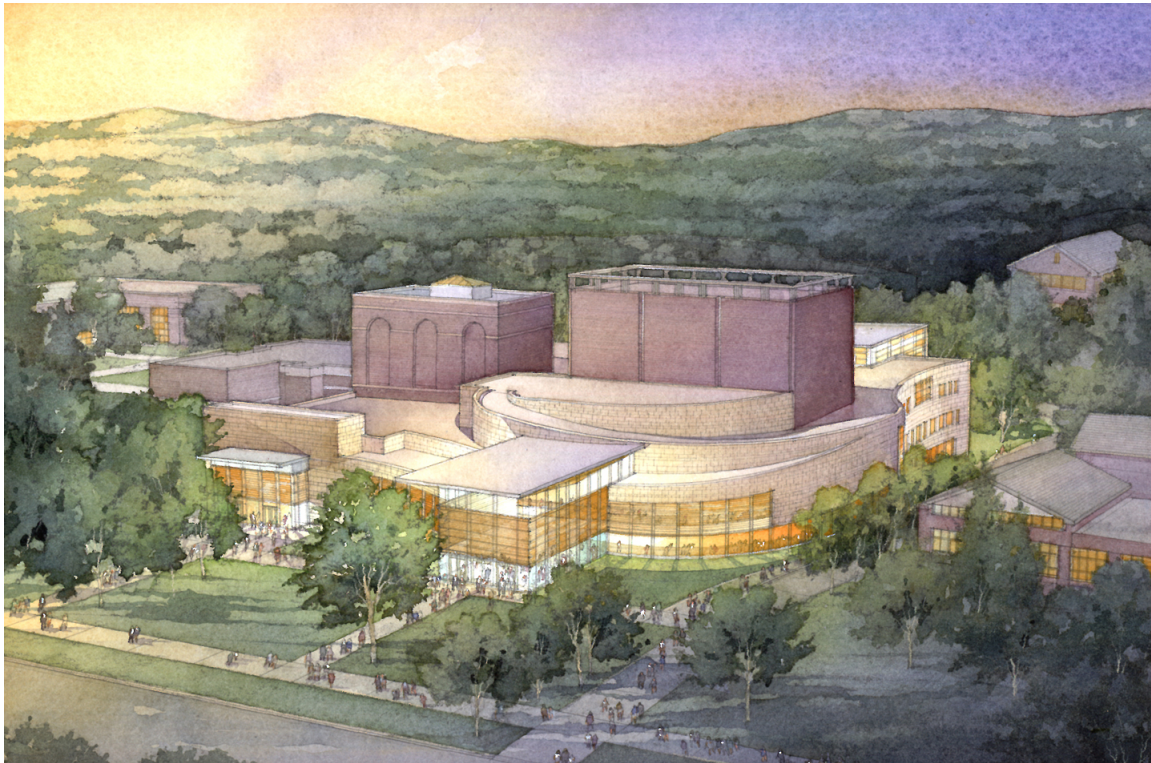


Williams College

'62 Center for Theatre & Dance



## Lighting Systems

Existing Conditions & Evaluations

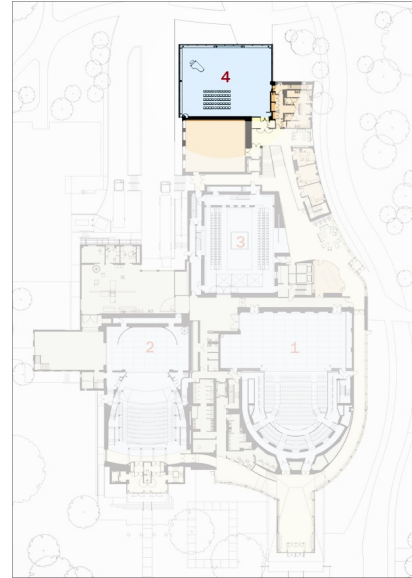
Devin Maurizio  
Lighting/Electrical Option  
R. Mistrick

## Space 1: Dance Rehearsal Studio (A large work space)

### Existing Conditions:

*Lighting* - In the dance rehearsal studio, there are two major permanent lighting systems and one variable pipe-mounted theatrical lighting system. The two permanent lighting systems consist of an indirect linear fluorescent system and a Halogen canister downlight system. Cut sheets for the luminaires and ballasts in these systems are provided at the end of this space's section.

*Controls* - These systems are controlled on two separate systems within the room. The linear fluorescent pendants are switched along the east wall after the mirrors by five keyed switches and are separated into bi-level switching on two zones: a west zone and an east zone, each consisting of 3 rows of luminaires. The second control system in the space is for the halogen downlights. These are controlled by a dimmer switch on the wall directly to the right of the entry doors that is connected to a dimmer rack located in room 090. The downlights are controlled separately through the dimmer rack in rows for a total of five separate dimmers, allowing for a high level of flexibility in the space.



*Space Properties* - The vertical surfaces of the space are primarily made of glass and mirrors. The glass in the space, made of clear glazing, has a transmittance value that was calculated using an illuminance meter to be approximately 0.62. The mirrors in the space are eight foot tall continuous mirrors. All other walls within the space are made of acoustical panels that are light blue in color, with an approximate reflectance of 36%. The floor is made of sprung wood paneling and is usually covered with a medium blue exercise mat that is approximately two inches thick and approximately 15% reflective. The structural trusses and overhead mechanical system are both visible above the unfinished ceiling. Ductwork is a matte brushed aluminum, assumed to be approximately 50% reflectance and has some specularly to it.

### Design Criteria:

*Illuminance Criteria* - Illuminance requirements for the space are 30fc horizontal and 30fc vertical. Horizontal illuminance is higher than typically recommended, but the space is also a part of an educational facility and may have reading and/or writing tasks within the space. Please note that these criteria can only be applied to general space use. Specialized illuminance levels vary upon necessity of theatrical performance and may vary severely in both directions.

*Power Allowance* - According to the Massachusetts Energy Code 780.CMR.Chapter13, which is compliant and in excess of ASHRAE Standard 90.1-2001, using the space-by-space method, the maximum allowable power allowance for this space is 1.6w/ft<sup>2</sup> (5120w), considering the space to be an academic classroom/lecture area. Actual power allowance could probably be

higher for the space since it has significant theatrical performing arts activities. However, the code does not specifically cover lighting power densities for theatrical performance spaces.

*Aesthetic Quality* - Visual interest in the space should be kept at a minimum since the focus should be on the dancers, not the space. However, a high end feel should be maintained, as the culture of dance draws in crowds with a more exquisite taste. In this respect, it may be necessary to provide light from hidden luminaires or to choose luminaires that are very attractive yet unobtrusive.

*Direct & Reflected Glare* - As dancers are required to be in specific locations throughout a performance, it is imperative for them to be able to see clearly. Direct and reflected glare could cause serious issues by masking certain locations on the floor or by blinding the dance through the reflected component.

*Uniformity* - Since dance often is performed by multiple dancers all in unison, it is important to have a high level of uniformity across the space. This will help to enhance the idea of fluid motion throughout the entire body of dancers. In some instances, it may be necessary or beneficial to have varying levels of light across the space for different performances. This introduces the need for a second, variable lighting system. Also, being able to have the center of the space illuminated for performances, while the perimeter hides the viewers will create a much more relaxing environment for the spectators.

*Modeling of Faces* - Dancers go through arduous makeup processes when getting ready for performances to enhance their facial features. Creating a lighting system that creates beautiful faces throughout the spaces, in any direction, is very important for this system to be effective. Energy and mood are often times direct outputs from the faces and motions of the bodies of the dancers within the performance.

*Psychological Aspects* - Dance is generally designed to invoke emotion, whether it is a direct emotion such as anger or sorrow, or a passive emotion such as awe or excitement. While the dance itself may be capable of invoking these emotions, a well-designed lighting scheme within the space can dramatically increase these effects. Theatrical lighting concepts should probably be used in this space to provide a system that is dynamic enough for the vast differences in performances that may occur.

*System Control & Flexibility* - Dynamic lighting is imperative to creating an effective space for dance performance. Character, emotional attitude, and energy change for every piece of dance that is performed and a lighting system should be available to contribute to and accentuate these differences.

*Daylight Integration & Control* - Although a part of system control, the importance of daylighting integration and control in this space warrants its own category. Two and a half of the four walls in the space are all glass, floor to ceiling, introducing an incredible amount of daylight into the space. Direct glare from sunlight isn't as much an issue in the space, since the main glass wall is north facing. However, morning and early evening sun may cause some issues during certain parts of the year. For most of the year, the lights can probably be kept off due to the large amount of daylight in the space.

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**Spatial Layout:**

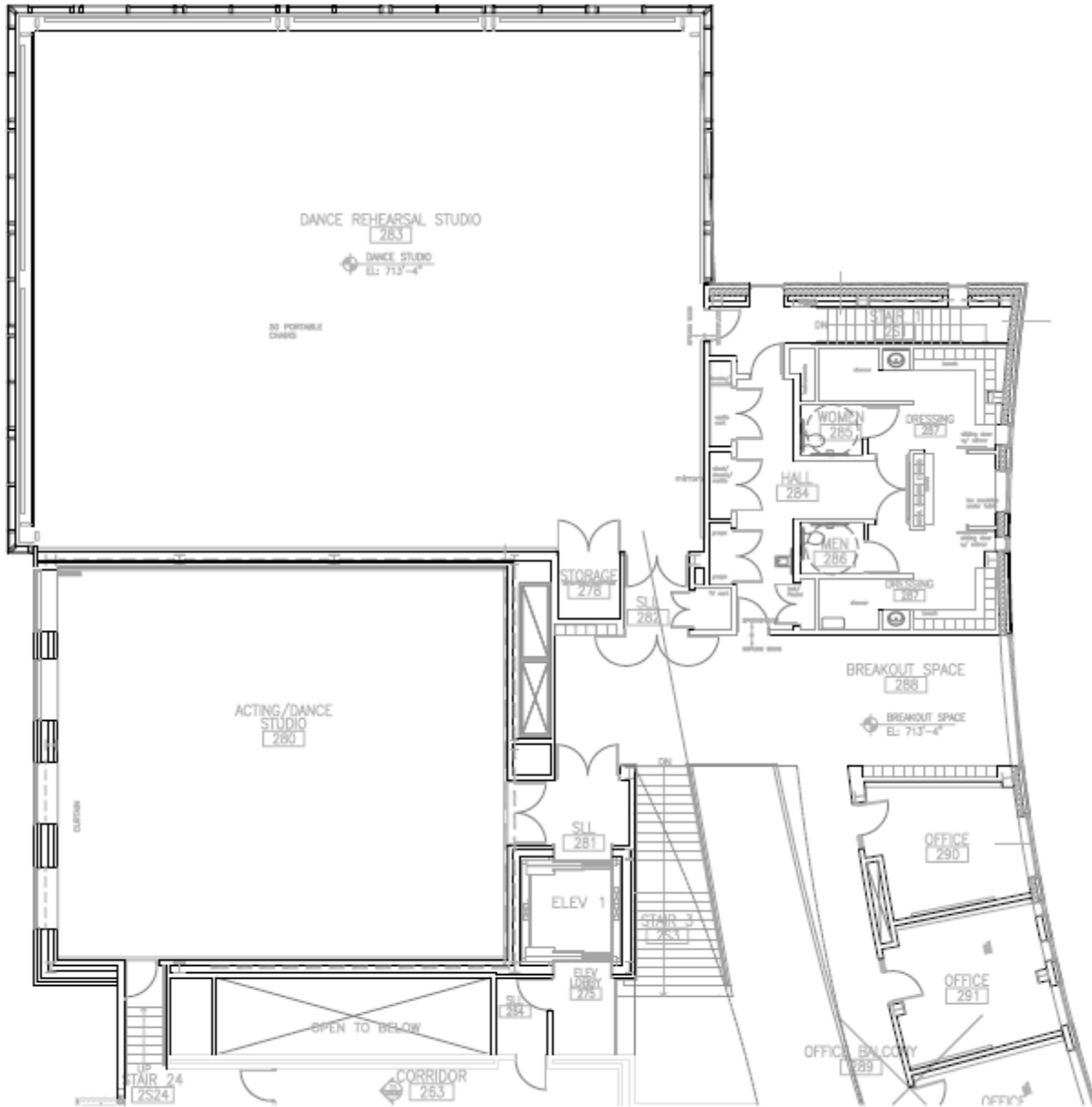


Figure 1.1 – Floorplan

Space Characteristics:

- Ceiling Height: 27'
- Area: 3250 sq. ft.
- Materials: Aluminum, Glass, Wood, Acoustical Wallboard

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 Williamstown, MA

**Performance Analysis:**

Existing Conditions

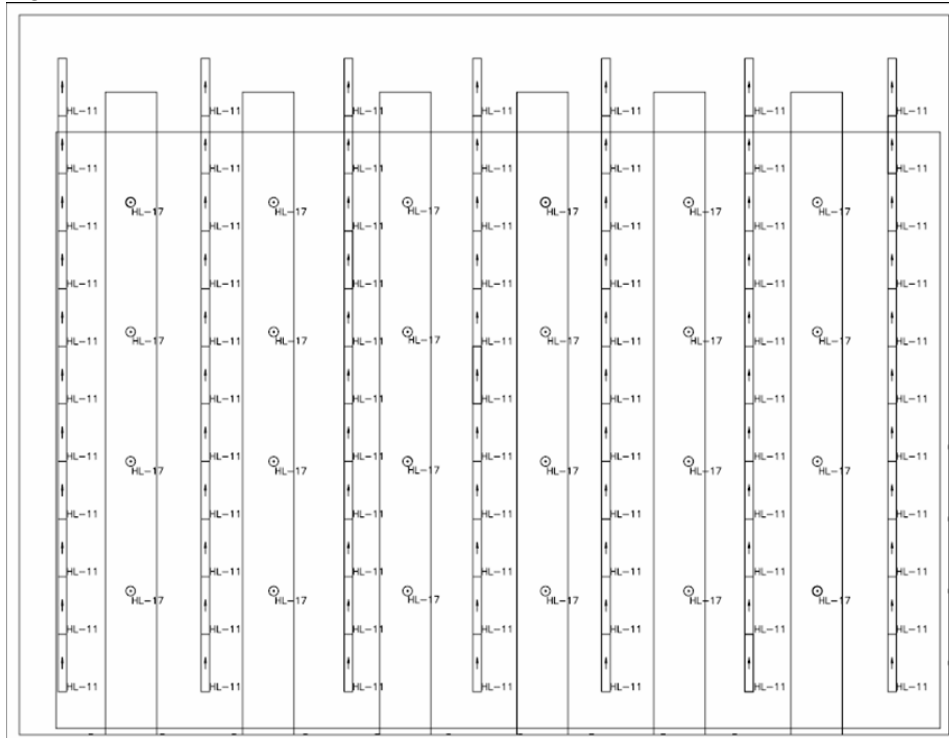


Figure 1.1 – Luminaire Layout (reference Appendix for luminaire types)

Assumptions:

- 18 month cleaning cycle
- Very clean
- RCR: ~5
- Horizontal illuminance measured at floor level
- Vertical illuminance measured between 3 and 6 feet above finished floor

Fixture Type	Maintenance Category	LLD	LDD	BF	RSDD	Total LLF
HL-11	II	0.95	0.96	0.88	0.89	0.71
HL-17	IV	0.95	0.92	1.00	0.89	0.78

Table 1.1 – Light Loss Factors

Energy Modeling:

- HL-11: 77 fixtures @ 85w = 6545w
- HL-17: 24 fixtures @ 90w = 2160w
- Total LPD: 2.7w / sq. ft.

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Electric Lighting Conditions

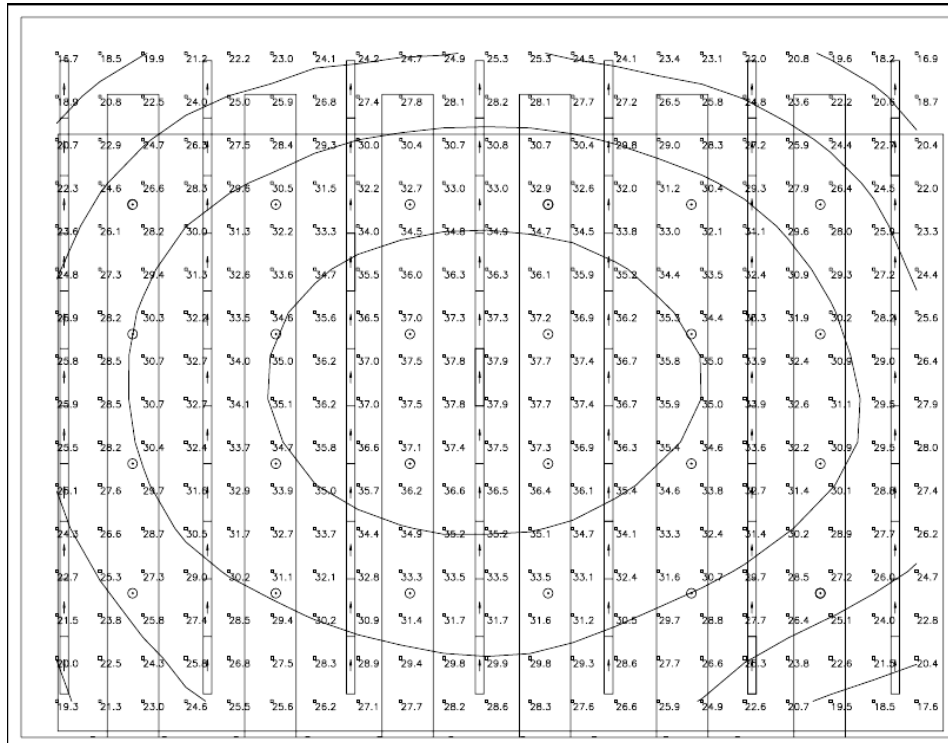


Figure 1.2 – Horizontal Illuminance Values & Isocontours

Illuminance Summary:

- Average Horizontal Illuminance: 30fc
- Max/Min Ratio: 2.3:1
- Average Vertical Illuminance: 39fc
- Max/Min Ratio: 1.4:1

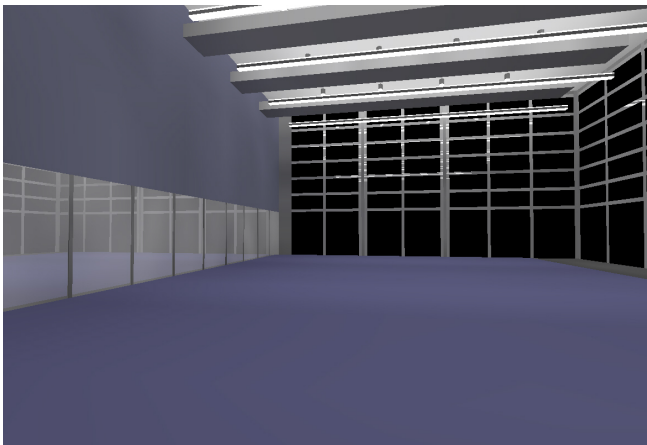


Figure 1.3 – Rendering (West)

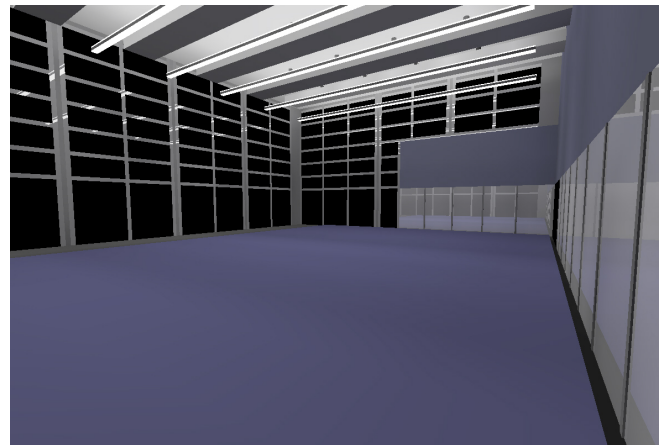


Figure 1.4 – Rendering (East)



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Daylighting Conditions

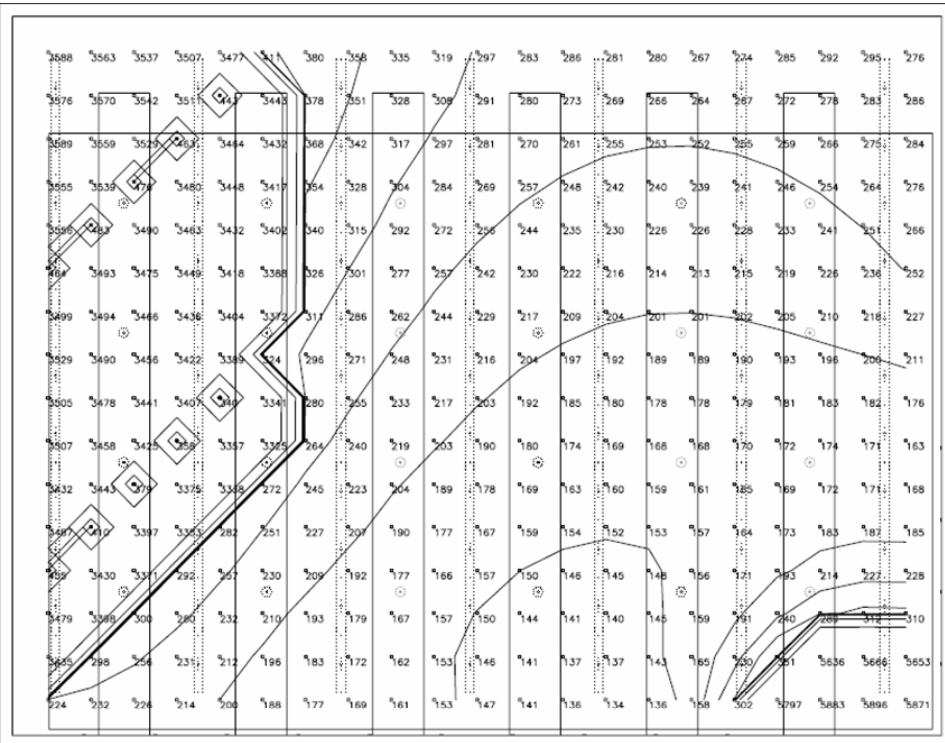


Figure 1.5 – Illuminance Values & Isocontours

Illuminance Summary:

- Average Horizontal Illuminance: 950fc
- Max/Min Ratio: 44:1
- Average Vertical Illuminance:
- Max/Min Ratio:

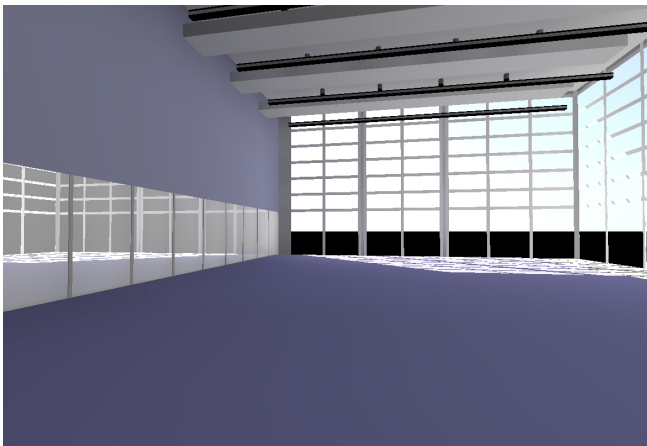


Figure 1.6 – Rendering (West)

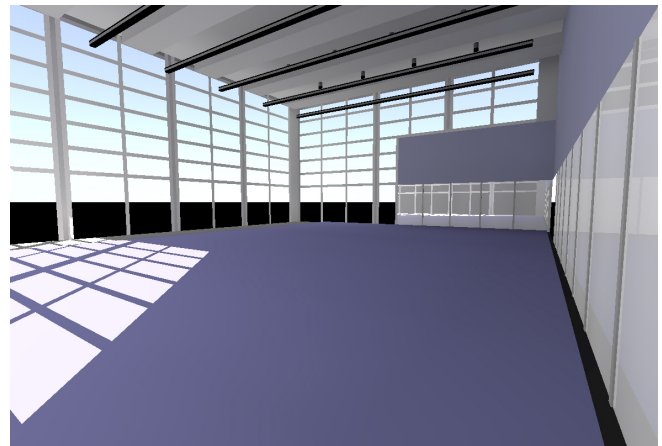


Figure 1.7 – Rendering (East)



Devin Maurizio  
Lighting Electrical Option  
R. Mistrick

11.28.2006  
Tech Report 1

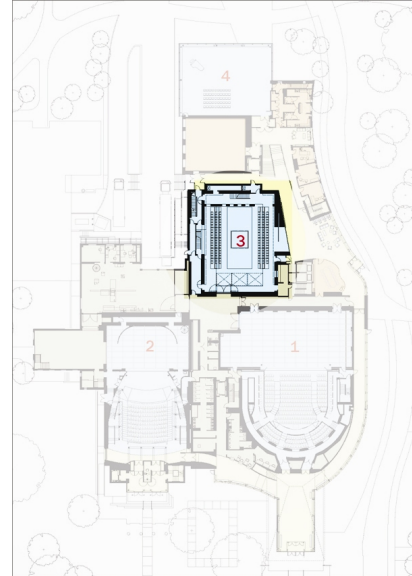
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Williamstown, MA

**Summary:**

## Space 2: Center Stage (A special purpose space)

### Existing Conditions:

*Lighting* - The Center Stage black box theatre has three distinct levels: the ground level, the balcony level, and the tech level. Each one has its own specific lighting system. On the ground level, indirect low voltage flexible xenon strip lighting illuminates the underside of the balcony level all around the perimeter. There are also industrial blue jelly jar work lights for tech safety during performances. The balcony level has the same lighting as the ground level, with jelly jars and xenon strips. The tech level has surface mounted linear fluorescent industrial strip lights and several 1000w quart work lights attached to the balcony railing to facilitate in setting up the lighting on this level for the performances below. A little higher and in the center of the space is the general lighting for the space. The linear fluorescent industrial strip lights used above the tech level are suspended from the ceiling here. Another system of theatrical lighting fixtures is also available and used extensively. A full pipe grid and balcony railings are available for attaching theatrical fixtures to for the various performances in the space.



*Controls* - Lighting control in this space is maintained through a low voltage touch panel that sends scene settings and lighting level information through a relay panel and to the lighting loads. Each work light is controlled separately through the relay.

*Space Properties* - Most of the materials in the space are steel and brick. All of the seating on the ground level is movable and can be completely removed through the use of a large hydraulic lift in the center of the room that brings the seating carts in and out of the basement of this room. There's a single large window in the space in the center of the wall on the west side of the space. There is a mechanical blackout shade for use when productions are in progress and daylighting is undesirable. Transmittance of the glass is approximately 62%. The tech level balcony is generally used for theatrical luminaire storage when not in use for a performance and is therefore generally cluttered. The floor is made of painted black wood panels, with an approximate reflectance of 7%. The painted metal throughout the space is approximately 10% reflective and has a small out of specularity to it. The brick walls in the space have an approximate reflectance value of 26%.

### Design Criteria:

*Illuminance Criteria* - Illuminance requirements for the space are 30fc horizontal and 30fc vertical. The space is a part of an educational facility and will have reading and writing tasks within the space. Please note that these criteria can only be applied to general space use. Specialized illuminance levels vary upon necessity of theatrical performance and may vary severely in both directions.

*Power Allowance* - According to the Massachusetts Energy Code 780.CMR.Chapter13, which is compliant and in excess of ASHRAE Standard 90.1-2001, using the space-by-space method, the maximum allowable power allowance for this space is  $3.3\text{w}/\text{ft}^2$  (13860w), considering the space to be a convention center exhibition space. Actual power allowance could vary since the code does not specifically list allowances for theatrical spaces.

*Aesthetic Quality* - The emphasis in the space needs to be the actors and other performers that are in the space, not the aesthetic quality of the space itself. As a viewer, walking into a space that looks “expensive” or designed with a high end feel helps to frame expectations and foreshadow that the coming performance will also be professional and high class. The psychological impact of entering that high end space creates the expectation that what is going on in the space was important enough and talented enough to warrant such an exquisite space. Luminaires should probably be hidden if possible or unobtrusive to the space.

*Direct & Reflected Glare* - Direct and reflected glare can cause significant issues for both the performers and the actors, as well as for students trying to read or write. Visual clarity in the space is important for successful theatrical productions and viewer comfort. Care should be taken to avoid these conditions.

*Uniformity* - Uniformity for general space use is important since all the seating throughout the entire space is movable and on any particular day the arrangement could be different, but the tasks may be the same. Such variability requires a degree of uniformity to secure equivalent performance levels in any occasion.

*Modeling of Faces* - Good facial modeling for theatrical performers is extremely important for maintaining visual interest and conveying appropriate messages to the viewing audience. Actors try very hard to look beautiful or ugly (depending on their character) through training in expression and use of makeup. The lighting needs to be very uniform and of high quality to allow these skills to adequately progress to the audience.

*Psychological Aspects* - Dance is generally designed to invoke emotion, whether it is a direct emotion such as anger or sorrow, or a passive emotion such as awe or excitement. While the dance itself may be capable of invoking these emotions, a well-designed lighting scheme within the space can dramatically increase these effects. Theatrical lighting concepts should probably be used in this space to provide a system that is dynamic enough for the vast differences in performances that may occur.

*System Control & Flexibility* - Theatrical performances require constantly changing lighting systems to match the breadth of work in the profession. Since this space is also used as an academic classroom, there needs to be the flexibility in the system to be used for general purposes

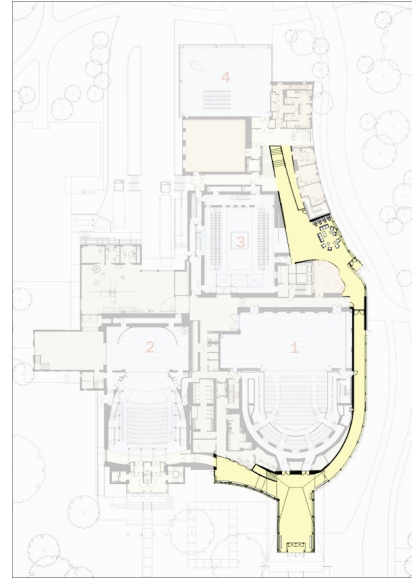
*Daylight Integration & Control* - There's one large window in the space on the west side of the room, creating a necessity for daylight controls. The early evening hours, when there are most likely a number of classes in and out of the space, will have terrible low angle sun piercing through this window. Also, since the space is used for performances, a blackout shade will be necessary to use the space during the day.

### Space 3: Lobby & Corridor (A circulation space)

#### Existing Conditions:

*Lighting* - The main lobby has two lighting systems: one for vertically illuminating the “glass box” and a second for general horizontal illumination. The corridor has a single system of compact fluorescent downlights. The center stage lobby, located in the north east corner of the building, has a series of MR16 accent lights suspended above it.

*Controls* - All of the lighting in the main lobby is connected to the building management system through dimmer panels connected to a Lutron Grafik Eye system, located on the ground floor of the lobby just inside the theatre entrance. The system consists of a Lutron dimming panel, DPA, and two programming interfaces. Corridor lighting is connected to two keyed switches located on the wall to the left of the 550 seat theatre back of house service corridor. The Center Stage breakout lobby is connected to a dimming rack through the building management system.



*Space Properties* – The lobbies and hallway are infused with constant spans of glass. Glass transmittance values throughout the buildings circulation spaces are approximately 62% and were hand measured with an illuminance meter. In the corridor to the north of the Center Stage lobby, there’s a skylight above made of fritted glass. When the wooden slats are included in this calculation, the transmittance value decreases to approximately 20%. The main lobby is primarily wood paneling with an approximate reflectance value of 45%. The hallway switches material to light grey punched metal paneling, with a reflectance value of approximately 60%. The Center Stage lobby has wood paneling, also a reflectance value of approximately 45%.

#### Design Criteria:

*Illuminance Criteria* - Illuminance requirements for the space are 10fc horizontal and 10fc vertical. In exception to this, the illuminance requirement for the center stage lobby should be increased to 30fc since it has tables and chairs that may be used for studying.

*Power Allowance* - According to the Massachusetts Energy Code 780.CMR.Chapter13, which is compliant and in excess of ASHRAE Standard 90.1-2001, using the space-by-space method, the maximum allowable power allowance is 1.2w/ft<sup>2</sup> for the lobbies and 0.7w/ft<sup>2</sup> for the transition corridors, totaling 5191w.

*Aesthetic Quality* - The appearance of the space and its luminaires are the first impression a patron has when coming to a performance and is therefore very necessary to consider. Also necessary to consider is the extensive use of wood throughout the space. Warm tones should be used to bring out the warmth of the material.

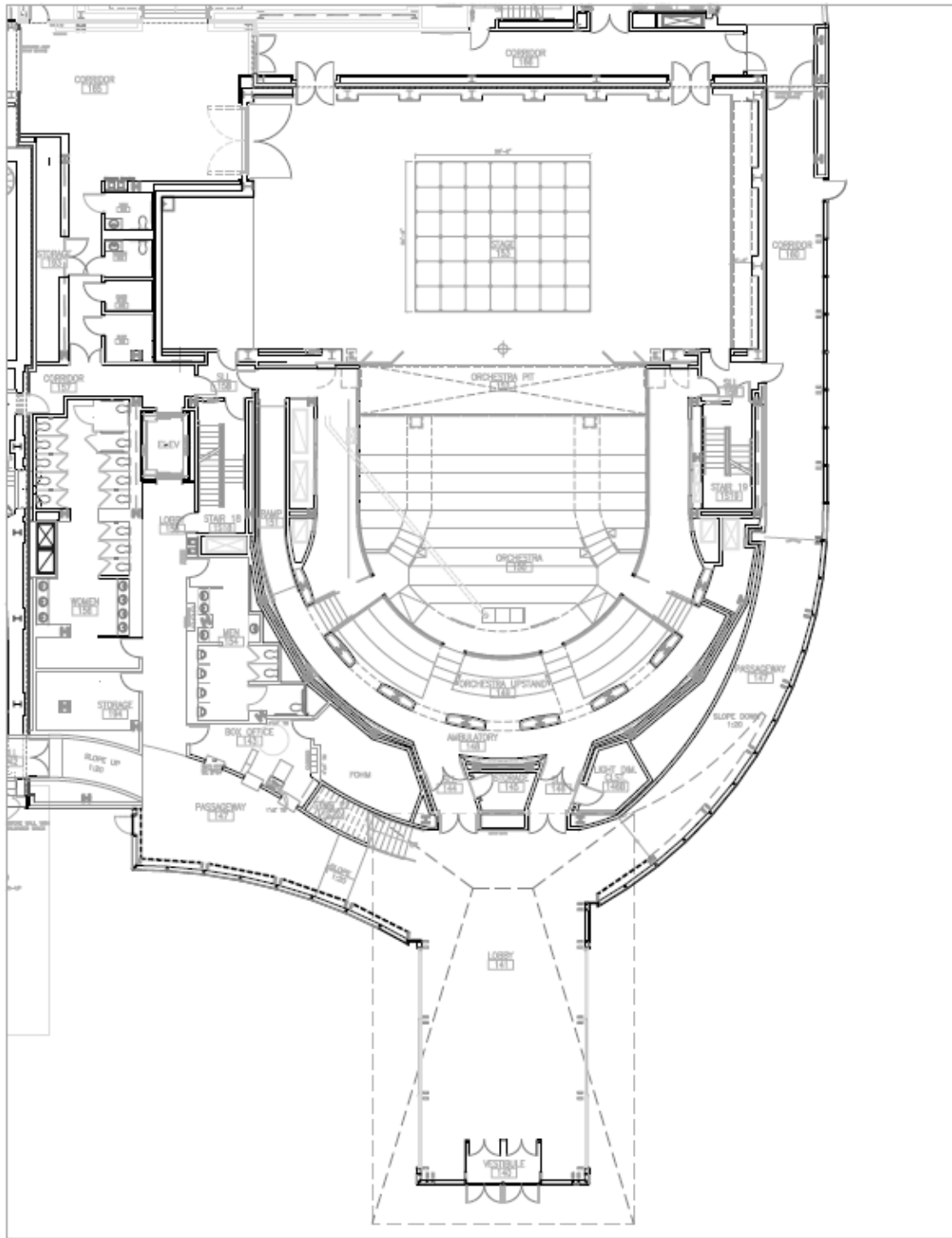
*Uniformity* - Uniformity helps to maintain a smooth journey along the corridor. A break in this uniformity at the two lobbies and the grand staircase can help to build a hierarchy of spaces.

*Modeling of Faces* - Facial modeling will be important in the lobby so that patrons will look good to each other while they are waiting for performances to start or during intermission.

*System Control & Flexibility* - Flexibility might be nice in the southern lobby to match performance mood or time of day. Since this is the main entrance to the large 550 seat theatre, this entrance can have very dynamic lighting to impress the patrons as they walk in. During normal daytime use, the space would only really need appropriate task lighting to make up for overcast days.

*Daylight Integration & Control* - There's a significant amount of daylight that penetrates into the space from the east side of the corridor, where there's a continuous strip of windows, and the skylight above the central section of the corridor. The southern entrance lobby, in particular, has all three sides made of glass. Energy savings are quite possible all throughout these spaces.

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1<sup>st</sup> Floor Plan Showing 550 Seat Theatre and Corridor

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	11.6	12.7	13.0	13.6	13.5	13.0	11.9	10.4	
■									■
	12.5	13.8	14.5	14.7	14.6	14.0	12.9	11.1	
	13.2	14.5	15.2	15.6	15.4	14.8	13.7	11.8	■
■									■
	13.6	15.0	15.8	16.2	16.1	15.5	14.4	12.7	
	14.0	15.4	16.0	16.7	16.6	16.1	15.1	13.5	■
■									■
	14.3	15.7	16.7	17.1	17.0	16.5	15.6	14.0	
	14.5	16.0	16.9	17.4	17.3	16.9	15.9	14.3	■
■									■
	14.6	16.1	17.1	17.5	17.5	17.1	16.1	14.4	
	14.7	16.2	17.2	17.6	17.6	17.2	16.2	14.5	■
■									■
	14.7	16.2	17.2	17.7	17.7	17.2	16.2	14.5	
	14.6	16.2	17.1	17.6	17.6	17.1	16.1	14.5	■
■									■
	14.5	16.1	17.0	17.5	17.5	17.0	16.0	14.4	
	14.4	15.9	16.8	17.2	17.3	16.8	15.8	14.2	■
■									■
	14.1	15.6	16.5	16.9	16.9	16.5	15.5	13.9	
	13.7	15.2	16.1	16.5	16.5	16.1	15.1	13.6	■
■									■
	13.3	14.6	15.5	15.9	15.9	15.5	14.6	13.1	

**Lobby**

	4.7	5.3	5.0	
	5.8	6.4	6.1	
	6.6	7.5	6.9	
	7.0	7.9	7.4	
		⊙		
	7.0	7.9	7.4	
	7.1	7.9	7.4	
	6.8	7.6	7.2	
	6.8	7.7	7.2	
	6.8	7.7	7.2	
	6.7	7.5	7.1	
		⊙		
	6.6	7.5	7.0	
	6.5	7.4	6.9	
		⊙		
	6.4	7.1	6.7	
	6.1	6.9	6.5	
	6.1	6.9	6.5	
		⊙		
	6.1	6.8	6.4	

**Corridor**

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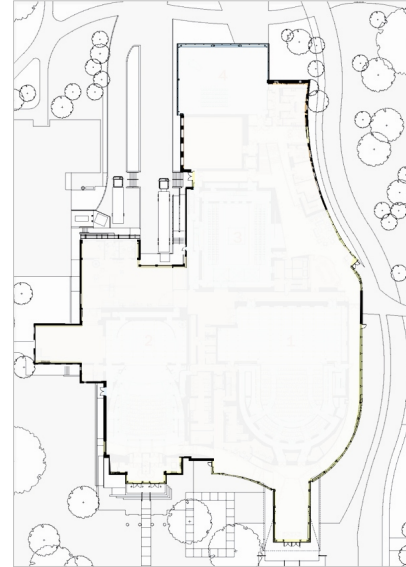
## Space 4: Building Façade (An exterior space)

### Existing Conditions:

*Lighting* - The exterior façade is not lit by electric lighting except in areas required by code for egress, such as the entry driveway, emergency lighting for the two main building entrances, and the small exterior patio on the east side of the main lobby.

*Controls* - All exterior lighting is controlled through the building automation system and photocells with low voltage control lines.

*Space Properties* - The exterior building façade is made up of 3 distinct types of materials: limestone veneer (~65%), which covers the majority of the building, glass & aluminum framed windows, and brick (~26%), which is used for the fly towers of the two main performance theatres. The one exception to this material use is the underside of the thrust roof overhang of the main lobby which is made of wood paneling (~45%).



### Design Criteria:

*Illuminance Criteria* - Illuminance suggestions for building entrances is 5fc horizontal and 3fc vertical. Since the building has dark surroundings and light colored materials, illuminance suggestions for building façade are 3fc vertical and must not interfere with pedestrian and vehicular visibility.

*Power Allowance* - According to the Massachusetts Energy Code 780.CMR.Chapter13, which is compliant and in excess of ASHRAE Standard 90.1-2001, building entrances with canopies can have a maximum power density of 3w/ft<sup>2</sup>, building entrances without canopies can have a maximum power density of 33w/lf of door, and the façade can have 0.25w/ft<sup>2</sup> of illuminated façade. Also noted here, the code requires that all exterior lights above 100w must have an efficacy of not less than 60lm/w.

*Aesthetic Quality* - The first thing a person sees when either walking or driving by is the building exterior. To draw them into the building, interesting lighting must catch their attention.

*Light Pollution/Trespass* - Williamstown, MA is in a somewhat small town rural area. Dark sky compliance in this area seems very important for maintaining the natural beauty of the night.



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**Appendix (Luminaire Schedules)**

<b>HLB LUMINAIRE SCHEDULE</b>					
Fixture Type	Lamps		Manufacturer & Catalog No.	Voltage	Mounting
	No.	Type			
HL-1	1	100A/1F	LIGHTOLIER G7057CLW/G410	120	RECESSED
HL-2	1	100W A19	LIGHTOLIER C4AWCLW/C4120	120	RECESSED
HL-3	1	Q50MR16/C/NFL25	TRANSLITE SOROMA MICROSPOT L 211-AL	120	SURFACE
HL-3A	1	Q50MR16/C/NFL25	TRANSLITE SOROMA MICROSPOT L 211-AL	120	SURFACE
HL-4	-	5 WATT XENON	STARFIRE LIGHTING XF-3-5-72"-24v WITH XF-ASW REFLECTOR	120	SURFACE
HL-4A	-	5 WATT XENON	STARFIRE LIGHTING XF-3-5-84"-24v WITH XF-ASW REFLECTOR	120	SURFACE
HL-4B	-	5 WATT XENON	STARFIRE LIGHTING XF-3-5-96"-24v WITH XF-ASW REFLECTOR	120	SURFACE
HL-4C	-	5 WATT XENON	STARFIRE LIGHTING XF-3-5-120"-24v WITH XF-ASW REFLECTOR	120	SURFACE
HL-4D	-	5 WATT XENON	STARFIRE LIGHTING XF-3-5-144"-24v WITH XF-ASW REFLECTOR	120	SURFACE
HL-5	2	Q500PAR56MFL	KIRLIN SR31245-38-99-WB-MOD	120	WALL
HL-6	1	PLT-26W/830/4P/ALTO	LIGHTOLIER 8021 CCLW/6132BU	277	RECESSED
HL-7			Not Used		
HL-8	1	PLT-42W/830/4P/ALTO	LIGHTOLIER 8022 CCLW/7142BU	277	RECESSED
HL-9	1	50PAR20/H/SP10	STONCO 30KL	120	SURFACE
HL-10	1	Q350T3/CL/HIR	STONCO CPH515L	120	SURFACE
HL-11	3	F32T8/TL835	LINEAR LIGHTING CD27P-1-3-ET8-277-PRD-C-24-BW-ED-12	277	PENDANT
HL-11A	3	F32T8/TL835	LINEAR LIGHTING CD27P-1-3-ET8-277-PRD-C-24-BW-ED-8	277	PENDANT
HL-12	1	PLT-42W/830/4P/ALTO	DELRAY LIGHTING 2072SO-32-277-E	277	PENDANT
HL-13	-		Not Used		
HL-13A	-		Not Used		
HL-13B	1	F54T5/830/HO	LIGHTOLIER 8269WH	277	SUSPENDED
HL-14	3	90WPAR38/HAL/WFL/60/WLL	RSA COMBO - MODIFIED FOR WALL MOUNT	120	WALL
HL-15	1	90PAR38/H/FL25	LIGHTOLIER 8747WH/6196WH C-CLAMP MONOPOINT	120	SURFACE
HL-16	1	Q350T3/CL/HIR	INSIGHT LIGHTING TM501-RCB-1-1-CC-SS-MOD	120	WALL
HL-17	1	90PAR38/H/FL25	LIGHTOLIER 7026AD/7249	120	WALL
HL-18	2	Q500PAR56MFL	KIRLIN SR 31245-38-99-___	120	SURFACE
HL-19	-		Not Used		
HL-20	1	PLT-42W/830/4P/ALTO	LIGHTOLIER 8022WW CCLW/7142BU	277	RECESSED
HL-21	1	PLT-26W/830/4P/ALTO	LIGHTOLIER 8046 CCLW/61322BU	277	RECESSED
HL-22	1	90WPAR38/HAL/WFL/60/WLL	LIGHTOLIER C6P38A/C6D120	120	RECESSED
HL-23	1	CDM35/T6/U/830/G12	INSIGHT LIGHTING TM517-WCB-1-1-N-SS	120	WALL
HL-24	1	100A/1F	SPERO VX215-41-G	120	SURFACE
HL-25	1	22 WATT T5 R	WILA 202-70-SA-OR/10-120	120	SURFACE

<b>THEATRE LUMINAIRE SCHEDULE</b>					
Fixture Type	Lamps		Manufacturer & Catalog No.	Voltage	Mounting
	No.	Type			
BL	1	40W19/F	BEGA 2226P-MOD-INC		SURFACE
FL1	1	F32T8/TL835	COLUMBIA CS4-132-EB8-120-CSWG4	120	CEILING SURFACE
FL2	1	F32T8/TL835	COLUMBIA CS4-132-EB8-120-CSWG4	120	SUSPENDED
FL3	2	F32T8/TL835	COLUMBIA WC4-232-EB8-120	120	SURFACE
WL	1	1000T 3Q/P/CL	HUBBELL QL-1505		CATWALK RAIL

Williams College '62 Center For Theater & Dance  
Williamstown, MA

ELECTRICAL ENGINEER LUMINAIRE SCHEDULE					
Fixture Type	Lamps		Manufacturer & Catalog No.	Voltage	Mounting
	No.	Type			
C1	1	500 T3Q/P/CL	STONCO CPH515		SURFACE
C2	1	50MR16/VWFL/60(FNV)	BK LIGHTING NS-9-BZP-9-11 TRANSFORMER CUS-1826-02-BZP TREE STRAP TS-TMC-BZP-6"		SURFACE
EC1	-	LED	DUAL LITE LESCS-G-(X/R/L/D/C)A		CEILING SURFACE
EC2	-	LED	DUAL LITE LESCS-G-(X/R/L/D/C)A		CEILING SURFACE
EC3	-	LED	DUAL LITE LESCS-G-(X/R/L/D/C)A		CEILING SURFACE
EC4	-	LED	DUAL LITE SEGWIN		CEILING SURFACE
EW1	-	LED	DUAL LITE LESCS-G-(X/R/L/D/C)A		WALL SURFACE
EW2	-	LED	DUAL LITE LESCS-G-(X/R/L/D/C)A		WALL SURFACE
EW3	-	LED	DUAL LITE SEGWIN		WALL SURFACE
EW4	2	FURNISHED WITH LAMP	DUAL LITE EZ-2		WALL
FC1	4	F32T8/TL835	COLUMBIA CSR8-232-EB8LH-277-CSWG4	277	CEILING SURFACE
FC1A	2	F32T8/TL835	COLUMBIA CSR4-232-EB8LH-277-CSWG4	277	CEILING SURFACE
FC1B	1	F17T8/TL835	COLUMBIA CH2-117-EB8LH-277	277	CEILING SURFACE
FC2	4	F32T8/TL835	COLUMBIA CS8-232-EB8LH-277-CSWG4	277	CEILING SURFACE
FC3	2	F32T8/TL835	COLUMBIA WC4-232-EB8-277	277	CEILING SURFACE
FC4	2	F32T8/TL835	COLUMBIA CS4-232-EB8LH-277-CSWG4	277	CEILING SURFACE
FC5	2	F32T8/TL835	COLUMBIA CS4-232-EB8-277-CSWG4	277	CEILING SURFACE
FC6	4	F32T8/TL835	COLUMBIA CS8-232-EB8LH-277	277	CEILING SURFACE
FC7	1	PLC-26W/38	CANLET BFCF26H1-GHC-277	277	CEILING
FC8	1	FC12T9/CWHL	LITHONIA 10991-277	277	CEILING SURFACE
FC9	2	F32T8/TL835	COLUMBIA STR24-232G-MPO-EB8LH-277	277	CEILING SURFACE
FR1	2	F32T8/TL835	COLUMBIA 4PS24-232G-FSA12.125-EB8LH-277	277	RECESSED
FR1A	2	FB32T8/TL835/6	COLUMBIA 4PS22-232U6G-FSA12.125-EB8LH-277	277	RECESSED
FR2	2	F32T8/TL835	COLUMBIA HC24-232G-LD29-S-EB8LH-277	277	RECESSED
FR2A	2	FB32T8/TL835/6	COLUMBIA HC22-232U6G-LD34-S-EB8LH-277	277	RECESSED
FR2B	3	FT40W/2G11/RS/35	COLUMBIA HC22-40TT-G-LD34-S-EB8LH-277	277	RECESSED
FR3	1	PLC-26W/35	PRESCOLITE CFT832-HEB-ST-F802H		RECESSED
FR4	2	F32T8/TL835	COLUMBIA STR24-232G-MPO-EB8LH-277	277	RECESSED
FR5	3	F32T8/TL835	COLUMBIA 4PS24-332G-FSA12.125-EB8LH-277	277	RECESSED
FR6	3	F32T8/TL835	COLUMBIA HC24-332G-LD39-S-EB8LH-277	277	RECESSED
FR7	2	F32T8/TL835	COLUMBIA HC24-232F-LD29-S-EB8LH-277	277	RECESSED
FR8	1	PLC-26W/35	PRESCOLITE CFT832-HEB-ST1P-B6-277	277	RECESSED
FS1	4	F32T8/TL835	COLUMBIA CSR8-232-EB8LH-277-CSWG4	277	SUSPENDED
FS1A	2	F32T8/TL835	COLUMBIA CSR4-232-EB8LH-277-CSWG4	277	SUSPENDED
FS2	2	F32T8/TL835	COLUMBIA CS4-232-EB8-277-CSWG4	277	SUSPENDED
FS3	4	F32T8/TL835	LINEAR LIGHTING CD27P-B-2-ET8-277-PRD-24-BW-8'	277	SUSPENDED
FS3A	2	F32T8/TL835	LINEAR LIGHTING CD27P-B-2-ET8-277-PRD-24-BW-4'	277	SUSPENDED
FS4	2	F32T8/TL835	COLUMBIA WC 4-232-EB8-277	277	SUSPENDED
FW1	4	F32T8/TL835	COLUMBIA F4-2DT8-WM-LD-EB8LH-277-8-SGL	277	WALL SURFACE
FW1A	2	F25T8/TL835	COLUMBIA F4-2DT8-WM-LD-EB8LH-277-MW-6-SGL	277	WALL SURFACE
FW1B	2	F32T8/TL835	COLUMBIA F4-2DT8-WM-LD-EB8LH-277-MW-4-SGL	277	WALL SURFACE
FW1C	1	F17T8/TL835	COLUMBIA F4-1DT8-WM-LD-EB8LH-277-MW-2-SGL	277	WALL SURFACE
FW2	4	F32T8/TL835	COLUMBIA WAL 8-232-EB8LH-277	277	WALL SURFACE
FW2A	2	F32T8/TL835	COLUMBIA WAL 4-232-EB8LH-277	277	WALL SURFACE
FW3	1	PLC-26W/35	CANLET BFWF26H1D-GHC-277	277	WALL SURFACE
FW4	2	F32T8/TL835	COLUMBIA CS4-232-EB8-277-CSWG4	277	WALL SURFACE
FW5	1	FC12T9/CWHL	LITHONIA 10991-277	277	WALL SURFACE
FW6	1	PLC-26W/35	CANLET BFWF26H1D-GHC-120	120	WALL SURFACE
FW7	1	PLS-13W/35	BEGA 2294P-277	277	WALL
MC1	1	MH175/U/M	SPAULDING PDI-M175PS-MT-Q2-SGB		CEILING SURFACE
MS1	1/1	MS320/PS/BU-ONLY 250Q/CL/MC	HUBBELL BL320 W8 HG16 WH-QST		SUSPENDED
MS2	1	CDM150/TD/830	HUBBELL BL150 W8 HG16 WH-WG16		SUSPENDED

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<b>ELECTRICAL ENGINEER LUMINAIRE SCHEDULE (cont.)</b>					
Fixture Type	Lamps		Manufacturer & Catalog No.	Voltage	Mounting
	No.	Type			
MS2A	1/1	CDM150/TD/830 250G/CL/MC	HUBBELL BL150 W8 HG16 WH WG16-QST		SUSPENDED
P1	1	MH175/C/U/MED ED-17	SPRING CITY WILLIAM & MARY EFED-H-3-CO SPRING CITY HARRISBURG/BALTIMORE 10'-11 1/2" POST HT		POLE
R1	1	150PAR38/2FL	EDISON PRICE DL38/45/5AA		RECESSED
R2	1	150PAR38/2FL	EDISON PRICE DL38/6/COL		RECESSED
R3	1	20W MC	BEGA 2908-120V	120	RECESSED
R4	1	150PAR38FL	EDISON PRICE DL38/5 COL		RECESSED
S1	1	75WPAR30	LIGHTILIER 8202/8235WH-6190WH-120	120	SUSPENDED
S2	1	150PAR38FL	PRESCOLITE 1125-976		SUSPENDED
T1	-	75WPAR16	PRESCOLITE TV141 WH PRESCOLITE TS4-WH TRACK		TRACK
W1	1	60W G25	COLE LIGHTING VS-6"-WG		WALL SURFACE