

# LEHIGH VALLEY HOSPITAL – CEDAR CREST CAMPUS



## ALLENTOWN, PA

Presented By:  
Derek Snover  
Construction Management



# PRESENTATION OUTLINE

- Project Overview
- CM Analysis 1 – Gaining Higher LEED Rating
- CM Analysis 2 – ICRA Plan
- Structural Redesign – Pre-cast Hollowcore Planks
- Mechanical Analysis – Rainwater Collection System
- Research Topic – Closing the Gap

# PROJECT OVERVIEW

- Owner: Lehigh Valley Hospital
- Construction Manager: Whiting-Turner
- Architect: Freeman White, Inc.
- Total Project Cost: \$181 million
- Project Schedule: June 2005 – December 2008
- Project Size: 310,000 sq ft Addition
- Project Delivery Method: Design Build

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# GAINING HIGHER LEED RATING

- Currently Silver Rated ~ 33 points

Focused on:

- On site recycling - 75% material
- Regional Materials (500 mi radius)
- Recycled Content – 10%
- Low VOC Materials

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# GAINING HIGHER LEED RATING

- Proposed **Gold** Total ~ 41 points

## Sustainable Sites (1 Credit Each)

- SS Credit 6.1: Storm water Design - Quantity Control
- SS Credit 6.2: Storm water Design - Quality Control

## Water Efficiency (1 Credit Each)

- WE Credit 2: Innovative Wastewater Technologies
- WE Credit 3.1: Water Use Reduction - 20% Reduction
- WE Credit 3.2: Water Use Reduction - 30% Reduction



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# GAINING HIGHER LEED RATING

- Proposed **Gold** Total ~ 41 points

## Energy & Atmosphere (1 Credit Each)

- EA Credit 2: On Site Renewable Energy

2.5% = 1 point

7.5% = 2 points

12.5% = 3 points

- EA Credit 6: Green Power

## Materials & Resources (1 Credit Each)

- MR Credit 6: Rapidly Renewable Materials



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# ICRA PLAN

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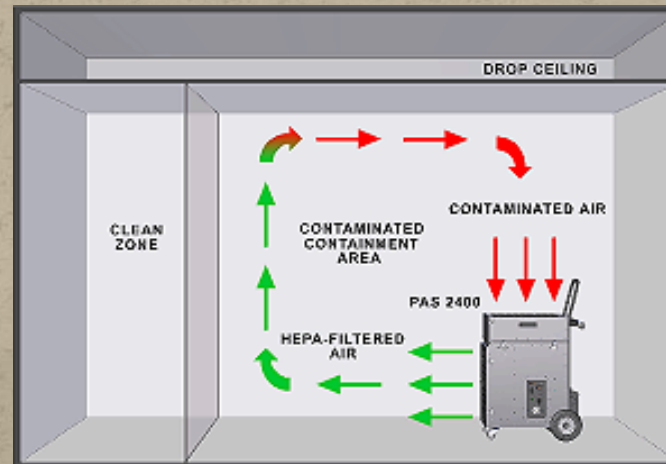
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PRECAUTION CLASS	Construction Project Type			
Patient Risk Group	TYPE A	TYPE B	TYPE C	TYPE D
LOW Risk Group	I	II	II	III/IV
MEDIUM Risk Group	I	II	III	IV
HIGH Risk Group	I	II	III/IV	IV
HIGHEST Risk Group	II	III/IV	III/IV	IV

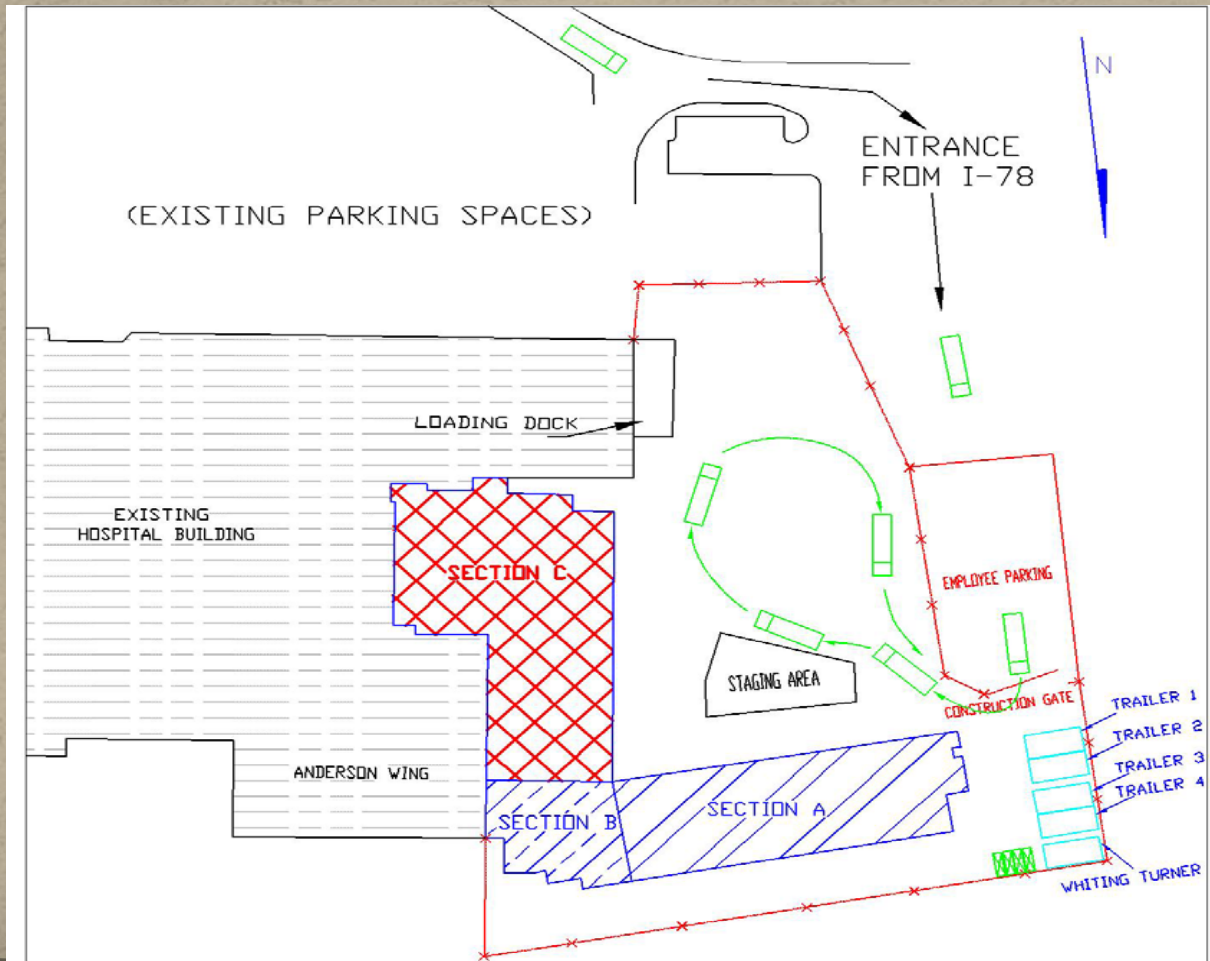
## Recommendations:

- Use solid partition walls
- HEPA filtered buffer space
- HEPA vacuum cleaner
- Sticky mats at each entrance
- HEPA filters on existing HVAC system



# ICRA PLAN

## Project Phasing



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# PRE-CAST HOLLOWCORE PLANKS

## Existing System:

- 3" 20 Gauge Galvanized Deck
- 3.25" Elevated Concrete Slab



## Proposed System:

- 10" Precast Concrete Hollowcore Planks

## Goals:

- Reduce Schedule Time and Labor Costs
- Compare Schedule, Material and Labor of Both Systems

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# PRE-CAST HOLLOWCORE PLANKS

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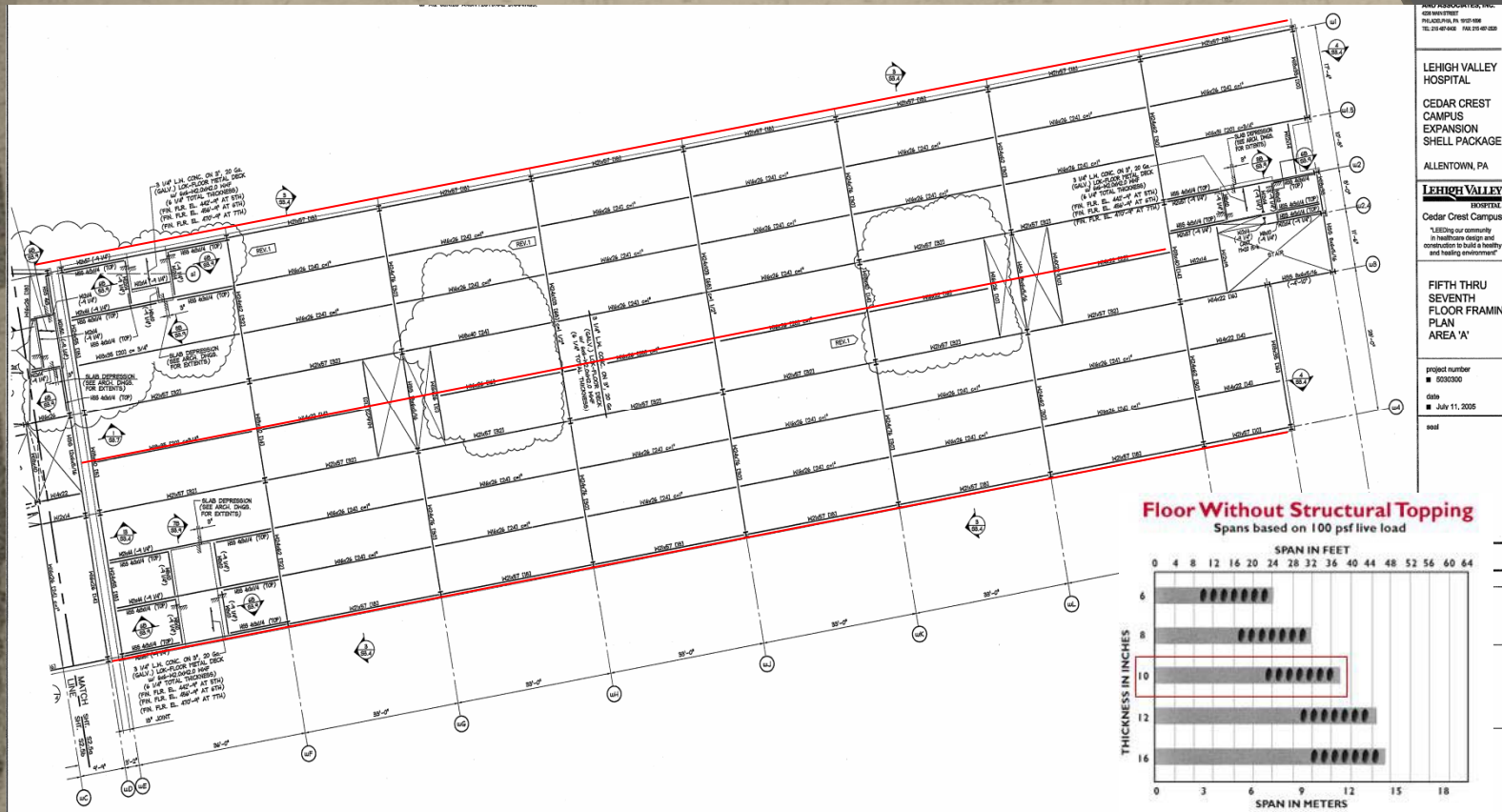
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- Changed W16x26 (down the middle) to W21x57 (typical at the edge)
- Eliminated all the beams between the red lines

# PRE-CAST HOLLOWCORE PLANKS

Project Overview

	Schedule	Material	Labor
Concrete Slab on Metal Deck	69	\$822,718.22	\$13,896.55
Precast Concrete Hollowcore Planks	51	\$1,632,013.37	\$2,697.44

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(Including Structural System)	SOMD	PCHP
Grand Totals	\$2,171,362.09	\$2,605,572.14

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## Conclusions:

- Able to reduce schedule time and labor costs
- Doubled the concrete material costs
- Able to make up costs in reduced structural members

# RAINWATER COLLECTION SYSTEM

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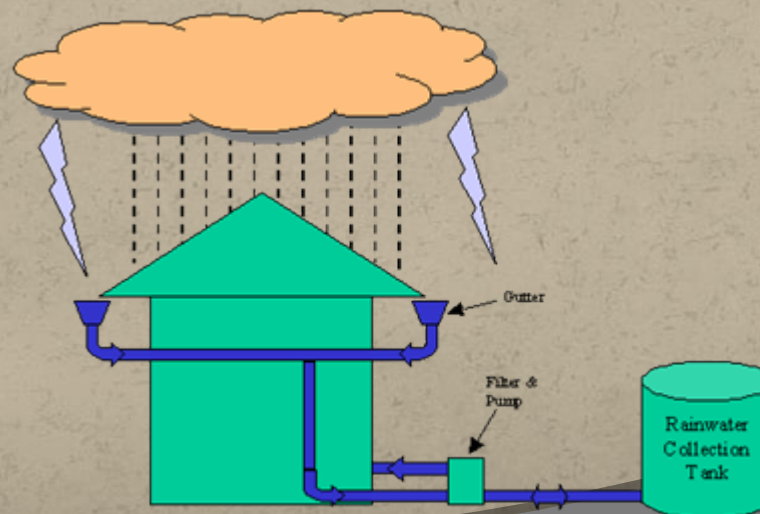
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## Introduction

- Allentown, PA average rainfall = 43.71 inches
- 41,701.4 sq ft of roof area
- Lots of toilets in the 188 private patient rooms
- Use to add 3 possible LEED credits



Rainwater Collection Overview

# RAINWATER COLLECTION SYSTEM

## Rainwater Harvesting System

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Roof Area (SF)				
Phase A	Phase B	Phase C	Total	
20,158.50	5,499.12	16,043.80	41,701.40	
Rainfall Total Annual				
Roof Area (SF)	Rainfall (in/12)	Volume (cu ft/yr)	Volume (gal/yr)	Volume (gal/day)
41,701.40	43.71	151,897.35	1,128,597.5	3,092.05

Toilets	Urinals	Waterless Urinals		
Quantity	Rate (GPF)	Demand	6 Flushes per day (gal)	8 Flushes per day (gal)
206	<del>6</del>	329.60	1,977.60	2,636.80

**DEMAND < AVAILABLE**

# RAINWATER COLLECTION SYSTEM

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## Collection System

Rainfilters of Texas: 265 gallon capacity / 151 sq ft of roof

$$41,701.4 \text{ SF} / 151 \text{ SF} = 276.17 \text{ SF}$$

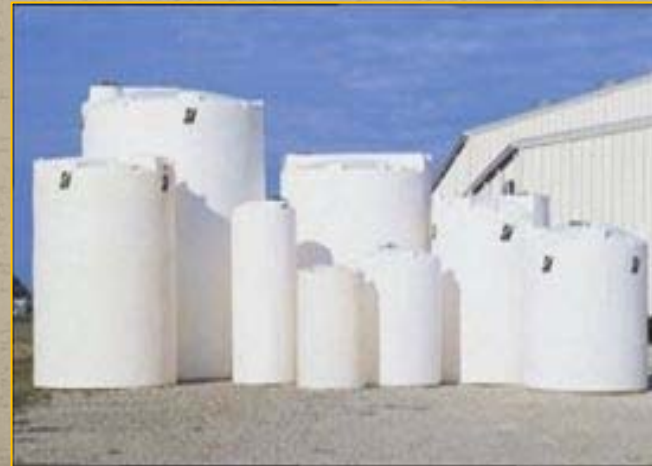
$$276.17 \text{ SF} (265 \text{ gal}) = \mathbf{73,185 \text{ gallons}}$$

## Holding Tanks

Largest tank that would fit :

4,500 gallon (142" Ø, 91" height)

$$73,185 / 4,500 = 16 \text{ tanks}$$



# RAINWATER COLLECTION SYSTEM

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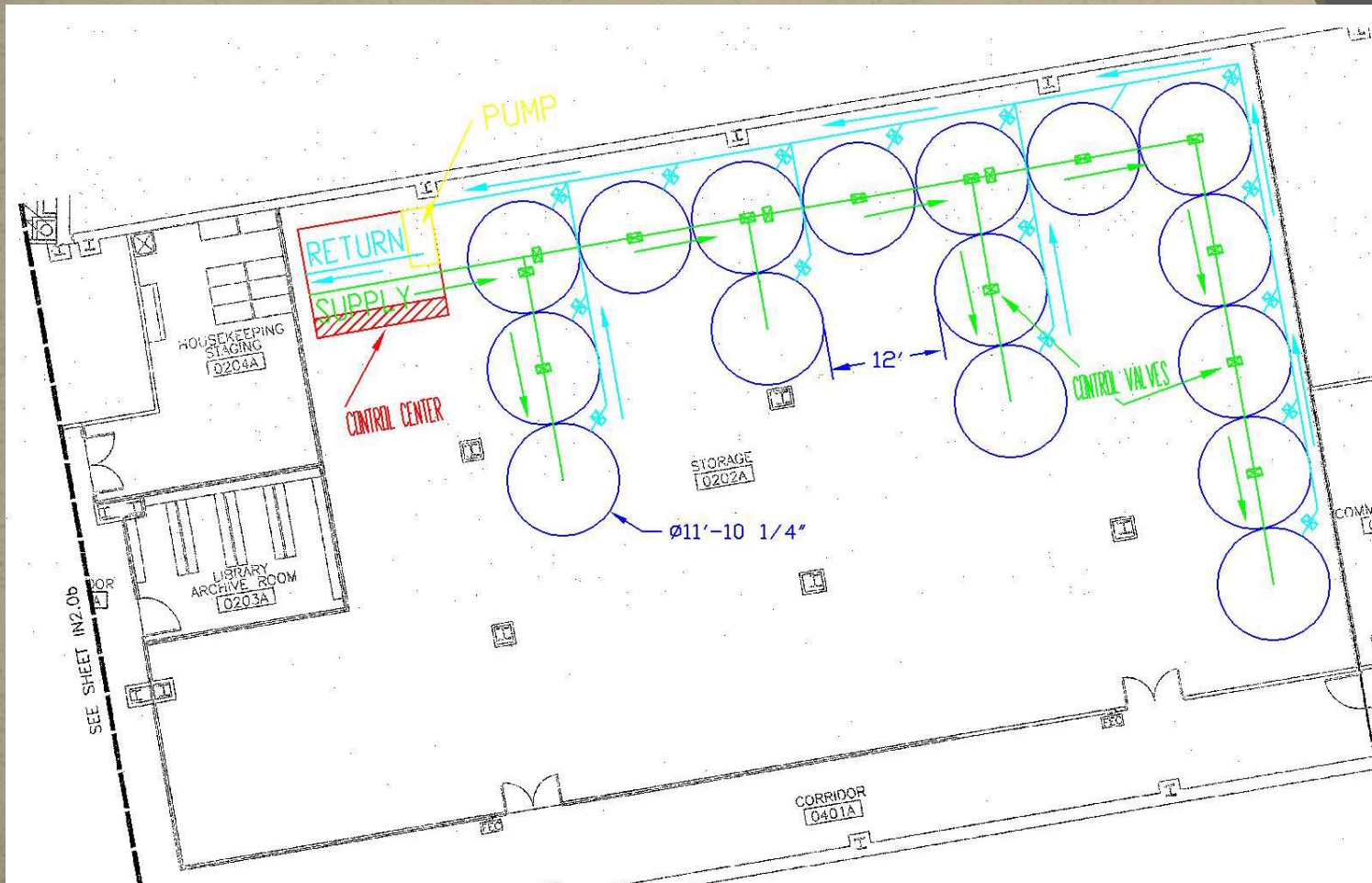
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# CLOSING THE GAP

## Problem

Generation gap between older generations and today's generation in understanding the benefits and effectiveness of Green Building Design.

## Solution

- Hold seminars
- Push harder to convince owners
- Make Green Building Design a priority
- Green Building products cheaper, more mainstream

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# CLOSING THE GAP

## Interesting Note:

“I am not sure what gap exists. People often say there is a generation gap, but what does this mean? I think one could do a thesis paper on this topic alone: The Generation Gap: Fact or Fiction?”

I think my generation (Baby Boomers) started programs focused on saving the planet back in the late 60’s and early 70’s.

Green Design is not new. What is new is that it has become very organized. Back in the 1970’s during the first oil crisis, everyone was looking into ways to create passively energy saving devices for buildings, including solar air conditioning.”

- Gary Smith PBS&J

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# CONCLUSIONS

## LEED Rating

- Possible to achieve **GOLD** status, 41 points

## ICRA Plan

- **Class IV** plan required
  - Plan to use solid wall barriers with HEPA filtered clean room
  - HEPA vacuum cleaners and sticky mats at all entrances
  - Optimal phasing to provide cleanest environment

## Structural Redesign

- Reduced schedule time (**18 days**) and labor costs (**\$11,199**)
- Reduced structural steel member amount

## Mechanical Analysis

- Harvest **1,128,597.31** gallons/year
- Eliminated **100%** grey water demand
- 16 tanks required to contain harvested water

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# CONCLUSIONS

## Acknowledgments

- Whiting-Turner
  - Eden Evans
- Penn State AE Faculty
- Friends & Family



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# QUESTIONS & COMMENTS



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