49513506	7.00%	2.904659454				
				5	31.667	0.702	22.22	41.49513506	8.00%	3.319610805				
				6	31.667	0.702	22.22	41.49513506	8.00%	3.319610805				
				7	31.667	0.702	22.22	41.49513506	8.00%	3.319610805				
				8	42.97054122	0.702	22.22	91.14496776	8.00%	7.291597421				
				9	61.86180013	0.702	22.22	174.1231979	7.00%	12.18862385				
				10	72.53652122	0.702	22.22	221.0109922	6.00%	13.26065953				
T H I	ADH	B	6.257	11	78.45767842	0.702	22.22	247.019166	6.00%	14.82114996	108.770756	1	108.7707565	1272.21

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FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
R D	[illegible]	[illegible]	[illegible]	12	80.28615446	0.702	22.22	255.0505898	5.00%	12.75252949	[illegible]	[illegible]	[illegible]	[illegible]
				13	78.12078447	0.702	22.22	245.5393883	4.00%	9.821575533				
				14	71.84008023	0.702	22.22	217.9519351	4.00%	8.718077404				
				15	60.68308323	0.702	22.22	168.9457852	3.00%	5.068373557				
				16	40.74281968	0.702	22.22	81.35989248	3.00%	2.440796775				
				17	31.667	0.702	22.22	41.49513506	3.00%	1.244854052				
				18	31.667	0.702	22.22	41.49513506	2.00%	0.829902701				
				19	31.667	0.702	22.22	41.49513506	2.00%	0.829902701				
				20	31.667	0.702	22.22	41.49513506	2.00%	0.829902701				
				21	31.667	0.702	22.22	41.49513506	1.00%	0.414951351				
				22	31.667	0.702	22.22	41.49513506	1.00%	0.414951351				
				23	31.667	0.702	22.22	41.49513506	1.00%	0.414951351				
	PHYSICS DEPARTMENT HEAD	M	35.24066557	0	31.667	0.419	22.22	139.4928798	19.00%	26.50364717	139.49288	1	139.4928798	
				1	31.667	0.419	22.22	139.4928798	59.00%	82.3007991				
				2	31.667	0.419	22.22	139.4928798	18.00%	25.10871837				
				3	31.667	0.419	22.22	139.4928798	3.00%	4.184786395				
				4	31.667	0.419	22.22	139.4928798	1.00%	1.394928798				
				5	31.667	0.419	22.22	139.4928798	0.00%	0				
				6	31.667	0.419	22.22	139.4928798	0.00%	0				
				7	31.667	0.419	22.22	139.4928798	0.00%	0				
				8	42.97054122	0.419	22.22	306.3991482	0.00%	0				
				9	61.86180013	0.419	22.22	585.3444334	0.00%	0				
				10	72.53652122	0.419	22.22	742.965645	0.00%	0				
				11	78.45767842	0.419	22.22	830.3964981	0.00%	0				
				12	80.28615446	0.419	22.22	857.3954806	0.00%	0				
				13	78.12078447	0.419	22.22	825.4219763	0.00%	0				
				14	71.84008023	0.419	22.22	732.6821095	0.00%	0				
				15	60.68308323	0.419	22.22	567.9396894	0.00%	0				
				16	40.74281968	0.419	22.22	273.5049709	0.00%	0				
				17	31.667	0.419	22.22	139.4928798	0.00%	0				
				18	31.667	0.419	22.22	139.4928798	0.00%	0				
				19	31.667	0.419	22.22	139.4928798	0.00%	0				
				20	31.667	0.419	22.22	139.4928798	0.00%	0				
				21	31.667	0.419	22.22	139.4928798	0.00%	0				
				22	31.667	0.419	22.22	139.4928798	0.00%	0				
				23	31.667	0.419	22.22	139.4928798	0.00%	0				
	ADMIN 1	M	6.26167	0	31.667	0.419	22.22	24.78552453	19.00%	4.709249661	24.7855245	1	24.78552453	
				1	31.667	0.419	22.22	24.78552453	59.00%	14.62345947				
				2	31.667	0.419	22.22	24.78552453	18.00%	4.461394415				
				3	31.667	0.419	22.22	24.78552453	3.00%	0.743565736				
				4	31.667	0.419	22.22	24.78552453	1.00%	0.247855245				
				5	31.667	0.419	22.22	24.78552453	0.00%	0				
				6	31.667	0.419	22.22	24.78552453	0.00%	0				
				7	31.667	0.419	22.22	24.78552453	0.00%	0				
				8	42.97054122	0.419	22.22	54.44194436	0.00%	0				
				9	61.86180013	0.419	22.22	104.0058018	0.00%	0				
				10	72.53652122	0.419	22.22	132.0124242	0.00%	0				
				11	78.45767842	0.419	22.22	147.5474074	0.00%	0				
				12	80.28615446	0.419	22.22	152.3446698	0.00%	0				
				13	78.12078447	0.419	22.22	146.6635191	0.00%	0				
				14	71.84008023	0.419	22.22	130.1852139	0.00%	0				
				15	60.68308323	0.419	22.22	100.9132733	0.00%	0				
				16	40.74281968	0.419	22.22	48.59720563	0.00%	0				
				17	31.667	0.419	22.22	24.78552453	0.00%	0				
				18	31.667	0.419	22.22	24.78552453	0.00%	0				
				19	31.667	0.419	22.22	24.78552453	0.00%	0				
				20	31.667	0.419	22.22	24.78552453	0.00%	0				
				21	31.667	0.419	22.22	24.78552453	0.00%	0				

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FLOOR	ROOM	WALL MATERIAL	EXTERIOR SURFACE [M2]	LST	Sol-air T	U	Tin	Conductive heat input	Conduction time factors	qi,teta	Conductive heat gains	QUANTITY	CTS	TOTAL
				22	31.667	0.419	22.22	24.78552453	0.00%	0				
				23	31.667	0.419	22.22	24.78552453	0.00%	0				
	ADMIN 2	M	3.36616	0	31.667	0.419	22.22	13.32424756	19.00%	2.531607037	13.3242476	1	13.32424756	
				1	31.667	0.419	22.22	13.32424756	59.00%	7.861306063				
				2	31.667	0.419	22.22	13.32424756	18.00%	2.398364562				
				3	31.667	0.419	22.22	13.32424756	3.00%	0.399727427				
				4	31.667	0.419	22.22	13.32424756	1.00%	0.133242476				
				5	31.667	0.419	22.22	13.32424756	0.00%	0				
				6	31.667	0.419	22.22	13.32424756	0.00%	0				
				7	31.667	0.419	22.22	13.32424756	0.00%	0				
				8	42.97054122	0.419	22.22	29.26699993	0.00%	0				
				9	61.86180013	0.419	22.22	55.91162897	0.00%	0				
				10	72.53652122	0.419	22.22	70.96748019	0.00%	0				
				11	78.45767842	0.419	22.22	79.31880489	0.00%	0				
				12	80.28615446	0.419	22.22	81.89772596	0.00%	0				
				13	78.12078447	0.419	22.22	78.84364257	0.00%	0				
				14	71.84008023	0.419	22.22	69.98520517	0.00%	0				
				15	60.68308323	0.419	22.22	54.24914185	0.00%	0				
				16	40.74281968	0.419	22.22	26.1249746	0.00%	0				
				17	31.667	0.419	22.22	13.32424756	0.00%	0				
				18	31.667	0.419	22.22	13.32424756	0.00%	0				
				19	31.667	0.419	22.22	13.32424756	0.00%	0				
				20	31.667	0.419	22.22	13.32424756	0.00%	0				
				21	31.667	0.419	22.22	13.32424756	0.00%	0				
				22	31.667	0.419	22.22	13.32424756	0.00%	0				
				23	31.667	0.419	22.22	13.32424756	0.00%	0				
	CONFERENCE 10 SEAT	M	12.030955	0	31.667	0.419	22.22	47.62204496	19.00%	9.048188542	47.622045	1	47.62204496	
				1	31.667	0.419	22.22	47.62204496	59.00%	28.09700653				
				2	31.667	0.419	22.22	47.62204496	18.00%	8.571968093				
				3	31.667	0.419	22.22	47.62204496	3.00%	1.428661349				
				4	31.667	0.419	22.22	47.62204496	1.00%	0.47622045				
				5	31.667	0.419	22.22	47.62204496	0.00%	0				
				6	31.667	0.419	22.22	47.62204496	0.00%	0				
				7	31.667	0.419	22.22	47.62204496	0.00%	0				
				8	42.97054122	0.419	22.22	104.6028588	0.00%	0				
				9	61.86180013	0.419	22.22	199.833131	0.00%	0				
				10	72.53652122	0.419	22.22	253.6440813	0.00%	0				
				11	78.45767842	0.419	22.22	283.4924579	0.00%	0				
				12	80.28615446	0.419	22.22	292.7097511	0.00%	0				
				13	78.12078447	0.419	22.22	281.7941856	0.00%	0				
				14	71.84008023	0.419	22.22	250.133343	0.00%	0				
				15	60.68308323	0.419	22.22	193.8912542	0.00%	0				
				16	40.74281968	0.419	22.22	93.37298101	0.00%	0				
				17	31.667	0.419	22.22	47.62204496	0.00%	0				
				18	31.667	0.419	22.22	47.62204496	0.00%	0				
				19	31.667	0.419	22.22	47.62204496	0.00%	0				
				20	31.667	0.419	22.22	47.62204496	0.00%	0				
				21	31.667	0.419	22.22	47.62204496	0.00%	0				
				22	31.667	0.419	22.22	47.62204496	0.00%	0				
				23	31.667	0.419	22.22	47.62204496	0.00%	0				
TOTAL														**9054.20**

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APPENDIX LC.7 – RADIANT SPLIT

FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
	PHYSICS STUDENT LOUNGE	1	3000	3000	1800	1200	2429	2429	1627.43	801.57	4442	4442	1110.5	3331.5	0	37.27	1.00%	0.37
															1	37.27	1.00%	0.37
															2	37.27	3.00%	1.12
															3	37.27	6.00%	2.24
															4	37.27	7.00%	2.61
															5	37.27	8.00%	2.98
															6	37.27	8.00%	2.98
															7	37.27	8.00%	2.98
															8	81.88	8.00%	6.55
															9	156.41	7.00%	10.95
															10	198.53	6.00%	11.91
															11	221.90	6.00%	13.31
															12	229.11	5.00%	11.46
															13	220.57	4.00%	8.82
															14	195.79	4.00%	7.83
															15	151.76	3.00%	4.55
															16	73.09	3.00%	2.19
															17	37.27	3.00%	1.12
															18	37.27	2.00%	0.75
															19	37.27	2.00%	0.75
															20	37.27	2.00%	0.75
															21	37.27	1.00%	0.37
															22	37.27	1.00%	0.37
															23	37.27	1.00%	0.37
	C.A.S.E. STORAGE A	1	70	70	42	28	2429	2429	1627.43	801.57	240	240	60	180	0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	PHYSICS COMPUTER LAB	1	4350	4350	2610	1740	2429	2429	1627.43	801.57	9025	9025	2256.25	6768.75	0	488.04	1.00%	4.88
															1	488.04	1.00%	4.88
															2	488.04	3.00%	14.64
															3	488.04	6.00%	29.28
															4	488.04	7.00%	34.16
															5	488.04	8.00%	39.04
															6	488.04	8.00%	39.04
															7	488.04	8.00%	39.04
															8	1071.98	8.00%	85.76
															9	2047.91	7.00%	143.35
															10	2599.37	6.00%	155.96
															11	2905.26	6.00%	174.32
															12	2999.72	5.00%	149.99
															13	2887.85	4.00%	115.51
															14	2563.39	4.00%	102.54
															15	1987.02	3.00%	59.61
															16	956.90	3.00%	28.71

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
97.71	61.56	36.15	0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			2377.93	2377.93	270.69	270.69	170.53	100.15	934.32	934.32	588.62	345.70	5815.07	3137.08	4599.49	7736.57
			6254.59	6254.59	809.11	809.11	509.74	299.37	934.32	934.32	588.62	345.70	6014.29	7352.95	4599.49	11952.43
			8389.94	8389.94	1162.06	1162.06	732.10	429.96	934.32	934.32	588.62	345.70	6144.88	9710.66	4599.49	14310.14
			9559.93	9559.93	1370.59	1370.59	863.47	507.12	934.32	934.32	588.62	345.70	6222.04	11012.03	4599.49	15611.51
			9919.45	9919.45	1436.56	1436.56	905.03	531.53	934.32	934.32	588.62	345.70	6246.45	11413.11	4599.49	16012.59
			9493.60	9493.60	1358.52	1358.52	855.87	502.65	934.32	934.32	588.62	345.70	6217.57	10938.09	4599.49	15537.58
			8251.70	8251.70	1138.08	1138.08	716.99	421.09	934.32	934.32	588.62	345.70	6136.01	9557.31	4599.49	14156.80
			6016.47	6016.47	772.19	772.19	486.48	285.71	934.32	934.32	588.62	345.70	6000.63	7091.57	4599.49	11691.06
			1912.59	1912.59	214.42	214.42	135.09	79.34	934.32	934.32	588.62	345.70	5794.26	2636.30	4599.49	7235.78
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
			0.00	0.00	0.00	0.00	0.00	0.00	934.32	934.32	588.62	345.70	5714.92	588.62	4599.49	5188.11
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1009.57	0.00	1729.43	1729.43
1279.28	805.95	473.33	0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			4755.64	4755.64	541.35	541.35	341.05	200.30	1868.55	1868.55	1177.19	691.36	10675.32	6273.88	7299.63	13573.51
			12508.60	12508.60	1618.15	1618.15	1019.43	598.71	1868.55	1868.55	1177.19	691.36	11073.73	14705.22	7299.63	22004.85
			16779.10	16779.10	2324.01	2324.01	1464.13	859.88	1868.55	1868.55	1177.19	691.36	11334.90	19420.42	7299.63	26720.04
			19118.99	19118.99	2741.06	2741.06	1726.87	1014.19	1868.55	1868.55	1177.19	691.36	11489.21	22023.04	7299.63	29322.67
			19837.99	19837.99	2872.99	2872.99	1809.98	1063.01	1868.55	1868.55	1177.19	691.36	11538.02	22825.16	7299.63	30124.79
			18986.34	18986.34	2716.91	2716.91	1711.65	1005.26	1868.55	1868.55	1177.19	691.36	11480.27	21875.18	7299.63	29174.80
			16502.64	16502.64	2276.06	2276.06	1433.92	842.14	1868.55	1868.55	1177.19	691.36	11317.16	19113.74	7299.63	26413.37
			12032.39	12032.39	1544.31	1544.31	972.92	571.40	1868.55	1868.55	1177.19	691.36	11046.41	14182.49	7299.63	21482.12
			3825.01	3825.01	428.82	428.82	270.16	158.66	1868.55	1868.55	1177.19	691.36	10633.68	5272.35	7299.63	12571.98

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
FIRST															17	488.04	3.00%	14.64
															18	488.04	2.00%	9.76
															19	488.04	2.00%	9.76
															20	488.04	2.00%	9.76
															21	488.04	1.00%	4.88
															22	488.04	1.00%	4.88
															23	488.04	1.00%	4.88
	STUDENT CLUB SPACE	1	750	750	450	300	2545	2545	1705.15	839.85	2521	2521	630.25	1890.75	0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	ACTIVE LEARNING STUDIO	1	5475	5475	3285	2190	2400	2400	1608	792	5496	5496	1374	4122	0	262.05	1.00%	2.62
															1	262.05	1.00%	2.62
															2	262.05	3.00%	7.86
															3	262.05	6.00%	15.72
															4	262.05	7.00%	18.34
															5	262.05	8.00%	20.96
															6	262.05	8.00%	20.96
															7	262.05	8.00%	20.96
															8	575.61	8.00%	46.05
															9	1099.64	7.00%	76.97
															10	1395.75	6.00%	83.74
															11	1560.00	6.00%	93.60
															12	1610.72	5.00%	80.54
															13	1550.65	4.00%	62.03
															14	1376.43	4.00%	55.06
															15	1066.94	3.00%	32.01
															16	513.81	3.00%	15.41
															17	262.05	3.00%	7.86
															18	262.05	2.00%	5.24
															19	262.05	2.00%	5.24
															20	262.05	2.00%	5.24
															21	262.05	1.00%	2.62
															22	262.05	1.00%	2.62
															23	262.05	1.00%	2.62
															0	262.05	1.00%	2.62
															1	262.05	1.00%	2.62
															2	262.05	3.00%	7.86
															3	262.05	6.00%	15.72
															4	262.05	7.00%	18.34
															5	262.05	8.00%	20.96
															6	262.05	8.00%	20.96
															7	262.05	8.00%	20.96
															8	575.61	8.00%	46.05
															9	1099.64	7.00%	76.97

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
			0.00	0.00	0.00	0.00	0.00	0.00	1868.55	1868.55	1177.19	691.36	10475.02	1177.19	7299.63	8476.81
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3030.60	0.00	2785.40	2785.40
686.92	432.76	254.16	0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			3470.61	3470.61	395.07	395.07	248.89	146.18	1363.65	1363.65	859.10	504.55	8008.88	4578.60	6699.76	11278.36
			9128.63	9128.63	1180.90	1180.90	743.97	436.93	1363.65	1363.65	859.10	504.55	8299.64	10731.69	6699.76	17431.45
			12245.19	12245.19	1696.03	1696.03	1068.50	627.53	1363.65	1363.65	859.10	504.55	8490.24	14172.79	6699.76	20872.55
			13952.81	13952.81	2000.40	2000.40	1260.25	740.15	1363.65	1363.65	859.10	504.55	8602.86	16072.15	6699.76	22771.91
			14477.53	14477.53	2096.67	2096.67	1320.90	775.77	1363.65	1363.65	859.10	504.55	8638.48	16657.53	6699.76	23357.29
			13856.00	13856.00	1982.77	1982.77	1249.14	733.62	1363.65	1363.65	859.10	504.55	8596.33	15964.24	6699.76	22664.00
			12043.43	12043.43	1661.04	1661.04	1046.45	614.58	1363.65	1363.65	859.10	504.55	8477.29	13948.98	6699.76	20648.74
			8781.09	8781.09	1127.02	1127.02	710.02	417.00	1363.65	1363.65	859.10	504.55	8279.71	10350.21	6699.76	17049.97
			2791.44	2791.44	312.95	312.95	197.16	115.79	1363.65	1363.65	859.10	504.55	7978.50	3847.70	6699.76	10547.46
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7862.71	859.10	6699.76	7558.86
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			3470.61	3470.61	395.07	395.07	248.89	146.18	1363.65	1363.65	859.10	504.55	7969.13	4578.60	6756.51	11335.11
			9128.63	9128.63	1180.90	1180.90	743.97	436.93	1363.65	1363.65	859.10	504.55	8259.89	10731.69	6756.51	17488.20

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
	ACTIVE LEARNING STUDIO	1	5625	5625	3375	2250	2400	2400	1608	792	5363	5363	1340.75	4022.25	10	1395.75	6.00%	83.74
															11	1560.00	6.00%	93.60
															12	1610.72	5.00%	80.54
															13	1550.65	4.00%	62.03
															14	1376.43	4.00%	55.06
															15	1066.94	3.00%	32.01
															16	513.81	3.00%	15.41
															17	262.05	3.00%	7.86
															18	262.05	2.00%	5.24
															19	262.05	2.00%	5.24
															20	262.05	2.00%	5.24
															21	262.05	1.00%	2.62
															22	262.05	1.00%	2.62
															23	262.05	1.00%	2.62
	STUDIO PREP STORAGE	1	70	70	42	28	2400	2400	1608	792	1161	1161	290.25	870.75	0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	ACTIVE LEARNING STUDIO	1	9675	9675	5805	3870	2632	2632	1763.44	868.56	35671	35671	8917.75	26753.25	0	955.91	1.00%	9.56
															1	955.91	1.00%	9.56
															2	955.91	3.00%	28.68
															3	955.91	6.00%	57.35
															4	955.91	7.00%	66.91
															5	955.91	8.00%	76.47
															6	955.91	8.00%	76.47
															7	955.91	8.00%	76.47
															8	2099.67	8.00%	167.97
															9	4011.21	7.00%	280.78
															10	5091.34	6.00%	305.48
															11	5690.48	6.00%	341.43
															12	5875.50	5.00%	293.77
															13	5656.39	4.00%	226.26
															14	5020.87	4.00%	200.83
															15	3891.94	3.00%	116.76
															16	1874.26	3.00%	56.23
															17	955.91	3.00%	28.68
															18	955.91	2.00%	19.12
															19	955.91	2.00%	19.12
															20	955.91	2.00%	19.12
															21	955.91	1.00%	9.56
															22	955.91	1.00%	9.56
															23	955.91	1.00%	9.56
															0	29.23	19.00%	5.55
															1	29.23	59.00%	17.24
															2	29.23	18.00%	5.26

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
686.92	432.76	254.16	12245.19	12245.19	1696.03	1696.03	1068.50	627.53	1363.65	1363.65	859.10	504.55	8450.49	14172.79	6756.51	20929.30
			13952.81	13952.81	2000.40	2000.40	1260.25	740.15	1363.65	1363.65	859.10	504.55	8563.11	16072.15	6756.51	22828.66
			14477.53	14477.53	2096.67	2096.67	1320.90	775.77	1363.65	1363.65	859.10	504.55	8598.73	16657.53	6756.51	23414.04
			13856.00	13856.00	1982.77	1982.77	1249.14	733.62	1363.65	1363.65	859.10	504.55	8556.58	15964.24	6756.51	22720.75
			12043.43	12043.43	1661.04	1661.04	1046.45	614.58	1363.65	1363.65	859.10	504.55	8437.54	13948.98	6756.51	20705.49
			8781.09	8781.09	1127.02	1127.02	710.02	417.00	1363.65	1363.65	859.10	504.55	8239.96	10350.21	6756.51	17106.72
			2791.44	2791.44	312.95	312.95	197.16	115.79	1363.65	1363.65	859.10	504.55	7938.75	3847.70	6756.51	10604.21
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
			0.00	0.00	0.00	0.00	0.00	0.00	1363.65	1363.65	859.10	504.55	7822.96	859.10	6756.51	7615.61
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1690.75	0.00	1940.25	1940.25
2505.71	1578.60	927.11	0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			1498.12	1498.12	170.53	170.53	107.44	63.10	588.63	588.63	370.84	217.79	32699.81	1976.40	18064.79	20041.18
			3940.45	3940.45	509.75	509.75	321.14	188.61	588.63	588.63	370.84	217.79	32825.32	4632.43	18064.79	22697.22
			5285.75	5285.75	732.11	732.11	461.23	270.88	588.63	588.63	370.84	217.79	32907.60	6117.81	18064.79	24182.60
			6022.86	6022.86	863.49	863.49	544.00	319.49	588.63	588.63	370.84	217.79	32956.21	6937.69	18064.79	25002.48
			6249.36	6249.36	905.05	905.05	570.18	334.87	588.63	588.63	370.84	217.79	32971.58	7190.37	18064.79	25255.16
			5981.07	5981.07	855.88	855.88	539.20	316.68	588.63	588.63	370.84	217.79	32953.39	6891.11	18064.79	24955.90
			5198.66	5198.66	717.00	717.00	451.71	265.29	588.63	588.63	370.84	217.79	32902.01	6021.20	18064.79	24085.99
			3790.44	3790.44	486.49	486.49	306.49	180.00	588.63	588.63	370.84	217.79	32816.72	4467.76	18064.79	22532.55
			1204.95	1204.95	135.09	135.09	85.11	49.98	588.63	588.63	370.84	217.79	32686.70	1660.89	18064.79	19725.68
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	588.63	588.63	370.84	217.79	32636.72	370.84	18064.79	18435.62
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIM		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
	CORNER OFFICE	2	225	450	270	180	2280	4560	3055.2	1504.8	480	960	240	720	3	29.23	3.00%	0.88
															4	29.23	1.00%	0.29
															5	29.23	0.00%	0.00
															6	29.23	0.00%	0.00
															7	29.23	0.00%	0.00
															8	64.20	0.00%	0.00
															9	122.65	0.00%	0.00
															10	155.67	0.00%	0.00
															11	173.99	0.00%	0.00
															12	179.65	0.00%	0.00
															13	172.95	0.00%	0.00
															14	153.52	0.00%	0.00
															15	119.00	0.00%	0.00
															16	57.31	0.00%	0.00
															17	29.23	0.00%	0.00
															18	29.23	0.00%	0.00
															19	29.23	0.00%	0.00
															20	29.23	0.00%	0.00
															21	29.23	0.00%	0.00
															22	29.23	0.00%	0.00
															23	29.23	0.00%	0.00
	REGULAR OFFICE	9	225	2025	1215	810	2300	20700	13869	6831	480	4320	1080	3240	0	27.90	19.00%	5.30
															1	27.90	59.00%	16.46
															2	27.90	18.00%	5.02
															3	27.90	3.00%	0.84
															4	27.90	1.00%	0.28
															5	27.90	0.00%	0.00
															6	27.90	0.00%	0.00
															7	27.90	0.00%	0.00
															8	61.28	0.00%	0.00
															9	117.08	0.00%	0.00
															10	148.60	0.00%	0.00
															11	166.09	0.00%	0.00
															12	171.49	0.00%	0.00
															13	165.09	0.00%	0.00
															14	146.55	0.00%	0.00
															15	113.59	0.00%	0.00
															16	54.70	0.00%	0.00
															17	27.90	0.00%	0.00
															18	27.90	0.00%	0.00
															19	27.90	0.00%	0.00
															20	27.90	0.00%	0.00
															21	27.90	0.00%	0.00
															22	27.90	0.00%	0.00
															23	27.90	0.00%	0.00
	C.A.S.E. DEAN'S OFFICE	1	525	525	315	210	2280	2280	1527.6	752.4	1041	1041	260.25	780.75	0	55.80	19.00%	10.60
															1	55.80	59.00%	32.92
															2	55.80	18.00%	10.04
															3	55.80	3.00%	1.67
															4	55.80	1.00%	0.56
															5	55.80	0.00%	0.00
															6	55.80	0.00%	0.00
															7	55.80	0.00%	0.00
															8	122.57	0.00%	0.00
															9	234.15	0.00%	0.00
															10	297.20	0.00%	0.00
															11	332.18	0.00%	0.00
															12	342.98	0.00%	0.00
															13	330.19	0.00%	0.00
															14	293.09	0.00%	0.00
															15	227.19	0.00%	0.00
															16	109.41	0.00%	0.00
															17	55.80	0.00%	0.00
															18	55.80	0.00%	0.00
															19	55.80	0.00%	0.00

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			7485.80	14971.60	852.13	1704.25	1073.68	630.57	2941.26	5882.53	3705.99	2176.53	5233.54	19751.28	3602.03	23353.30
			19689.64	39379.27	2547.10	5094.21	3209.35	1884.86	2941.26	5882.53	3705.99	2176.53	6487.82	46294.61	3602.03	49896.64
			26411.78	52823.56	3658.20	7316.39	4609.33	2707.06	2941.26	5882.53	3705.99	2176.53	7310.03	61138.88	3602.03	64740.91
58.46	36.83	21.63	30094.96	60189.93	4314.67	8629.35	5436.49	3192.86	2941.26	5882.53	3705.99	2176.53	7795.82	69332.41	3602.03	72934.43
			31226.75	62453.49	4522.34	9044.67	5698.14	3346.53	2941.26	5882.53	3705.99	2176.53	7949.49	71857.63	3602.03	75459.65
			29886.16	59772.32	4276.65	8553.31	5388.58	3164.72	2941.26	5882.53	3705.99	2176.53	7767.69	68866.90	3602.03	72468.92
			25976.61	51953.21	3582.71	7165.43	4514.22	2651.21	2941.26	5882.53	3705.99	2176.53	7254.17	60173.42	3602.03	63775.45
			18940.04	37880.07	2430.88	4861.77	3062.91	1798.85	2941.26	5882.53	3705.99	2176.53	6401.82	44648.98	3602.03	48251.01
			6020.90	12041.79	675.00	1350.01	850.51	499.50	2941.26	5882.53	3705.99	2176.53	5102.47	16598.29	3602.03	20200.32
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4602.96	3705.99	3602.03	7308.02
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			26894.59	242051.32	3061.48	27553.28	17358.57	10194.71	10567.21	95104.93	59916.10	35188.82	56357.45	319325.99	16322.19	335648.18
			70739.87	636658.86	9151.10	82359.88	51886.73	30473.16	10567.21	95104.93	59916.10	35188.82	76635.89	748461.69	16322.19	764783.88
			94890.84	854017.58	13142.97	118286.71	74520.63	43766.08	10567.21	95104.93	59916.10	35188.82	89928.81	988454.31	16322.19	1004776.51
251.10	158.19	92.91	108123.58	973112.18	15501.53	139513.80	87893.69	51620.11	10567.21	95104.93	59916.10	35188.82	97782.84	1120921.98	16322.19	1137244.18
			112189.79	1009708.08	16247.61	146228.49	92123.95	54104.54	10567.21	95104.93	59916.10	35188.82	100267.27	1161748.13	16322.19	1178070.33
			107373.40	966360.61	15364.94	138284.43	87119.19	51165.24	10567.21	95104.93	59916.10	35188.82	97327.97	1113395.90	16322.19	1129718.09
			93327.36	839946.26	12871.78	115846.06	72983.02	42863.04	10567.21	95104.93	59916.10	35188.82	89025.77	972845.38	16322.19	989167.57
			68046.75	612420.75	8733.55	78601.97	49519.24	29082.73	10567.21	95104.93	59916.10	35188.82	75245.46	721856.10	16322.19	738178.29
			21631.55	194683.96	2425.12	21826.09	13750.43	8075.65	10567.21	95104.93	59916.10	35188.82	54238.38	268350.50	16322.19	284672.70
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	95104.93	59916.10	35188.82	46162.73	59916.10	16322.19	76238.30
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			53789.18	53789.18	6122.95	6122.95	3857.46	2265.49	21134.43	21134.43	13314.69	7819.74	11869.67	70961.33	2173.16	73134.49
			141479.75	141479.75	18302.20	18302.20	11530.38	6771.81	21134.43	21134.43	13314.69	7819.74	16375.99	166324.82	2173.16	168497.98
			189781.69	189781.69	26285.94	26285.94	16560.14	9725.80	21134.43	21134.43	13314.69	7819.74	19329.98	219656.51	2173.16	221829.67
111.60	70.31	41.29	216247.15	216247.15	31003.07	31003.07	19531.93	11471.13	21134.43	21134.43	13314.69	7819.74	21075.32	249093.77	2173.16	251266.93
			224379.57	224379.57	32495.22	32495.22	20471.99	12023.23	21134.43	21134.43	13314.69	7819.74	21627.41	258166.25	2173.16	260339.41
			214746.80	214746.80	30729.87	30729.87	19359.82	11370.05	21134.43	21134.43	13314.69	7819.74	20974.23	247421.31	2173.16	249594.47
			186654.72	186654.72	25743.57	25743.57	16218.45	9525.12	21134.43	21134.43	13314.69	7819.74	19129.30	216187.86	2173.16	218361.02
			136093.50	136093.50	17467.10	17467.10	11004.28	6462.83	21134.43	21134.43	13314.69	7819.74	16067.01	160412.47	2173.16	162585.63
			43263.10	43263.10	4850.24	4850.24	3055.65	1794.59	21134.43	21134.43	13314.69	7819.74	11398.77	59633.44	2173.16	61806.60
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
															20	55.80	0.00%	0.00
															21	55.80	0.00%	0.00
															22	55.80	0.00%	0.00
															23	55.80	0.00%	0.00
	C.A.S.E. DEAN'S OFFICE RECEPTION	1	375	375	225	150	2280	2280	1527.6	752.4	814	814	203.5	610.5	0	55.80	19.00%	10.60
															1	55.80	59.00%	32.92
															2	55.80	18.00%	10.04
															3	55.80	3.00%	1.67
															4	55.80	1.00%	0.56
															5	55.80	0.00%	0.00
															6	55.80	0.00%	0.00
															7	55.80	0.00%	0.00
															8	122.57	0.00%	0.00
															9	234.15	0.00%	0.00
															10	297.20	0.00%	0.00
															11	332.18	0.00%	0.00
															12	342.98	0.00%	0.00
															13	330.19	0.00%	0.00
															14	293.09	0.00%	0.00
															15	227.19	0.00%	0.00
															16	109.41	0.00%	0.00
															17	55.80	0.00%	0.00
															18	55.80	0.00%	0.00
															19	55.80	0.00%	0.00
															20	55.80	0.00%	0.00
															21	55.80	0.00%	0.00
															22	55.80	0.00%	0.00
															23	55.80	0.00%	0.00
	C.A.S.E. ADMIN SUPPORT	1	225	225	135	90	2280	2280	1527.6	752.4	2561	2561	640.25	1920.75	0	27.90	19.00%	5.30
															1	27.90	59.00%	16.46
															2	27.90	18.00%	5.02
															3	27.90	3.00%	0.84
															4	27.90	1.00%	0.28
															5	27.90	0.00%	0.00
															6	27.90	0.00%	0.00
															7	27.90	0.00%	0.00
															8	61.28	0.00%	0.00
															9	117.08	0.00%	0.00
															10	148.60	0.00%	0.00
															11	166.09	0.00%	0.00
															12	171.49	0.00%	0.00
															13	165.09	0.00%	0.00
															14	146.55	0.00%	0.00
															15	113.59	0.00%	0.00
															16	54.70	0.00%	0.00
															17	27.90	0.00%	0.00
															18	27.90	0.00%	0.00
															19	27.90	0.00%	0.00
															20	27.90	0.00%	0.00
															21	27.90	0.00%	0.00
															22	27.90	0.00%	0.00
															23	27.90	0.00%	0.00
	POST DOC OFFICE	11	375	4125	2475	1650	2300	25300	16951	8349	720	7920	1980	5940	0	27.90	19.00%	5.30
															1	27.90	59.00%	16.46
															2	27.90	18.00%	5.02
															3	27.90	3.00%	0.84
															4	27.90	1.00%	0.28
															5	27.90	0.00%	0.00
															6	27.90	0.00%	0.00
															7	27.90	0.00%	0.00
															8	61.28	0.00%	0.00
															9	117.08	0.00%	0.00
															10	148.60	0.00%	0.00
															11	166.09	0.00%	0.00
															12	171.49	0.00%	0.00

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9604.18	13314.69	2173.16	15487.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			53789.18	53789.18	6122.95	6122.95	3857.46	2265.49	21134.43	21134.43	13314.69	7819.74	11639.42	70961.33	2026.41	72987.74
			141479.75	141479.75	18302.20	18302.20	11530.38	6771.81	21134.43	21134.43	13314.69	7819.74	16145.74	166324.82	2026.41	168351.23
			189781.69	189781.69	26285.94	26285.94	16560.14	9725.80	21134.43	21134.43	13314.69	7819.74	19099.73	219656.51	2026.41	221682.92
111.60	70.31	41.29	216247.15	216247.15	31003.07	31003.07	19531.93	11471.13	21134.43	21134.43	13314.69	7819.74	20845.07	249093.77	2026.41	251120.18
			224379.57	224379.57	32495.22	32495.22	20471.99	12023.23	21134.43	21134.43	13314.69	7819.74	21397.16	258166.25	2026.41	260192.66
			214746.80	214746.80	30729.87	30729.87	19359.82	11370.05	21134.43	21134.43	13314.69	7819.74	20743.98	247421.31	2026.41	249447.72
			186654.72	186654.72	25743.57	25743.57	16218.45	9525.12	21134.43	21134.43	13314.69	7819.74	18899.05	216187.86	2026.41	218214.27
			136093.50	136093.50	17467.10	17467.10	11004.28	6462.83	21134.43	21134.43	13314.69	7819.74	15836.76	160412.47	2026.41	162438.88
			43263.10	43263.10	4850.24	4850.24	3055.65	1794.59	21134.43	21134.43	13314.69	7819.74	11168.52	59633.44	2026.41	61659.85
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	21134.43	21134.43	13314.69	7819.74	9373.93	13314.69	2026.41	15341.10
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			26894.59	26894.59	3061.48	3061.48	1928.73	1132.75	10567.21	10567.21	6657.34	3909.87	7816.09	35480.67	2320.43	37801.09
			70739.87	70739.87	9151.10	9151.10	5765.19	3385.91	10567.21	10567.21	6657.34	3909.87	10069.25	83162.41	2320.43	85482.84
			94890.84	94890.84	13142.97	13142.97	8280.07	4862.90	10567.21	10567.21	6657.34	3909.87	11546.24	109828.26	2320.43	112148.68
27.90	17.58	10.32	108123.58	108123.58	15501.53	15501.53	9765.97	5735.57	10567.21	10567.21	6657.34	3909.87	12418.91	124546.89	2320.43	126867.31
			112189.79	112189.79	16247.61	16247.61	10235.99	6011.62	10567.21	10567.21	6657.34	3909.87	12694.96	129083.13	2320.43	131403.55
			107373.40	107373.40	15364.94	15364.94	9679.91	5685.03	10567.21	10567.21	6657.34	3909.87	12368.37	123710.66	2320.43	126031.08
			93327.36	93327.36	12871.78	12871.78	8109.22	4762.56	10567.21	10567.21	6657.34	3909.87	11445.90	108093.93	2320.43	110414.36
			68046.75	68046.75	8733.55	8733.55	5502.14	3231.41	10567.21	10567.21	6657.34	3909.87	9914.76	80206.23	2320.43	82526.66
			21631.55	21631.55	2425.12	2425.12	1527.83	897.29	10567.21	10567.21	6657.34	3909.87	7580.64	29816.72	2320.43	32137.15
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	10567.21	6657.34	3909.87	6683.34	6657.34	2320.43	8977.77
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			26894.59	295840.50	3061.48	33676.24	21216.03	12460.21	10567.21	116239.35	73230.79	43008.56	71521.32	390287.32	21599.35	411886.67
			70739.87	778138.61	9151.10	100662.08	63417.11	37244.97	10567.21	116239.35	73230.79	43008.56	96306.08	914786.51	21599.35	936385.86
			94890.84	1043799.27	13142.97	144572.65	91080.77	53491.88	10567.21	116239.35	73230.79	43008.56	112552.99	1208110.83	21599.35	1229710.18
306.90	193.35	113.55	108123.58	1189359.34	15501.53	170516.87	107425.63	63091.24	10567.21	116239.35	73230.79	43008.56	122152.36	1370015.76	21599.35	1391615.10
			112189.79	1234087.65	16247.61	178723.71	112595.94	66127.77	10567.21	116239.35	73230.79	43008.56	125188.89	1419914.38	21599.35	1441513.73

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
SECOND															13	165.09	0.00%	0.00
															14	146.55	0.00%	0.00
															15	113.59	0.00%	0.00
															16	54.70	0.00%	0.00
															17	27.90	0.00%	0.00
															18	27.90	0.00%	0.00
															19	27.90	0.00%	0.00
															20	27.90	0.00%	0.00
															21	27.90	0.00%	0.00
															22	27.90	0.00%	0.00
															23	27.90	0.00%	0.00
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
	PHYSICS GRAD OFFICES	1	525	525	315	210	2280	2280	1527.6	752.4	1681	1681	420.25	1260.75	11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
															0	17.16	19.00%	3.26
															1	17.16	59.00%	10.13
															2	17.16	18.00%	3.09
															3	17.16	3.00%	0.51
															4	17.16	1.00%	0.17
															5	17.16	0.00%	0.00
															6	17.16	0.00%	0.00
															7	17.16	0.00%	0.00
															8	37.70	0.00%	0.00
															9	72.02	0.00%	0.00
															10	91.41	0.00%	0.00
	BREAK OUT	2	720	1440	864	576	2300	4600	3082	1518	920	1840	460	1380	11	102.17	0.00%	0.00
															12	105.49	0.00%	0.00
															13	101.55	0.00%	0.00
															14	90.14	0.00%	0.00
															15	69.88	0.00%	0.00
															16	33.65	0.00%	0.00
															17	17.16	0.00%	0.00
															18	17.16	0.00%	0.00
															19	17.16	0.00%	0.00
															20	17.16	0.00%	0.00
															21	17.16	0.00%	0.00
															22	17.16	0.00%	0.00
															23	17.16	0.00%	0.00
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			107373.40	1181107.41	15364.94	169014.30	106479.01	62535.29	10567.21	116239.35	73230.79	43008.56	121596.41	1360817.21	21599.35	1382416.56
			93327.36	1026600.98	12871.78	141589.62	89201.46	52388.16	10567.21	116239.35	73230.79	43008.56	111449.28	1189033.24	21599.35	1210632.59
			68046.75	748514.25	8733.55	96069.08	60523.52	35545.56	10567.21	116239.35	73230.79	43008.56	94606.67	882268.57	21599.35	903867.91
			21631.55	237947.07	2425.12	26676.33	16806.09	9870.24	10567.21	116239.35	73230.79	43008.56	68931.36	327983.95	21599.35	349583.29
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	116239.35	73230.79	43008.56	59061.12	73230.79	21599.35	94830.14
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2223.15	0.00	2262.85	2262.85
34.32	21.62	12.70	0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			2951.55	5903.11	335.98	671.97	423.34	248.63	1159.70	2319.40	1461.22	858.18	4593.51	7787.67	4427.62	12215.30
			7763.37	15526.74	1004.29	2008.58	1265.41	743.17	1159.70	2319.40	1461.22	858.18	5088.05	18253.37	4427.62	22680.99
			10413.82	20827.65	1442.38	2884.76	1817.40	1067.36	1159.70	2319.40	1461.22	858.18	5412.24	24106.27	4427.62	28533.89
			11866.05	23732.11	1701.22	3402.44	2143.54	1258.90	1159.70	2319.40	1461.22	858.18	5603.78	27336.87	4427.62	31764.49
			12312.30	24624.60	1783.10	3566.20	2246.70	1319.49	1159.70	2319.40	1461.22	858.18	5664.37	28332.53	4427.62	32760.15
			11783.72	23567.45	1686.23	3372.46	2124.65	1247.81	1159.70	2319.40	1461.22	858.18	5592.69	27153.32	4427.62	31580.95
			10242.24	20484.48	1412.62	2825.24	1779.90	1045.34	1159.70	2319.40	1461.22	858.18	5390.22	23725.60	4427.62	28153.22
			7467.81	14935.62	958.47	1916.93	1207.67	709.27	1159.70	2319.40	1461.22	858.18	5054.14	17604.51	4427.62	22032.14
			2373.96	4747.92	266.15	532.29	335.34	196.95	1159.70	2319.40	1461.22	858.18	4541.83	6544.49	4427.62	10972.11
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	1159.70	2319.40	1461.22	858.18	4344.88	1461.22	4427.62	5888.85
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
	TEACHING LAB STORAGE	1	70	70	42	28	2229	2229	1493.43	735.57	240	240	60	180	6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	PHYSICS ELECTRONICS LAB	1	1950	1950	1170	780	2229	2229	1493.43	735.57	22078	22078	5519.5	16558.5	0	564.12	1.00%	5.64
															1	564.12	1.00%	5.64
															2	564.12	3.00%	16.92
															3	564.12	6.00%	33.85
															4	564.12	7.00%	39.49
															5	564.12	8.00%	45.13
															6	564.12	8.00%	45.13
															7	564.12	8.00%	45.13
															8	1239.10	8.00%	99.13
															9	2367.17	7.00%	165.70
															10	3004.60	6.00%	180.28
															11	3358.18	6.00%	201.49
															12	3467.37	5.00%	173.37
															13	3338.06	4.00%	133.52
															14	2963.02	4.00%	118.52
															15	2296.79	3.00%	68.90
															16	1106.07	3.00%	33.18
															17	564.12	3.00%	16.92
															18	564.12	2.00%	11.28
															19	564.12	2.00%	11.28
															20	564.12	2.00%	11.28
															21	564.12	1.00%	5.64
															22	564.12	1.00%	5.64
															23	564.12	1.00%	5.64
	PHYSICS CONFERENCE ROOM	1	3675	3675	2205	1470	2229	2229	1493.43	735.57	3255	3255	813.75	2441.25	0	82.90	1.00%	0.83
															1	82.90	1.00%	0.83
															2	82.90	3.00%	2.49
															3	82.90	6.00%	4.97
															4	82.90	7.00%	5.80
															5	82.90	8.00%	6.63
															6	82.90	8.00%	6.63
															7	82.90	8.00%	6.63
															8	182.09	8.00%	14.57
															9	347.86	7.00%	24.35
															10	441.53	6.00%	26.49
															11	493.49	6.00%	29.61
															12	509.53	5.00%	25.48
															13	490.53	4.00%	19.62
															14	435.42	4.00%	17.42
															15	337.51	3.00%	10.13
															16	162.54	3.00%	4.88
															17	82.90	3.00%	2.49
															18	82.90	2.00%	1.66
															19	82.90	2.00%	1.66
															20	82.90	2.00%	1.66
															21	82.90	1.00%	0.83
															22	82.90	1.00%	0.83

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	943.57	0.00	1595.43	1595.43
1478.72	931.59	547.13	0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			3475.34	3475.34	395.61	395.61	249.23	146.37	1365.51	1365.51	860.27	505.24	19272.81	4584.84	9114.52	13699.37
			9141.07	9141.07	1182.51	1182.51	744.98	437.53	1365.51	1365.51	860.27	505.24	19563.96	10746.32	9114.52	19860.85
			12261.88	12261.88	1698.35	1698.35	1069.96	628.39	1365.51	1365.51	860.27	505.24	19754.82	14192.11	9114.52	23306.63
			13971.83	13971.83	2003.12	2003.12	1261.97	741.16	1365.51	1365.51	860.27	505.24	19867.59	16094.07	9114.52	25208.59
			14497.27	14497.27	2099.53	2099.53	1322.70	776.83	1365.51	1365.51	860.27	505.24	19903.26	16680.24	9114.52	25794.77
			13874.89	13874.89	1985.47	1985.47	1250.85	734.62	1365.51	1365.51	860.27	505.24	19861.06	15986.01	9114.52	25100.53
			12059.85	12059.85	1663.30	1663.30	1047.88	615.42	1365.51	1365.51	860.27	505.24	19741.86	13968.00	9114.52	23082.52
			8793.06	8793.06	1128.56	1128.56	710.99	417.57	1365.51	1365.51	860.27	505.24	19544.00	10364.32	9114.52	19478.85
			2795.25	2795.25	313.38	313.38	197.43	115.95	1365.51	1365.51	860.27	505.24	19242.38	3852.94	9114.52	12967.47
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
			0.00	0.00	0.00	0.00	0.00	0.00	1365.51	1365.51	860.27	505.24	19126.43	860.27	9114.52	9974.79
217.30	136.90	80.40	0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			1769.22	1769.22	201.39	201.39	126.88	74.52	695.15	695.15	437.94	257.20	5058.94	2334.04	4649.08	6983.12
			4653.51	4653.51	601.99	601.99	379.25	222.74	695.15	695.15	437.94	257.20	5207.16	5470.71	4649.08	10119.78
			6242.24	6242.24	864.59	864.59	544.69	319.90	695.15	695.15	437.94	257.20	5304.32	7224.88	4649.08	11873.95
			7112.74	7112.74	1019.74	1019.74	642.44	377.31	695.15	695.15	437.94	257.20	5361.73	8193.12	4649.08	12842.20
			7380.23	7380.23	1068.82	1068.82	673.36	395.46	695.15	695.15	437.94	257.20	5379.89	8491.53	4649.08	13140.61
			7063.39	7063.39	1010.76	1010.76	636.78	373.98	695.15	695.15	437.94	257.20	5358.41	8138.11	4649.08	12787.19
			6139.39	6139.39	846.75	846.75	533.45	313.30	695.15	695.15	437.94	257.20	5297.72	7110.79	4649.08	11759.86
			4476.35	4476.35	574.52	574.52	361.95	212.57	695.15	695.15	437.94	257.20	5197.00	5276.24	4649.08	9925.32
			1423.00	1423.00	159.53	159.53	100.51	59.03	695.15	695.15	437.94	257.20	5043.45	1961.45	4649.08	6610.52
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
															23	82.90	1.00%	0.83
	BREAK OUT 2	1	960	960	576	384	2229	2229	1493.43	735.57	480	480	120	360	0	67.05	19.00%	12.74
															1	67.05	59.00%	39.56
															2	67.05	18.00%	12.07
															3	67.05	3.00%	2.01
															4	67.05	1.00%	0.67
															5	67.05	0.00%	0.00
															6	67.05	0.00%	0.00
															7	67.05	0.00%	0.00
															8	147.28	0.00%	0.00
															9	281.37	0.00%	0.00
															10	357.13	0.00%	0.00
															11	399.16	0.00%	0.00
															12	412.14	0.00%	0.00
															13	396.77	0.00%	0.00
															14	352.19	0.00%	0.00
															15	273.00	0.00%	0.00
															16	131.47	0.00%	0.00
															17	67.05	0.00%	0.00
															18	67.05	0.00%	0.00
															19	67.05	0.00%	0.00
															20	67.05	0.00%	0.00
															21	67.05	0.00%	0.00
															22	67.05	0.00%	0.00
															23	67.05	0.00%	0.00
	CORNER OFFICE	2	225	450	270	180	2640	5280	3537.6	1742.4	480	960	240	720	0	29.23	19.00%	5.55
															1	29.23	59.00%	17.24
															2	29.23	18.00%	5.26
															3	29.23	3.00%	0.88
															4	29.23	1.00%	0.29
															5	29.23	0.00%	0.00
															6	29.23	0.00%	0.00
															7	29.23	0.00%	0.00
															8	64.20	0.00%	0.00
															9	122.65	0.00%	0.00
															10	155.67	0.00%	0.00
															11	173.99	0.00%	0.00
															12	179.65	0.00%	0.00
															13	172.95	0.00%	0.00
															14	153.52	0.00%	0.00
															15	119.00	0.00%	0.00
															16	57.31	0.00%	0.00
															17	29.23	0.00%	0.00
															18	29.23	0.00%	0.00
															19	29.23	0.00%	0.00
															20	29.23	0.00%	0.00
															21	29.23	0.00%	0.00
															22	29.23	0.00%	0.00
															23	29.23	0.00%	0.00
	REGULAR OFFICE	24	225	5400	3240	2160	2640	63360	42451.2	20908.8	480	11520	2880	8640	0	27.90	19.00%	5.30
															1	27.90	59.00%	16.46
															2	27.90	18.00%	5.02
															3	27.90	3.00%	0.84
															4	27.90	1.00%	0.28
															5	27.90	0.00%	0.00
															6	27.90	0.00%	0.00
															7	27.90	0.00%	0.00
															8	61.28	0.00%	0.00
															9	117.08	0.00%	0.00
															10	148.60	0.00%	0.00
															11	166.09	0.00%	0.00
															12	171.49	0.00%	0.00
															13	165.09	0.00%	0.00
															14	146.55	0.00%	0.00
															15	113.59	0.00%	0.00

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TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			0.00	0.00	0.00	0.00	0.00	0.00	695.15	695.15	437.94	257.20	4984.42	437.94	4649.08	5087.02
67.05	42.24	24.81	0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			4107.10	4107.10	467.52	467.52	294.54	172.98	1613.73	1613.73	1016.65	597.08	2274.44	5418.28	2231.67	7649.96
			10802.75	10802.75	1397.47	1397.47	880.41	517.06	1613.73	1613.73	1016.65	597.08	2618.52	12699.80	2231.67	14931.47
			14490.86	14490.86	2007.07	2007.07	1264.46	742.62	1613.73	1613.73	1016.65	597.08	2844.08	16771.97	2231.67	19003.64
			16511.64	16511.64	2367.25	2367.25	1491.37	875.88	1613.73	1613.73	1016.65	597.08	2977.34	19019.66	2231.67	21251.33
			17132.60	17132.60	2481.19	2481.19	1563.15	918.04	1613.73	1613.73	1016.65	597.08	3019.50	19712.39	2231.67	21944.07
			16397.08	16397.08	2346.39	2346.39	1478.23	868.17	1613.73	1613.73	1016.65	597.08	2969.62	18891.96	2231.67	21123.63
			14252.10	14252.10	1965.66	1965.66	1238.37	727.29	1613.73	1613.73	1016.65	597.08	2828.75	16507.12	2231.67	18738.79
			10391.48	10391.48	1333.71	1333.71	840.24	493.47	1613.73	1613.73	1016.65	597.08	2594.93	12248.36	2231.67	14480.03
			3303.37	3303.37	370.34	370.34	233.32	137.03	1613.73	1613.73	1016.65	597.08	2238.49	4553.34	2231.67	6785.01
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
			0.00	0.00	0.00	0.00	0.00	0.00	1613.73	1613.73	1016.65	597.08	2101.46	1016.65	2231.67	3248.32
58.46	36.83	21.63	0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			7485.80	14971.60	852.13	1704.25	1073.68	630.57	2941.26	5882.53	3705.99	2176.53	5471.14	19751.28	4084.43	23835.70
			19689.64	39379.27	2547.10	5094.21	3209.35	1884.86	2941.26	5882.53	3705.99	2176.53	6725.42	46294.61	4084.43	50379.04
			26411.78	52823.56	3658.20	7316.39	4609.33	2707.06	2941.26	5882.53	3705.99	2176.53	7547.63	61138.88	4084.43	65223.31
			30094.96	60189.93	4314.67	8629.35	5436.49	3192.86	2941.26	5882.53	3705.99	2176.53	8033.42	69332.41	4084.43	73416.83
			31226.75	62453.49	4522.34	9044.67	5698.14	3346.53	2941.26	5882.53	3705.99	2176.53	8187.09	71857.63	4084.43	75942.05
			29886.16	59772.32	4276.65	8553.31	5388.58	3164.72	2941.26	5882.53	3705.99	2176.53	8005.29	68866.90	4084.43	72951.32
			25976.61	51953.21	3582.71	7165.43	4514.22	2651.21	2941.26	5882.53	3705.99	2176.53	7491.77	60173.42	4084.43	64257.85
			18940.04	37880.07	2430.88	4861.77	3062.91	1798.85	2941.26	5882.53	3705.99	2176.53	6639.42	44648.98	4084.43	48733.41
			6020.90	12041.79	675.00	1350.01	850.51	499.50	2941.26	5882.53	3705.99	2176.53	5340.07	16598.29	4084.43	20682.72
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
			0.00	0.00	0.00	0.00	0.00	0.00	2941.26	5882.53	3705.99	2176.53	4840.56	3705.99	4084.43	7790.42
669.61	421.85	247.75	0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			26894.59	645470.18	3061.48	73475.42	46289.52	27185.91	10567.21	253613.14	159776.28	93836.86	152979.32	851535.97	48993.05	900529.02
			70739.87	1697756.96	9151.10	219626.36	138364.60	81261.75	10567.21	253613.14	159776.28	93836.86	207055.17	1995897.84	48993.05	2044890.89
			94890.84	2277380.22	13142.97	315431.23	198721.67	116709.56	10567.21	253613.14	159776.28	93836.86	242502.97	2635878.17	48993.05	2684871.22
			108123.58	2594965.82	15501.53	372036.80	234383.19	137653.62	10567.21	253613.14	159776.28	93836.86	263447.03	2989125.29	48993.05	3038118.34
			112189.79	2692554.88	16247.61	389942.64	245663.86	144278.78	10567.21	253613.14	159776.28	93836.86	270072.19	3097995.02	48993.05	3146988.07
			107373.40	2576961.62	15364.94	368758.48	232317.84	136440.64	10567.21	253613.14	159776.28	93836.86	262234.05	2969055.73	48993.05	3018048.78
			93327.36	2239856.69	12871.78	308922.82	194621.37	114301.44	10567.21	253613.14	159776.28	93836.86	240094.86	2594254.34	48993.05	2643247.39
			68046.75	1633122.01	8733.55	209605.26	132051.31	77553.95	10567.21	253613.14	159776.28	93836.86	203347.36	1924949.60	48993.05	1973942.65

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
															16	54.70	0.00%	0.00
															17	27.90	0.00%	0.00
															18	27.90	0.00%	0.00
															19	27.90	0.00%	0.00
															20	27.90	0.00%	0.00
															21	27.90	0.00%	0.00
															22	27.90	0.00%	0.00
															23	27.90	0.00%	0.00
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
	PHYSICS GRAD OFFICE - 338	1	1125	1125	675	450	2654	2654	1778.18	875.82	2761	2761	690.25	2070.75	11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
	PHYSICS GRAD OFFICES - 345	1	750	750	450	300	2416	2416	1618.72	797.28	2521	2521	630.25	1890.75	11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			21631.55	519157.24	2425.12	58202.90	36667.82	21535.07	10567.21	253613.14	159776.28	93836.86	147328.49	715601.34	48993.05	764594.39
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
			0.00	0.00	0.00	0.00	0.00	0.00	10567.21	253613.14	159776.28	93836.86	125793.41	159776.28	48993.05	208769.33
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3396.57	0.00	3143.43	3143.43
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2988.03	0.00	2698.97	2698.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
	PHYSICS GRAD OFFICES - 347	1	750	750	450	300	2416	2416	1618.72	797.28	2641	2641	660.25	1980.75	9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	PHYSICS GRAD OFFICES - 349	1	750	750	450	300	2416	2416	1618.72	797.28	2641	2641	660.25	1980.75	0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	PHYSICS GRAD OFFICES - 357	1	900	900	540	360	2292	2292	1535.64	756.36	2641	2641	660.25	1980.75	0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3078.03	0.00	2728.97	2728.97
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
THIRD	PHYSICS GRAD OFFICES - 359	1	900	900	540	360	2292	2292	1535.64	756.36	2641	2641	660.25	1980.75	2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	PHYSICS CGRAD OFFICES - 360	1	900	900	540	360	2292	2292	1535.64	756.36	2521	2521	630.25	1890.75	0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
	PHYSICS CGRAD OFFICES - 386	1	525	525	315	210	2640	2640	1768.8	871.2	1681	1681	420.25	1260.75	0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
															11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3097.11	0.00	2735.89	2735.89
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3007.11	0.00	2705.89	2705.89
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
															0	16.09	19.00%	3.06
															1	16.09	59.00%	9.49
															2	16.09	18.00%	2.90
															3	16.09	3.00%	0.48
															4	16.09	1.00%	0.16
															5	16.09	0.00%	0.00
															6	16.09	0.00%	0.00
															7	16.09	0.00%	0.00
															8	35.34	0.00%	0.00
															9	67.51	0.00%	0.00
															10	85.69	0.00%	0.00
	BREAK OUT	2	720	1440	864	576	2640	5280	3537.6	1742.4	920	1840	460	1380	11	95.77	0.00%	0.00
															12	98.89	0.00%	0.00
															13	95.20	0.00%	0.00
															14	84.50	0.00%	0.00
															15	65.50	0.00%	0.00
															16	31.54	0.00%	0.00
															17	16.09	0.00%	0.00
															18	16.09	0.00%	0.00
															19	16.09	0.00%	0.00
															20	16.09	0.00%	0.00
															21	16.09	0.00%	0.00
															22	16.09	0.00%	0.00
															23	16.09	0.00%	0.00
															0	67.90	1.00%	0.68
															1	67.90	1.00%	0.68
															2	67.90	3.00%	2.04
															3	67.90	6.00%	4.07
															4	67.90	7.00%	4.75
															5	67.90	8.00%	5.43
															6	67.90	8.00%	5.43
															7	67.90	8.00%	5.43
															8	149.13	8.00%	11.93
															9	284.91	7.00%	19.94
															10	361.63	6.00%	21.70
	PHYSICS VISITING OFFICE SUITE	1	350	350	210	140	2285	2285	1530.95	754.05	2281	2281	570.25	1710.75	11	404.18	6.00%	24.25
															12	417.32	5.00%	20.87
															13	401.76	4.00%	16.07
															14	356.62	4.00%	14.26
															15	276.44	3.00%	8.29
															16	133.12	3.00%	3.99
															17	67.90	3.00%	2.04
															18	67.90	2.00%	1.36
															19	67.90	2.00%	1.36
															20	67.90	2.00%	1.36
															21	67.90	1.00%	0.68
															22	67.90	1.00%	0.68
															23	67.90	1.00%	0.68
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
	MAIL + PRINT	1					2285	2285	1530.95	754.05	3268	3268	817	2451	11	0.00	6.00%	0.00

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TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2341.95	0.00	2504.05	2504.05
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			2767.16	5534.32	314.99	629.98	396.89	233.09	1087.25	2174.50	1369.94	804.57	4747.97	7301.14	4881.87	12183.01
			7278.36	14556.71	941.55	1883.10	1186.35	696.75	1087.25	2174.50	1369.94	804.57	5211.62	17113.00	4881.87	21994.87
			9763.23	19526.45	1352.27	2704.53	1703.86	1000.68	1087.25	2174.50	1369.94	804.57	5515.55	22600.25	4881.87	27482.12
32.18	20.27	11.91	11124.73	22249.46	1594.94	3189.88	2009.62	1180.25	1087.25	2174.50	1369.94	804.57	5695.12	25629.02	4881.87	30510.89
			11543.10	23086.20	1671.70	3343.40	2106.34	1237.06	1087.25	2174.50	1369.94	804.57	5751.93	26562.48	4881.87	31444.35
			11047.55	22095.09	1580.88	3161.77	1991.91	1169.85	1087.25	2174.50	1369.94	804.57	5684.72	25456.94	4881.87	30338.81
			9602.36	19204.72	1324.37	2648.73	1668.70	980.03	1087.25	2174.50	1369.94	804.57	5494.90	22243.36	4881.87	27125.23
			7001.26	14002.53	898.59	1797.17	1132.22	664.95	1087.25	2174.50	1369.94	804.57	5179.83	16504.68	4881.87	21386.56
			2225.65	4451.30	249.52	499.04	314.39	184.64	1087.25	2174.50	1369.94	804.57	4699.51	6135.63	4881.87	11017.50
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	1087.25	2174.50	1369.94	804.57	4514.87	1369.94	4881.87	6251.81
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			1396.35	1396.35	158.95	158.95	100.14	58.81	548.64	548.64	345.65	203.00	2932.46	1842.13	2423.32	4265.46
			3672.77	3672.77	475.12	475.12	299.33	175.79	548.64	548.64	345.65	203.00	3049.44	4317.74	2423.32	6741.07
			4926.67	4926.67	682.37	682.37	429.90	252.48	548.64	548.64	345.65	203.00	3126.13	5702.22	2423.32	8125.54
177.97	112.12	65.85	5613.71	5613.71	804.83	804.83	507.04	297.79	548.64	548.64	345.65	203.00	3171.44	6466.40	2423.32	8889.72
			5824.83	5824.83	843.57	843.57	531.45	312.12	548.64	548.64	345.65	203.00	3185.77	6701.92	2423.32	9125.24
			5574.76	5574.76	797.74	797.74	502.58	295.16	548.64	548.64	345.65	203.00	3168.81	6422.98	2423.32	8846.31
			4845.50	4845.50	668.30	668.30	421.03	247.27	548.64	548.64	345.65	203.00	3120.92	5612.17	2423.32	8035.49
			3532.95	3532.95	453.44	453.44	285.67	167.77	548.64	548.64	345.65	203.00	3041.42	4164.26	2423.32	6587.58
			1123.10	1123.10	125.91	125.91	79.32	46.59	548.64	548.64	345.65	203.00	2920.24	1548.07	2423.32	3971.39
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	548.64	548.64	345.65	203.00	2873.65	345.65	2423.32	2768.97
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
															23	0.00	1.00%	0.00
															0	41.50	1.00%	0.41
															1	41.50	1.00%	0.41
															2	41.50	3.00%	1.24
															3	41.50	6.00%	2.49
															4	41.50	7.00%	2.90
															5	41.50	8.00%	3.32
															6	41.50	8.00%	3.32
															7	41.50	8.00%	3.32
															8	91.14	8.00%	7.29
															9	174.12	7.00%	12.19
															10	221.01	6.00%	13.26
	ADH	1					2285	2285	1530.95	754.05	720	720	180	540	11	247.02	6.00%	14.82
															12	255.05	5.00%	12.75
															13	245.54	4.00%	9.82
															14	217.95	4.00%	8.72
															15	168.95	3.00%	5.07
															16	81.36	3.00%	2.44
															17	41.50	3.00%	1.24
															18	41.50	2.00%	0.83
															19	41.50	2.00%	0.83
															20	41.50	2.00%	0.83
															21	41.50	1.00%	0.41
															22	41.50	1.00%	0.41
															23	41.50	1.00%	0.41
															0	0.00	1.00%	0.00
															1	0.00	1.00%	0.00
															2	0.00	3.00%	0.00
															3	0.00	6.00%	0.00
															4	0.00	7.00%	0.00
															5	0.00	8.00%	0.00
															6	0.00	8.00%	0.00
															7	0.00	8.00%	0.00
															8	0.00	8.00%	0.00
															9	0.00	7.00%	0.00
															10	0.00	6.00%	0.00
	COFFEE	1					2285	2285	1530.95	754.05	4462	4462	1115.5	3346.5	11	0.00	6.00%	0.00
															12	0.00	5.00%	0.00
															13	0.00	4.00%	0.00
															14	0.00	4.00%	0.00
															15	0.00	3.00%	0.00
															16	0.00	3.00%	0.00
															17	0.00	3.00%	0.00
															18	0.00	2.00%	0.00
															19	0.00	2.00%	0.00
															20	0.00	2.00%	0.00
															21	0.00	1.00%	0.00
															22	0.00	1.00%	0.00
			1050	1050	630	420									23	0.00	1.00%	0.00
															0	139.49	19.00%	26.50
															1	139.49	59.00%	82.30
															2	139.49	18.00%	25.11
															3	139.49	3.00%	4.18
															4	139.49	1.00%	1.39

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3625.05	0.00	2977.95	2977.95
108.77	68.53	40.25	0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			853.26	853.26	97.13	97.13	61.19	35.94	335.26	335.26	211.21	124.04	1494.28	1125.66	1779.48	2905.14
			2244.29	2244.29	290.33	290.33	182.91	107.42	335.26	335.26	211.21	124.04	1565.76	2638.41	1779.48	4417.89
			3010.51	3010.51	416.97	416.97	262.69	154.28	335.26	335.26	211.21	124.04	1612.62	3484.41	1779.48	5263.89
			3430.33	3430.33	491.80	491.80	309.84	181.97	335.26	335.26	211.21	124.04	1640.31	3951.37	1779.48	5730.85
			3559.33	3559.33	515.47	515.47	324.75	190.72	335.26	335.26	211.21	124.04	1649.06	4095.29	1779.48	5874.77
			3406.53	3406.53	487.47	487.47	307.10	180.36	335.26	335.26	211.21	124.04	1638.70	3924.84	1779.48	5704.32
			2960.90	2960.90	408.37	408.37	257.27	151.10	335.26	335.26	211.21	124.04	1609.44	3429.39	1779.48	5208.86
			2158.85	2158.85	277.08	277.08	174.56	102.52	335.26	335.26	211.21	124.04	1560.86	2544.62	1779.48	4324.10
			686.28	686.28	76.94	76.94	48.47	28.47	335.26	335.26	211.21	124.04	1486.81	945.97	1779.48	2725.44
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
			0.00	0.00	0.00	0.00	0.00	0.00	335.26	335.26	211.21	124.04	1458.34	211.21	1779.48	1990.69
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4100.55	0.00	2646.45	2646.45
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
	PHYSICS DEPARTMENT HEAD	1					2285	2285	1530.95	754.05	1521	1521	380.25	1140.75	5	139.49	0.00%	0.00
															6	139.49	0.00%	0.00
															7	139.49	0.00%	0.00
															8	306.40	0.00%	0.00
															9	585.34	0.00%	0.00
															10	742.97	0.00%	0.00
															11	830.40	0.00%	0.00
															12	857.40	0.00%	0.00
															13	825.42	0.00%	0.00
															14	732.68	0.00%	0.00
															15	567.94	0.00%	0.00
															16	273.50	0.00%	0.00
															17	139.49	0.00%	0.00
															18	139.49	0.00%	0.00
															19	139.49	0.00%	0.00
															20	139.49	0.00%	0.00
															21	139.49	0.00%	0.00
															22	139.49	0.00%	0.00
															23	139.49	0.00%	0.00
	ADMIN - 282-F	1					2285	2285	1530.95	754.05	720	720	180	540	0	24.79	19.00%	4.71
															1	24.79	59.00%	14.62
															2	24.79	18.00%	4.46
															3	24.79	3.00%	0.74
															4	24.79	1.00%	0.25
															5	24.79	0.00%	0.00
															6	24.79	0.00%	0.00
															7	24.79	0.00%	0.00
															8	54.44	0.00%	0.00
															9	104.01	0.00%	0.00
															10	132.01	0.00%	0.00
															11	147.55	0.00%	0.00
															12	152.34	0.00%	0.00
															13	146.66	0.00%	0.00
															14	130.19	0.00%	0.00
															15	100.91	0.00%	0.00
															16	48.60	0.00%	0.00
															17	24.79	0.00%	0.00
															18	24.79	0.00%	0.00
															19	24.79	0.00%	0.00
															20	24.79	0.00%	0.00
															21	24.79	0.00%	0.00
															22	24.79	0.00%	0.00
															23	24.79	0.00%	0.00
	ADMIN - 382-G	1					2285	2285	1530.95	754.05	720	720	180	540	0	13.32	19.00%	2.53
															1	13.32	59.00%	7.86
															2	13.32	18.00%	2.40
															3	13.32	3.00%	0.40
															4	13.32	1.00%	0.13
															5	13.32	0.00%	0.00
															6	13.32	0.00%	0.00
															7	13.32	0.00%	0.00
															8	29.27	0.00%	0.00
															9	55.91	0.00%	0.00
															10	70.97	0.00%	0.00
															11	79.32	0.00%	0.00
															12	81.90	0.00%	0.00
															13	78.84	0.00%	0.00
															14	69.99	0.00%	0.00
															15	54.25	0.00%	0.00
															16	26.12	0.00%	0.00
															17	13.32	0.00%	0.00
															18	13.32	0.00%	0.00
															19	13.32	0.00%	0.00
															20	13.32	0.00%	0.00
															21	13.32	0.00%	0.00

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E SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
139.49	87.88	51.61	0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			3403.79	0.00	387.46	387.46	244.10	143.36	1337.39	1337.39	842.56	494.83	2584.61	1086.66	1999.08	3085.74
			8952.86	0.00	1158.17	1158.17	729.64	428.52	1337.39	1337.39	842.56	494.83	2869.77	1572.20	1999.08	3571.28
			12009.41	0.00	1663.38	1663.38	1047.93	615.45	1337.39	1337.39	842.56	494.83	3056.70	1890.48	1999.08	3889.56
			13684.15	0.00	1961.88	1961.88	1235.98	725.90	1337.39	1337.39	842.56	494.83	3167.14	2078.54	1999.08	4077.62
			14198.77	0.00	2056.30	2056.30	1295.47	760.83	1337.39	1337.39	842.56	494.83	3202.08	2138.03	1999.08	4137.11
			13589.21	0.00	1944.59	1944.59	1225.09	719.50	1337.39	1337.39	842.56	494.83	3160.75	2067.65	1999.08	4066.73
			11811.54	0.00	1629.06	1629.06	1026.31	602.75	1337.39	1337.39	842.56	494.83	3044.00	1868.86	1999.08	3867.94
			8612.02	0.00	1105.32	1105.32	696.35	408.97	1337.39	1337.39	842.56	494.83	2850.22	1538.91	1999.08	3537.99
			2737.70	0.00	306.92	306.92	193.36	113.56	1337.39	1337.39	842.56	494.83	2554.81	1035.92	1999.08	3035.00
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
			0.00	0.00	0.00	0.00	0.00	0.00	1337.39	1337.39	842.56	494.83	2441.25	842.56	1999.08	2841.64
24.79	15.61	9.17	0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			913.47	913.47	103.98	103.98	65.51	38.47	358.91	358.91	226.11	132.80	1474.49	1205.09	1726.56	2931.65
			2402.66	2402.66	310.81	310.81	195.81	115.00	358.91	358.91	226.11	132.80	1551.02	2824.59	1726.56	4551.15
			3222.94	3222.94	446.40	446.40	281.23	165.17	358.91	358.91	226.11	132.80	1601.18	3730.28	1726.56	5456.85
			3672.38	3672.38	526.50	526.50	331.70	194.81	358.91	358.91	226.11	132.80	1630.82	4230.20	1726.56	5956.76
			3810.49	3810.49	551.84	551.84	347.66	204.18	358.91	358.91	226.11	132.80	1640.20	4384.27	1726.56	6110.83
			3646.90	3646.90	521.87	521.87	328.78	193.09	358.91	358.91	226.11	132.80	1629.11	4201.79	1726.56	5928.36
			3169.83	3169.83	437.19	437.19	275.43	161.76	358.91	358.91	226.11	132.80	1597.78	3671.38	1726.56	5397.94
			2311.19	2311.19	296.63	296.63	186.88	109.75	358.91	358.91	226.11	132.80	1545.77	2724.18	1726.56	4450.74
			734.71	734.71	82.37	82.37	51.89	30.48	358.91	358.91	226.11	132.80	1466.49	1012.72	1726.56	2739.28
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
			0.00	0.00	0.00	0.00	0.00	0.00	358.91	358.91	226.11	132.80	1436.02	226.11	1726.56	1952.68
13.32	8.39	4.93	0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			491.00	491.00	55.89	55.89	35.21	20.68	192.92	192.92	121.54	71.38	1391.04	647.75	1719.34	2367.09
			1291.45	1291.45	167.07	167.07	105.25	61.81	192.92	192.92	121.54	71.38	1432.17	1518.24	1719.34	3237.59
			1732.36	1732.36	239.94	239.94	151.16	88.78	192.92	192.92	121.54	71.38	1459.14	2005.06	1719.34	3724.41
			1973.94	1973.94	283.00	283.00	178.29	104.71	192.92	192.92	121.54	71.38	1475.07	2273.77	1719.34	3993.12
			2048.18	2048.18	296.62	296.62	186.87	109.75	192.92	192.92	121.54	71.38	1480.11	2356.59	1719.34	4075.93
			1960.25	1960.25	280.51	280.51	176.72	103.79	192.92	192.92	121.54	71.38	1474.15	2258.51	1719.34	3977.85
			1703.82	1703.82	234.99	234.99	148.04	86.95	192.92	192.92	121.54	71.38	1457.31	1973.40	1719.34	3692.75
			1242.29	1242.29	159.44	159.44	100.45	58.99	192.92	192.92	121.54	71.38	1429.35	1464.27	1719.34	3183.62
			394.91	394.91	44.27	44.27	27.89	16.38	192.92	192.92	121.54	71.38	1386.74	544.34	1719.34	2263.69
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88

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FLOOR	ROOM NAME	QUANTITY	PEOPLE				LIGHTING				APPLIANCES				HOUR	CONDUCTIVE TIME		
			PEOPLE	TOTAL	RADIANT	CONVECTIVE	LIGHTING	TOTAL	RADIANT	CONVECTIVE	APPLIANCES	TOTAL	RADIANT	CONVECTIVE		HG PER HOUR	COEFFICIENTS	MULT
															22	13.32	0.00%	0.00
															23	13.32	0.00%	0.00
	CONFERENCE 10 SEAT	1	1425	1425	855	570	2285	2285	1530.95	754.05	1254	1254	313.5	940.5	0	47.62	19.00%	9.05
															1	47.62	59.00%	28.10
															2	47.62	18.00%	8.57
															3	47.62	3.00%	1.43
															4	47.62	1.00%	0.48
															5	47.62	0.00%	0.00
															6	47.62	0.00%	0.00
															7	47.62	0.00%	0.00
															8	104.60	0.00%	0.00
															9	199.83	0.00%	0.00
															10	253.64	0.00%	0.00
															11	283.49	0.00%	0.00
															12	292.71	0.00%	0.00
															13	281.79	0.00%	0.00
															14	250.13	0.00%	0.00
															15	193.89	0.00%	0.00
															16	93.37	0.00%	0.00
															17	47.62	0.00%	0.00
															18	47.62	0.00%	0.00
															19	47.62	0.00%	0.00
															20	47.62	0.00%	0.00
															21	47.62	0.00%	0.00
															22	47.62	0.00%	0.00
															23	47.62	0.00%	0.00

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SERIES			DIRECT SOLAR HEAT GAIN -		DIFFUSE SOLAR HEAT GAIN				CONDUCTIVE SOLAR HEAT GAIN				TOTAL CONVECTIVE	RADIANT SOLAR	RADIANT NON-SOLAR	TOTAL RADIANT
TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	EACH	TOTAL	RADIANT	CONVECTIVE	EACH	TOTAL	RADIANT	CONVECTIVE				
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
			0.00	0.00	0.00	0.00	0.00	0.00	192.92	192.92	121.54	71.38	1370.36	121.54	1719.34	1840.88
47.62	30.00	17.62	0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			4354.47	4354.47	495.68	495.68	312.28	183.40	1710.93	1710.93	1077.88	633.04	3098.61	5744.64	2729.45	8474.09
			11453.41	11453.41	1481.64	1481.64	933.44	548.21	1710.93	1710.93	1077.88	633.04	3463.42	13464.73	2729.45	16194.19
			15363.67	15363.67	2127.96	2127.96	1340.62	787.35	1710.93	1710.93	1077.88	633.04	3702.56	17782.17	2729.45	20511.62
			17506.17	17506.17	2509.84	2509.84	1581.20	928.64	1710.93	1710.93	1077.88	633.04	3843.85	20165.25	2729.45	22894.70
			18164.52	18164.52	2630.63	2630.63	1657.30	973.33	1710.93	1710.93	1077.88	633.04	3888.55	20899.71	2729.45	23629.16
			17384.71	17384.71	2487.72	2487.72	1567.26	920.46	1710.93	1710.93	1077.88	633.04	3835.67	20029.86	2729.45	22759.31
			15110.53	15110.53	2084.06	2084.06	1312.96	771.10	1710.93	1710.93	1077.88	633.04	3686.31	17501.37	2729.45	20230.82
			11017.37	11017.37	1414.04	1414.04	890.85	523.19	1710.93	1710.93	1077.88	633.04	3438.41	12986.10	2729.45	15715.55
			3502.34	3502.34	392.65	392.65	247.37	145.28	1710.93	1710.93	1077.88	633.04	3060.49	4827.59	2729.45	7557.04
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34
			0.00	0.00	0.00	0.00	0.00	0.00	1710.93	1710.93	1077.88	633.04	2915.21	1077.88	2729.45	3807.34

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APPENDIX LC.8 – HOURLY COOLING LOADS

FLOOR	ROOM NAME	LST	TOTAL CONVECTIVE	RADIANT SOLAR	SOLAR COEFFICIENTS	SOLAR RTS	RADIANT NON-SOLAR	NON-SOLAR COEFFICIENTS	NON-SOLAR RTS	HOURLY COOLING LOAD
	PHYSICS STUDENT LOUNGE	0	5714.92	588.62	51.00%	300.20	4599.49	42.00%	1931.78	7946.90
		1	5714.92	588.62	12.00%	70.63	4599.49	9.00%	413.95	6199.51
		2	5714.92	588.62	6.00%	35.32	4599.49	5.00%	229.97	5980.21
		3	5714.92	588.62	3.00%	17.66	4599.49	4.00%	183.98	5916.56
		4	5714.92	588.62	3.00%	17.66	4599.49	4.00%	183.98	5916.56
		5	5714.92	588.62	2.00%	11.77	4599.49	3.00%	137.98	5864.68
		6	5714.92	588.62	2.00%	11.77	4599.49	3.00%	137.98	5864.68
		7	5714.92	588.62	2.00%	11.77	4599.49	3.00%	137.98	5864.68
		8	5815.07	3137.08	2.00%	62.74	4599.49	3.00%	137.98	6015.80
		9	6014.29	7352.95	2.00%	147.06	4599.49	2.00%	91.99	6253.34
		10	6144.88	9710.66	2.00%	194.21	4599.49	2.00%	91.99	6431.08
		11	6222.04	11012.03	1.00%	110.12	4599.49	2.00%	91.99	6424.15
		12	6246.45	11413.11	1.00%	114.13	4599.49	2.00%	91.99	6452.57
		13	6217.57	10938.09	1.00%	109.38	4599.49	2.00%	91.99	6418.94
		14	6136.01	9557.31	1.00%	95.57	4599.49	2.00%	91.99	6323.57
		15	6000.63	7091.57	1.00%	70.92	4599.49	2.00%	91.99	6163.54
		16	5794.26	2636.30	1.00%	26.36	4599.49	2.00%	91.99	5912.61
		17	5714.92	588.62	1.00%	5.89	4599.49	2.00%	91.99	5812.80
		18	5714.92	588.62	1.00%	5.89	4599.49	1.00%	45.99	5766.80
		19	5714.92	588.62	1.00%	5.89	4599.49	1.00%	45.99	5766.80
		20	5714.92	588.62	1.00%	5.89	4599.49	1.00%	45.99	5766.80
		21	5714.92	588.62	1.00%	5.89	4599.49	1.00%	45.99	5766.80
		22	5714.92	588.62	1.00%	5.89	4599.49	1.00%	45.99	5766.80
		23	5714.92	588.62	1.00%	5.89	4599.49	1.00%	45.99	5766.80
	C.A.S.E. STORAGE A	0	1009.57	0.00	51.00%	0.00	1729.43	42.00%	726.36	1735.93
		1	1009.57	0.00	12.00%	0.00	1729.43	9.00%	155.65	1165.22
		2	1009.57	0.00	6.00%	0.00	1729.43	5.00%	86.47	1096.04
		3	1009.57	0.00	3.00%	0.00	1729.43	4.00%	69.18	1078.75
		4	1009.57	0.00	3.00%	0.00	1729.43	4.00%	69.18	1078.75
		5	1009.57	0.00	2.00%	0.00	1729.43	3.00%	51.88	1061.45
		6	1009.57	0.00	2.00%	0.00	1729.43	3.00%	51.88	1061.45
		7	1009.57	0.00	2.00%	0.00	1729.43	3.00%	51.88	1061.45
		8	1009.57	0.00	2.00%	0.00	1729.43	3.00%	51.88	1061.45
		9	1009.57	0.00	2.00%	0.00	1729.43	2.00%	34.59	1044.16
		10	1009.57	0.00	2.00%	0.00	1729.43	2.00%	34.59	1044.16
		11	1009.57	0.00	1.00%	0.00	1729.43	2.00%	34.59	1044.16
		12	1009.57	0.00	1.00%	0.00	1729.43	2.00%	34.59	1044.16
		13	1009.57	0.00	1.00%	0.00	1729.43	2.00%	34.59	1044.16
		14	1009.57	0.00	1.00%	0.00	1729.43	2.00%	34.59	1044.16
		15	1009.57	0.00	1.00%	0.00	1729.43	2.00%	34.59	1044.16
		16	1009.57	0.00	1.00%	0.00	1729.43	2.00%	34.59	1044.16
		17	1009.57	0.00	1.00%	0.00	1729.43	2.00%	34.59	1044.16
		18	1009.57	0.00	1.00%	0.00	1729.43	1.00%	17.29	1026.86
		19	1009.57	0.00	1.00%	0.00	1729.43	1.00%	17.29	1026.86
		20	1009.57	0.00	1.00%	0.00	1729.43	1.00%	17.29	1026.86
		21	1009.57	0.00	1.00%	0.00	1729.43	1.00%	17.29	1026.86
		22	1009.57	0.00	1.00%	0.00	1729.43	1.00%	17.29	1026.86
		23	1009.57	0.00	1.00%	0.00	1729.43	1.00%	17.29	1026.86
	PHYSICS COMPUTER LAB	0	10475.02	1177.19	51.00%	600.37	7299.63	42.00%	3065.84	14141.23
		1	10475.02	1177.19	12.00%	141.26	7299.63	9.00%	656.97	11273.25
		2	10475.02	1177.19	6.00%	70.63	7299.63	5.00%	364.98	10910.63
		3	10475.02	1177.19	3.00%	35.32	7299.63	4.00%	291.99	10802.32
		4	10475.02	1177.19	3.00%	35.32	7299.63	4.00%	291.99	10802.32
		5	10475.02	1177.19	2.00%	23.54	7299.63	3.00%	218.99	10717.55
		6	10475.02	1177.19	2.00%	23.54	7299.63	3.00%	218.99	10717.55
		7	10475.02	1177.19	2.00%	23.54	7299.63	3.00%	218.99	10717.55
		8	10675.32	6273.88	2.00%	125.48	7299.63	3.00%	218.99	11019.78
		9	11073.73	14705.22	2.00%	294.10	7299.63	2.00%	145.99	11513.83
		10	11334.90	19420.42	2.00%	388.41	7299.63	2.00%	145.99	11869.30
		11	11489.21	22023.04	1.00%	220.23	7299.63	2.00%	145.99	11855.43
		12	11538.02	22825.16	1.00%	228.25	7299.63	2.00%	145.99	11912.27
		13	11480.27	21875.18	1.00%	218.75	7299.63	2.00%	145.99	11845.02
		14	11317.16	19113.74	1.00%	191.14	7299.63	2.00%	145.99	11654.29
		15	11046.41	14182.49	1.00%	141.82	7299.63	2.00%	145.99	11334.23
		16	10633.68	5272.35	1.00%	52.72	7299.63	2.00%	145.99	10832.40
		17	10475.02	1177.19	1.00%	11.77	7299.63	2.00%	145.99	10632.78
		18	10475.02	1177.19	1.00%	11.77	7299.63	1.00%	73.00	10559.79
		19	10475.02	1177.19	1.00%	11.77	7299.63	1.00%	73.00	10559.79
		20	10475.02	1177.19	1.00%	11.77	7299.63	1.00%	73.00	10559.79
		21	10475.02	1177.19	1.00%	11.77	7299.63	1.00%	73.00	10559.79
		22	10475.02	1177.19	1.00%	11.77	7299.63	1.00%	73.00	10559.79
		23	10475.02	1177.19	1.00%	11.77	7299.63	1.00%	73.00	10559.79
		0	3030.60	0.00	51.00%	0.00	2785.40	42.00%	1169.87	4200.47
		1	3030.60	0.00	12.00%	0.00	2785.40	9.00%	250.69	3281.29
		2	3030.60	0.00	6.00%	0.00	2785.40	5.00%	139.27	3169.87
		3	3030.60	0.00	3.00%	0.00	2785.40	4.00%	111.42	3142.02
		4	3030.60	0.00	3.00%	0.00	2785.40	4.00%	111.42	3142.02
		5	3030.60	0.00	2.00%	0.00	2785.40	3.00%	83.56	3114.16
		6	3030.60	0.00	2.00%	0.00	2785.40	3.00%	83.56	3114.16
		7	3030.60	0.00	2.00%	0.00	2785.40	3.00%	83.56	3114.16
		8	3030.60	0.00	2.00%	0.00	2785.40	3.00%	83.56	3114.16

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FLOOR	ROOM NAME	LST	TOTAL CONVECTIVE	RADIANT SOLAR	SOLAR COEFFICIENTS	SOLAR RTS	RADIANT NON-SOLAR	NON-SOLAR COEFFICIENTS	NON-SOLAR RTS	HOURLY COOLING LOAD
FIRST	STUDENT CLUB SPACE	9	3030.60	0.00	2.00%	0.00	2785.40	2.00%	55.71	3086.31
		10	3030.60	0.00	2.00%	0.00	2785.40	2.00%	55.71	3086.31
		11	3030.60	0.00	1.00%	0.00	2785.40	2.00%	55.71	3086.31
		12	3030.60	0.00	1.00%	0.00	2785.40	2.00%	55.71	3086.31
		13	3030.60	0.00	1.00%	0.00	2785.40	2.00%	55.71	3086.31
		14	3030.60	0.00	1.00%	0.00	2785.40	2.00%	55.71	3086.31
		15	3030.60	0.00	1.00%	0.00	2785.40	2.00%	55.71	3086.31
		16	3030.60	0.00	1.00%	0.00	2785.40	2.00%	55.71	3086.31
		17	3030.60	0.00	1.00%	0.00	2785.40	2.00%	55.71	3086.31
		18	3030.60	0.00	1.00%	0.00	2785.40	1.00%	27.85	3058.45
		19	3030.60	0.00	1.00%	0.00	2785.40	1.00%	27.85	3058.45
		20	3030.60	0.00	1.00%	0.00	2785.40	1.00%	27.85	3058.45
		21	3030.60	0.00	1.00%	0.00	2785.40	1.00%	27.85	3058.45
		22	3030.60	0.00	1.00%	0.00	2785.40	1.00%	27.85	3058.45
		23	3030.60	0.00	1.00%	0.00	2785.40	1.00%	27.85	3058.45
	ACTIVE LEARNING STUDIO	0	7862.71	859.10	51.00%	438.14	6699.76	42.00%	2813.90	11114.75
		1	7862.71	859.10	12.00%	103.09	6699.76	9.00%	602.98	8568.78
		2	7862.71	859.10	6.00%	51.55	6699.76	5.00%	334.99	8249.24
		3	7862.71	859.10	3.00%	25.77	6699.76	4.00%	267.99	8156.47
		4	7862.71	859.10	3.00%	25.77	6699.76	4.00%	267.99	8156.47
		5	7862.71	859.10	2.00%	17.18	6699.76	3.00%	200.99	8080.88
		6	7862.71	859.10	2.00%	17.18	6699.76	3.00%	200.99	8080.88
		7	7862.71	859.10	2.00%	17.18	6699.76	3.00%	200.99	8080.88
		8	8008.88	4578.60	2.00%	91.57	6699.76	3.00%	200.99	8301.45
		9	8299.64	10731.69	2.00%	214.63	6699.76	2.00%	134.00	8648.27
		10	8490.24	14172.79	2.00%	283.46	6699.76	2.00%	134.00	8907.69
		11	8602.86	16072.15	1.00%	160.72	6699.76	2.00%	134.00	8897.57
		12	8638.48	16657.53	1.00%	166.58	6699.76	2.00%	134.00	8939.05
		13	8596.33	15964.24	1.00%	159.64	6699.76	2.00%	134.00	8889.97
		14	8477.29	13948.98	1.00%	139.49	6699.76	2.00%	134.00	8750.78
		15	8279.71	10350.21	1.00%	103.50	6699.76	2.00%	134.00	8517.20
		16	7978.50	3847.70	1.00%	38.48	6699.76	2.00%	134.00	8150.97
		17	7862.71	859.10	1.00%	8.59	6699.76	2.00%	134.00	8005.30
		18	7862.71	859.10	1.00%	8.59	6699.76	1.00%	67.00	7938.30
		19	7862.71	859.10	1.00%	8.59	6699.76	1.00%	67.00	7938.30
		20	7862.71	859.10	1.00%	8.59	6699.76	1.00%	67.00	7938.30
		21	7862.71	859.10	1.00%	8.59	6699.76	1.00%	67.00	7938.30
		22	7862.71	859.10	1.00%	8.59	6699.76	1.00%	67.00	7938.30
		23	7862.71	859.10	1.00%	8.59	6699.76	1.00%	67.00	7938.30
	ACTIVE LEARNING STUDIO	0	7822.96	859.10	51.00%	438.14	6756.51	42.00%	2837.73	11098.83
		1	7822.96	859.10	12.00%	103.09	6756.51	9.00%	608.09	8534.14
		2	7822.96	859.10	6.00%	51.55	6756.51	5.00%	337.83	8212.33
		3	7822.96	859.10	3.00%	25.77	6756.51	4.00%	270.26	8118.99
		4	7822.96	859.10	3.00%	25.77	6756.51	4.00%	270.26	8118.99
		5	7822.96	859.10	2.00%	17.18	6756.51	3.00%	202.70	8042.84
		6	7822.96	859.10	2.00%	17.18	6756.51	3.00%	202.70	8042.84
		7	7822.96	859.10	2.00%	17.18	6756.51	3.00%	202.70	8042.84
		8	7969.13	4578.60	2.00%	91.57	6756.51	3.00%	202.70	8263.40
		9	8259.89	10731.69	2.00%	214.63	6756.51	2.00%	135.13	8609.66
		10	8450.49	14172.79	2.00%	283.46	6756.51	2.00%	135.13	8869.08
		11	8563.11	16072.15	1.00%	160.72	6756.51	2.00%	135.13	8858.96
		12	8598.73	16657.53	1.00%	166.58	6756.51	2.00%	135.13	8900.43
		13	8556.58	15964.24	1.00%	159.64	6756.51	2.00%	135.13	8851.36
		14	8437.54	13948.98	1.00%	139.49	6756.51	2.00%	135.13	8712.16
		15	8239.96	10350.21	1.00%	103.50	6756.51	2.00%	135.13	8478.59
		16	7938.75	3847.70	1.00%	38.48	6756.51	2.00%	135.13	8112.36
		17	7822.96	859.10	1.00%	8.59	6756.51	2.00%	135.13	7966.68
		18	7822.96	859.10	1.00%	8.59	6756.51	1.00%	67.57	7899.12
		19	7822.96	859.10	1.00%	8.59	6756.51	1.00%	67.57	7899.12
		20	7822.96	859.10	1.00%	8.59	6756.51	1.00%	67.57	7899.12
		21	7822.96	859.10	1.00%	8.59	6756.51	1.00%	67.57	7899.12
		22	7822.96	859.10	1.00%	8.59	6756.51	1.00%	67.57	7899.12
		23	7822.96	859.10	1.00%	8.59	6756.51	1.00%	67.57	7899.12
	STUDIO PREP STORAGE	0	1690.75	0.00	51.00%	0.00	1940.25	42.00%	814.91	2505.66
		1	1690.75	0.00	12.00%	0.00	1940.25	9.00%	174.62	1865.37
		2	1690.75	0.00	6.00%	0.00	1940.25	5.00%	97.01	1787.76
		3	1690.75	0.00	3.00%	0.00	1940.25	4.00%	77.61	1768.36
		4	1690.75	0.00	3.00%	0.00	1940.25	4.00%	77.61	1768.36
		5	1690.75	0.00	2.00%	0.00	1940.25	3.00%	58.21	1748.96
		6	1690.75	0.00	2.00%	0.00	1940.25	3.00%	58.21	1748.96
		7	1690.75	0.00	2.00%	0.00	1940.25	3.00%	58.21	1748.96
		8	1690.75	0.00	2.00%	0.00	1940.25	3.00%	58.21	1748.96
		9	1690.75	0.00	2.00%	0.00	1940.25	2.00%	38.81	1729.56
		10	1690.75	0.00	2.00%	0.00	1940.25	2.00%	38.81	1729.56
		11	1690.75	0.00	1.00%	0.00	1940.25	2.00%	38.81	1729.56
		12	1690.75	0.00	1.00%	0.00	1940.25	2.00%	38.81	1729.56
		13	1690.75	0.00	1.00%	0.00	1940.25	2.00%	38.81	1729.56
		14	1690.75	0.00	1.00%	0.00	1940.25	2.00%	38.81	1729.56
		15	1690.75	0.00	1.00%	0.00	1940.25	2.00%	38.81	1729.56
		16	1690.75	0.00	1.00%	0.00	1940.25	2.00%	38.81	1729.56
		17	1690.75	0.00	1.00%	0.00	1940.25	2.00%	38.81	1729.56

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FLOOR	ROOM NAME	LST	TOTAL CONVECTIVE	RADIANT SOLAR	SOLAR COEFFICIENTS	SOLAR RTS	RADIANT NON-SOLAR	NON-SOLAR COEFFICIENTS	NON-SOLAR RTS	HOURLY COOLING LOAD
		18	1690.75	0.00	1.00%	0.00	1940.25	1.00%	19.40	1710.15
		19	1690.75	0.00	1.00%	0.00	1940.25	1.00%	19.40	1710.15
		20	1690.75	0.00	1.00%	0.00	1940.25	1.00%	19.40	1710.15
		21	1690.75	0.00	1.00%	0.00	1940.25	1.00%	19.40	1710.15
		22	1690.75	0.00	1.00%	0.00	1940.25	1.00%	19.40	1710.15
		23	1690.75	0.00	1.00%	0.00	1940.25	1.00%	19.40	1710.15
	ACTIVE LEARNING STUDIO	0	32636.72	370.84	51.00%	189.13	18064.79	42.00%	7587.21	40413.05
		1	32636.72	370.84	12.00%	44.50	18064.79	9.00%	1625.83	34307.05
		2	32636.72	370.84	6.00%	22.25	18064.79	5.00%	903.24	33562.20
		3	32636.72	370.84	3.00%	11.13	18064.79	4.00%	722.59	33370.43
		4	32636.72	370.84	3.00%	11.13	18064.79	4.00%	722.59	33370.43
		5	32636.72	370.84	2.00%	7.42	18064.79	3.00%	541.94	33186.08
		6	32636.72	370.84	2.00%	7.42	18064.79	3.00%	541.94	33186.08
		7	32636.72	370.84	2.00%	7.42	18064.79	3.00%	541.94	33186.08
		8	32699.81	1976.40	2.00%	39.53	18064.79	3.00%	541.94	33281.28
		9	32825.32	4632.43	2.00%	92.65	18064.79	2.00%	361.30	33279.27
		10	32907.60	6117.81	2.00%	122.36	18064.79	2.00%	361.30	33391.25
		11	32956.21	6937.69	1.00%	69.38	18064.79	2.00%	361.30	33386.88
		12	32971.58	7190.37	1.00%	71.90	18064.79	2.00%	361.30	33404.78
		13	32953.39	6891.11	1.00%	68.91	18064.79	2.00%	361.30	33383.60
		14	32902.01	6021.20	1.00%	60.21	18064.79	2.00%	361.30	33323.51
		15	32816.72	4467.76	1.00%	44.68	18064.79	2.00%	361.30	33222.69
		16	32686.70	1660.89	1.00%	16.61	18064.79	2.00%	361.30	33064.60
		17	32636.72	370.84	1.00%	3.71	18064.79	2.00%	361.30	33001.72
		18	32636.72	370.84	1.00%	3.71	18064.79	1.00%	180.65	32821.07
		19	32636.72	370.84	1.00%	3.71	18064.79	1.00%	180.65	32821.07
		20	32636.72	370.84	1.00%	3.71	18064.79	1.00%	180.65	32821.07
		21	32636.72	370.84	1.00%	3.71	18064.79	1.00%	180.65	32821.07
		22	32636.72	370.84	1.00%	3.71	18064.79	1.00%	180.65	32821.07
		23	32636.72	370.84	1.00%	3.71	18064.79	1.00%	180.65	32821.07
	CORNER OFFICE	0	4602.96	3705.99	51.00%	1890.06	3602.03	42.00%	1512.85	8005.87
		1	4602.96	3705.99	12.00%	444.72	3602.03	9.00%	324.18	5371.86
		2	4602.96	3705.99	6.00%	222.36	3602.03	5.00%	180.10	5005.42
		3	4602.96	3705.99	3.00%	111.18	3602.03	4.00%	144.08	4858.22
		4	4602.96	3705.99	3.00%	111.18	3602.03	4.00%	144.08	4858.22
		5	4602.96	3705.99	2.00%	74.12	3602.03	3.00%	108.06	4785.14
		6	4602.96	3705.99	2.00%	74.12	3602.03	3.00%	108.06	4785.14
		7	4602.96	3705.99	2.00%	74.12	3602.03	3.00%	108.06	4785.14
		8	5233.54	19751.28	2.00%	395.03	3602.03	3.00%	108.06	5736.62
		9	6487.82	46294.61	2.00%	925.89	3602.03	2.00%	72.04	7485.75
		10	7310.03	61138.88	2.00%	1222.78	3602.03	2.00%	72.04	8604.85
		11	7795.82	69332.41	1.00%	693.32	3602.03	2.00%	72.04	8561.19
		12	7949.49	71857.63	1.00%	718.58	3602.03	2.00%	72.04	8740.11
		13	7767.69	68866.90	1.00%	688.67	3602.03	2.00%	72.04	8528.40
		14	7254.17	60173.42	1.00%	601.73	3602.03	2.00%	72.04	7927.95
		15	6401.82	44648.98	1.00%	446.49	3602.03	2.00%	72.04	6920.35
		16	5102.47	16598.29	1.00%	165.98	3602.03	2.00%	72.04	5340.49
		17	4602.96	3705.99	1.00%	37.06	3602.03	2.00%	72.04	4712.06
		18	4602.96	3705.99	1.00%	37.06	3602.03	1.00%	36.02	4676.04
		19	4602.96	3705.99	1.00%	37.06	3602.03	1.00%	36.02	4676.04
		20	4602.96	3705.99	1.00%	37.06	3602.03	1.00%	36.02	4676.04
		21	4602.96	3705.99	1.00%	37.06	3602.03	1.00%	36.02	4676.04
		22	4602.96	3705.99	1.00%	37.06	3602.03	1.00%	36.02	4676.04
		23	4602.96	3705.99	1.00%	37.06	3602.03	1.00%	36.02	4676.04
	REGULAR OFFICE	0	46162.73	59916.10	51.00%	30557.21	16322.19	42.00%	6855.32	83575.27
		1	46162.73	59916.10	12.00%	7189.93	16322.19	9.00%	1469.00	54821.66
		2	46162.73	59916.10	6.00%	3594.97	16322.19	5.00%	816.11	50573.81
		3	46162.73	59916.10	3.00%	1797.48	16322.19	4.00%	652.89	48613.10
		4	46162.73	59916.10	3.00%	1797.48	16322.19	4.00%	652.89	48613.10
		5	46162.73	59916.10	2.00%	1198.32	16322.19	3.00%	489.67	47850.72
		6	46162.73	59916.10	2.00%	1198.32	16322.19	3.00%	489.67	47850.72
		7	46162.73	59916.10	2.00%	1198.32	16322.19	3.00%	489.67	47850.72
		8	56357.45	319325.99	2.00%	6386.52	16322.19	3.00%	489.67	63233.63
		9	76635.89	748461.69	2.00%	14969.23	16322.19	2.00%	326.44	91931.57
		10	89928.81	988454.31	2.00%	19769.09	16322.19	2.00%	326.44	110024.34
		11	97782.84	1120921.98	1.00%	11209.22	16322.19	2.00%	326.44	109318.50
		12	100267.27	1161748.13	1.00%	11617.48	16322.19	2.00%	326.44	112211.20
		13	97327.97	1113395.90	1.00%	11133.96	16322.19	2.00%	326.44	108788.37
		14	89025.77	972845.38	1.00%	9728.45	16322.19	2.00%	326.44	99080.67
		15	75245.46	721856.10	1.00%	7218.56	16322.19	2.00%	326.44	82790.47
		16	54238.38	268350.50	1.00%	2683.51	16322.19	2.00%	326.44	57248.33
		17	46162.73	59916.10	1.00%	599.16	16322.19	2.00%	326.44	47088.34
		18	46162.73	59916.10	1.00%	599.16	16322.19	1.00%	163.22	46925.11
		19	46162.73	59916.10	1.00%	599.16	16322.19	1.00%	163.22	46925.11
		20	46162.73	59916.10	1.00%	599.16	16322.19	1.00%	163.22	46925.11
		21	46162.73	59916.10	1.00%	599.16	16322.19	1.00%	163.22	46925.11
		22	46162.73	59916.10	1.00%	599.16	16322.19	1.00%	163.22	46925.11
		23	46162.73	59916.10	1.00%	599.16	16322.19	1.00%	163.22	46925.11
		0	9604.18	13314.69	51.00%	6790.49	2173.16	42.00%	912.73	17307.40
		1	9604.18	13314.69	12.00%	1597.76	2173.16	9.00%	195.58	11397.53

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	C.A.S.E. DEAN'S OFFICE	2	9604.18	13314.69	6.00%	798.88	2173.16	5.00%	108.66	10511.72
		3	9604.18	13314.69	3.00%	399.44	2173.16	4.00%	86.93	10090.55
		4	9604.18	13314.69	3.00%	399.44	2173.16	4.00%	86.93	10090.55
		5	9604.18	13314.69	2.00%	266.29	2173.16	3.00%	65.19	9935.67
		6	9604.18	13314.69	2.00%	266.29	2173.16	3.00%	65.19	9935.67
		7	9604.18	13314.69	2.00%	266.29	2173.16	3.00%	65.19	9935.67
		8	11869.67	70961.33	2.00%	1419.23	2173.16	3.00%	65.19	13354.09
		9	16375.99	166324.82	2.00%	3326.50	2173.16	2.00%	43.46	19745.95
		10	19329.98	219656.51	2.00%	4393.13	2173.16	2.00%	43.46	23766.57
		11	21075.32	249093.77	1.00%	2490.94	2173.16	2.00%	43.46	23609.72
		12	21627.41	258166.25	1.00%	2581.66	2173.16	2.00%	43.46	24252.54
		13	20974.23	247421.31	1.00%	2474.21	2173.16	2.00%	43.46	23491.91
		14	19129.30	216187.86	1.00%	2161.88	2173.16	2.00%	43.46	21334.64
		15	16067.01	160412.47	1.00%	1604.12	2173.16	2.00%	43.46	17714.60
		16	11398.77	59633.44	1.00%	596.33	2173.16	2.00%	43.46	12038.57
		17	9604.18	13314.69	1.00%	133.15	2173.16	2.00%	43.46	9780.79
		18	9604.18	13314.69	1.00%	133.15	2173.16	1.00%	21.73	9759.06
		19	9604.18	13314.69	1.00%	133.15	2173.16	1.00%	21.73	9759.06
		20	9604.18	13314.69	1.00%	133.15	2173.16	1.00%	21.73	9759.06
		21	9604.18	13314.69	1.00%	133.15	2173.16	1.00%	21.73	9759.06
		22	9604.18	13314.69	1.00%	133.15	2173.16	1.00%	21.73	9759.06
		23	9604.18	13314.69	1.00%	133.15	2173.16	1.00%	21.73	9759.06
	C.A.S.E. DEAN'S OFFICE RECEPTION	0	9373.93	13314.69	51.00%	6790.49	2026.41	42.00%	851.09	17015.51
		1	9373.93	13314.69	12.00%	1597.76	2026.41	9.00%	182.38	11154.07
		2	9373.93	13314.69	6.00%	798.88	2026.41	5.00%	101.32	10274.13
		3	9373.93	13314.69	3.00%	399.44	2026.41	4.00%	81.06	9854.43
		4	9373.93	13314.69	3.00%	399.44	2026.41	4.00%	81.06	9854.43
		5	9373.93	13314.69	2.00%	266.29	2026.41	3.00%	60.79	9701.02
		6	9373.93	13314.69	2.00%	266.29	2026.41	3.00%	60.79	9701.02
		7	9373.93	13314.69	2.00%	266.29	2026.41	3.00%	60.79	9701.02
		8	11639.42	70961.33	2.00%	1419.23	2026.41	3.00%	60.79	13119.44
		9	16145.74	166324.82	2.00%	3326.50	2026.41	2.00%	40.53	19512.77
		10	19099.73	219656.51	2.00%	4393.13	2026.41	2.00%	40.53	23533.39
		11	20845.07	249093.77	1.00%	2490.94	2026.41	2.00%	40.53	23376.53
		12	21397.16	258166.25	1.00%	2581.66	2026.41	2.00%	40.53	24019.35
		13	20743.98	247421.31	1.00%	2474.21	2026.41	2.00%	40.53	23258.73
		14	18899.05	216187.86	1.00%	2161.88	2026.41	2.00%	40.53	21101.46
		15	15836.76	160412.47	1.00%	1604.12	2026.41	2.00%	40.53	17481.41
		16	11168.52	59633.44	1.00%	596.33	2026.41	2.00%	40.53	11805.38
		17	9373.93	13314.69	1.00%	133.15	2026.41	2.00%	40.53	9547.61
		18	9373.93	13314.69	1.00%	133.15	2026.41	1.00%	20.26	9527.34
		19	9373.93	13314.69	1.00%	133.15	2026.41	1.00%	20.26	9527.34
		20	9373.93	13314.69	1.00%	133.15	2026.41	1.00%	20.26	9527.34
		21	9373.93	13314.69	1.00%	133.15	2026.41	1.00%	20.26	9527.34
		22	9373.93	13314.69	1.00%	133.15	2026.41	1.00%	20.26	9527.34
		23	9373.93	13314.69	1.00%	133.15	2026.41	1.00%	20.26	9527.34
	C.A.S.E. ADMIN SUPPORT	0	6683.34	6657.34	51.00%	3395.25	2320.43	42.00%	974.58	11053.17
		1	6683.34	6657.34	12.00%	798.88	2320.43	9.00%	208.84	7691.06
		2	6683.34	6657.34	6.00%	399.44	2320.43	5.00%	116.02	7198.80
		3	6683.34	6657.34	3.00%	199.72	2320.43	4.00%	92.82	6975.88
		4	6683.34	6657.34	3.00%	199.72	2320.43	4.00%	92.82	6975.88
		5	6683.34	6657.34	2.00%	133.15	2320.43	3.00%	69.61	6886.10
		6	6683.34	6657.34	2.00%	133.15	2320.43	3.00%	69.61	6886.10
		7	6683.34	6657.34	2.00%	133.15	2320.43	3.00%	69.61	6886.10
		8	7816.09	35480.67	2.00%	709.61	2320.43	3.00%	69.61	8595.31
		9	10069.25	83162.41	2.00%	1663.25	2320.43	2.00%	46.41	11778.91
		10	11546.24	109828.26	2.00%	2196.57	2320.43	2.00%	46.41	13789.21
		11	12418.91	124546.89	1.00%	1245.47	2320.43	2.00%	46.41	13710.79
		12	12694.96	129083.13	1.00%	1290.83	2320.43	2.00%	46.41	14032.20
		13	12368.37	123710.66	1.00%	1237.11	2320.43	2.00%	46.41	13651.88
		14	11445.90	108093.93	1.00%	1080.94	2320.43	2.00%	46.41	12573.25
		15	9914.76	80206.23	1.00%	802.06	2320.43	2.00%	46.41	10763.23
		16	7580.64	29816.72	1.00%	298.17	2320.43	2.00%	46.41	7925.21
		17	6683.34	6657.34	1.00%	66.57	2320.43	2.00%	46.41	6796.32
		18	6683.34	6657.34	1.00%	66.57	2320.43	1.00%	23.20	6773.12
		19	6683.34	6657.34	1.00%	66.57	2320.43	1.00%	23.20	6773.12
		20	6683.34	6657.34	1.00%	66.57	2320.43	1.00%	23.20	6773.12
		21	6683.34	6657.34	1.00%	66.57	2320.43	1.00%	23.20	6773.12
		22	6683.34	6657.34	1.00%	66.57	2320.43	1.00%	23.20	6773.12
		23	6683.34	6657.34	1.00%	66.57	2320.43	1.00%	23.20	6773.12
		0	59061.12	73230.79	51.00%	37347.70	21599.35	42.00%	9071.73	105480.55
		1	59061.12	73230.79	12.00%	8787.70	21599.35	9.00%	1943.94	69792.75
		2	59061.12	73230.79	6.00%	4393.85	21599.35	5.00%	1079.97	64534.93
		3	59061.12	73230.79	3.00%	2196.92	21599.35	4.00%	863.97	62122.01
		4	59061.12	73230.79	3.00%	2196.92	21599.35	4.00%	863.97	62122.01
		5	59061.12	73230.79	2.00%	1464.62	21599.35	3.00%	647.98	61173.71
		6	59061.12	73230.79	2.00%	1464.62	21599.35	3.00%	647.98	61173.71
		7	59061.12	73230.79	2.00%	1464.62	21599.35	3.00%	647.98	61173.71
		8	71521.32	390287.32	2.00%	7805.75	21599.35	3.00%	647.98	79975.05
		9	96306.08	914786.51	2.00%	18295.73	21599.35	2.00%	431.99	115033.80
		10	112552.99	1208110.83	2.00%	24162.22	21599.35	2.00%	431.99	137147.20

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SECOND	POST DOC OFFICE	11	122152.36	1370015.76	1.00%	13700.16	21599.35	2.00%	431.99	136284.50
		12	125188.89	1419914.38	1.00%	14199.14	21599.35	2.00%	431.99	139820.02
		13	121596.41	1360817.21	1.00%	13608.17	21599.35	2.00%	431.99	135636.57
		14	111449.28	1189033.24	1.00%	11890.33	21599.35	2.00%	431.99	123771.60
		15	94606.67	882268.57	1.00%	8822.69	21599.35	2.00%	431.99	103861.35
		16	68931.36	327983.95	1.00%	3279.84	21599.35	2.00%	431.99	72643.18
		17	59061.12	73230.79	1.00%	732.31	21599.35	2.00%	431.99	60225.41
		18	59061.12	73230.79	1.00%	732.31	21599.35	1.00%	215.99	60009.42
		19	59061.12	73230.79	1.00%	732.31	21599.35	1.00%	215.99	60009.42
		20	59061.12	73230.79	1.00%	732.31	21599.35	1.00%	215.99	60009.42
		21	59061.12	73230.79	1.00%	732.31	21599.35	1.00%	215.99	60009.42
		22	59061.12	73230.79	1.00%	732.31	21599.35	1.00%	215.99	60009.42
		23	59061.12	73230.79	1.00%	732.31	21599.35	1.00%	215.99	60009.42
	PHYSICS GRAD OFFICES	0	2223.15	0.00	51.00%	0.00	2262.85	42.00%	950.40	3173.55
		1	2223.15	0.00	12.00%	0.00	2262.85	9.00%	203.66	2426.81
		2	2223.15	0.00	6.00%	0.00	2262.85	5.00%	113.14	2336.29
		3	2223.15	0.00	3.00%	0.00	2262.85	4.00%	90.51	2313.66
		4	2223.15	0.00	3.00%	0.00	2262.85	4.00%	90.51	2313.66
		5	2223.15	0.00	2.00%	0.00	2262.85	3.00%	67.89	2291.04
		6	2223.15	0.00	2.00%	0.00	2262.85	3.00%	67.89	2291.04
		7	2223.15	0.00	2.00%	0.00	2262.85	3.00%	67.89	2291.04
		8	2223.15	0.00	2.00%	0.00	2262.85	3.00%	67.89	2291.04
		9	2223.15	0.00	2.00%	0.00	2262.85	2.00%	45.26	2268.41
		10	2223.15	0.00	2.00%	0.00	2262.85	2.00%	45.26	2268.41
		11	2223.15	0.00	1.00%	0.00	2262.85	2.00%	45.26	2268.41
		12	2223.15	0.00	1.00%	0.00	2262.85	2.00%	45.26	2268.41
		13	2223.15	0.00	1.00%	0.00	2262.85	2.00%	45.26	2268.41
		14	2223.15	0.00	1.00%	0.00	2262.85	2.00%	45.26	2268.41
		15	2223.15	0.00	1.00%	0.00	2262.85	2.00%	45.26	2268.41
		16	2223.15	0.00	1.00%	0.00	2262.85	2.00%	45.26	2268.41
		17	2223.15	0.00	1.00%	0.00	2262.85	2.00%	45.26	2268.41
		18	2223.15	0.00	1.00%	0.00	2262.85	1.00%	22.63	2245.78
		19	2223.15	0.00	1.00%	0.00	2262.85	1.00%	22.63	2245.78
		20	2223.15	0.00	1.00%	0.00	2262.85	1.00%	22.63	2245.78
		21	2223.15	0.00	1.00%	0.00	2262.85	1.00%	22.63	2245.78
		22	2223.15	0.00	1.00%	0.00	2262.85	1.00%	22.63	2245.78
		23	2223.15	0.00	1.00%	0.00	2262.85	1.00%	22.63	2245.78
	BREAK OUT	0	4344.88	1461.22	51.00%	745.22	4427.62	42.00%	1859.60	6949.71
		1	4344.88	1461.22	12.00%	175.35	4427.62	9.00%	398.49	4918.71
		2	4344.88	1461.22	6.00%	87.67	4427.62	5.00%	221.38	4653.93
		3	4344.88	1461.22	3.00%	43.84	4427.62	4.00%	177.10	4565.82
		4	4344.88	1461.22	3.00%	43.84	4427.62	4.00%	177.10	4565.82
		5	4344.88	1461.22	2.00%	29.22	4427.62	3.00%	132.83	4506.93
		6	4344.88	1461.22	2.00%	29.22	4427.62	3.00%	132.83	4506.93
		7	4344.88	1461.22	2.00%	29.22	4427.62	3.00%	132.83	4506.93
		8	4593.51	7787.67	2.00%	155.75	4427.62	3.00%	132.83	4882.09
		9	5088.05	18253.37	2.00%	365.07	4427.62	2.00%	88.55	5541.67
		10	5412.24	24106.27	2.00%	482.13	4427.62	2.00%	88.55	5982.92
		11	5603.78	27336.87	1.00%	273.37	4427.62	2.00%	88.55	5965.70
		12	5664.37	28332.53	1.00%	283.33	4427.62	2.00%	88.55	6036.25
		13	5592.69	27153.32	1.00%	271.53	4427.62	2.00%	88.55	5952.78
		14	5390.22	23725.60	1.00%	237.26	4427.62	2.00%	88.55	5716.03
		15	5054.14	17604.51	1.00%	176.05	4427.62	2.00%	88.55	5318.74
		16	4541.83	6544.49	1.00%	65.44	4427.62	2.00%	88.55	4695.82
		17	4344.88	1461.22	1.00%	14.61	4427.62	2.00%	88.55	4448.04
		18	4344.88	1461.22	1.00%	14.61	4427.62	1.00%	44.28	4403.77
		19	4344.88	1461.22	1.00%	14.61	4427.62	1.00%	44.28	4403.77
		20	4344.88	1461.22	1.00%	14.61	4427.62	1.00%	44.28	4403.77
		21	4344.88	1461.22	1.00%	14.61	4427.62	1.00%	44.28	4403.77
		22	4344.88	1461.22	1.00%	14.61	4427.62	1.00%	44.28	4403.77
		23	4344.88	1461.22	1.00%	14.61	4427.62	1.00%	44.28	4403.77
	TEACHING LAB STORAGE	0	943.57	0.00	51.00%	0.00	1595.43	42.00%	670.08	1613.65
		1	943.57	0.00	12.00%	0.00	1595.43	9.00%	143.59	1087.16
		2	943.57	0.00	6.00%	0.00	1595.43	5.00%	79.77	1023.34
		3	943.57	0.00	3.00%	0.00	1595.43	4.00%	63.82	1007.39
		4	943.57	0.00	3.00%	0.00	1595.43	4.00%	63.82	1007.39
		5	943.57	0.00	2.00%	0.00	1595.43	3.00%	47.86	991.43
		6	943.57	0.00	2.00%	0.00	1595.43	3.00%	47.86	991.43
		7	943.57	0.00	2.00%	0.00	1595.43	3.00%	47.86	991.43
		8	943.57	0.00	2.00%	0.00	1595.43	3.00%	47.86	991.43
		9	943.57	0.00	2.00%	0.00	1595.43	2.00%	31.91	975.48
		10	943.57	0.00	2.00%	0.00	1595.43	2.00%	31.91	975.48
		11	943.57	0.00	1.00%	0.00	1595.43	2.00%	31.91	975.48
		12	943.57	0.00	1.00%	0.00	1595.43	2.00%	31.91	975.48
		13	943.57	0.00	1.00%	0.00	1595.43	2.00%	31.91	975.48
		14	943.57	0.00	1.00%	0.00	1595.43	2.00%	31.91	975.48
		15	943.57	0.00	1.00%	0.00	1595.43	2.00%	31.91	975.48
		16	943.57	0.00	1.00%	0.00	1595.43	2.00%	31.91	975.48
		17	943.57	0.00	1.00%	0.00	1595.43	2.00%	31.91	975.48
		18	943.57	0.00	1.00%	0.00	1595.43	1.00%	15.95	959.52
		19	943.57	0.00	1.00%	0.00	1595.43	1.00%	15.95	959.52

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FLOOR	ROOM NAME	LST	TOTAL CONVECTIVE	RADIANT SOLAR	SOLAR COEFFICIENTS	SOLAR RTS	RADIANT NON-SOLAR	NON-SOLAR COEFFICIENTS	NON-SOLAR RTS	HOURLY COOLING LOAD
		20	943.57	0.00	1.00%	0.00	1595.43	1.00%	15.95	959.52
		21	943.57	0.00	1.00%	0.00	1595.43	1.00%	15.95	959.52
		22	943.57	0.00	1.00%	0.00	1595.43	1.00%	15.95	959.52
		23	943.57	0.00	1.00%	0.00	1595.43	1.00%	15.95	959.52
		0	19126.43	860.27	51.00%	438.74	9114.52	42.00%	3828.10	23393.27
		1	19126.43	860.27	12.00%	103.23	9114.52	9.00%	820.31	20049.97
		2	19126.43	860.27	6.00%	51.62	9114.52	5.00%	455.73	19633.77
		3	19126.43	860.27	3.00%	25.81	9114.52	4.00%	364.58	19516.82
		4	19126.43	860.27	3.00%	25.81	9114.52	4.00%	364.58	19516.82
		5	19126.43	860.27	2.00%	17.21	9114.52	3.00%	273.44	19417.07
		6	19126.43	860.27	2.00%	17.21	9114.52	3.00%	273.44	19417.07
		7	19126.43	860.27	2.00%	17.21	9114.52	3.00%	273.44	19417.07
		8	19272.81	4584.84	2.00%	91.70	9114.52	3.00%	273.44	19637.94
		9	19563.96	10746.32	2.00%	214.93	9114.52	2.00%	182.29	19961.18
		10	19754.82	14192.11	2.00%	283.84	9114.52	2.00%	182.29	20220.95
	PHYSICS ELECTRONICS LAB	11	19867.59	16094.07	1.00%	160.94	9114.52	2.00%	182.29	20210.82
		12	19903.26	16680.24	1.00%	166.80	9114.52	2.00%	182.29	20252.35
		13	19861.06	15986.01	1.00%	159.86	9114.52	2.00%	182.29	20203.21
		14	19741.86	13968.00	1.00%	139.68	9114.52	2.00%	182.29	20063.83
		15	19544.00	10364.32	1.00%	103.64	9114.52	2.00%	182.29	19829.93
		16	19242.38	3852.94	1.00%	38.53	9114.52	2.00%	182.29	19463.20
		17	19126.43	860.27	1.00%	8.60	9114.52	2.00%	182.29	19317.33
		18	19126.43	860.27	1.00%	8.60	9114.52	1.00%	91.15	19226.18
		19	19126.43	860.27	1.00%	8.60	9114.52	1.00%	91.15	19226.18
		20	19126.43	860.27	1.00%	8.60	9114.52	1.00%	91.15	19226.18
		21	19126.43	860.27	1.00%	8.60	9114.52	1.00%	91.15	19226.18
		22	19126.43	860.27	1.00%	8.60	9114.52	1.00%	91.15	19226.18
		23	19126.43	860.27	1.00%	8.60	9114.52	1.00%	91.15	19226.18
		0	4984.42	437.94	51.00%	223.35	4649.08	42.00%	1952.61	7160.39
		1	4984.42	437.94	12.00%	52.55	4649.08	9.00%	418.42	5455.39
		2	4984.42	437.94	6.00%	26.28	4649.08	5.00%	232.45	5243.16
		3	4984.42	437.94	3.00%	13.14	4649.08	4.00%	185.96	5183.53
		4	4984.42	437.94	3.00%	13.14	4649.08	4.00%	185.96	5183.53
		5	4984.42	437.94	2.00%	8.76	4649.08	3.00%	139.47	5132.66
		6	4984.42	437.94	2.00%	8.76	4649.08	3.00%	139.47	5132.66
		7	4984.42	437.94	2.00%	8.76	4649.08	3.00%	139.47	5132.66
		8	5058.94	2334.04	2.00%	46.68	4649.08	3.00%	139.47	5245.09
		9	5207.16	5470.71	2.00%	109.41	4649.08	2.00%	92.98	5409.56
		10	5304.32	7224.88	2.00%	144.50	4649.08	2.00%	92.98	5541.80
	PHYSICS CONFERENCE ROOM	11	5361.73	8193.12	1.00%	81.93	4649.08	2.00%	92.98	5536.64
		12	5379.89	8491.53	1.00%	84.92	4649.08	2.00%	92.98	5557.79
		13	5358.41	8138.11	1.00%	81.38	4649.08	2.00%	92.98	5532.77
		14	5297.72	7110.79	1.00%	71.11	4649.08	2.00%	92.98	5461.81
		15	5197.00	5276.24	1.00%	52.76	4649.08	2.00%	92.98	5342.74
		16	5043.45	1961.45	1.00%	19.61	4649.08	2.00%	92.98	5156.05
		17	4984.42	437.94	1.00%	4.38	4649.08	2.00%	92.98	5081.79
		18	4984.42	437.94	1.00%	4.38	4649.08	1.00%	46.49	5035.30
		19	4984.42	437.94	1.00%	4.38	4649.08	1.00%	46.49	5035.30
		20	4984.42	437.94	1.00%	4.38	4649.08	1.00%	46.49	5035.30
		21	4984.42	437.94	1.00%	4.38	4649.08	1.00%	46.49	5035.30
		22	4984.42	437.94	1.00%	4.38	4649.08	1.00%	46.49	5035.30
		23	4984.42	437.94	1.00%	4.38	4649.08	1.00%	46.49	5035.30
		0	2101.46	1016.65	51.00%	518.49	2231.67	42.00%	937.30	3557.25
		1	2101.46	1016.65	12.00%	122.00	2231.67	9.00%	200.85	2424.31
		2	2101.46	1016.65	6.00%	61.00	2231.67	5.00%	111.58	2274.04
		3	2101.46	1016.65	3.00%	30.50	2231.67	4.00%	89.27	2221.23
		4	2101.46	1016.65	3.00%	30.50	2231.67	4.00%	89.27	2221.23
		5	2101.46	1016.65	2.00%	20.33	2231.67	3.00%	66.95	2188.74
		6	2101.46	1016.65	2.00%	20.33	2231.67	3.00%	66.95	2188.74
		7	2101.46	1016.65	2.00%	20.33	2231.67	3.00%	66.95	2188.74
		8	2274.44	5418.28	2.00%	108.37	2231.67	3.00%	66.95	2449.76
		9	2618.52	12699.80	2.00%	254.00	2231.67	2.00%	44.63	2917.15
		10	2844.08	16771.97	2.00%	335.44	2231.67	2.00%	44.63	3224.15
	BREAK OUT 2	11	2977.34	19019.66	1.00%	190.20	2231.67	2.00%	44.63	3212.17
		12	3019.50	19712.39	1.00%	197.12	2231.67	2.00%	44.63	3261.26
		13	2969.62	18891.96	1.00%	188.92	2231.67	2.00%	44.63	3203.18
		14	2828.75	16507.12	1.00%	165.07	2231.67	2.00%	44.63	3038.46
		15	2594.93	12248.36	1.00%	122.48	2231.67	2.00%	44.63	2762.05
		16	2238.49	4553.34	1.00%	45.53	2231.67	2.00%	44.63	2328.65
		17	2101.46	1016.65	1.00%	10.17	2231.67	2.00%	44.63	2156.26
		18	2101.46	1016.65	1.00%	10.17	2231.67	1.00%	22.32	2133.94
		19	2101.46	1016.65	1.00%	10.17	2231.67	1.00%	22.32	2133.94
		20	2101.46	1016.65	1.00%	10.17	2231.67	1.00%	22.32	2133.94
		21	2101.46	1016.65	1.00%	10.17	2231.67	1.00%	22.32	2133.94
		22	2101.46	1016.65	1.00%	10.17	2231.67	1.00%	22.32	2133.94
		23	2101.46	1016.65	1.00%	10.17	2231.67	1.00%	22.32	2133.94
		0	4840.56	3705.99	51.00%	1890.06	4084.43	42.00%	1715.46	8446.08
		1	4840.56	3705.99	12.00%	444.72	4084.43	9.00%	367.60	5652.88
		2	4840.56	3705.99	6.00%	222.36	4084.43	5.00%	204.22	5267.14
		3	4840.56	3705.99	3.00%	111.18	4084.43	4.00%	163.38	5115.12

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		4	4840.56	3705.99	3.00%	111.18	4084.43	4.00%	163.38	5115.12
		5	4840.56	3705.99	2.00%	74.12	4084.43	3.00%	122.53	5037.22
		6	4840.56	3705.99	2.00%	74.12	4084.43	3.00%	122.53	5037.22
		7	4840.56	3705.99	2.00%	74.12	4084.43	3.00%	122.53	5037.22
		8	5471.14	19751.28	2.00%	395.03	4084.43	3.00%	122.53	5988.70
		9	6725.42	46294.61	2.00%	925.89	4084.43	2.00%	81.69	7733.00
		10	7547.63	61138.88	2.00%	1222.78	4084.43	2.00%	81.69	8852.09
	CORNER OFFICE	11	8033.42	69332.41	1.00%	693.32	4084.43	2.00%	81.69	8808.44
		12	8187.09	71857.63	1.00%	718.58	4084.43	2.00%	81.69	8987.36
		13	8005.29	68866.90	1.00%	688.67	4084.43	2.00%	81.69	8775.65
		14	7491.77	60173.42	1.00%	601.73	4084.43	2.00%	81.69	8175.19
		15	6639.42	44648.98	1.00%	446.49	4084.43	2.00%	81.69	7167.60
		16	5340.07	16598.29	1.00%	165.98	4084.43	2.00%	81.69	5587.74
		17	4840.56	3705.99	1.00%	37.06	4084.43	2.00%	81.69	4959.31
		18	4840.56	3705.99	1.00%	37.06	4084.43	1.00%	40.84	4918.47
		19	4840.56	3705.99	1.00%	37.06	4084.43	1.00%	40.84	4918.47
		20	4840.56	3705.99	1.00%	37.06	4084.43	1.00%	40.84	4918.47
		21	4840.56	3705.99	1.00%	37.06	4084.43	1.00%	40.84	4918.47
		22	4840.56	3705.99	1.00%	37.06	4084.43	1.00%	40.84	4918.47
		23	4840.56	3705.99	1.00%	37.06	4084.43	1.00%	40.84	4918.47
		0	125793.41	159776.28	51.00%	81485.90	48993.05	42.00%	20577.08	227856.40
		1	125793.41	159776.28	12.00%	19173.15	48993.05	9.00%	4409.37	149375.94
		2	125793.41	159776.28	6.00%	9586.58	48993.05	5.00%	2449.65	137829.64
		3	125793.41	159776.28	3.00%	4793.29	48993.05	4.00%	1959.72	132546.43
		4	125793.41	159776.28	3.00%	4793.29	48993.05	4.00%	1959.72	132546.43
		5	125793.41	159776.28	2.00%	3195.53	48993.05	3.00%	1469.79	130458.73
		6	125793.41	159776.28	2.00%	3195.53	48993.05	3.00%	1469.79	130458.73
		7	125793.41	159776.28	2.00%	3195.53	48993.05	3.00%	1469.79	130458.73
		8	152979.32	851535.97	2.00%	17030.72	48993.05	3.00%	1469.79	171479.83
		9	207055.17	1995897.84	2.00%	39917.96	48993.05	2.00%	979.86	247952.98
		10	242502.97	2635878.17	2.00%	52717.56	48993.05	2.00%	979.86	296200.39
	REGULAR OFFICE	11	263447.03	2989125.29	1.00%	29891.25	48993.05	2.00%	979.86	294318.15
		12	270072.19	3097995.02	1.00%	30979.95	48993.05	2.00%	979.86	302032.00
		13	262234.05	2969055.73	1.00%	29690.56	48993.05	2.00%	979.86	292904.47
		14	240094.86	2594254.34	1.00%	25942.54	48993.05	2.00%	979.86	267017.26
		15	203347.36	1924949.60	1.00%	19249.50	48993.05	2.00%	979.86	223576.72
		16	147328.49	715601.34	1.00%	7156.01	48993.05	2.00%	979.86	155464.36
		17	125793.41	159776.28	1.00%	1597.76	48993.05	2.00%	979.86	128371.04
		18	125793.41	159776.28	1.00%	1597.76	48993.05	1.00%	489.93	127881.11
		19	125793.41	159776.28	1.00%	1597.76	48993.05	1.00%	489.93	127881.11
		20	125793.41	159776.28	1.00%	1597.76	48993.05	1.00%	489.93	127881.11
		21	125793.41	159776.28	1.00%	1597.76	48993.05	1.00%	489.93	127881.11
		22	125793.41	159776.28	1.00%	1597.76	48993.05	1.00%	489.93	127881.11
		23	125793.41	159776.28	1.00%	1597.76	48993.05	1.00%	489.93	127881.11
		0	3396.57	0.00	51.00%	0.00	3143.43	42.00%	1320.24	4716.81
		1	3396.57	0.00	12.00%	0.00	3143.43	9.00%	282.91	3679.48
		2	3396.57	0.00	6.00%	0.00	3143.43	5.00%	157.17	3553.74
		3	3396.57	0.00	3.00%	0.00	3143.43	4.00%	125.74	3522.31
		4	3396.57	0.00	3.00%	0.00	3143.43	4.00%	125.74	3522.31
		5	3396.57	0.00	2.00%	0.00	3143.43	3.00%	94.30	3490.87
		6	3396.57	0.00	2.00%	0.00	3143.43	3.00%	94.30	3490.87
		7	3396.57	0.00	2.00%	0.00	3143.43	3.00%	94.30	3490.87
		8	3396.57	0.00	2.00%	0.00	3143.43	3.00%	94.30	3490.87
		9	3396.57	0.00	2.00%	0.00	3143.43	2.00%	62.87	3459.44
		10	3396.57	0.00	2.00%	0.00	3143.43	2.00%	62.87	3459.44
	PHYSICS GRAD OFFICE - 338	11	3396.57	0.00	1.00%	0.00	3143.43	2.00%	62.87	3459.44
		12	3396.57	0.00	1.00%	0.00	3143.43	2.00%	62.87	3459.44
		13	3396.57	0.00	1.00%	0.00	3143.43	2.00%	62.87	3459.44
		14	3396.57	0.00	1.00%	0.00	3143.43	2.00%	62.87	3459.44
		15	3396.57	0.00	1.00%	0.00	3143.43	2.00%	62.87	3459.44
		16	3396.57	0.00	1.00%	0.00	3143.43	2.00%	62.87	3459.44
		17	3396.57	0.00	1.00%	0.00	3143.43	2.00%	62.87	3459.44
		18	3396.57	0.00	1.00%	0.00	3143.43	1.00%	31.43	3428.00
		19	3396.57	0.00	1.00%	0.00	3143.43	1.00%	31.43	3428.00
		20	3396.57	0.00	1.00%	0.00	3143.43	1.00%	31.43	3428.00
		21	3396.57	0.00	1.00%	0.00	3143.43	1.00%	31.43	3428.00
		22	3396.57	0.00	1.00%	0.00	3143.43	1.00%	31.43	3428.00
		23	3396.57	0.00	1.00%	0.00	3143.43	1.00%	31.43	3428.00
		0	2988.03	0.00	51.00%	0.00	2698.97	42.00%	1133.57	4121.60
		1	2988.03	0.00	12.00%	0.00	2698.97	9.00%	242.91	3230.94
		2	2988.03	0.00	6.00%	0.00	2698.97	5.00%	134.95	3122.98
		3	2988.03	0.00	3.00%	0.00	2698.97	4.00%	107.96	3095.99
		4	2988.03	0.00	3.00%	0.00	2698.97	4.00%	107.96	3095.99
		5	2988.03	0.00	2.00%	0.00	2698.97	3.00%	80.97	3069.00
		6	2988.03	0.00	2.00%	0.00	2698.97	3.00%	80.97	3069.00
		7	2988.03	0.00	2.00%	0.00	2698.97	3.00%	80.97	3069.00
		8	2988.03	0.00	2.00%	0.00	2698.97	3.00%	80.97	3069.00
		9	2988.03	0.00	2.00%	0.00	2698.97	2.00%	53.98	3042.01
		10	2988.03	0.00	2.00%	0.00	2698.97	2.00%	53.98	3042.01
	PHYSICS GRAD OFFICES - 345	11	2988.03	0.00	1.00%	0.00	2698.97	2.00%	53.98	3042.01
		12	2988.03	0.00	1.00%	0.00	2698.97	2.00%	53.98	3042.01

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FLOOR	ROOM NAME	LST	TOTAL CONVECTIVE	RADIANT SOLAR	SOLAR COEFFICIENTS	SOLAR RTS	RADIANT NON-SOLAR	NON-SOLAR COEFFICIENTS	NON-SOLAR RTS	HOURLY COOLING LOAD
		13	2988.03	0.00	1.00%	0.00	2698.97	2.00%	53.98	3042.01
		14	2988.03	0.00	1.00%	0.00	2698.97	2.00%	53.98	3042.01
		15	2988.03	0.00	1.00%	0.00	2698.97	2.00%	53.98	3042.01
		16	2988.03	0.00	1.00%	0.00	2698.97	2.00%	53.98	3042.01
		17	2988.03	0.00	1.00%	0.00	2698.97	2.00%	53.98	3042.01
		18	2988.03	0.00	1.00%	0.00	2698.97	1.00%	26.99	3015.02
		19	2988.03	0.00	1.00%	0.00	2698.97	1.00%	26.99	3015.02
		20	2988.03	0.00	1.00%	0.00	2698.97	1.00%	26.99	3015.02
		21	2988.03	0.00	1.00%	0.00	2698.97	1.00%	26.99	3015.02
		22	2988.03	0.00	1.00%	0.00	2698.97	1.00%	26.99	3015.02
		23	2988.03	0.00	1.00%	0.00	2698.97	1.00%	26.99	3015.02
	PHYSICS GRAD OFFICES - 347	0	3078.03	0.00	51.00%	0.00	2728.97	42.00%	1146.17	4224.20
		1	3078.03	0.00	12.00%	0.00	2728.97	9.00%	245.61	3323.64
		2	3078.03	0.00	6.00%	0.00	2728.97	5.00%	136.45	3214.48
		3	3078.03	0.00	3.00%	0.00	2728.97	4.00%	109.16	3187.19
		4	3078.03	0.00	3.00%	0.00	2728.97	4.00%	109.16	3187.19
		5	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		6	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		7	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		8	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		9	3078.03	0.00	2.00%	0.00	2728.97	2.00%	54.58	3132.61
		10	3078.03	0.00	2.00%	0.00	2728.97	2.00%	54.58	3132.61
		11	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		12	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		13	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		14	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		15	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		16	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		17	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		18	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		19	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		20	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		21	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		22	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		23	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
	PHYSICS GRAD OFFICES - 349	0	3078.03	0.00	51.00%	0.00	2728.97	42.00%	1146.17	4224.20
		1	3078.03	0.00	12.00%	0.00	2728.97	9.00%	245.61	3323.64
		2	3078.03	0.00	6.00%	0.00	2728.97	5.00%	136.45	3214.48
		3	3078.03	0.00	3.00%	0.00	2728.97	4.00%	109.16	3187.19
		4	3078.03	0.00	3.00%	0.00	2728.97	4.00%	109.16	3187.19
		5	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		6	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		7	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		8	3078.03	0.00	2.00%	0.00	2728.97	3.00%	81.87	3159.90
		9	3078.03	0.00	2.00%	0.00	2728.97	2.00%	54.58	3132.61
		10	3078.03	0.00	2.00%	0.00	2728.97	2.00%	54.58	3132.61
		11	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		12	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		13	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		14	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		15	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		16	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		17	3078.03	0.00	1.00%	0.00	2728.97	2.00%	54.58	3132.61
		18	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		19	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		20	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		21	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		22	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
		23	3078.03	0.00	1.00%	0.00	2728.97	1.00%	27.29	3105.32
	PHYSICS GRAD OFFICES - 357	0	3097.11	0.00	51.00%	0.00	2735.89	42.00%	1149.07	4246.18
		1	3097.11	0.00	12.00%	0.00	2735.89	9.00%	246.23	3343.34
		2	3097.11	0.00	6.00%	0.00	2735.89	5.00%	136.79	3233.90
		3	3097.11	0.00	3.00%	0.00	2735.89	4.00%	109.44	3206.55
		4	3097.11	0.00	3.00%	0.00	2735.89	4.00%	109.44	3206.55
		5	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		6	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		7	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		8	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		9	3097.11	0.00	2.00%	0.00	2735.89	2.00%	54.72	3151.83
		10	3097.11	0.00	2.00%	0.00	2735.89	2.00%	54.72	3151.83
		11	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		12	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		13	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		14	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		15	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		16	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		17	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		18	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		19	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		20	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		21	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47

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FLOOR	ROOM NAME	LST	TOTAL CONVECTIVE	RADIANT SOLAR	SOLAR COEFFICIENTS	SOLAR RTS	RADIANT NON-SOLAR	NON-SOLAR COEFFICIENTS	NON-SOLAR RTS	HOURLY COOLING LOAD
THIRD		22	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		23	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
	PHYSICS GRAD OFFICES - 359	0	3097.11	0.00	51.00%	0.00	2735.89	42.00%	1149.07	4246.18
		1	3097.11	0.00	12.00%	0.00	2735.89	9.00%	246.23	3343.34
		2	3097.11	0.00	6.00%	0.00	2735.89	5.00%	136.79	3233.90
		3	3097.11	0.00	3.00%	0.00	2735.89	4.00%	109.44	3206.55
		4	3097.11	0.00	3.00%	0.00	2735.89	4.00%	109.44	3206.55
		5	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		6	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		7	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		8	3097.11	0.00	2.00%	0.00	2735.89	3.00%	82.08	3179.19
		9	3097.11	0.00	2.00%	0.00	2735.89	2.00%	54.72	3151.83
		10	3097.11	0.00	2.00%	0.00	2735.89	2.00%	54.72	3151.83
		11	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		12	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		13	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		14	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		15	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		16	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		17	3097.11	0.00	1.00%	0.00	2735.89	2.00%	54.72	3151.83
		18	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		19	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		20	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		21	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		22	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
		23	3097.11	0.00	1.00%	0.00	2735.89	1.00%	27.36	3124.47
	PHYSICS CGRAD OFFICES - 360	0	3007.11	0.00	51.00%	0.00	2705.89	42.00%	1136.47	4143.58
		1	3007.11	0.00	12.00%	0.00	2705.89	9.00%	243.53	3250.64
		2	3007.11	0.00	6.00%	0.00	2705.89	5.00%	135.29	3142.40
		3	3007.11	0.00	3.00%	0.00	2705.89	4.00%	108.24	3115.35
		4	3007.11	0.00	3.00%	0.00	2705.89	4.00%	108.24	3115.35
		5	3007.11	0.00	2.00%	0.00	2705.89	3.00%	81.18	3088.29
		6	3007.11	0.00	2.00%	0.00	2705.89	3.00%	81.18	3088.29
		7	3007.11	0.00	2.00%	0.00	2705.89	3.00%	81.18	3088.29
		8	3007.11	0.00	2.00%	0.00	2705.89	3.00%	81.18	3088.29
		9	3007.11	0.00	2.00%	0.00	2705.89	2.00%	54.12	3061.23
		10	3007.11	0.00	2.00%	0.00	2705.89	2.00%	54.12	3061.23
		11	3007.11	0.00	1.00%	0.00	2705.89	2.00%	54.12	3061.23
		12	3007.11	0.00	1.00%	0.00	2705.89	2.00%	54.12	3061.23
		13	3007.11	0.00	1.00%	0.00	2705.89	2.00%	54.12	3061.23
		14	3007.11	0.00	1.00%	0.00	2705.89	2.00%	54.12	3061.23
		15	3007.11	0.00	1.00%	0.00	2705.89	2.00%	54.12	3061.23
		16	3007.11	0.00	1.00%	0.00	2705.89	2.00%	54.12	3061.23
		17	3007.11	0.00	1.00%	0.00	2705.89	2.00%	54.12	3061.23
		18	3007.11	0.00	1.00%	0.00	2705.89	1.00%	27.06	3034.17
		19	3007.11	0.00	1.00%	0.00	2705.89	1.00%	27.06	3034.17
		20	3007.11	0.00	1.00%	0.00	2705.89	1.00%	27.06	3034.17
		21	3007.11	0.00	1.00%	0.00	2705.89	1.00%	27.06	3034.17
		22	3007.11	0.00	1.00%	0.00	2705.89	1.00%	27.06	3034.17
		23	3007.11	0.00	1.00%	0.00	2705.89	1.00%	27.06	3034.17
	PHYSICS CGRAD OFFICES - 386	0	2341.95	0.00	51.00%	0.00	2504.05	42.00%	1051.70	3393.65
		1	2341.95	0.00	12.00%	0.00	2504.05	9.00%	225.36	2567.31
		2	2341.95	0.00	6.00%	0.00	2504.05	5.00%	125.20	2467.15
		3	2341.95	0.00	3.00%	0.00	2504.05	4.00%	100.16	2442.11
		4	2341.95	0.00	3.00%	0.00	2504.05	4.00%	100.16	2442.11
		5	2341.95	0.00	2.00%	0.00	2504.05	3.00%	75.12	2417.07
		6	2341.95	0.00	2.00%	0.00	2504.05	3.00%	75.12	2417.07
		7	2341.95	0.00	2.00%	0.00	2504.05	3.00%	75.12	2417.07
		8	2341.95	0.00	2.00%	0.00	2504.05	3.00%	75.12	2417.07
		9	2341.95	0.00	2.00%	0.00	2504.05	2.00%	50.08	2392.03
		10	2341.95	0.00	2.00%	0.00	2504.05	2.00%	50.08	2392.03
		11	2341.95	0.00	1.00%	0.00	2504.05	2.00%	50.08	2392.03
		12	2341.95	0.00	1.00%	0.00	2504.05	2.00%	50.08	2392.03
		13	2341.95	0.00	1.00%	0.00	2504.05	2.00%	50.08	2392.03
		14	2341.95	0.00	1.00%	0.00	2504.05	2.00%	50.08	2392.03
		15	2341.95	0.00	1.00%	0.00	2504.05	2.00%	50.08	2392.03
		16	2341.95	0.00	1.00%	0.00	2504.05	2.00%	50.08	2392.03
		17	2341.95	0.00	1.00%	0.00	2504.05	2.00%	50.08	2392.03
		18	2341.95	0.00	1.00%	0.00	2504.05	1.00%	25.04	2366.99
		19	2341.95	0.00	1.00%	0.00	2504.05	1.00%	25.04	2366.99
		20	2341.95	0.00	1.00%	0.00	2504.05	1.00%	25.04	2366.99
		21	2341.95	0.00	1.00%	0.00	2504.05	1.00%	25.04	2366.99
		22	2341.95	0.00	1.00%	0.00	2504.05	1.00%	25.04	2366.99
		23	2341.95	0.00	1.00%	0.00	2504.05	1.00%	25.04	2366.99
		0	4514.87	1369.94	51.00%	698.67	4881.87	42.00%	2050.39	7263.92
		1	4514.87	1369.94	12.00%	164.39	4881.87	9.00%	439.37	5118.63
		2	4514.87	1369.94	6.00%	82.20	4881.87	5.00%	244.09	4841.16
		3	4514.87	1369.94	3.00%	41.10	4881.87	4.00%	195.27	4751.24
		4	4514.87	1369.94	3.00%	41.10	4881.87	4.00%	195.27	4751.24
		5	4514.87	1369.94	2.00%	27.40	4881.87	3.00%	146.46	4688.73
		6	4514.87	1369.94	2.00%	27.40	4881.87	3.00%	146.46	4688.73

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	BREAK OUT	7	4514.87	1369.94	2.00%	27.40	4881.87	3.00%	146.46	4688.73
		8	4747.97	7301.14	2.00%	146.02	4881.87	3.00%	146.46	5040.44
		9	5211.62	17113.00	2.00%	342.26	4881.87	2.00%	97.64	5651.51
		10	5515.55	22600.25	2.00%	452.00	4881.87	2.00%	97.64	6065.19
		11	5695.12	25629.02	1.00%	256.29	4881.87	2.00%	97.64	6049.05
		12	5751.93	26562.48	1.00%	265.62	4881.87	2.00%	97.64	6115.19
		13	5684.72	25456.94	1.00%	254.57	4881.87	2.00%	97.64	6036.93
		14	5494.90	22243.36	1.00%	222.43	4881.87	2.00%	97.64	5814.97
		15	5179.83	16504.68	1.00%	165.05	4881.87	2.00%	97.64	5442.51
		16	4699.51	6135.63	1.00%	61.36	4881.87	2.00%	97.64	4858.51
		17	4514.87	1369.94	1.00%	13.70	4881.87	2.00%	97.64	4626.21
		18	4514.87	1369.94	1.00%	13.70	4881.87	1.00%	48.82	4577.39
		19	4514.87	1369.94	1.00%	13.70	4881.87	1.00%	48.82	4577.39
		20	4514.87	1369.94	1.00%	13.70	4881.87	1.00%	48.82	4577.39
		21	4514.87	1369.94	1.00%	13.70	4881.87	1.00%	48.82	4577.39
		22	4514.87	1369.94	1.00%	13.70	4881.87	1.00%	48.82	4577.39
		23	4514.87	1369.94	1.00%	13.70	4881.87	1.00%	48.82	4577.39
	PHYSICS VISITING OFFICE SUITE	0	2873.65	345.65	51.00%	176.28	2423.32	42.00%	1017.80	4067.72
		1	2873.65	345.65	12.00%	41.48	2423.32	9.00%	218.10	3133.23
		2	2873.65	345.65	6.00%	20.74	2423.32	5.00%	121.17	3015.55
		3	2873.65	345.65	3.00%	10.37	2423.32	4.00%	96.93	2980.95
		4	2873.65	345.65	3.00%	10.37	2423.32	4.00%	96.93	2980.95
		5	2873.65	345.65	2.00%	6.91	2423.32	3.00%	72.70	2953.26
		6	2873.65	345.65	2.00%	6.91	2423.32	3.00%	72.70	2953.26
		7	2873.65	345.65	2.00%	6.91	2423.32	3.00%	72.70	2953.26
		8	2932.46	1842.13	2.00%	36.84	2423.32	3.00%	72.70	3042.00
		9	3049.44	4317.74	2.00%	86.35	2423.32	2.00%	48.47	3184.26
		10	3126.13	5702.22	2.00%	114.04	2423.32	2.00%	48.47	3288.64
		11	3171.44	6466.40	1.00%	64.66	2423.32	2.00%	48.47	3284.57
		12	3185.77	6701.92	1.00%	67.02	2423.32	2.00%	48.47	3301.25
		13	3168.81	6422.98	1.00%	64.23	2423.32	2.00%	48.47	3281.51
		14	3120.92	5612.17	1.00%	56.12	2423.32	2.00%	48.47	3225.51
		15	3041.42	4164.26	1.00%	41.64	2423.32	2.00%	48.47	3131.53
		16	2920.24	1548.07	1.00%	15.48	2423.32	2.00%	48.47	2984.18
		17	2873.65	345.65	1.00%	3.46	2423.32	2.00%	48.47	2925.57
		18	2873.65	345.65	1.00%	3.46	2423.32	1.00%	24.23	2901.34
		19	2873.65	345.65	1.00%	3.46	2423.32	1.00%	24.23	2901.34
		20	2873.65	345.65	1.00%	3.46	2423.32	1.00%	24.23	2901.34
		21	2873.65	345.65	1.00%	3.46	2423.32	1.00%	24.23	2901.34
		22	2873.65	345.65	1.00%	3.46	2423.32	1.00%	24.23	2901.34
		23	2873.65	345.65	1.00%	3.46	2423.32	1.00%	24.23	2901.34
	MAIL + PRINT	0	3625.05	0.00	51.00%	0.00	2977.95	42.00%	1250.74	4875.79
		1	3625.05	0.00	12.00%	0.00	2977.95	9.00%	268.02	3893.07
		2	3625.05	0.00	6.00%	0.00	2977.95	5.00%	148.90	3773.95
		3	3625.05	0.00	3.00%	0.00	2977.95	4.00%	119.12	3744.17
		4	3625.05	0.00	3.00%	0.00	2977.95	4.00%	119.12	3744.17
		5	3625.05	0.00	2.00%	0.00	2977.95	3.00%	89.34	3714.39
		6	3625.05	0.00	2.00%	0.00	2977.95	3.00%	89.34	3714.39
		7	3625.05	0.00	2.00%	0.00	2977.95	3.00%	89.34	3714.39
		8	3625.05	0.00	2.00%	0.00	2977.95	3.00%	89.34	3714.39
		9	3625.05	0.00	2.00%	0.00	2977.95	2.00%	59.56	3684.61
		10	3625.05	0.00	2.00%	0.00	2977.95	2.00%	59.56	3684.61
		11	3625.05	0.00	1.00%	0.00	2977.95	2.00%	59.56	3684.61
		12	3625.05	0.00	1.00%	0.00	2977.95	2.00%	59.56	3684.61
		13	3625.05	0.00	1.00%	0.00	2977.95	2.00%	59.56	3684.61
		14	3625.05	0.00	1.00%	0.00	2977.95	2.00%	59.56	3684.61
		15	3625.05	0.00	1.00%	0.00	2977.95	2.00%	59.56	3684.61
		16	3625.05	0.00	1.00%	0.00	2977.95	2.00%	59.56	3684.61
		17	3625.05	0.00	1.00%	0.00	2977.95	2.00%	59.56	3684.61
		18	3625.05	0.00	1.00%	0.00	2977.95	1.00%	29.78	3654.83
		19	3625.05	0.00	1.00%	0.00	2977.95	1.00%	29.78	3654.83
		20	3625.05	0.00	1.00%	0.00	2977.95	1.00%	29.78	3654.83
		21	3625.05	0.00	1.00%	0.00	2977.95	1.00%	29.78	3654.83
		22	3625.05	0.00	1.00%	0.00	2977.95	1.00%	29.78	3654.83
		23	3625.05	0.00	1.00%	0.00	2977.95	1.00%	29.78	3654.83
	ADH	0	1458.34	211.21	51.00%	107.72	1779.48	42.00%	747.38	2313.44
		1	1458.34	211.21	12.00%	25.35	1779.48	9.00%	160.15	1643.84
		2	1458.34	211.21	6.00%	12.67	1779.48	5.00%	88.97	1559.99
		3	1458.34	211.21	3.00%	6.34	1779.48	4.00%	71.18	1535.86
		4	1458.34	211.21	3.00%	6.34	1779.48	4.00%	71.18	1535.86
		5	1458.34	211.21	2.00%	4.22	1779.48	3.00%	53.38	1515.95
		6	1458.34	211.21	2.00%	4.22	1779.48	3.00%	53.38	1515.95
		7	1458.34	211.21	2.00%	4.22	1779.48	3.00%	53.38	1515.95
		8	1494.28	1125.66	2.00%	22.51	1779.48	3.00%	53.38	1570.17
		9	1565.76	2638.41	2.00%	52.77	1779.48	2.00%	35.59	1654.12
		10	1612.62	3484.41	2.00%	69.69	1779.48	2.00%	35.59	1717.90
		11	1640.31	3951.37	1.00%	39.51	1779.48	2.00%	35.59	1715.41
		12	1649.06	4095.29	1.00%	40.95	1779.48	2.00%	35.59	1725.61
		13	1638.70	3924.84	1.00%	39.25	1779.48	2.00%	35.59	1713.54
		14	1609.44	3429.39	1.00%	34.29	1779.48	2.00%	35.59	1679.32
		15	1560.86	2544.62	1.00%	25.45	1779.48	2.00%	35.59	1621.90

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		16	1486.81	945.97	1.00%	9.46	1779.48	2.00%	35.59	1531.86
		17	1458.34	211.21	1.00%	2.11	1779.48	2.00%	35.59	1496.04
		18	1458.34	211.21	1.00%	2.11	1779.48	1.00%	17.79	1478.25
		19	1458.34	211.21	1.00%	2.11	1779.48	1.00%	17.79	1478.25
		20	1458.34	211.21	1.00%	2.11	1779.48	1.00%	17.79	1478.25
		21	1458.34	211.21	1.00%	2.11	1779.48	1.00%	17.79	1478.25
		22	1458.34	211.21	1.00%	2.11	1779.48	1.00%	17.79	1478.25
		23	1458.34	211.21	1.00%	2.11	1779.48	1.00%	17.79	1478.25
	COFFEE	0	4100.55	0.00	51.00%	0.00	2646.45	42.00%	1111.51	5212.06
		1	4100.55	0.00	12.00%	0.00	2646.45	9.00%	238.18	4338.73
		2	4100.55	0.00	6.00%	0.00	2646.45	5.00%	132.32	4232.87
		3	4100.55	0.00	3.00%	0.00	2646.45	4.00%	105.86	4206.41
		4	4100.55	0.00	3.00%	0.00	2646.45	4.00%	105.86	4206.41
		5	4100.55	0.00	2.00%	0.00	2646.45	3.00%	79.39	4179.94
		6	4100.55	0.00	2.00%	0.00	2646.45	3.00%	79.39	4179.94
		7	4100.55	0.00	2.00%	0.00	2646.45	3.00%	79.39	4179.94
		8	4100.55	0.00	2.00%	0.00	2646.45	3.00%	79.39	4179.94
		9	4100.55	0.00	2.00%	0.00	2646.45	2.00%	52.93	4153.48
		10	4100.55	0.00	2.00%	0.00	2646.45	2.00%	52.93	4153.48
		11	4100.55	0.00	1.00%	0.00	2646.45	2.00%	52.93	4153.48
		12	4100.55	0.00	1.00%	0.00	2646.45	2.00%	52.93	4153.48
		13	4100.55	0.00	1.00%	0.00	2646.45	2.00%	52.93	4153.48
		14	4100.55	0.00	1.00%	0.00	2646.45	2.00%	52.93	4153.48
		15	4100.55	0.00	1.00%	0.00	2646.45	2.00%	52.93	4153.48
		16	4100.55	0.00	1.00%	0.00	2646.45	2.00%	52.93	4153.48
		17	4100.55	0.00	1.00%	0.00	2646.45	2.00%	52.93	4153.48
		18	4100.55	0.00	1.00%	0.00	2646.45	1.00%	26.46	4127.01
		19	4100.55	0.00	1.00%	0.00	2646.45	1.00%	26.46	4127.01
		20	4100.55	0.00	1.00%	0.00	2646.45	1.00%	26.46	4127.01
		21	4100.55	0.00	1.00%	0.00	2646.45	1.00%	26.46	4127.01
		22	4100.55	0.00	1.00%	0.00	2646.45	1.00%	26.46	4127.01
		23	4100.55	0.00	1.00%	0.00	2646.45	1.00%	26.46	4127.01
	PHYSICS DEPARTMENT HEAD	0	2441.25	842.56	51.00%	429.70	1999.08	42.00%	839.61	3710.56
		1	2441.25	842.56	12.00%	101.11	1999.08	9.00%	179.92	2722.27
		2	2441.25	842.56	6.00%	50.55	1999.08	5.00%	99.95	2591.75
		3	2441.25	842.56	3.00%	25.28	1999.08	4.00%	79.96	2546.49
		4	2441.25	842.56	3.00%	25.28	1999.08	4.00%	79.96	2546.49
		5	2441.25	842.56	2.00%	16.85	1999.08	3.00%	59.97	2518.07
		6	2441.25	842.56	2.00%	16.85	1999.08	3.00%	59.97	2518.07
		7	2441.25	842.56	2.00%	16.85	1999.08	3.00%	59.97	2518.07
		8	2584.61	1086.66	2.00%	21.73	1999.08	3.00%	59.97	2666.31
		9	2869.77	1572.20	2.00%	31.44	1999.08	2.00%	39.98	2941.19
		10	3056.70	1890.48	2.00%	37.81	1999.08	2.00%	39.98	3134.49
		11	3167.14	2078.54	1.00%	20.79	1999.08	2.00%	39.98	3227.91
		12	3202.08	2138.03	1.00%	21.38	1999.08	2.00%	39.98	3263.44
		13	3160.75	2067.65	1.00%	20.68	1999.08	2.00%	39.98	3221.40
		14	3044.00	1868.86	1.00%	18.69	1999.08	2.00%	39.98	3102.67
		15	2850.22	1538.91	1.00%	15.39	1999.08	2.00%	39.98	2905.59
		16	2554.81	1035.92	1.00%	10.36	1999.08	2.00%	39.98	2605.15
		17	2441.25	842.56	1.00%	8.43	1999.08	2.00%	39.98	2489.65
		18	2441.25	842.56	1.00%	8.43	1999.08	1.00%	19.99	2469.66
		19	2441.25	842.56	1.00%	8.43	1999.08	1.00%	19.99	2469.66
		20	2441.25	842.56	1.00%	8.43	1999.08	1.00%	19.99	2469.66
		21	2441.25	842.56	1.00%	8.43	1999.08	1.00%	19.99	2469.66
		22	2441.25	842.56	1.00%	8.43	1999.08	1.00%	19.99	2469.66
		23	2441.25	842.56	1.00%	8.43	1999.08	1.00%	19.99	2469.66
	ADMIN - 282-F	0	1436.02	226.11	51.00%	115.32	1726.56	42.00%	725.16	2276.49
		1	1436.02	226.11	12.00%	27.13	1726.56	9.00%	155.39	1618.54
		2	1436.02	226.11	6.00%	13.57	1726.56	5.00%	86.33	1535.91
		3	1436.02	226.11	3.00%	6.78	1726.56	4.00%	69.06	1511.86
		4	1436.02	226.11	3.00%	6.78	1726.56	4.00%	69.06	1511.86
		5	1436.02	226.11	2.00%	4.52	1726.56	3.00%	51.80	1492.34
		6	1436.02	226.11	2.00%	4.52	1726.56	3.00%	51.80	1492.34
		7	1436.02	226.11	2.00%	4.52	1726.56	3.00%	51.80	1492.34
		8	1474.49	1205.09	2.00%	24.10	1726.56	3.00%	51.80	1550.39
		9	1551.02	2824.59	2.00%	56.49	1726.56	2.00%	34.53	1642.04
		10	1601.18	3730.28	2.00%	74.61	1726.56	2.00%	34.53	1710.32
		11	1630.82	4230.20	1.00%	42.30	1726.56	2.00%	34.53	1707.66
		12	1640.20	4384.27	1.00%	43.84	1726.56	2.00%	34.53	1718.57
		13	1629.11	4201.79	1.00%	42.02	1726.56	2.00%	34.53	1705.66
		14	1597.78	3671.38	1.00%	36.71	1726.56	2.00%	34.53	1669.02
		15	1545.77	2724.18	1.00%	27.24	1726.56	2.00%	34.53	1607.55
		16	1466.49	1012.72	1.00%	10.13	1726.56	2.00%	34.53	1511.15
		17	1436.02	226.11	1.00%	2.26	1726.56	2.00%	34.53	1472.81
		18	1436.02	226.11	1.00%	2.26	1726.56	1.00%	17.27	1455.54
		19	1436.02	226.11	1.00%	2.26	1726.56	1.00%	17.27	1455.54
		20	1436.02	226.11	1.00%	2.26	1726.56	1.00%	17.27	1455.54
		21	1436.02	226.11	1.00%	2.26	1726.56	1.00%	17.27	1455.54
		22	1436.02	226.11	1.00%	2.26	1726.56	1.00%	17.27	1455.54
		23	1436.02	226.11	1.00%	2.26	1726.56	1.00%	17.27	1455.54
		0	1370.36	121.54	51.00%	61.98	1719.34	42.00%	722.12	2154.47

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	ADMIN - 382-G	1	1370.36	121.54	12.00%	14.58	1719.34	9.00%	154.74	1539.69
		2	1370.36	121.54	6.00%	7.29	1719.34	5.00%	85.97	1463.62
		3	1370.36	121.54	3.00%	3.65	1719.34	4.00%	68.77	1442.78
		4	1370.36	121.54	3.00%	3.65	1719.34	4.00%	68.77	1442.78
		5	1370.36	121.54	2.00%	2.43	1719.34	3.00%	51.58	1424.37
		6	1370.36	121.54	2.00%	2.43	1719.34	3.00%	51.58	1424.37
		7	1370.36	121.54	2.00%	2.43	1719.34	3.00%	51.58	1424.37
		8	1391.04	647.75	2.00%	12.95	1719.34	3.00%	51.58	1455.58
		9	1432.17	1518.24	2.00%	30.36	1719.34	2.00%	34.39	1496.93
		10	1459.14	2005.06	2.00%	40.10	1719.34	2.00%	34.39	1533.63
		11	1475.07	2273.77	1.00%	22.74	1719.34	2.00%	34.39	1532.20
		12	1480.11	2356.59	1.00%	23.57	1719.34	2.00%	34.39	1538.06
		13	1474.15	2258.51	1.00%	22.59	1719.34	2.00%	34.39	1531.12
		14	1457.31	1973.40	1.00%	19.73	1719.34	2.00%	34.39	1511.43
		15	1429.35	1464.27	1.00%	14.64	1719.34	2.00%	34.39	1478.38
		16	1386.74	544.34	1.00%	5.44	1719.34	2.00%	34.39	1426.57
		17	1370.36	121.54	1.00%	1.22	1719.34	2.00%	34.39	1405.96
		18	1370.36	121.54	1.00%	1.22	1719.34	1.00%	17.19	1388.77
		19	1370.36	121.54	1.00%	1.22	1719.34	1.00%	17.19	1388.77
		20	1370.36	121.54	1.00%	1.22	1719.34	1.00%	17.19	1388.77
		21	1370.36	121.54	1.00%	1.22	1719.34	1.00%	17.19	1388.77
		22	1370.36	121.54	1.00%	1.22	1719.34	1.00%	17.19	1388.77
		23	1370.36	121.54	1.00%	1.22	1719.34	1.00%	17.19	1388.77
	CONFERENCE 10 SEAT	0	2915.21	1077.88	51.00%	549.72	2729.45	42.00%	1146.37	4611.30
		1	2915.21	1077.88	12.00%	129.35	2729.45	9.00%	245.65	3290.21
		2	2915.21	1077.88	6.00%	64.67	2729.45	5.00%	136.47	3116.36
		3	2915.21	1077.88	3.00%	32.34	2729.45	4.00%	109.18	3056.73
		4	2915.21	1077.88	3.00%	32.34	2729.45	4.00%	109.18	3056.73
		5	2915.21	1077.88	2.00%	21.56	2729.45	3.00%	81.88	3018.65
		6	2915.21	1077.88	2.00%	21.56	2729.45	3.00%	81.88	3018.65
		7	2915.21	1077.88	2.00%	21.56	2729.45	3.00%	81.88	3018.65
		8	3098.61	5744.64	2.00%	114.89	2729.45	3.00%	81.88	3295.39
		9	3463.42	13464.73	2.00%	269.29	2729.45	2.00%	54.59	3787.30
		10	3702.56	17782.17	2.00%	355.64	2729.45	2.00%	54.59	4112.79
		11	3843.85	20165.25	1.00%	201.65	2729.45	2.00%	54.59	4100.09
		12	3888.55	20899.71	1.00%	209.00	2729.45	2.00%	54.59	4152.13
		13	3835.67	20029.86	1.00%	200.30	2729.45	2.00%	54.59	4090.56
		14	3686.31	17501.37	1.00%	175.01	2729.45	2.00%	54.59	3915.92
		15	3438.41	12986.10	1.00%	129.86	2729.45	2.00%	54.59	3622.86
		16	3060.49	4827.59	1.00%	48.28	2729.45	2.00%	54.59	3163.36
		17	2915.21	1077.88	1.00%	10.78	2729.45	2.00%	54.59	2980.58
		18	2915.21	1077.88	1.00%	10.78	2729.45	1.00%	27.29	2953.29
		19	2915.21	1077.88	1.00%	10.78	2729.45	1.00%	27.29	2953.29
		20	2915.21	1077.88	1.00%	10.78	2729.45	1.00%	27.29	2953.29
		21	2915.21	1077.88	1.00%	10.78	2729.45	1.00%	27.29	2953.29
		22	2915.21	1077.88	1.00%	10.78	2729.45	1.00%	27.29	2953.29
		23	2915.21	1077.88	1.00%	10.78	2729.45	1.00%	27.29	2953.29