

Thesis Presentation

Prince Frederick Hall, University of Maryland

Completed by: Lauren Kandt
PSU AE, Construction Management
Advisor: Ray Sowers
April 2014



Introduction

Building Information

Infinity System Investigation

Grey Water System Investigation

Photovoltaic Cell Window Investigation

Architectural Breadth

Information Transfer Research

Survey Results

App Business Plan

Recommendation



Building Information

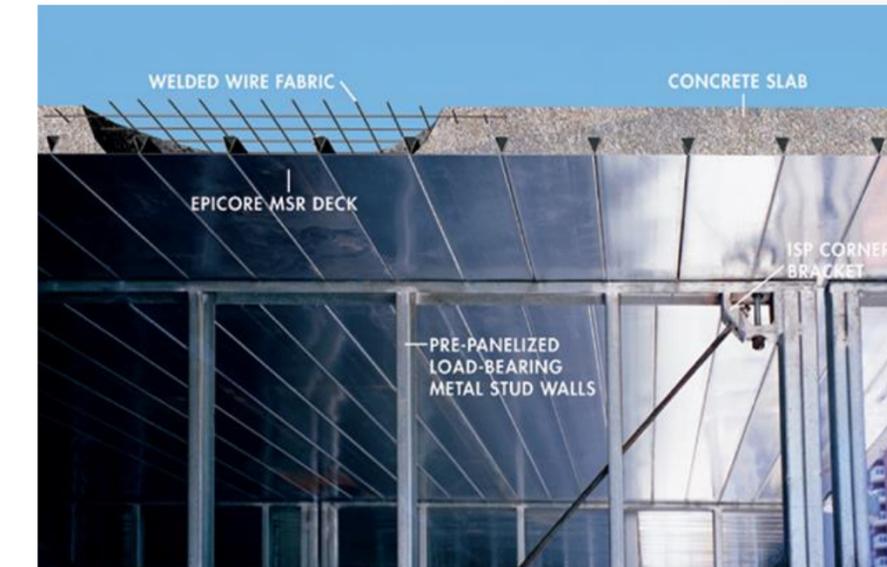
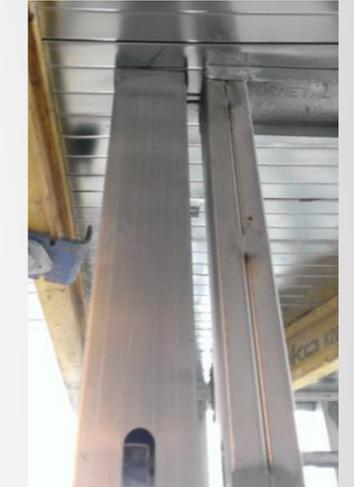
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Infinity Structural System Investigation

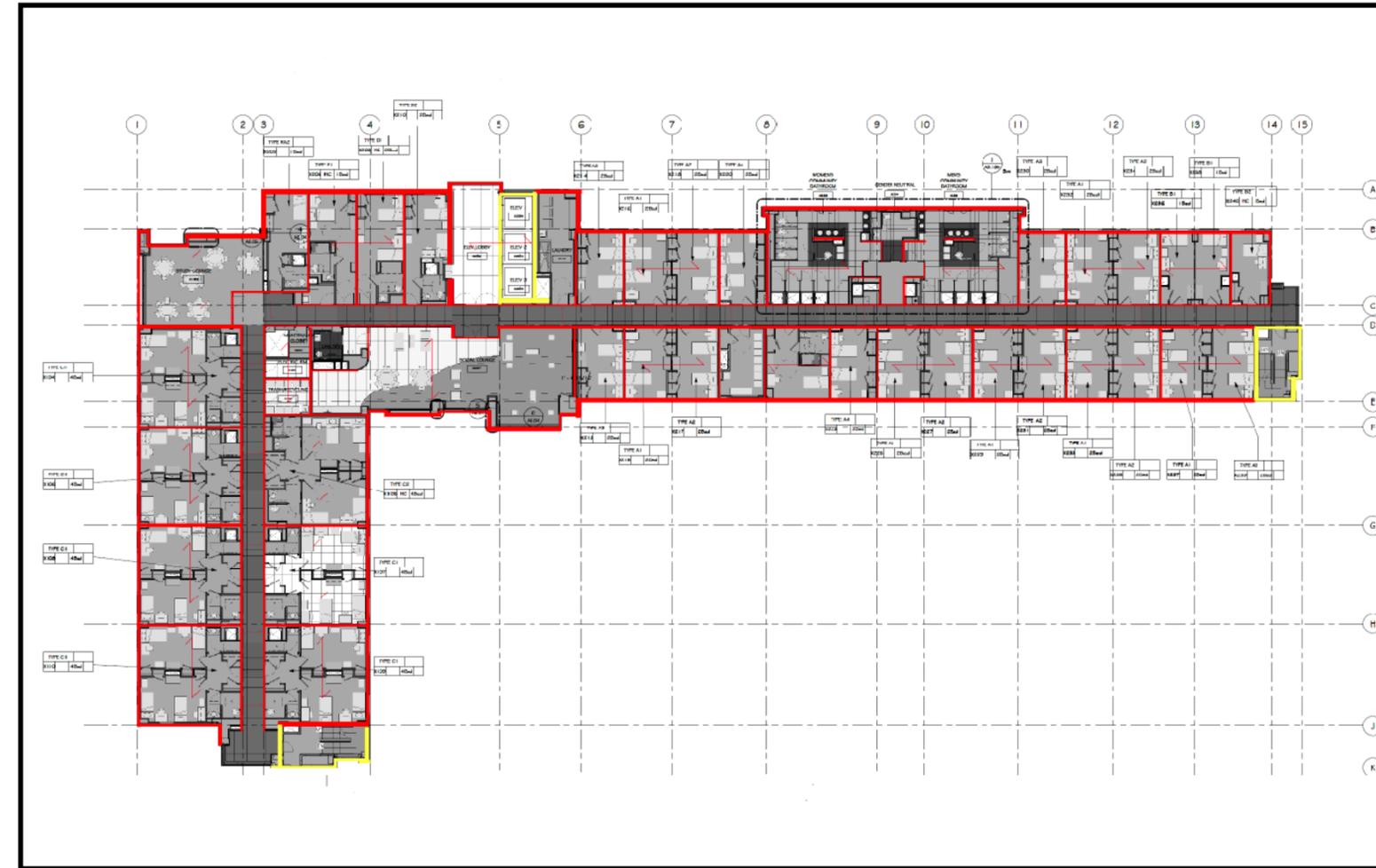
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Duration Estimates				
Project	Floor Area	Days/ Floor	Structural Durations (2-7 floors)	
Shafer and Grace	14000	9	Cast-In-Place	114 days
Prince Frederick Hall	22512	15	Infinity	90 days
			Duration Difference	24 days



Infinity Structural System Investigation

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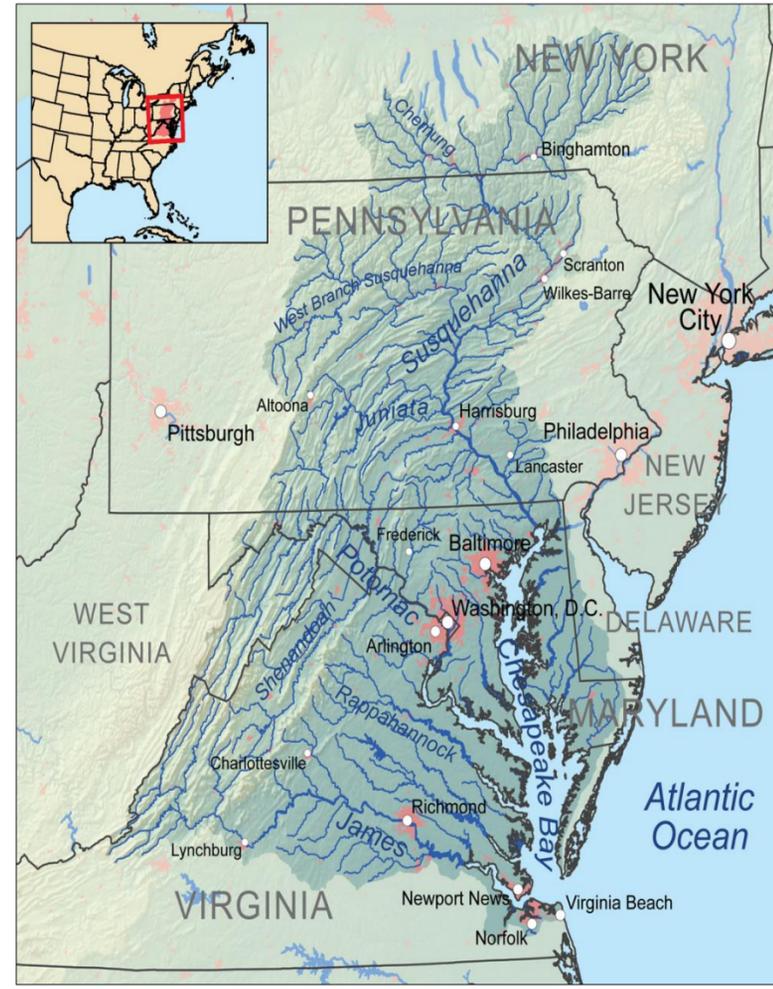
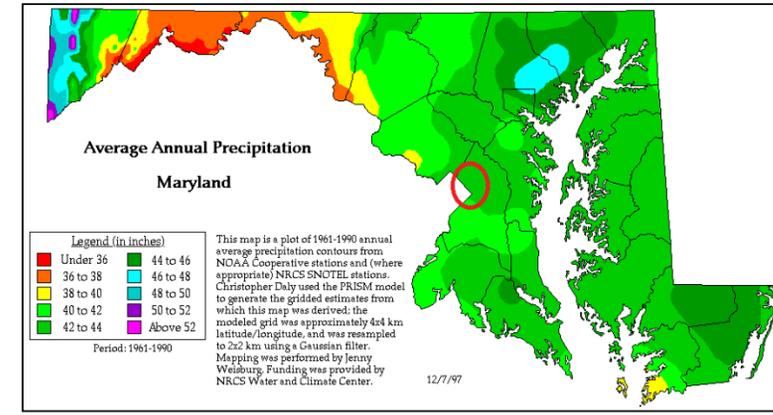
Structural Breadth
Infinity Panel locations on Typical floor
Load Bearing Panels are in Red, ISP are in yellow.

Cost Comparison between Concrete Columns/Decking and Infinity Panels/Decking										
Floor 4 only										
	#	unit	Material/Unit	Material Total	Labor/ Unit	Labor Total	Equipment/ Unit	Equipment total	Total plus O&P	Total
Infinity Panels	2507.02	LF	\$ 11.30	\$ 28,329.33	\$ 13.05	\$32,716.61	\$ -	\$ -	\$ 32.50	\$ 81,478.15
ISP	223.2	LF	\$ 11.30	\$ 2,522.16	\$ 13.05	\$ 2,912.76	\$ -	\$ -	\$ 32.50	\$ 7,254.00
EPICOR Metal Decking	22512	SF	\$ 1.65	\$ 37,144.80	\$ 0.41	\$ 9,229.92	\$ 0.03	\$ 675.36	\$ 2.59	\$ 58,306.08
Rebar	6	Ton	\$ 1,050.00	\$ 6,300.00	\$ 540.00	\$ 3,240.00	\$ -	\$ -	\$ 2,025.00	\$ 12,150.00
Concrete	22512	SF	\$ 1.97	\$ 44,348.64	\$ 0.85	\$19,135.20	\$ 0.28	\$ 6,303.36	\$ 3.75	\$ 84,420.00
Totals:			Material	\$ 118,644.93	Labor	\$67,234.49	Equipment	\$ 6,978.72	Grand Total	\$243,608.23
									Original Cost 4th floor Concrete	\$377,000.00
									Difference	\$133,391.77

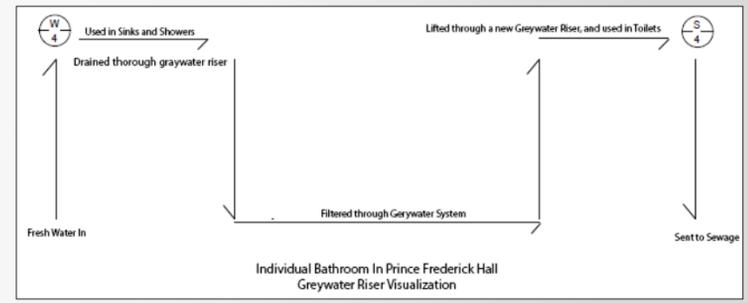
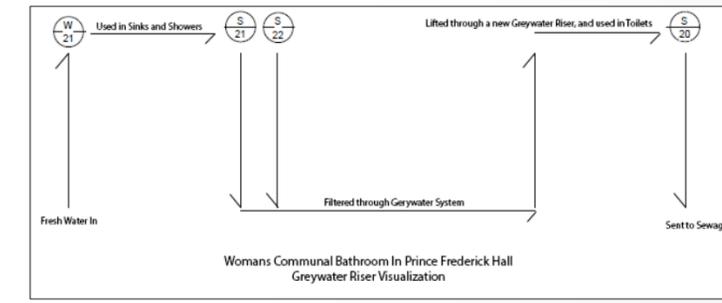
Grey Water System Investigation

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Initial Results		
	Gallons	
	Per Day	Per Year
Original Building Totals	12203.2	4454168
Rainwater Collected		546324
Adjusted Building Total		3907844
Greywater Reuse	1879.2	685908
Adjusted Building Total	10324	3768260



Water Use Estimates									
Per Floors 2-7									
Toilets		# units	# of students	Flush per day/student	Gallons per flush	Gallons/day/student	Gallons per day	Gallons per year	
Toilet	Female	12	38	3	1.6	4.8	182.4	66576	
	Male	10	38	0.5	1.6	0.8	30.4	11096	
Urinal	Male	2	38	2.5	1	2.5	95	34675	
Other		# units	# of students	minutes/day/student	avg. gallons/minute	Gallons/day/student	Gallons per day	Gallons per year	
Sinks	Female	16	38	5	2.2	11	418	152570	
	Male	16	38	5	2.2	11	418	152570	
Showers	Female	10	38	10	1.5	15	570	208050	
	Male	10	38	5	1.5	7.5	285	104025	
Per Floor 1									
Toilets		# units	# of students	Flush per day	Gallons per flush	Gallons/day/student	Gallons per day	Gallons per year	
Toilet	Female	7	4	3	1.6	4.8	19.2	7008	
	Male	6	4	0.5	1.6	0.8	3.2	1168	
Urinal	Male	1	4	2.5	1	2.5	10	3650	
Other		# units	# of students	minutes/day/student	avg. gallons/minute	Gallons/day/student	Gallons per day	Gallons per year	
Sinks	Female	6	4	5	2.2	11	44	16060	
	Male	6	4	5	2.2	11	44	16060	
Showers	Female	3	4	10	1.5	15	60	21900	
	Male	3	4	5	1.5	7.5	30	10950	
							Building Totals	12203.2	4454168



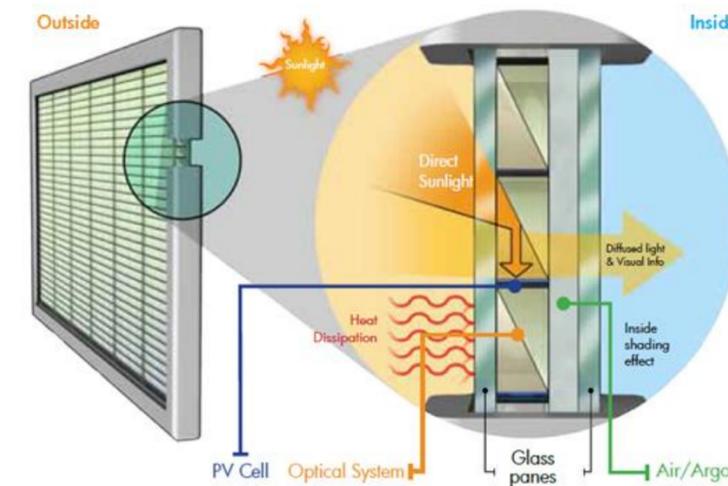
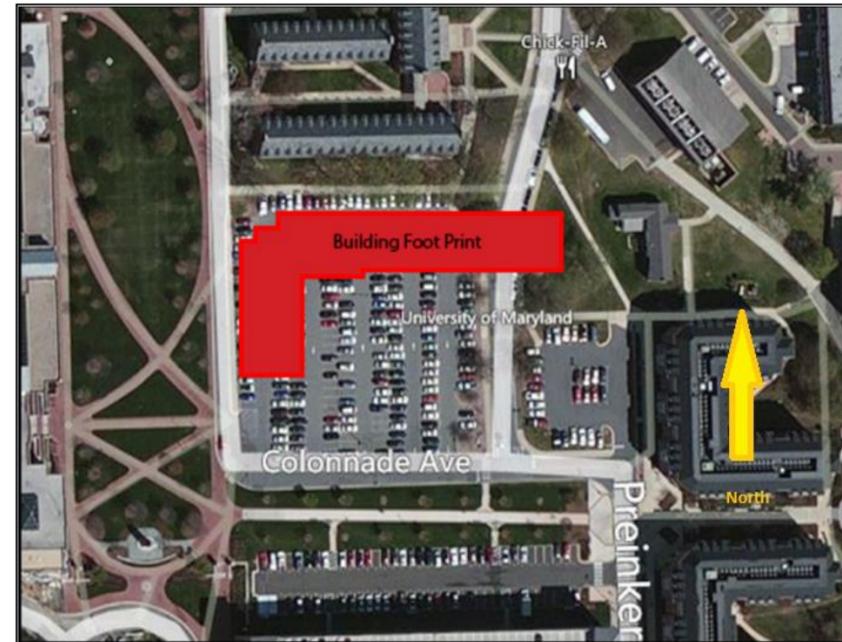
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Estimated Greywater Source and Use											
Source		#/floor	#/Floors 2-7	# Students	Students/ Floors 2-7	Unit /Day/Student	Unit	Gallons/Unit	Gallon/Day/Student	Gallon/Day	Gallon/Year
Sink	Female	3	18	22	132	5	Minutes	2.2	11	1452	529980
	Male	3	18	22	132	5	Minutes	2.2	11	1452	529980
Shower	Female	4	24	22	132	10	Minutes	1.5	15	1980	722700
	Male	4	24	22	132	5	Minutes	1.5	7.5	990	361350
									Total Sink Greywater		1059960
									Total Shower Greywater		1084050
									Total Source Greywater		2144010
Use											
Toilets	Female	4	24	22	132	3	Flush	1.6	4.8	633.6	231264
	Male	2	12	22	132	0.5	Flush	1.6	0.8	105.6	38544
Urinals	Male	2	12	22	132	2.5	Flush	1	2.5	330	120450
									Total Used Greywater		390258

Photovoltaic Cell Window Investigation

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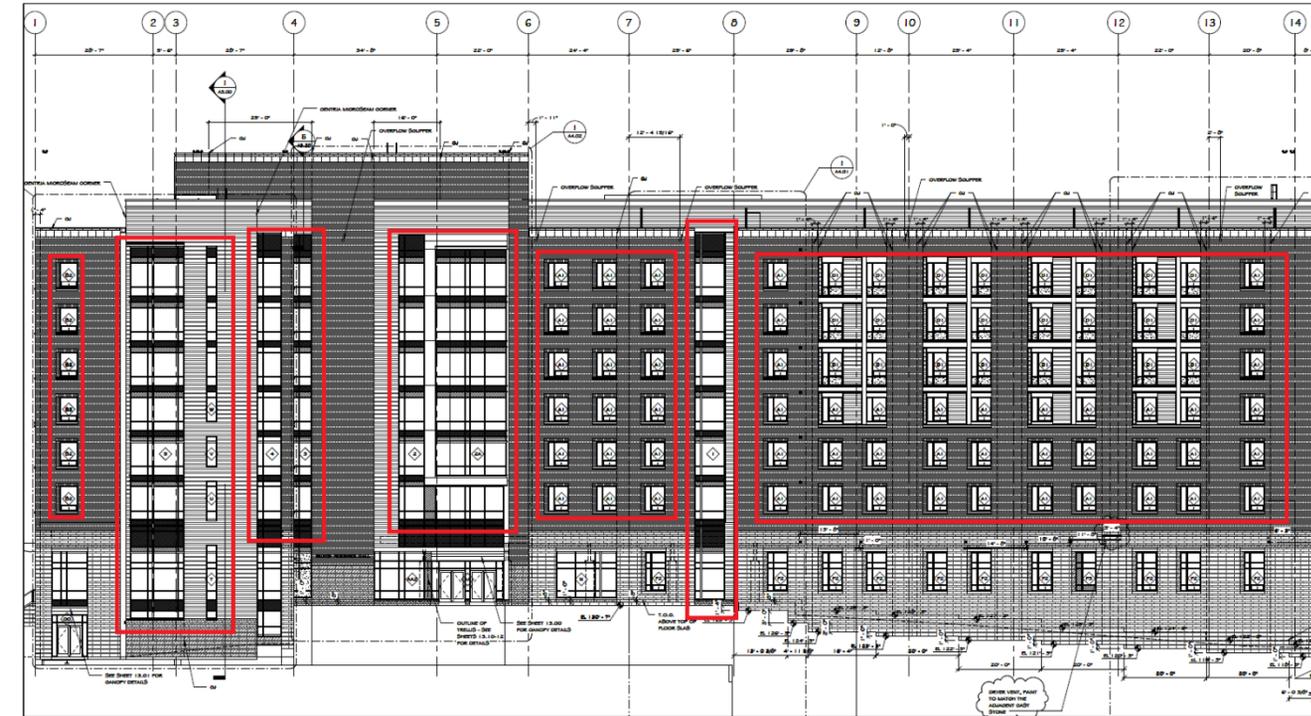
Estimated Energy Consumption					
Unit	Avg. Consumption /Unit (KwH)	# of Unit	Consumption Total (KWH)	\$/KWH	Annual Cost
Students	505.74	388	196227.12	0.129	25313.3
SqFt	24	22300	535200	0.129	69040.8
		Building Total	731427.12	0.129	94354.1

Estimated Energy Gain Annual					
	KWH/SF	SF	KWH Total	\$/KWH	Savings
Dorm Windows	9.63	5675.88	54658.72	0.13	7050.98
Curtain Wall	9.63	6685.00	64376.55	0.13	8304.57
		Total KWH	119035.27	Total Savings	15355.55

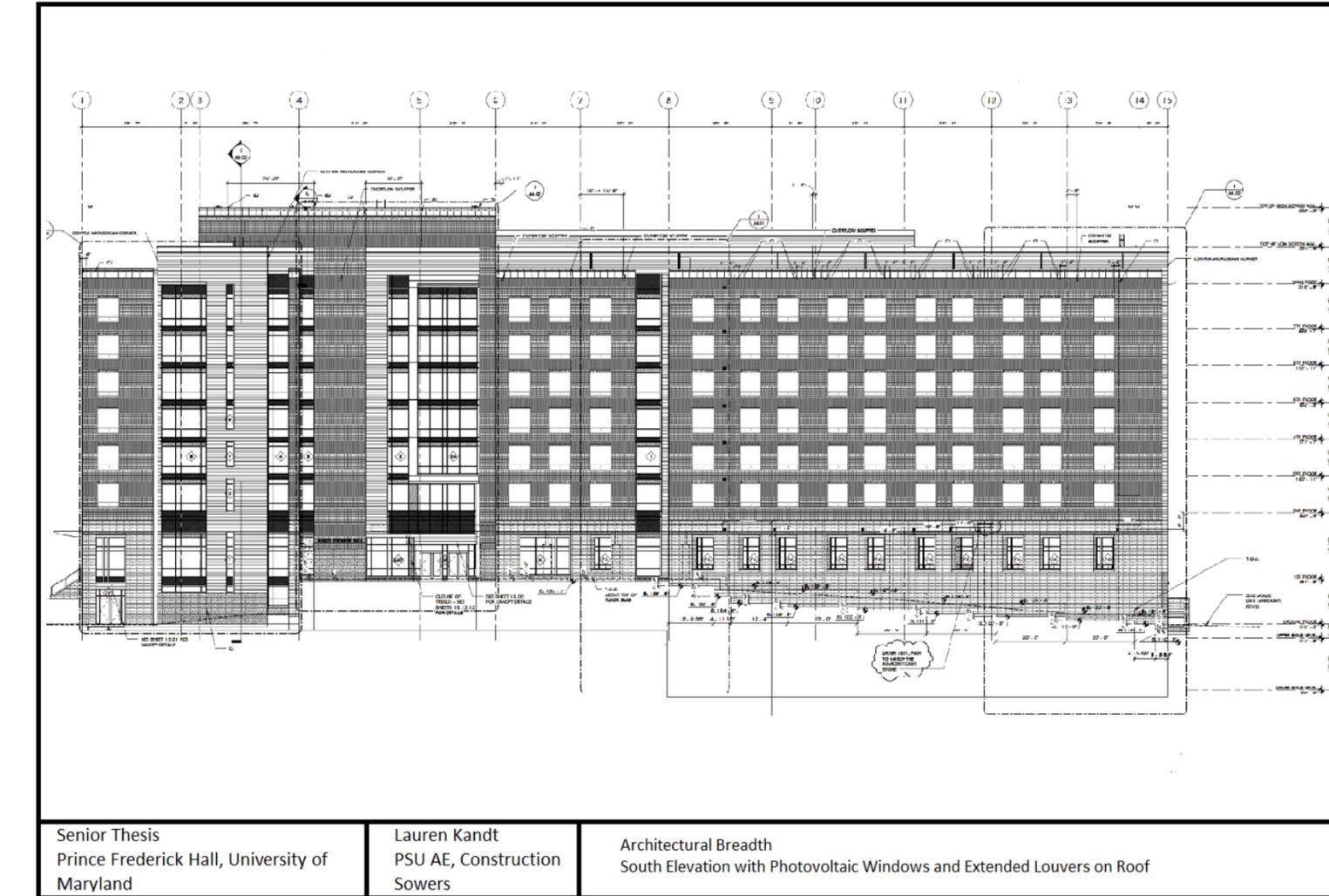
Energy Gains Annual - New Windows					
	KWH/SF	SF	KWH Total	\$/KWH	Savings
Dorm Windows	9.63	6149	59214.87	0.129	7638.72
Curtain Wall	9.63	6685	64376.55	0.129	8304.57
		Total KWH	123591.42	Total Savings	15943.3

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		Total KWH	123591.42	Total Savings	15943.3



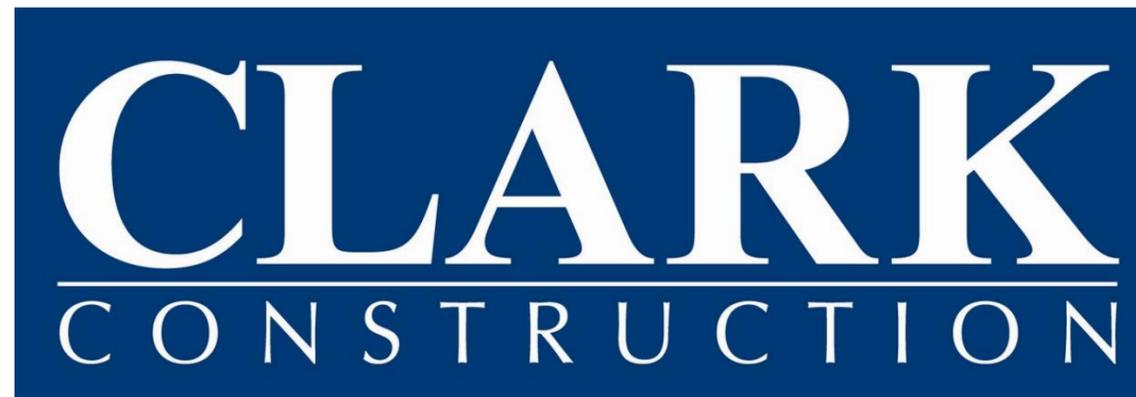
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Architectural Breadth
South Elevation with Photovoltaic Windows and Extended Louvers on Roof

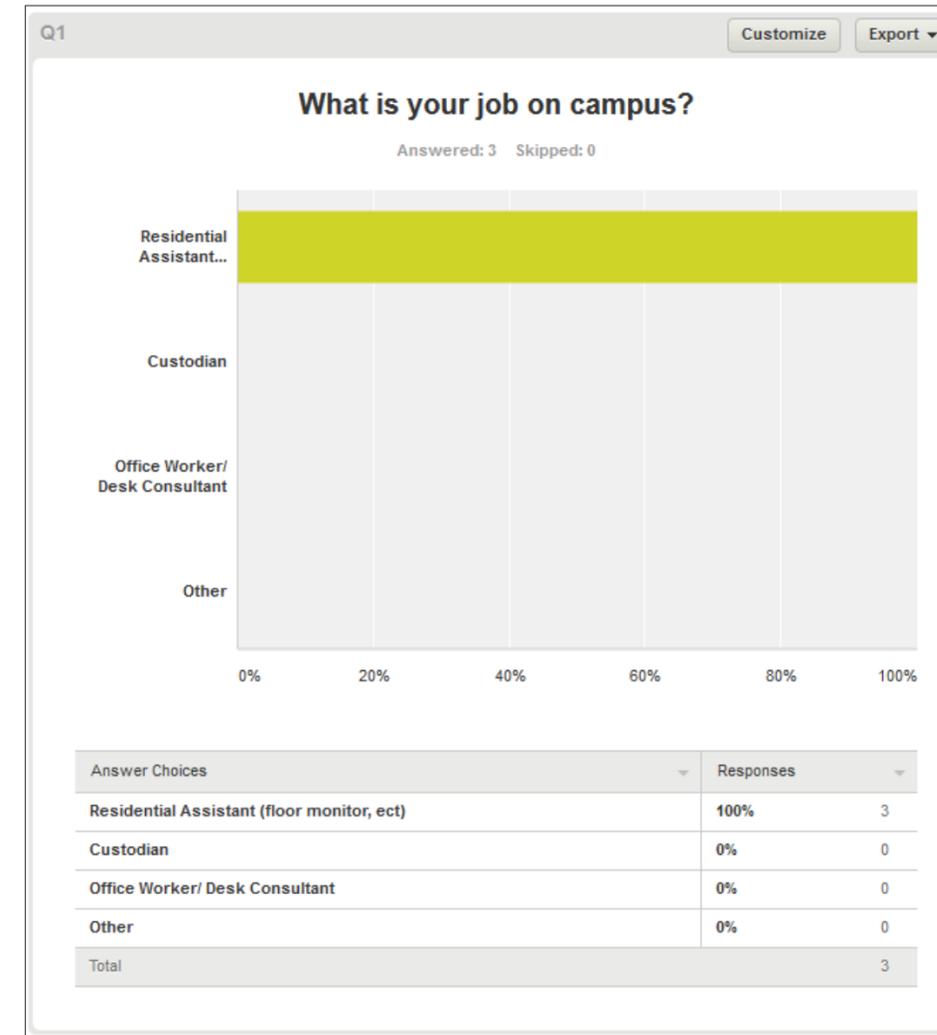
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Q7

Do you know if the campus building in question is LEED certified?
Answered: 3 Skipped: 0

● Responses (3) Text Analysis My Categories

Categorize as... Filter by Category Search responses

Showing 3 responses

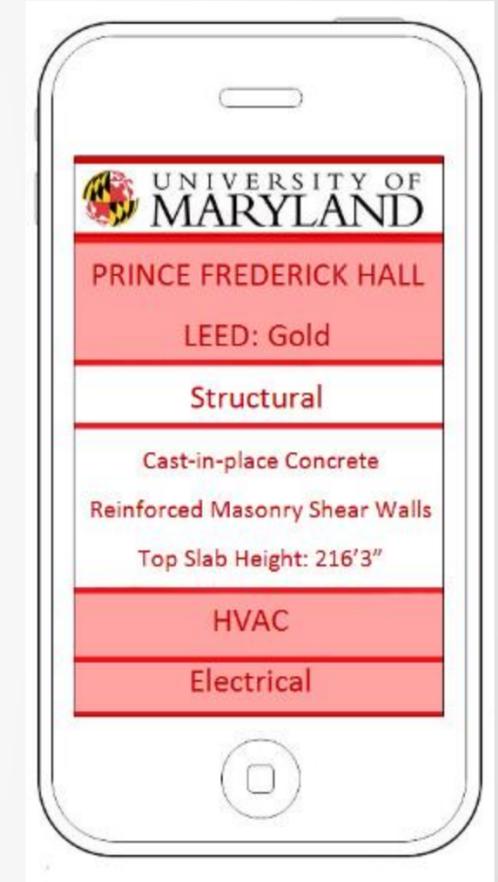
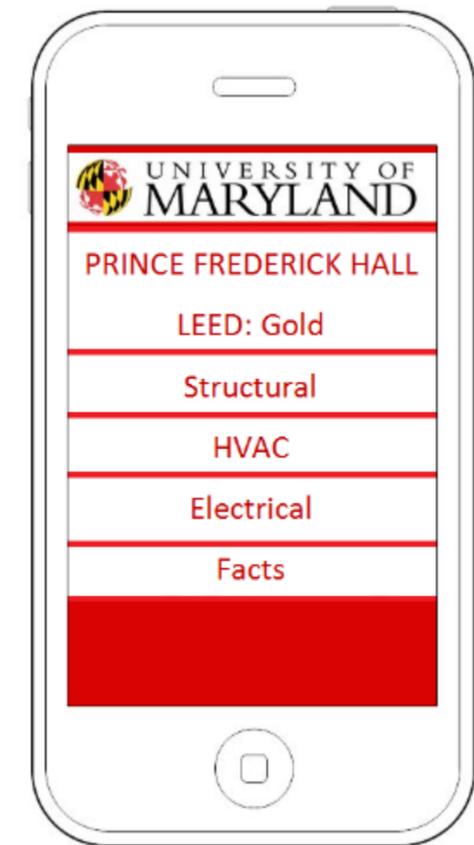
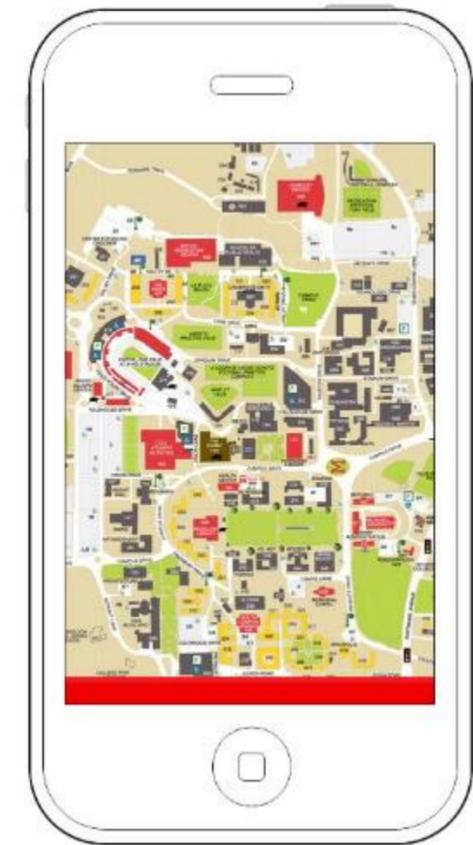
No idea matey.
3/17/2014 6:12 PM [View respondent's answers](#)

It is most definitely not. LEED certification is silly anyways. People pay all this money to have a "green" building when they can do the same things, and just not pay for the certification.
3/17/2014 12:05 PM [View respondent's answers](#)

no, i do not know
3/17/2014 12:00 PM [View respondent's answers](#)

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Recommendations

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Questions?

Thank you for your time and attendance.

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