



Steven Farrah
Senior Thesis Presentation
Voorhees Replacement Facility
Voorhees, NJ





Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers





Project Overview

Project Team

Presentation Outline

- I. **Project Overview**
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Function: Hospital

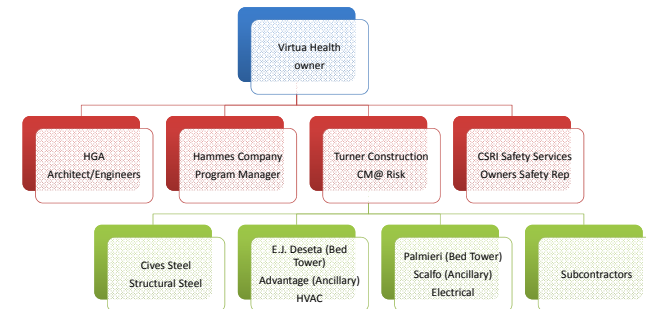
Size: 675,000 SF

Height: 8 Stories

Delivery Method: CM @ Risk w/GMP Contract

Cost: 323 Million Construction Costs

Construction Schedule: March 2008 – March 2011





Project Location

Project Location

Presentation Outline

- I. **Project Overview**
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers



Point A
(Current
Hospital)



Point B
(Replacement
Hospital)





LEED/Sustainability Study

Background/Goals

Presentation Outline

- I. Project Overview
- II. **LEED/Sustainability Study**
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

LEED/Sustainability Study

- I. Sustainable Sites
- II. Water Efficiency
- III. Energy & Atmosphere
- IV. Materials & Resources
- V. Indoor Air Quality
- VI. Conclusions



GOALS

1. Evaluate the Designed Voorhees Replacement Facility to Determine What LEED Points are Currently Being Achieved.
2. Conduct a Point-by-Point Cost Analysis of Points Not Being Obtained By the Current Design.
3. Determine the Cost to Reach Each LEED Certification in the Voorhees Replacement Facility

Voorhees Replacement Facility
Is Not Currently Pursuing a LEED Rating



Certification	Points Required
Certified	40 - 49
Silver	50 - 59
Gold	60 - 79
Platinum	80 - 110



LEED/Sustainability Study

Sustainable Sites

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
 - I. Lighting Breadth
 - II. Mechanical Breadth
- III. Patient Room LED Lighting
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

LEED/Sustainability Study

- I. Sustainable Sites
 - II. Water Efficiency
 - III. Energy & Atmosphere
 - IV. Materials & Resources
 - V. Indoor Air Quality
 - VI. Conclusions



Points Used in Each LEED Rating				Base Building	Certified	Silver	Gold
Sustainable Sites Possible Points: 26							
Prereq 1	Construction Activity Pollution Pre		Prerequisite				
Credit 1	Site Selection	1					
Credit 2	Development Density and Community Connectivity	5					
Credit 3	Brownfield Redevelopment	1					
Credit 4.1	Alternative Transportation—Public Transportation A	6					
Credit 4.2	Alternative Transportation—Bicycle Storage and Ch	1					
Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-E	3					
Credit 4.4	Alternative Transportation—Parking Capacity	2					
Credit 5.1	Site Development—Protect or Restore Habitat	1					
Credit 5.2	Site Development—Maximize Open	1					
Credit 6.1	Stormwater Design—Quantity Contr	1					
Credit 6.2	Stormwater Design—Quality Contr	1					
Credit 7.1	Heat Island Effect—Non-roof	1					
Credit 7.2	Heat Island Effect—Roof	1					
Credit 8	Light Pollution Reduction	1					

Sustainable Sites				
LEED Rating	Points Included In Base Building	Points Obtained at a Cost	Additional Cost of Points	Section Total Points
Base Building	9	-	\$ -	9
Certified	9	6	\$ 14,663.00	15
Silver	9	6	\$ 14,663.00	15
Gold	9	7	\$ 1,483,200.00	16
Platinum	-	-	-	-

- Site Selection
- Building Footprint
- Parking Footprint



LEED/Sustainability Study

Water Efficiency

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

LEED/Sustainability Study

- I. Sustainable Sites
- II. Water Efficiency
- III. Energy & Atmosphere
- IV. Materials & Resources
- V. Indoor Air Quality
- VI. Conclusions



Points Used in Each LEED Rating				Base Building	Certified	Silver	Gold
Water Efficiency Possible Points: 10							
Prereq 1	Water Use Reduction—20% Reducti		Prerequisite				
Credit 1	Water Efficient Landscaping		2 to 4				
	Reduce by 50%		2				
	No Potable Water Use or Irrigation		4				
Credit 2	Innovative Wastewater Technolgy		2				
Credit 3	Water Use Reduction		2 to 4				
	Reduce by 30%		2				
	Reduce by 35%		3				
	Reduce by 40%		4				

Water Efficiency				
LEED Rating	Points Included In Base Building	Points Obtained at a Cost	Additional Cost of Points	Section Total Points
Base Building	0	-	\$ -	0
Certified	0	4	\$ 85,225.00	4
Silver	0	4	\$ 85,225.00	4
Gold	0	4	\$ 85,225.00	4
Platinum	-	-	-	-

- Water Efficient Fixtures
- Rainwater/Grey Water Collection Systems
- Use Plants Native to Area



LEED/Sustainability Study

Energy & Atmosphere

Presentation Outline

- I. Project Overview
- II. **LEED/Sustainability Study**
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

LEED/Sustainability Study

- I. Sustainable Sites
- II. Water Efficiency
- III. **Energy & Atmosphere**
- IV. Materials & Resources
- V. Indoor Air Quality
- VI. Conclusions



Points Used in Each LEED Rating				Base Building	Certified	Silver	Gold
Energy and Atmosphere				Possible Points: 35			
Prereq 1	Fundamental Commissioning of Building Energy Systems	Prerequisite					
Prereq 2	Minimum Energy Performance	Prerequisite					
Prereq 3	Fundamental Refrigerant Management	Prerequisite					
Crack 1	Optimize Energy Performance	1 to 19					
	Improve by 12% for New Buildings	1					
	Improve by 14% for New Buildings	2					
	Improve by 16% for New Buildings	3					
	Improve by 18-48% for New Buildings	4-18					
Crack 3	On-Site Renewable Energy	1 to 7					
	1% Renewable Energy	1					
	2% Renewable Energy	2					
	3% Renewable Energy	3					
	4% Renewable Energy	4					
	5% Renewable Energy	5					
	11% Renewable Energy	6					
	13% Renewable Energy	7					
Crack 3	Enhanced Commissioning	2					
Crack 4	Enhanced Refrigerant Management	2					
Crack 5	Measurement and Verification	3					
Crack 6	Green Power	2					

Energy & Atmosphere				
LEED Rating	Points Included In Base Building	Points Obtained at a Cost	Additional Cost of Points	Section Total Points
Base Building	7	-	\$ -	7
Certified	7	0	\$ -	7
Silver	7	5	\$ 285,457.00	12
Gold	7	9	\$ 6,195,757.00	16
Platinum	-	-	-	-

- Energy Modeling
- Renewable Energy
- Commissioning



LEED/Sustainability Study

Materials & Resources

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

LEED/Sustainability Study

- I. Sustainable Sites
- II. Water Efficiency
- III. Energy & Atmosphere
- IV. Materials & Resources
- V. Indoor Air Quality
- VI. Conclusions



Points Used in Each LEED Rating				Base Building	Certified	Silver	Gold
Materials and Resources Possible Points: 14							
Prereq 1	Storage and Collection of Recyclables		Prerequisite 4				
Crat 11	Building Reuse—Maintain Existing Walls, Floors, and F 1 to 3						
	Reuse 55%	1					
	Reuse 75%	2					
	Reuse 95%	3					
Crat 12	Building Reuse—Maintain 50% of Interior Non-Struct	1					
Crat 2	Construction Waste Management	1 to 2					
	50% Recycled or Salvaged	1					
	75% Recycled or Salvaged	2					
Crat 3	Material Reuse	1 to 2					
	Reuse 5%	1					
	Reuse 10%	2					
Crat 4	Recycled Content	1 to 2					
	10% of Content	1					
	20% of Content	2					
Crat 5	Regional Materials	1 to 2					
	10% of Materials	1					
	20% of Materials	2					
Crat 6	Rapidly Renewable Materials	1					
Crat 7	Certified Wood	1					

Materials & Resources				
LEED Rating	Points Included In Base Building	Points Obtained at a Cost	Additional Cost of Points	Section Total Points
Base Building	1	-	\$ -	1
Certified	1	0	\$ -	1
Silver	1	4	\$ 432,000.00	5
Gold	1	6	\$ 972,000.00	7
Platinum	-	-	-	-

- Construction Waste Management/Recycling
- Recycled Content
- Regional Materials



LEED/Sustainability Study

Indoor Air Quality

Presentation Outline

- I. Project Overview
- II. **LEED/Sustainability Study**
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

LEED/Sustainability Study

- I. Sustainable Sites
- II. Water Efficiency
- III. Energy & Atmosphere
- IV. Materials & Resources
- V. **Indoor Air Quality**
- VI. Conclusions



Points Used in Each LEED Rating				Base Building	Certified	Silver	Gold
Indoor Environmental Quality Possible Points: 15							
Prereq 1	Minimum Indoor Air Quality Perform	Prerequisite					
Prereq 2	Environmental Tobacco Smoke (ETS) Control	Prerequisite					
Credit 1	Outdoor Air Delivery Monitoring	1					
Credit 2	Increased Ventilation	1					
Credit 3.1	Construction IAQ Management Plan—During Constru	1					
Credit 3.2	Construction IAQ Management Plan—Before Occupan	1					
Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1					
Credit 4.2	Low-Emitting Materials—Paints and Coatings	1					
Credit 4.3	Low-Emitting Materials—Flooring S	1					
Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifit	1					
Credit 5	Indoor Chemical and Pollutant Source Control	1					
Credit 6.1	Controllability of Systems—Lighting	1					
Credit 6.2	Controllability of Systems—Thermal Comfort	1					
Credit 7.1	Thermal Comfort—Design	1					
Credit 7.2	Thermal Comfort—Verification	1					
Credit 8.1	Daylight and Views—Daylight	1					
Credit 8.2	Daylight and Views—Views	1					

Indoor Air Quality				
LEED Rating	Points Included In Base Building	Points Obtained at a Cost	Additional Cost of Points	Section Total Points
Base Building	12	-	\$ -	12
Certified	12	0	\$ -	12
Silver	12	0	\$ -	12
Gold	12	0	\$ -	12
Platinum	-	-	-	-

- Outside Air / Ventilation
- Indoor Air Quality Plan
- Low-Emitting Materials
- Controllability of Lighting & Thermal Comfort



LEED/Sustainability Study

Conclusions

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study**
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

LEED/Sustainability Study

- I. Sustainable Sites
- II. Water Efficiency
- III. Energy & Atmosphere
- IV. Materials & Resources
- V. Indoor Air Quality
- VI. Conclusions**



- The current design of the Voorhees Replacement Facility is achieving 30 LEED points
- Start Early
- A LEED rating can be obtained at little cost to the project if the owner sets the standard early.

Soft Cost Estimates			
Cost Description	% of Construction Cost	Total Construction Cost	Cost to Project
Design Costs	0.50%	\$323,000,000	\$1,615,000
Documentation & Application Fees	0.50%	\$323,000,000	\$1,615,000
Energy Modeling	0.10%	\$323,000,000	\$323,000
	Total		\$3,553,000

TOTALS				
LEED Rating	Total Additional Cost	% Construction Cost Increase	Point Range	Point Total
Base Building	\$ -	-	-	30
Certified	\$ 3,652,888.00	1.118%	40-49	42
Silver	\$ 4,370,345.00	1.335%	50-59	51
Gold	\$ 12,289,182.00	3.665%	60-79	60
Platinum	-	-	80-110	-





Patient Room LED Lighting

Background/Goals

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

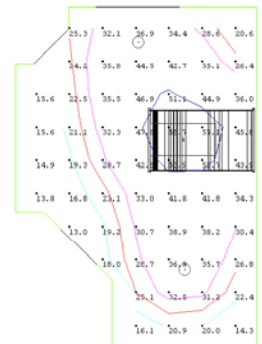
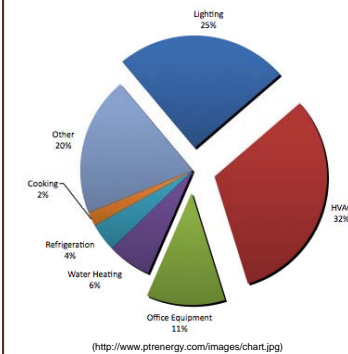
Patient Room LED Lighting

- I. Lighting Breadth
- II. Mechanical Breadth
- III. Cost Analysis
- IV. Conclusions



GOALS

1. Redesign a Typical Patient Room to Utilize LED Lighting In Place of Fluorescent Lighting
2. Determine Effect of Lighting Change on the Mechanical System
3. Evaluate the Life Cycle of the LED Lit Room





Patient Room LED Lighting

Lighting Breadth

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Patient Room LED Lighting

- I. Lighting Breadth
- II. Mechanical Breadth
- III. Cost Analysis
- IV. Conclusions



Required Lighting Levels

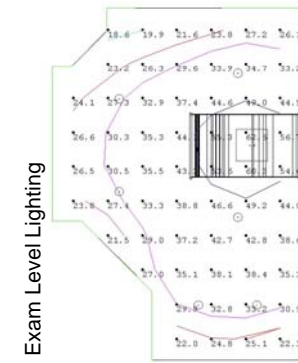
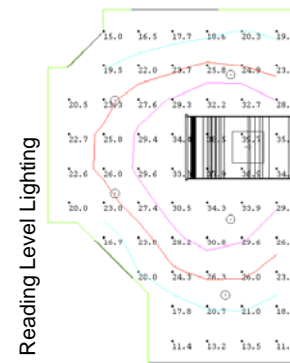
- Reading – 30 Footcandles
- Exam Level – 50 Footcandles



Cree LR24



Halo 6" LED Downlight





Patient Room LED Lighting

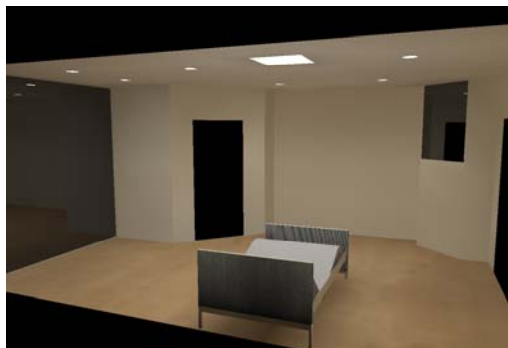
Lighting Breadth

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Patient Room LED Lighting

- I. Lighting Breadth
- II. Mechanical Breadth
- III. Cost Analysis
- IV. Conclusions





Patient Room LED Lighting

Mechanical Breadth

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Patient Room LED Lighting

- I. Lighting Breadth
- II. Mechanical Breadth
- III. Cost Analysis
- IV. Conclusions

Total Fluorescent Room Wattage - 212W
 Total LED Room Wattage - 142W

Reduction in BTUs/hr Per Room = 364 BTUs/hr

Total Reduction in BTUs/hr = (364 BTUs/hr-room)x(300 patient rooms) = 109,200 BTUs/hr



Mechanical Equipment

Total CFM Reduction For All Patient Rooms = 109,200 BTUs/hr / 20° / 1.1 = 4964 CFM

There Is No Mechanical Equipment Cost Savings Due to Equipment Downsizing

Electricity Savings

Change in Load on Chillers = (109,200 BTUs/hr) / (12,000BTUs/Ton) = 9.1 Tons

Cost Savings/Year = (0.6kW/Ton)x(9.1Tons)x(2000hrs)x (\$0.1307/kWhr) = \$1,427.00/Year



Patient Room LED Lighting

Cost Analysis

Presentation Outline

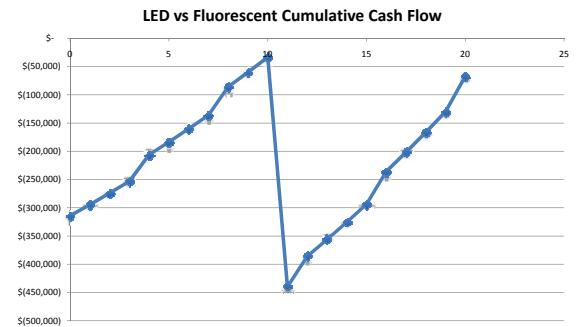
- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Patient Room LED Lighting

- I. Lighting Breadth
- II. Mechanical Breadth
- III. Cost Analysis
- IV. Conclusions



LED vs Fluorescent Life Cycle Analysis			
Voorhees Replacement Facility			
Average Number of Hours of Use Per Day	12		
Price of Electricity (Dollars/per kWh)	0.1307		
Existing Fluorescent Lighting		LED Replacement Lighting	
Luminaire Description	DF 11	MF 13	HALO / CREE
Total Luminaire Cost	\$ 78,000	\$ 130,500	\$ 302,400
Total Controls Cost	N/A	N/A	\$ 90,000
Total Initial Cost	\$ 208,500	\$	\$ 524,100
Total Annual Energy Costs	\$ 36,065		\$ 18,520
Energy Savings from LED per year		\$ 17,546	
Average Annual Lamp Maintenance Cost	\$ 5,518		\$ 35,478
Extra Average Maintenance Cost for LED		\$ (29,959)	
Mechanical Savings per year		\$ 1,427	
Total savings per year		\$ (10,986)	





Patient Room LED Lighting

Conclusions

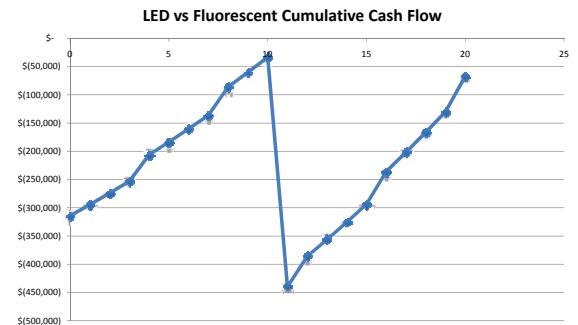
Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Patient Room LED Lighting

- I. Lighting Breadth
- II. Mechanical Breadth
- III. Cost Analysis
- IV. Conclusions

- Rooms can be designed using LED downlighting
- Rooms designed using LED lighting may see a reduction in mechanical energy costs.
- LED lighting presents too much of an initial investment and replacement cost to produce a cost savings over time.





Bed Tower Schedule Analysis

Background/Goals

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth

IV. Bed Tower Schedule Analysis

- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Bed Tower Schedule Analysis

- I. Overview
- II. Schedule
- III. Conclusions



GOALS

1. Create a Short Interval Schedule for the Fit-Out of the Bed Tower to Accelerate the Project Schedule.





Bed Tower Schedule Analysis

Overview

Presentation Outline

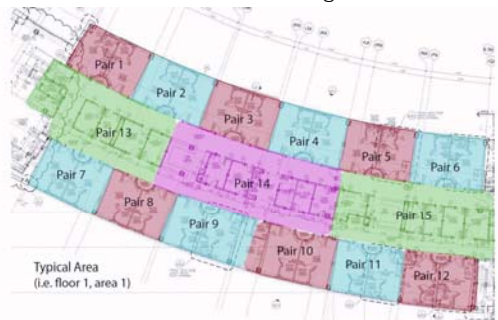
- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. **Bed Tower Schedule Analysis**
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Bed Tower Schedule Analysis

- I. **Overview**
- II. Schedule
- III. Conclusions



Patient Room Pairing



- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Rough-in in wall plumbing 2. Rough-in in wall duct drops 3. Rough-in in wall medical gas 4. Rough-in in wall electrical 5. Rough-in in wall low-voltage wiring 6. Insulate, drywall and tape partitions 7. Frame drywall ceilings 8. Electrical work in drywall ceilings 9. Ductwork in drywall ceilings 10. Drywall and tape drywall ceilings 11. Prime and paint 1 coat walls and drywall ceilings 12. Install acoustical ceiling tile grid 13. Drop in and install light fixtures 14. Install all ceramic tile floors and partial walls | <ol style="list-style-type: none"> 15. Install millwork 16. Install plumbing/bathroom fixtures 17. Install carpet, VCT flooring and base 18. Install grilles and diffusers 19. 2nd and final coat of paint 20. Install doors, hardware and interior glazing 21. Drop in acoustical ceiling tile into grid 22. Cut in sprinkler heads (ACT and drywall) 23. Finish and install low voltage devices 24. Finish and install medical gas trim plates and labels 25. Finish and install electrical devices and trim plates |
|--|--|



Bed Tower Schedule Analysis

Analysis

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. **Bed Tower Schedule Analysis**
- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Bed Tower Schedule Analysis

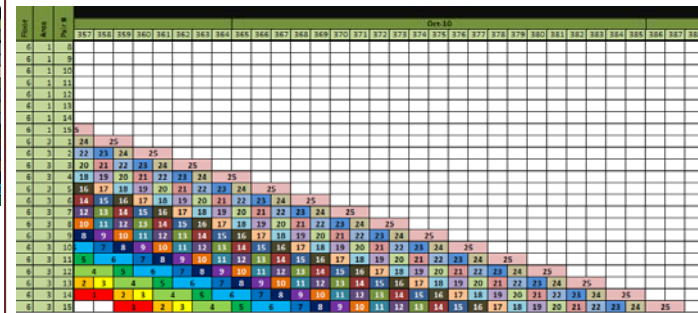
- I. Overview
- II. **Schedule**
- III. Conclusions



Short Interval Schedule Start



Short Interval Schedule Finish





Bed Tower Schedule Analysis

Conclusions

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth

IV. Bed Tower Schedule Analysis

- V. Conclusions
- VI. Acknowledgements
- VII. Questions & Answers

Bed Tower Schedule Analysis

- I. Overview
- II. Schedule
- III. **Conclusions**



Original Bed Tower Fit-Out Completion Date:	December 23 rd , 2010
Short Interval Schedule Bed Tower Fit-Out Completion Date:	November 2 nd , 2010
Schedule Reduction:	35 Work Days 1.75 Calendar Months

General Conditions/
Requirements Cost/Month: \$301,950.00/Month

**General Conditions Savings = (\$301,950.00/calendar month) x
(1.75 calendar months) = \$528,412.00**



Conclusions

Conclusions

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. **Conclusions**
- VI. Acknowledgements
- VII. Questions & Answers



LEED/Sustainability Study

- The current design of the Voorhees Replacement Facility is already achieving 30 LEED points
- Start Early
- A LEED rating can be obtained at little cost to the project if the owner sets the standard early.



Patient Room LED Lighting

- Rooms can be designed using LED downlighting
- Rooms designed using LED lighting may see a reduction in mechanical energy costs.
- LED lighting presents too much of an initial investment and replacement cost to produce a cost savings over time.

Bed Tower Schedule Analysis

- Schedule Reduction: 35 Work Days or 1.75 Calendar Months
- General Conditions Savings = $(\$301,950.00/\text{calendar month}) \times (1.75 \text{ calendar months}) = \$528,412.00$



Acknowledgements

Acknowledgements

Presentation Outline

- I. Project Overview
- II. LEED/Sustainability Study
- III. Patient Room LED Lighting
 - I. Lighting Breadth
 - II. Mechanical Breadth
- IV. Bed Tower Schedule Analysis
- V. Conclusions
- VI. Acknowledgements**
- VII. Questions & Answers



Penn State Architectural Engineering Faculty

Chris Magent
Professor Parfitt
Professor Holland
Corey Wilkinson

Turner Construction

Bill Swanson
Joel Miner
Jeremy Klinger
Chris McCrae

HGA Architects & Engineers

Mike Torine
Wayne Johnson
RD Ruffin
Chad O'Donnell
Paul Gruettner
Pat Hunt
Jim Koehler
Michael Woodson

Haines & Kibblehouse

Tom Spenillo

Hamada Inc.

Joe Bruski

Thomas Building Group

Michael Gejer

Hispanic Ventures

Len Spatocco

SwisslogTranslogic

Jeff Mazur

E.J. Deseta Company

Sean Brooks

Majek Fire Protection

George Dougherty

Falasca Mechanical

Wally Copestick

Johnson Controls

Kyle Bonner

Palmieri Electric

Sharon Ashbridge



Questions & Answers

