

Main Entrance Lobby

Overview:

The Main Entrance Lobby provides the entrance to the home of the occupants of the Franklin Care Center. Entrance to the building is provided by a revolving glass door, which leads to a reception area. Once you enter the lobby, the main staircase will be on your left hand side, and elevators straight ahead. The main entrance also includes a visitor's lounge where visitors can sit and read while waiting to see a patient.

Design Criteria

Main Goal: To combine daylight and energy efficient electric light to create a welcoming entrance to the Franklin Care Center that also serves as a transition space allowing for adjustment of the elderly' eyes.

Very Important Design Factors:

Appearance (Typically Important):

Although appearance is typically considered an important factor for the lighting design of the entrance to a health care facility, I believe that appearance is a very important design factor for the Franklin Care Center. The main lobby serves as the entrance to the home of the residents of the Center, and therefore should appear inviting and impressive. It is very important for the main entrance to portray a welcoming feeling rather than an institutional one. Part of the space is open to the second floor with a vaulted wood slot ceiling. This architecture of the space should be enhanced through the lighting of the lobby.

Daylighting Integration and Control:

Daylight is particularly important to the entrance of an elderly care center. As the eye ages it has a more difficult time adjusting to different light levels. So an elderly person may have difficulty entering a dark lobby from the bright outdoors. Instead, the lobby must be used as a transition space. Integrated daylight is the easiest way to balance the light levels inside the lobby with the light levels outside. Integrating daylight into the lobby can also save energy. The lobby is a large space that daylight can penetrate far into. The open space with vaulted ceiling will also allow daylight to enter the second floor lobby and corridor lowering the demand for electric light.

Horizontal Illuminance:

The illuminance in the lobby must be flexible to allow for the adjustment of occupant's eyes as they enter from the outdoors. During the day the horizontal illuminance of the main entrance should be 100fc. This is much higher than a typical

lobby because it takes into account the slower adjustment of elderly people's eyes. At night the horizontal illuminance should be only 10 fc to match the low illuminance levels outdoors.

The reception area requires an illuminance of 30fc on the workplane to allow for administrative tasks and VDT use.

The visitor lounge should have a horizontal illuminance of 30fc at the workplane to allow for reading tasks.

Vertical Illuminance:

To provide good facial rendering, the vertical illuminance for the lobby and waiting area should be a minimum of 5fc.

Luminance of room surfaces:

Since the lobby will be used as a transition space from the bright outdoors into the building, the surfaces should be light to create a bright atmosphere.

Facial Modeling:

The main entrance is a very social space where people will be constantly interacting. Special attention should be given to facial modeling. The use of daylight and indirect lighting techniques should be used to create good facial modeling.

Color Contrast:

Since aesthetics are important to the entry space, so is the color contrast. A good CRI lamp should be used to get true color, and enhance the materials of the space.

Light distribution on surfaces:

Light should be uniformly distributed on surfaces. Patterns, or contrast changes can be extremely distracting to the elderly. In the lobby contrast can be used to orient occupants, but should not be present unnecessarily.

Important Design Criteria:

Glare:

Direct glare should be avoided in the lobby since it can be distracting. Lighting in the lobby should be used to enhance the architecture, and glare would take away from that goal.

Source/Task/Eye geometry:

Source/task/eye geometry is more important in the visitors lounge and reception than in the main lobby area. Task lighting should be provided for a VDT at the reception desk, and adequate lighting should be provided for reading in the visitors lounge.

ASHRAE 90.1 Power Density: Using the space by space power density method, a lobby should have a maximum power density of 1.3 W/sqft.

Design Concept

Since the lobby is a transition space from outside to indoors it should be brighter during the daytime and dimmer at night. The architectural design of the lobby allows for this to happen naturally through the use of daylight. The east facing façade of the lobby is a glass curtain wall, so when it is light outside the daylight will penetrate into the lobby and make it a comfortable transition space. The electric lighting in the lobby was designed for night time, and dimmed when appropriate during the day based on daylight conditions.

The goal of the lighting design for the lobby is to enhance the architecture of the space and create a residential atmosphere. The main architectural feature of the lobby is a grand vaulted wood ceiling; this needed to be emphasized in the lighting design. In order to enhance the beauty of the wood, the ceiling was illuminated from the higher side using a row of metal halide fixtures. Metal halide was chosen as the source because fluorescent luminaires did not provide enough illumination on the wood to reflect adequate light down towards the floor. The row of metal halide fixtures was concealed in a cove to preserve the clean architecture of the space. Even using the metal halide luminaires, uplighting the wood ceiling did not provide the recommended 10fc in the lobby corridors on the floor. To provide additional illumination decorative bowl pendants were chosen. These pendants increase the floor illumination to an adequate level while creating a residential atmosphere in the lobby. Safety on the stairs was an additional concern in the lobby since these stairs will be used by residents as well as guests. To provide increased illumination on each stair a step light was placed just above each tread on both sides of the step. This fixture will supply extra light on the tread, and provided contrast between each tread and each riser. To increase illumination levels in the receptionist area linear indirect pendants were chosen. In addition to these the receptionist has a task light at her desk that she can use when she feels it is necessary.

In the visitors area glare free lighting was chosen to make the space more comfortable. Decorative louvered downlights were chosen for general illumination. The louvered design of these fixtures reduces glare, making a more comfortable environment for the elderly. Matching sconces using the same glare free louvered design were also used to mark the elevators in the lobby. Table and floor lamps provide additional illumination for reading in the visitor's area as well as continued the residential atmosphere. Art work on the wall was illuminated by halogen lamps

Finishes



Wood ceiling
Wood ceiling
P=29%



Walls: Peach
P=75%



Floor: White
Marble
P=76%

Equipment Luminaire Schedule

Fixture	Description	Fixture	Lamp	Lamp	Ballast	Ballast	Lamps	Fixture			
Label		Cat No.	#	Type	Cat. No.	CRI	CCT	Type	Cat. No.	per ballast	Quantity
F1	Wall mounted metal halide uplight	P2-LS-M150-LS1-SGW	1	ED 17	MCG150/U/M3K ALTO	85	3000	Electronic	Advanced Transformer 71A5437BP	1	19
F2	Compact fluorescent decorative pendant	American Glass Light 6118-U	2	Quad	CFQ18W/G24Q/830	82	3000	DALI dimming	Sylvania QTP2x18CF/UNV DALI	2	8
F4	Surface mounted decorative downlight	Magic-1/32W/CF GX24Q3 277 GLASS	2	Triple Tube	CFTR32W/G24Q/830	82	3000	DALI dimming	Sylvania QTP2x32CF/UNV DALI	2	4
F5	Incandescent table lamp	Louis Poulsen PH4 1/2-T-1/100W/A19/IF MED/120 GLASS	1	A19	100A/CL/DL/RP	100	n/a	n/a	n/a	n/a	1
F5a	Incandescent floor lamp	Louis Poulsen PH4 1/2-F-1/100W/A19/IF MED/120 GLASS	1	A19	100A/CL/DL/RP	100	n/a	n/a	n/a	n/a	1
F6	Recessed wall mounted LED steplight	Erco 33730.000	1	LED	n/a	n/a	n/a	n/a	n/a	n/a	48
F8	Wall mounted compact fluorescent decorative sconce	OSW-1/18W/CF GX24Q-3/4-277-WHT	1	Quad	CFQ18W/G24Q/830	82	3000	DALI dimming	Sylvania QTP2x18CF/UNV DALI	2	2
F12	Recessed halogen accent light	Lucifer DL2G	1	MR16	20MR16/T/NSP10	100	n/a	n/a	n/a	n/a	2
F17	Suspended indirect fluorescent pendant	Lightolier 48228ALU	2	T5	FP28/830/ECO	82	3000	DALI dimming	Sylvania QTP2x28T5/UNV DALI	2	3
F18	Desk task light	Erco 33170.000	1	Capsul	50T4Q/CL/AX	100	n/a	n/a	n/a	n/a	1

Visible Luminaires



F2



F4



F5



F5a



F6



F8



F17



F18

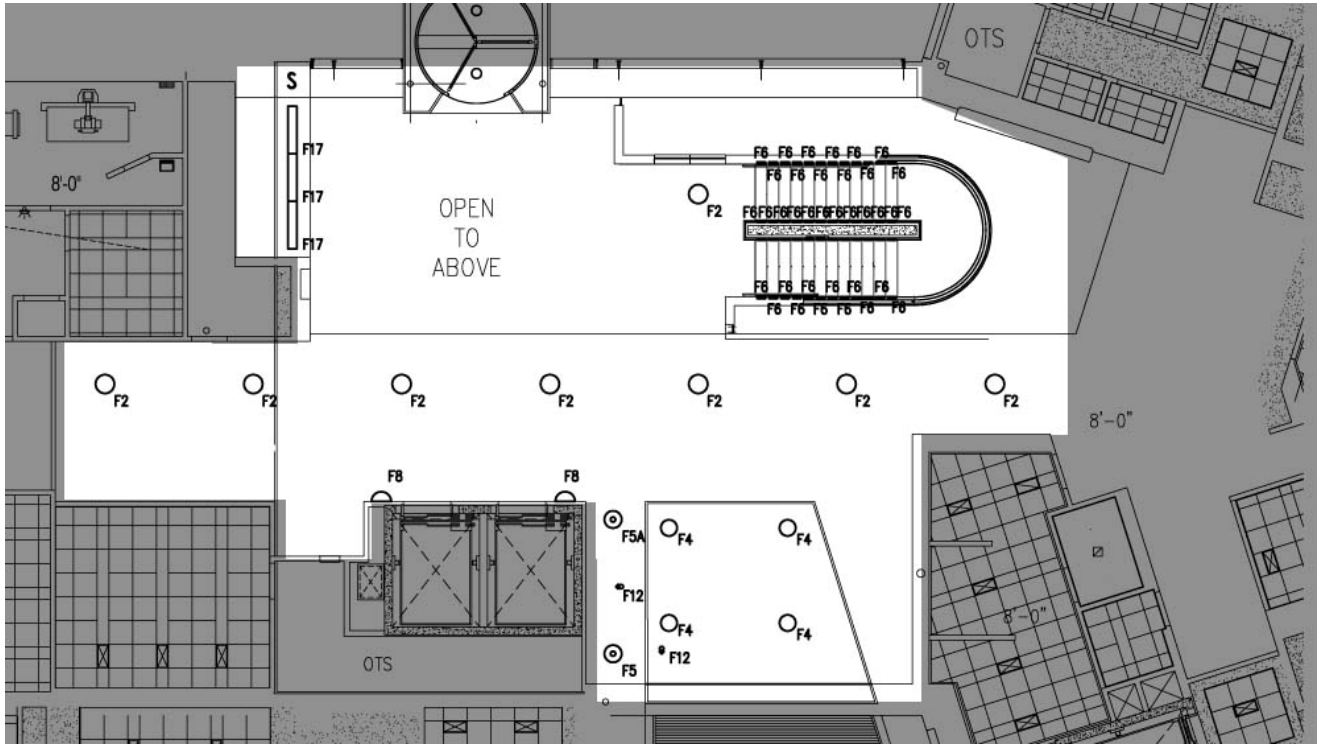
Light Loss Factors

Luminaire Label	Maintenance Category	Cleaning Interval	Initial Lumens per Luminaire	Mean Lumens per Luminaire	LLD	LDD	RSDD	BF	Total LLF
F1	VI	Clean - 12 months	14000	10500	0.75	0.88	0.98	1	0.65
F2	V	Clean - 12 months	2300	2150	0.934783	0.89	0.98	1	0.82
F3	II	Clean - 12 months	4800	4128	0.86	0.94	0.98	1	0.79
F4	II	Clean - 12 months	4800	4128	0.86	0.94	0.98	1	0.79
F5/F5a	III	Clean - 12 months	1550	1472.5	0.95	0.9	0.96	1	0.82
F6	VI	Clean - 12 months	-	-	1.00	0.88	0.98	1	0.86
F8	II	Clean - 12 months	1150	1075	0.93	0.94	0.98	1	0.86
F11	III	Clean - 12 months	320	304	0.95	0.9	0.96	1	0.82
F17	II	Clean - 12 months	2900	2697	0.93	0.94	0.98	1	0.86
F18	III	Clean - 12 months	910	864.5	0.95	0.9	0.96	1	0.82

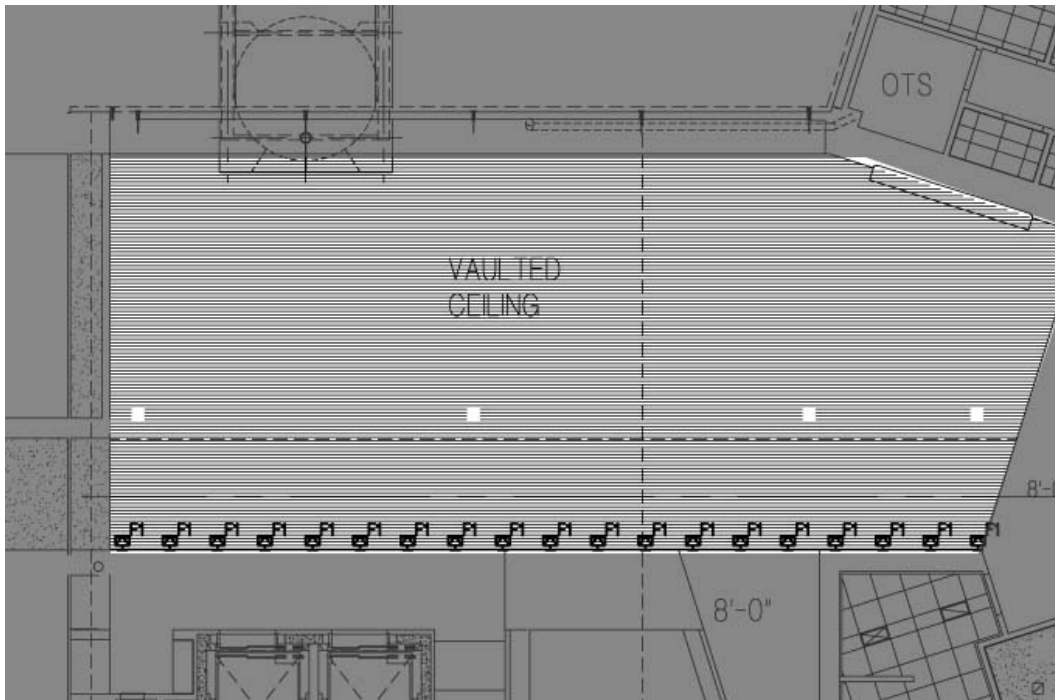
DALI Equipment

	Description	Cat. No.	Quantity
Power Supply	Wattstopper ezDALI Power Supply	DPS150-2	1
Wall Control	Wattstopper ezDALI Group and Scene Control	DLCSS4-2	1
Photosensor	Wattstopper Photosensor	LS-301	2

Luminaire Layout



First Floor



Second Floor Note: 2nd floor lobby lighting not in scope

Control Zones

Fluorescent and compact fluorescent lighting in the lobby will be controlled by a Wattstopper ezDALI group controller. This wall box controller allows each DALI group to be dimmed individually. In addition to the group controller there will be a relay module that will control the halogen accent fixtures that illuminate artwork in the visitors lounge. Whenever the downlights in the visitor's area (DALI group 3 as shown below) are on, the relay module will turn on the accent lights.

Three photosensors will help integrate the electric light with daylight. A daylighting study was conducted to determine the amount of light that would enter the lobby during different seasons. The conditions studied were as follows:

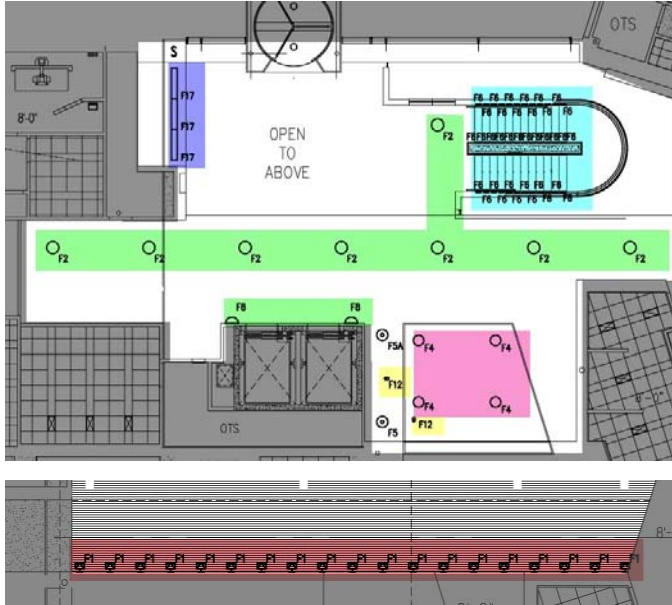
Date	Sky condition	Time
21-Mar	Clear sky	10am, 12pm, 2pm, 4pm
	Overcast sky	10am, 12pm, 2pm, 4pm
21-Jun	Clear sky	10am, 12pm, 2pm, 4pm
	Overcast sky	10am, 12pm, 2pm, 4pm
21-Dec	Clear sky	10am, 12pm, 2pm, 4pm
	Overcast sky	10am, 12pm, 2pm, 4pm

The results of this study showed a large variation in the amount of daylight entering the lobby. This led to the selection of photosensors to control the fluorescent lighting in the main lobby and visitor's lounge. On a clear day in March or June very little if any of the fluorescent lighting is needed. However on December 21 with an overcast sky the least amount of daylight enters the lobby and these fixtures can only be dimmed between 80% and 90% of their full output. A photosensor will work best to control the fluorescent fixtures to the appropriate dimming level. The metal halide uplights (F1) were found to be unnecessary under any of the studied conditions. These fixtures will be put on a timer so that they turn off at 9:30am and turn back on at 4:30pm each day. Switching these fixtures off for seven hours each day will conserve a decent amount of energy.

Location Critical Points

The critical points were chosen based on the values obtained from the daylighting study. Each point was chosen because it was a consistently low value based on daylight alone and not too close to the corner of the room.

DALI Control Groups



Dali Group 1	F2 CFL Pendants and F8 CFL Sconces
Dali Group 2	F17 Fluorescent Pendants
Dali Group 3	F4 Downlights
Relay Module 1	F 11 Halogen Accent
Control Group 5	F1 Metal Halide Uplights

*F5 and F5a are controlled by switches on the fixtures

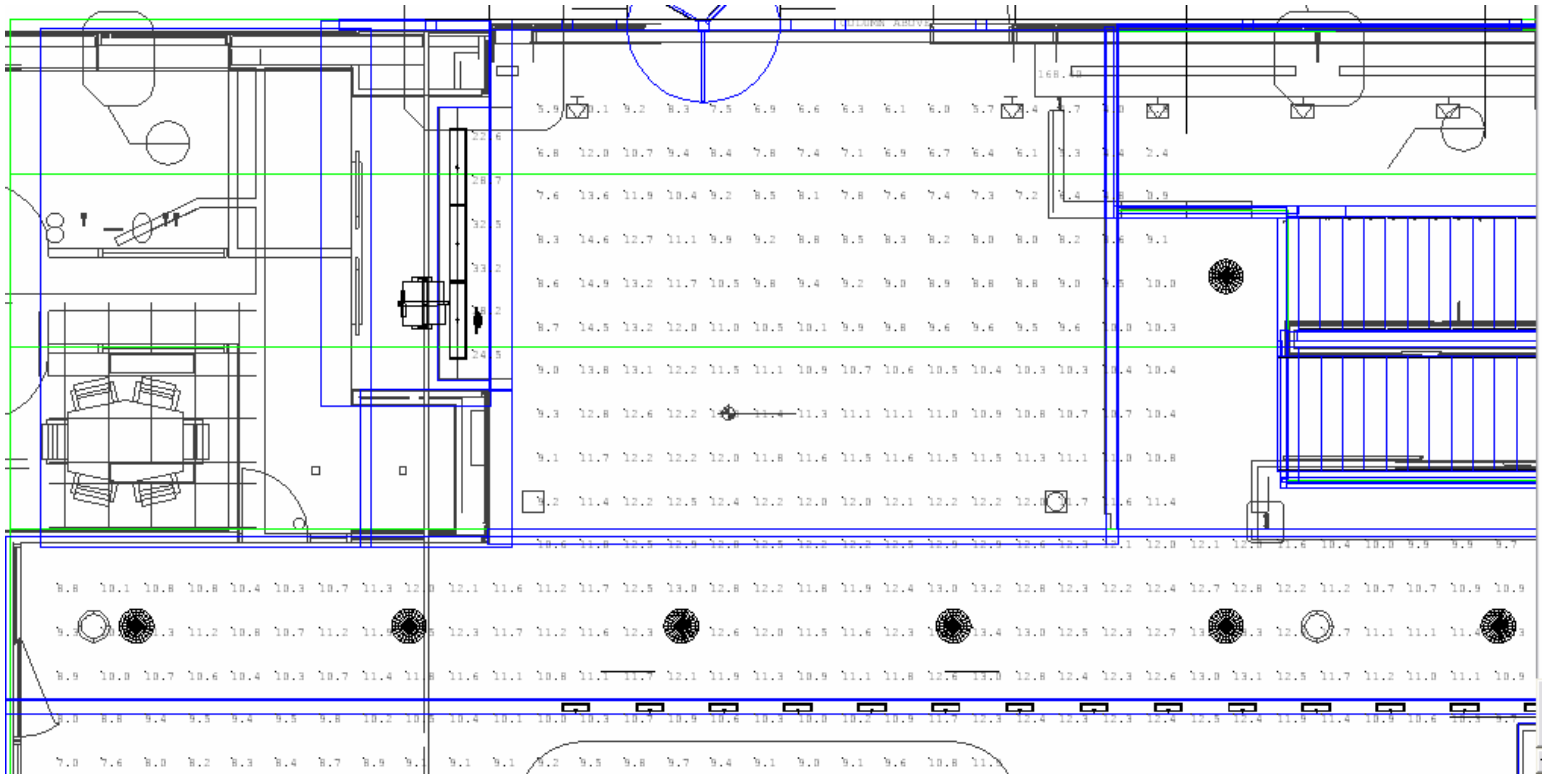
DALI Settings

Dali Group 1	Photosensor 1 Control - maintain 10fc at critical point
Dali Group 2	Controlled by wallbox group controller
Dali Group 3	Photosensor 2 Control - maintain 30fc at critical point
Relay Module 1	On when Dali Group 3 is on, off when Dali Group 3 is off
Control Group 5	Timer - off 9am - 5pm
LED steplights	Remain on at all times

Circuiting

Luminaire	input watts	# used	volts	amps per ballast	total VA load
F1	173	19	277	n/a	3287
F2	40	8	277	0.33	731.28
F4	70	4	277	0.6	664.8
F5	100	1	120	n/a	100
F5a	100	1	120	n/a	100
F6	2.6	48	277	n/a	124.8
F8	40	1	277	0.33	91.41
F12	20	2	120	n/a	40
F17	64	3	277	0.31	257.61
F18	50	1	120	n/a	50
Power supply	1.5	1	277	n/a	1.5
TOTAL VA					5448.4

Circuit	Load (VA)	Wire Size	Conduit	Breaker Size
L-1	4018.28	2#12 AGW, 1#12 GRD	3/4"	20A
L-2	1015.32	2#12 AGW, 1#12 GRD	3/4"	20A
L-3	290	2#12 AGW, 1#12 GRD	3/4"	20A



Illuminance Values of Reception area and Lobby floor

Lobby floor

Goal: 10fc

Achieved: 10.36fc

Reception Desk

Goal: 30fc without task light

Achieved: 28.28

*adjustable task light on desk

for when necessary

Visitor's Lounge at 2.5'

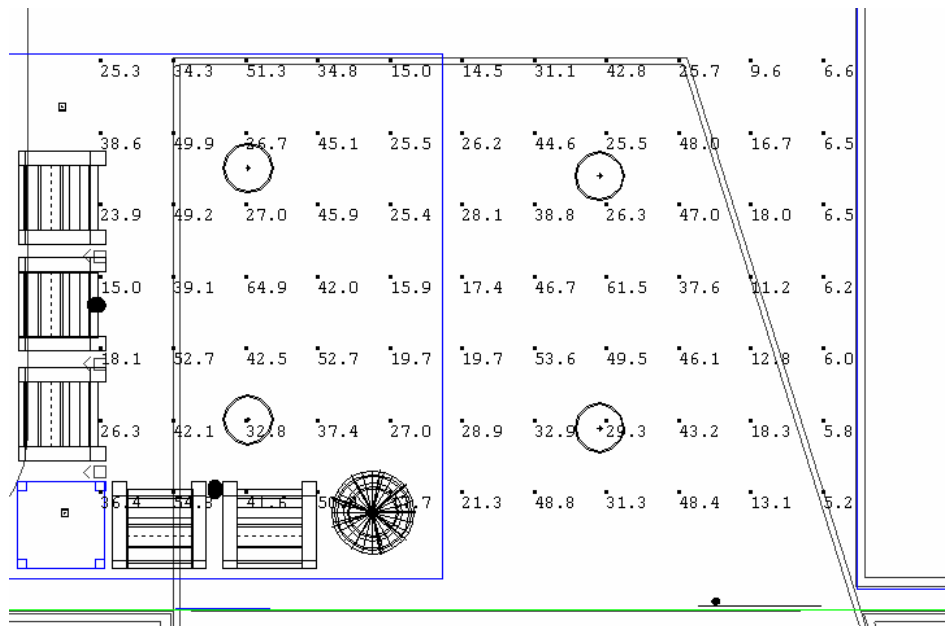
Goal: 30fc

Achieved: 31.23fc

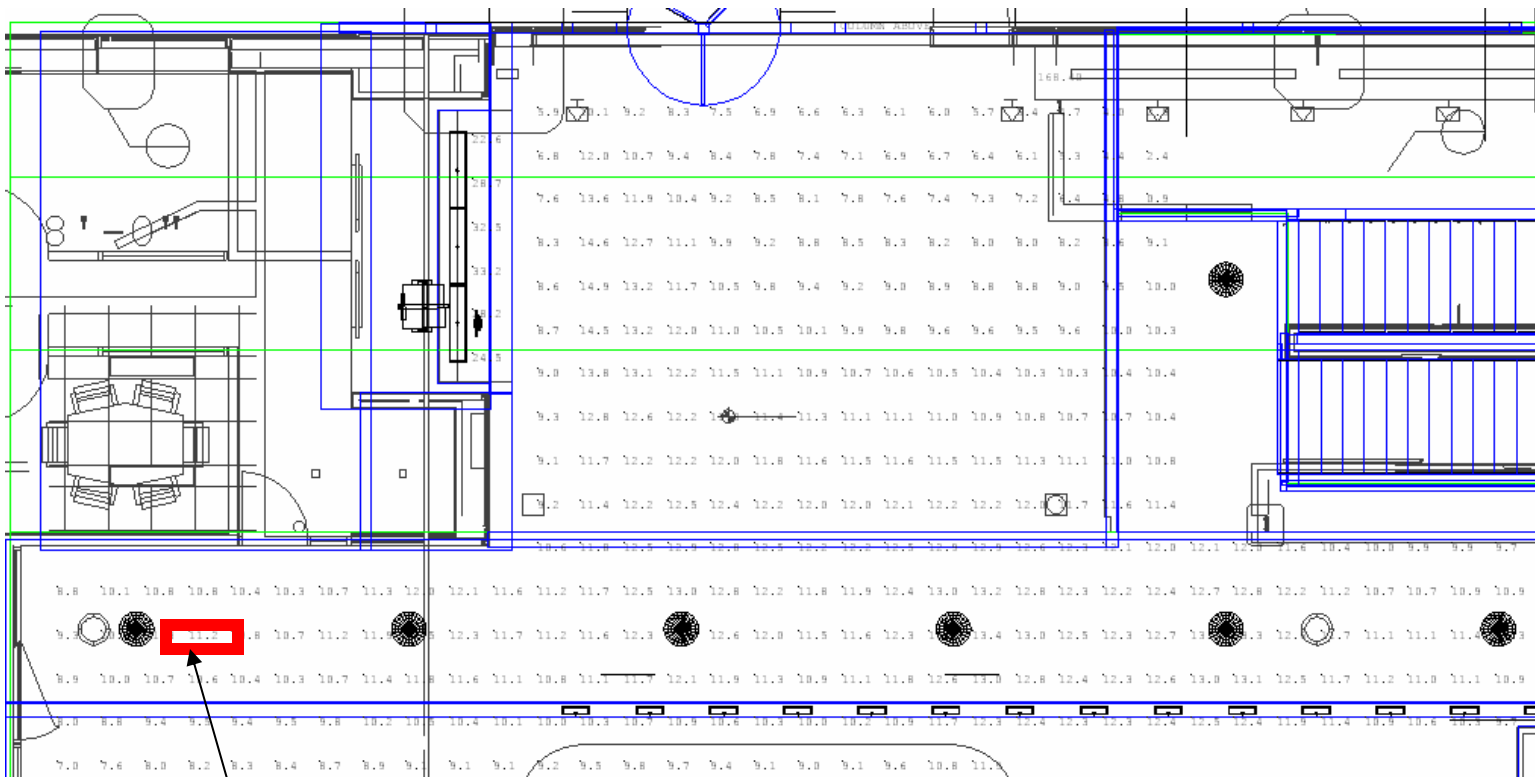
Stairs

Goal: 10fc

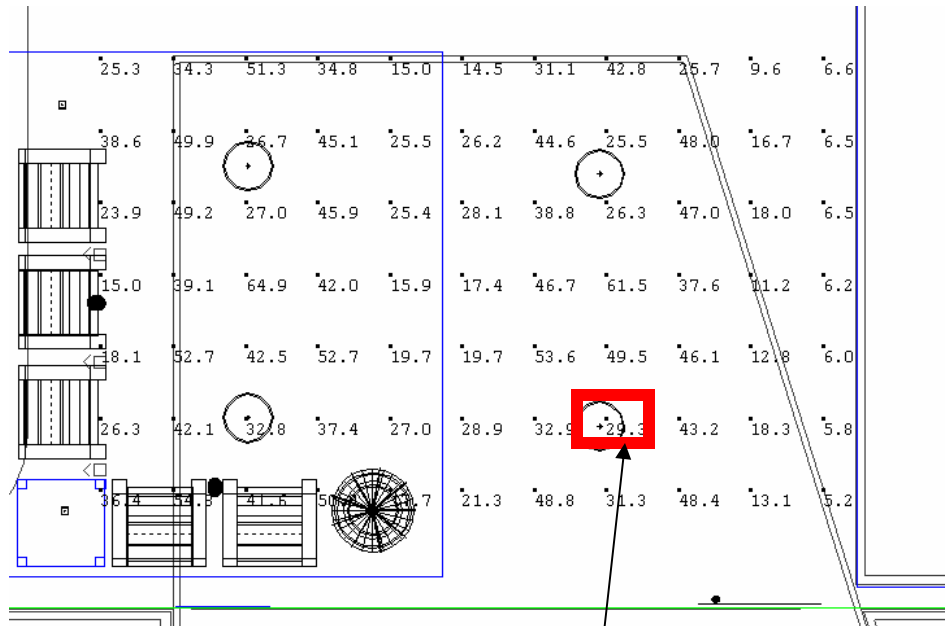
Achieved: 11fc



Visitors area illuminance Values at 2.5'



Photosensor 1 critical point
 Goal Illuminance = 10fc



Photosensor 2 critical point
 Goal Illuminance = 29.3fc

Power Density

Fixture Label	Description	Lamp #	Lamp Type	Ballast Type	Lamps per ballast	Fixture Quantity	Ballast Watts	power
F1	Wall mounted metal halide uplight	1	ED 17	Electronic	1	19	173	3287
F2	Compact fluorescent decorative pendant	2	Quad	DALI dimming	2	8	40	320
F4	Surface mounted decorative downlight	2	Triple Tube	DALI dimming	2	4	70	280
F5	Incandescent table lamp	1	A19	n/a	n/a	1	100	100
F5a	Incandescent floor lamp	1	A19	n/a	n/a	1	100	100
F6	Recessed wall mounted LED steplight	1	LED	n/a	n/a	48	2.6	124.8
F8	Wall mounted compact fluorescent decorative sconce	1	Quad	DALI dimming	2	2	40	40
F12	Recessed halogen accent light	1	MR16	n/a	n/a	2	20	40
F17	Suspended indirect fluorescent pendant	2	T5	DALI dimming	2	3	64	192
F18	Desk task light	1	Capsul	n/a	n/a	1	50	50
							Total Watts	4533.80
							Square footage	3200.00
							Total Power Density W/sqft	1.42
							VDT Power Density W/sqft	0.08
							Decorative Power Density W/sqft	0.09
							Physical Therapy Power Density	1.25

Allowable power density = 1.3 W/sqft
 1 W/sqft addition for decorative
 0.35 W/sqft additional for VDT usage
 Achieved power density = 1.25 W/sqft
 0.09 additional for decorative
 0.08 additional for VDT

The power density for the lobby is 4% below ASHRAE90.1

Renderings



Lobby and Visitor's Lounge





Reception Desk



Visitor's Lounge



View from Visitor's Lounge



View from Reception Desk



Entry and Staircase

Conclusions

A combination of architecture, materials and lighting create an enjoyable, residential atmosphere for the entrance to the Franklin Care Center. The high vaulted wood ceiling is illuminated by daylight or electric light depending on the time of day, creating a spacious, open lobby. The wood is a light color of a high enough reflectance to provide ambient illumination at the first floor of the lobby. All visible lighting fixtures were carefully chosen decorative fixtures to enforce a residential atmosphere. These fixtures are either indirect or louvered to prevent undesirable glare that can be particularly distracting to the elderly eye. The integration of architecture, materials and lighting portray a residential atmosphere that makes one feel as if they are entering a home rather than a medical institution.

Easy daylight integration is provided by DALI control. During the day the open lobby space will be bright from the penetrating daylight, when additional light is necessary in the corridors or visitor's lounge the photosensors will signal for DALI to provide more illumination. Although the power density for the lobby is only 4% below ASHRAE's value, dimming will conserve additional energy throughout the day. The group control switch is located adjacent to the receptionist's desk to allow these settings to be overridden when necessary.