

**DESCRIPTION OF INTERIM CAPITAL PROJECT FOR CONSIDERATION**

April 5, 2017

**MEDICAL UNIVERSITY OF SOUTH CAROLINA**

**PROJECT NAME:** Storm Eye Institute Chiller Replacement

**REQUESTED ACTION:** Establish Construction Budget (Phase II)

**REQUESTED ACTION AMOUNT:** \$2,012,500

*Internal Projected Cost: \$2,050,000*

**PREVIOUS CHE ACTIONS:** October 5, 2017 (Phase I, \$37,500)

<b><u>Project Budget</u></b>	<b><u>Previous</u></b>	<b><u>Change</u></b>	<b><u>Revised</u></b>
Professional Service Fees	\$37,500	\$127,500	\$165,000
Renovations - Utilities	\$0	\$1,650,000	\$1,650,000
Labor Costs	\$0	\$70,000	\$70,000
Contingency	\$0	\$165,000	\$165,000
<b>Total</b>	<b>\$37,500</b>	<b>\$2,012,500</b>	<b>\$2,050,000</b>

<b><u>Source of Funds</u></b>	<b><u>Previous</u></b>	<b><u>Change</u></b>	<b><u>Revised</u></b>
Institutional Deferred Maintenance	\$37,500	\$2,012,500	\$2,050,000
<b>Total</b>	<b>\$37,500</b>	<b>\$2,012,500</b>	<b>\$2,050,000</b>

**DESCRIPTION:**

MUSC requests to proceed to the full design and construction phase to replace two aged and failing chillers on the roof of the Storm Eye Institute. One chiller has completely failed and the other is operating at 50% capacity. In addition, the University has been borrowing chilled water from the hospital to maintain operations. As part of the replacement project, the University will be enclosing the cooling towers and pumps to protect the systems from outside elements. The current chillers, which have 200 ton and 350 ton capacity, will both be replaced with 600 ton chillers. The chillers were last replaced in the 1990s and have met the end of their useful lives. The total project estimate came in \$450,000 below the Phase I internal projected cost of \$2.5M.

The project will not be LEED or Green Globes certified since it is a replacement of equipment. However, high efficiency motors and electronic controls will be included. The warranties will cover 15 months from substantial completion for the chillers, and 5 years for the motor compressor assembly. The delivery method for construction is design-bid-build, and construction is estimated to begin in September 2018, with completion estimated for March 2019.

This project was identified as a Year One project on the 2017 CPIP. It is included in the University's first priority, which addresses \$4m in deferred maintenance on campus. The funds for this project were identified and committed during the 2017-2018 budget process.

**E&G MAINTENANCE NEEDS:**

The overall building score in 2017 was 77. The project will address the cooling capacity which has a 4 rating, and the overall cooling system average is 2.5.

**ADDITIONAL ANNUAL OPERATING COSTS/SAVINGS:**

No additional annual operating costs or savings were identified with this project.

<b>Institution Name:</b>	<u>MUSC</u>	<b>Respondent:</b>	<u>Sim Parrish</u>
<b>Building Number:</b>	<u>650</u>		<u>Name</u>
<b>Building Name:</b>	<u>Storm Eye Institute</u>	<b>Telephone:</b>	<u>792-2772</u>
<b>Location:</b>	<u></u>	<b>E-Mail:</b>	<u>parrishs@musc.edu</u>
<b>Gross Square Feet:</b>	<u>95,356</u>		
<b>Year Const / Renov:</b>	<u>1975</u>   <u>1998</u>		
<b>Replacement Cost:</b>	<u>\$50,935,416</u>		

**Comments:**

Owned Fee Simple

<b>Please do not enter data in the cells below this line. Begin data entry on Page 2.</b>					
	System Avg. Score	Multiplier	System % of Building	Current % Value Bldg.	
Foundation	2.000	0.800	x	0.13	= 0.1040
Exterior Walls	2.125	0.763	x	0.13	= 0.0991
Floor	2.000	0.800	x	0.07	= 0.0560
Roof	2.333	0.700	x	0.07	= 0.0490
Interior Walls	2.000	0.800	x	0.03	= 0.0240
Windows	2.400	0.680	x	0.02	= 0.0136
Doors	1.000	1.000	x	0.01	= 0.0100
Ceiling	2.250	0.725	x	0.03	= 0.0218
Heating	2.250	0.725	x	0.10	= 0.0725
Cooling	2.500	0.650	x	0.10	= 0.0650
Plumbing	2.111	0.767	x	0.08	= 0.0613
Electrical	1.875	0.825	x	0.08	= 0.0660
Elevators	2.000	0.800	x	0.01	= 0.0080
Safety	1.000	1.000	x	0.05	= 0.0500
Design Standards	2.000	0.800	x	0.09	= 0.0720
<b>Agency Rating:</b>				<b>1.00</b>	<b>0.772</b>

<b>Replacement Cost:</b> \$50,935,416	<b>Bldg. Avg. Grade:</b> 77	<b>Condition Code:</b> 1 Satisfactory	<b>Condition Multiplier:</b> 1.00	<b>Difference:</b>
<b>Maintenance Need Over 20 Years:</b> \$8,434,905		2 Remodel A	0.8	-0.2
		3 Remodel B	0.5	-0.3
		4 Remodel C	0.2	-0.3
		5 Replace	0.00	-0.2

Building Name: Storm Eye Institute

Building Number: 650

Foundation	
1 - 2 - 3 - 4 - 5	Rating
Cracked Walls	2
Foundation Settlement	2
Foundation Deterioration	2
Design Load	2
<b>Average</b>	<b>2</b>

Exterior Wall System	
1 - 2 - 3 - 4 - 5	Rating
Physical Condition	3
Waterproofing	3
Caulking	3
Pointing	1
Code Compliance	1
Insulation	2
Maintainability	2
Painting	2
<b>Average</b>	<b>2.125</b>

Floor System	
1 - 2 - 3 - 4 - 5	Rating
Structural Condition	2
Maintainability	2
Floor Finish	2
Vibration	2
Fire Rating	2
Design Load	2
<b>Average</b>	<b>2</b>

Roof System	
1 - 2 - 3 - 4 - 5	Rating
Physical Condition	3
Leaks	2
Drainage	3
Insulation	2
Fire Rating	2
Design Load	2
<b>Average</b>	<b>2.3333</b>
Age of Roof Cover:	15
Type of Roof Cover:	built up
Flat:	X
Pitched:	

Interior Wall System	
1 - 2 - 3 - 4 - 5	Rating
Physical Condition	2
Strength & Stability	2
Acoustical Quality	2
Appearance	2
Adaptability	2
Maintainability	2
<b>Average</b>	<b>2</b>

Window System	
1 - 2 - 3 - 4 - 5	Rating
Physical Condition	2
Appearance	2
Functional Ability	2
Infiltration	3
Maintainability	3
<b>Average</b>	<b>2.4</b>

Door System	
1 - 2 - 3 - 4 - 5	Rating
Door Leaf	1
Frame	1
Hardware	1
Security	1
Fire Rating	1
<b>Average</b>	<b>1</b>

Ceiling System	
1 - 2 - 3 - 4 - 5	Rating
Structural Condition	2
Accoustical	3
Accessibility	2
Appearance	2
<b>Average</b>	<b>2.25</b>

Heating System	
1 - 2 - 3 - 4 - 5	Rating
Heating Capacity	2
Temperature Control	2
Noise Level	2
Air Circulation & Vent	2
Reliability	3
Reasonable Energy Consumption	3
Filtration	2
Humidity	2
<b>Average</b>	<b>2.25</b>
Age of System:	28 +/-
Heating Capacity-BTUs:	1000

Cooling System	
1 - 2 - 3 - 4 - 5	Rating
Cooling Capacity	4
Reasonable Energy Consumption	3
Temperature	2
Noise Level	2
Air Circulation & Vent	2
Reliability	3
Filtration	2
Humidity	2
<b>Average</b>	<b>2.5</b>
Age of System:	28
Cooling Capacity-Tons:	550

Plumbing System	
1 - 2 - 3 - 4 - 5	Rating
Water Pressure & Supply Quantities	2
Sanitation Hazards or Cross Functions	1
Drain & Waste Function	2
Fixture Quantities	2
Fixture Types & Cond.	2
Wheel Chair Fixtures	2
Restroom Facilities	2
Roof Drainage	4
Site Drainage	2
<b>Average</b>	<b>2.1111</b>

Electrical System	
1 - 2 - 3 - 4 - 5	Rating
Safety Conditions	1
Service Capacity	2
Panel Capacity	2
Convenience Outlets	2
Light Levels	2
Fixtures	2
Emergency Power	2
Exit Lighting	2
<b>Average</b>	<b>1.875</b>

Elevator System	
1 - 2 - 3 - 4 - 5	Rating
Size & Number	2
Maintainability	2
Code Compliance	2
<b>Average</b>	<b>2</b>

Safety Standards	
1 - 2 - 3 - 4 - 5	Rating
Means of Egress	1
Fire Ratings	1
Extinguishing Systems	1
Detection & Alarm Sys.	1
Lighting Systems	1
Handicap Access	1
<b>Average</b>	<b>1</b>

Design Standards	
1 - 2 - 3 - 4 - 5	Rating
Flexible Design	3
Suitable for Present Use	2
Gross to Assignable Area	1
<b>Average</b>	<b>2</b>

FOR DEPARTMENT USE ONLY	
CHE	_____
JBRC	_____
SFAA	_____
JBRC Staff	_____
ADMIN Staff	_____
A-1 Form Mailed	_____
SPIRS Date	_____
Summary	_____

(For Department Use Only)
SUMMARY NUMBER
FORM NUMBER

**PERMANENT IMPROVEMENT PROJECT REQUEST**

1. AGENCY Code H51 Name Medical University of South Carolina  
 Contact Person Philip S. Mauney Phone 843-792-2490

2. PROJECT Project # 9841 Name Storm Eye Institute Chiller Replacement  
 Facility # 650 Facility Name Storm Eye Institute

County Code	10 - Charleston
New/Revised Budget	\$2,050,000.00

Project Type	4 - Replace Existing Facilities/Systems
Facility Type	2 - Program/Academic

3. CPIP PROJECT APPROVAL FOR CURRENT FISCAL YEAR  
 CPIP priority number 1 of 4 for FY 2018.

4. PROJECT ACTION PROPOSED (Indicate all requested actions by checking the appropriate boxes.)

Establish Project	<input type="checkbox"/>	Decrease Budget	<input type="checkbox"/>	Close Project	<input type="checkbox"/>
Establish Project - CPIP	<input type="checkbox"/>	Change Source of Funds	<input type="checkbox"/>	Change Project Name	<input type="checkbox"/>
Increase Budget	<input checked="" type="checkbox"/>	Revise Scope	<input type="checkbox"/>	Cancel Project	<input type="checkbox"/>

5. PROJECT DESCRIPTION AND JUSTIFICATION  
 (Explain and justify the project or revision, including what it is, why it is needed, and any alternatives considered.  
 Attach supporting documentation/maps to fully convey the need for the request.)

This project will replace two existing failing air cooled chillers on the roof of the Storm Eye Institute. One existing 200 ton chiller has completely failed. The second existing 350 ton chiller has partially failed and currently can only operate at 50% capacity. These chillers will be replaced with one 600 ton water cooled chiller including associated cooling towers and pumps. The new chiller and tower water pumps will be located in an enclosure to protect them from outside elements. This request is for approval to proceed with phase 2 full design and construction.

6. OPERATING COSTS IMPLICATIONS  
 Attach Form A-49 if any additional operating costs or savings will result from this request. This includes costs to be absorbed with current funding.

7. ESTIMATED PROJECT SCHEDULE AND EXPENDITURES  
 Estimated Start Date: October 2017 Estimated Completion Date: June 2019  
 Estimated Expenditures: Thru Current FY: \$250,000.00 After Current FY: \$1,800,000.00

8. ESTIMATES OF NEW/REVISED PROJECT COSTS

<b>PROJECT #</b>	9841
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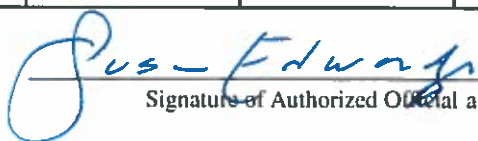
- 1. \_\_\_\_\_ Land Purchase ----> Land: \_\_\_\_\_ Acres
  - 2. \_\_\_\_\_ Building Purchase ----> Floor Space: \_\_\_\_\_ Gross Square Feet
  - 3. 165,000.00 Professional Services Fees
  - 4. \_\_\_\_\_ Equipment and/or Materials ----> Information Technology \_\_\_\_\_
  - 5. \_\_\_\_\_ Site Development
  - 6. \_\_\_\_\_ New Construction ----> Floor Space: \_\_\_\_\_ Gross Square Feet
  - 7. \_\_\_\_\_ Renovations - Building Interior ----> Floor Space: \_\_\_\_\_ Gross Square Feet
  - 8. 1,650,000.00 Renovations - Utilities
  - 9. \_\_\_\_\_ Roofing - \_\_\_\_\_ Roof Age
  - 10. \_\_\_\_\_ Renovations - Building Exterior
  - 11. \_\_\_\_\_ Other Permanent Improvements
  - 12. \_\_\_\_\_ Landscaping
  - 13. \_\_\_\_\_ Builders Risk Insurance
  - 14. \_\_\_\_\_ Other Capital Outlay
  - 15. 70,000.00 Labor Costs
  - 16. \_\_\_\_\_ Bond Issue Costs
  - 17. \_\_\_\_\_ Other: \_\_\_\_\_
  - 18. 165,000.00 Contingency
- \$2,050,000.00 TOTAL PROJECT BUDGET

ENVIRONMENTAL HAZARDS	
Identify all types of significant environmental hazards (including asbestos, PCB's, etc..) present in the project and the financial impact they will have on the project.	
Type:	_____
<u>Cost Breakdown</u>	
Design Services	\$ _____
Monitoring	\$ _____
Abate/Remed	\$ _____
Total Costs	\$ _____ 0.00

9. PROPOSED SOURCE OF FUNDING

Source	Previously Approved Amount	Increase/Decrease	Original/Revised Budget	Transfer to/from Proj. #	Rev Object Code	Treasurer's ID Number	Rev Sub Fund	Exp Sub Fund
(0) CIB, Group			0.00 0.00		8115		3043	3043
(1) Dept. CIB, Group			0.00 0.00		8115		3143	3143
(2) Institution Bonds			0.00 0.00					3235
(3) Revenue Bonds			0.00 0.00					3393
(4) Excess Debt Service			0.00 0.00					3497
(5) Capital Reserve Fund			0.00 0.00		8895		3603	3603
(6) Appropriated State			0.00 0.00		8895	68800100	1001	3600
(7) Federal			0.00 0.00			78800100		5787
(8) Athletic			0.00 0.00			88800100		3807
(9) Other (Specify) Institutional DM	37,500.00	2,012,500.00	2,050,000.00 0.00 0.00		2802	98800100	3055	3907
<b>TOTAL BUDGET</b>	<b>\$37,500.00</b>	<b>\$2,012,500.00</b>	<b>\$2,050,000.00</b>	<b>#1 on FY18 Capital Budget</b>				

10. SUBMITTED BY:

  
\_\_\_\_\_  
Signature of Authorized Official and Title

February 26, 2018

\_\_\_\_\_  
Date

11. APPROVED BY:

(For Department Use Only) Authorized Signature and Title

\_\_\_\_\_  
Date

**ADDITIONAL ANNUAL OPERATING COSTS / SAVINGS  
RESULTING FROM PERMANENT IMPROVEMENT PROJECT**

1. AGENCY Code H51 Name Medical University of South Carolina

2. PROJECT Project # 9841 Name Storm Eye Institute Chiller Replacement

3. ADDITIONAL ANNUAL OPERATING COSTS / SAVINGS. (Check whether reporting costs or savings.)

COSTS                       SAVINGS                       NO CHANGE

4.

TOTAL ADDITIONAL OPERATING COSTS / SAVINGS				
Projected Financing Sources				
(1)	(2)	(3)	(4)	(5)
Fiscal Year	General Funds	Federal	Other	Total
1)	\$	\$	\$	\$ 0.00
2)	\$	\$	\$	\$ 0.00
3)	\$	\$	\$	\$ 0.00

5. If "Other" sources are reported in Column 4 above, itemize and specify what the other sources are (revenues, fees, etc.).

6. Will the additional costs be absorbed into your existing budget?  YES                       NO  
If no, how will additional funds be provided?

7. Itemize below the cost factors that contribute to the total costs or savings reported above in Column 5 for the first fiscal year.

	<u>COST FACTORS</u>	<u>AMOUNT</u>
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____
6.	_____	_____
7.	_____	_____
8.	_____	_____
	TOTAL	\$0.00

8. If personal services costs or savings are reported in 7 above, please indicate the number of additional positions required or positions saved. \_\_\_\_\_

9. Submitted By:  Signature of Authorized Official and Title                      2/26/2018 Date

**PERMANENT IMPROVEMENT PROJECT INFORMATION FORMAT  
FOR PHASE II CONSTRUCTION BUDGET**

1. What is the total projected cost of the project and what is it based on? Please attach a summary of the costs prepared during the A&E pre-design phase to support the total cost.

**\$2,050,000**

2. What is/are the source(s) of funds for the construction? If any private or federal funds are included, please attach a letter guaranteeing the availability of the funds.

**Investment Fund - Deferred Maintenance**

3. What is your agency/institution's definition of each fund source to be used for construction? (If any type of fee makes up a portion of the source, what is the fee called, what is the fee amount, and when it was put in place. If there is a statutory authority authorizing the use of the funds for capital projects, please cite the code section.)

**Investment Fund - Deferred Maintenance**

4. What is the current uncommitted balance of funds for each source listed in 3 above?

All funds in the account were committed to deferred maintenance projects during FY18 capital budget process.

5. If institution or revenue bonds are included as a source, when were the bonds issued? If not issued yet, when is the bond resolution expected to be brought for State Fiscal Accountability Authority approval?

**Not applicable**

6. If a student fee is used to fund debt service, what is the current amount of the fee annually or by semester? Please specify which.

**Not Applicable**

7. Will the use of any funds for construction require an increase in any student fee or tuition? If so, please explain in detail.

**No**

8. Will the project be LEED certified for energy savings and conservation and if so, at what level will it be certified? For projects requiring or using LEED certification, please attach the required cost-benefit analysis and a checklist of items to be used to achieve LEED points or a description of the energy measures to achieve LEED.

**NO, Equipment Replacement**

9. What energy savings/conservation measures will be implemented within the project if the project will not be LEED certified? For projects that do not require/use LEED, please provide a paragraph on energy savings measures to be implemented as part of the project. If there are no energy savings measures included, please state that and explain why.

**High efficiency motors and electronic controls will be included in the project.**

10. What is the projected date (month and year) for execution of the construction contract?

**September 2018**

11. What is the projected date (month and year) for completion of construction?  
March 2019
12. What program(s) are to be included in the constructed or renovated space?  
Not Applicable, Equipment Replacement. The building is a mix of ophthalmology research and clinical space.
13. What is the total square footage of the building to be renovated or constructed?  
92,605 sf
14. If a portion of the building is to be renovated, what is the square footage of the portion that will be included in the renovation?  
Not Applicable, Equipment Replacement
15. What is the current age of the building or building systems to be renovated?  
42 years old
16. If any new space is being added to the facility, please provide demand/usage data to support the need.  
No space is being added
17. What are the estimated numbers of students, faculty, staff and/or clients that are expected to use the space affected by the project or the entire building? (Answer for as many as are applicable.)  
Not applicable, equipment replacement. Approximately 100 faculty, staff, and students plus 200 patients utilize the facility.
18. If the construction cost increased significantly from the internal estimate (30% or more), what factors caused the cost to increase?  
Not applicable
19. If the contingency is more than 10%, please explain why.  
Not applicable
20. If funds are being transferred from another project, what is the current status of the project from which funds are being transferred?  
Not applicable
21. Has the project been included in a previous year's CPIP? If so, what was the last year the project was included and for which year, 1-5?  
Yes, FY18 year 1
22. What are the economic impacts of the project, including job creation and retention? If there are none, please explain.  
This project will create/retain approximately 10 construction/engineering jobs during implementation. Since the chillers are critical to the operation of the HVAC system, the major economic impact is continued operation of a major facility
23. How will your agency/institution address and fund maintenance of this facility construction/renovation?  
Since this is a replacement of existing equipment in an existing facility, the maintenance support structure is already in place.



24. If your agency/institution has a deferred maintenance account, what is the name of the account and what is its current uncommitted balance?

Yes, the name of the account is "Investment Fund-Deferred Maintenance." All funds in the account were committed to deferred maintenance projects during the FY18 capital budget process.

25. If how maintenance will be addressed and funded for this facility construction/renovation has not been determined yet, what steps are in place to begin to address how your agency/institution will fund maintenance to this and other agency/institution facilities?

Not Applicable



# MASTER SUMMARY

## Schematic Design Estimate

For  
**Chiller Replacement**  
**Storm Eye Institute**  
 Charleston, SC

<b>Architect:</b> MECA 2330 Main Street Columbia, SC 29201	<b>Owner:</b> Medical University of South Carolina	<b>Cost Estimator:</b> Aiken Cost Consultants 19 West Stone Avenue Greenville, SC 29609
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Storm Eye Institute	Building		Sitework		Total	
	Cost	%	Cost	%	Cost	%
Chiller Replacement	1,546,341				1,546,341	
<b>Total Probable Base Bid</b>	<b>\$1,546,341</b>	<b>100.0%</b>			<b>\$1,546,341</b>	<b>100.0%</b>

Site Cost per Adjusted Gross						
LS						
Building Cost per Adjusted Gross						
2,500 SF	\$618.54	SF			\$618.54	SF

Construction Phase Contingency	77,317	5.0%			77,317	5.0%
<b>Total Construction Cost (TCC)</b>	<b>\$1,623,658</b>				<b>\$1,623,658</b>	

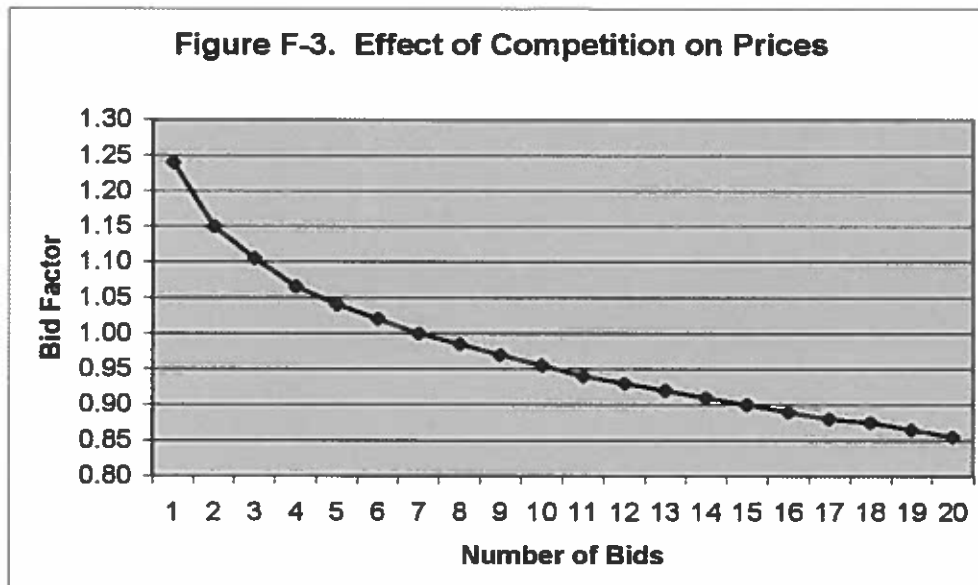
## Project Notes / General Comments

This estimate is based upon Schematic Design Drawings and Narrative dated 27 December 2017.

This estimate has been prepared in accordance with generally accepted estimating practices and principles. Aiken Cost Consultants' staff is available to discuss our methods, pricing, assumptions, or estimating philosophy with any interested party. Please contact us by phone at (864) 232-9342, by fax at (864) 233-2573, or by e-mail at Brad@AikenCost.com.

Aiken Cost Consultants estimates are intended to be used as a professional opinion of the probable cost of construction, based on our understanding of the design at the time the estimate was prepared. We have no control over General or Subcontractor overhead and profit percentages, bidding climates, schedules, contractor's methods of determining prices, continuing design modifications or addenda, etc., therefore, we cannot guarantee that proposals, bids, or actual construction costs will be within a certain range of this, or subsequent, cost estimates.

When preparing each cost estimate submittal Aiken Cost Consultants reviews current market conditions. It is our opinion that current construction market may be less than competitive at both the General Contractor and Sub Contractor levels. One of several resources the Owner should consider when bidding a project is the "Effect of Competition on Prices" table from the South Carolina State Engineer's Manual (see below). Additional project specific factors to consider (when applicable) are; anticipated mid-point of construction, difficult conditions, phasing, Liquidated Damages, limited or set-aside contracting requirements, etc. These multiple factors should also be considered whenever the project is delayed and/or market conditions change significantly.



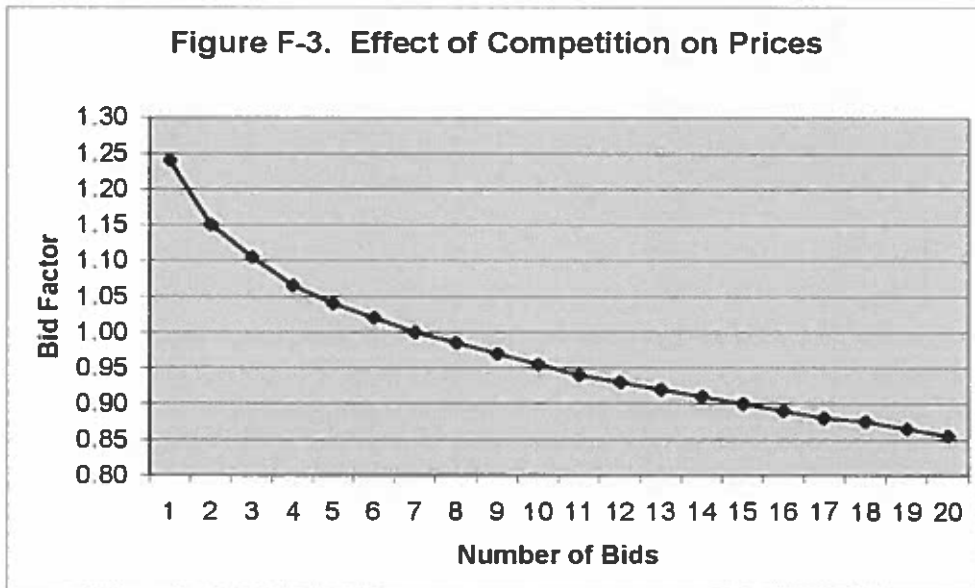
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**BUILDING SUMMARY**  
**Schematic Design Estimate**  
**FOR**  
**Chiller Replacement**  
**Storm Eye Institute**  
**Charleston, SC**

<b>Architect:</b> MECA 2330 Main Street Columbia, SC 29201	<b>Owner:</b> Medical University of South Carolina	<b>Cost Estimator:</b> Aiken Cost Consultants 19 West Stone Avenue Greenville, SC 29609
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Project Data		Area Calculation	
Project Code:	MEC23	Project Area	Adjusted Gross
Type of Work:	Renovation		2500 SF
Mid Point of Construction:	Jan 2019		
Est Const Duration:(Months)	3		
Owners Budget:	Unknown		
ACC Last Estimate:	NA	Total Bldg Area =	2500 SF

Project	Chiller Replacement	GFA -->	2,500	SF
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LEVEL 2 GROUP ELEMENTS Level 3 Elements	Element				Cost per unit GFA	%
	Quantity	Unit	Rate (\$)	Cost		

A10 FOUNDATION SYSTEM						
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A20 BASEMENT CONSTRUCTION						
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B10 SUPERSTRUCTURE				\$146,264	\$58.51	9.5%
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B1020 Roof Construction	1135	SF	128.87	146,264	58.51	
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B20 EXTERIOR CLOSURE						
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B2010 Exterior Walls	500	SF	17.81	8,904	3.56	0.6%
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B30 ROOFING						
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B3010 Roof Coverings	2000	SF	11.55	23,098	9.24	1.5%
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C10 INTERIOR CONSTRUCTION						
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C20 STAIRCASES						
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C2010 Stair Construction	20	LFN	291.42	5,828	2.33	0.4%
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C30 INTERIOR FINISHES						
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D10 CONVEYING SYSTEMS						
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Project	Chiller Replacement			GFA -->	2,500	SF	
LEVEL 2 GROUP ELEMENTS				Element		Cost per unit GFA	%
Level 3 Elements				Quantity	Unit		
D20 PLUMBING							
D30 HVAC							
				\$954,461	\$381.78	61.7%	
D3030 Cooling Generating Systems	600	TN	1,165.11	699,064	279.63		
D3040 Distribution Systems	600	TN	219.22	131,534	52.61		
D3060 Controls & Instrumentation	600	TN	55.99	33,593	13.44		
D3070 Special HVAC Systems & Equipment	600	TN	146.82	88,091	35.24		
D3080 Systems Testing & Balancing	600	TN	3.63	2,179	0.87		
D40 FIRE PROTECTION							
D50 ELECTRICAL							
				\$271,463	\$108.59	17.6%	
D5010 Electrical Service & Distribution	2500	SF	79.79	199,472	79.79		
D5020 Lighting & Branch Wiring	2500	SF	28.80	71,991	28.80		
E10 EQUIPMENT							
E20 FURNISHINGS							
F10 SPECIAL CONSTRUCTION							
F20 SELECTIVE BUILDING DEMOLITION							
				\$48,182	\$19.27	3.1%	
F2010 Building Elements Demolition	2500	SF	19.27	48,182	19.27		
<b>Building Elemental Cost without GC Field Overhead</b>				<b>\$1,458,200</b>	<b>583.28</b>	<b>94.3%</b>	
Z20 GC FIELD OVERHEAD							
GC Field Overhead for Building	2,500	SF		\$88,141	35.26	5.7%	
<b>Building Cost including GC Field Overhead</b>				<b>\$1,546,341</b>	<b>618.54</b>	<b>100.0%</b>	
<b>The above unit prices INCLUDE the following:</b>							
Fees & Permits	General Contractor Home Office Expense			General Contractor's Profit			
Bond	Escalation to Mid Point of Construction			Sub-Contractor OH&P			
State Sales Tax	Non-Competitive Market						
Design Contingency	Difficult Conditions						
<b>The following items are EXCLUDED from this estimate:</b>							
Design Fees	Furniture or Furnishings (Except as Noted)						
Inhouse Costs	Window Blinds or Other Window Treatments						
Finance Costs							

MEC23	Chiller Replacement	GC Field Overhead	Net SF:	2,500
Schematic Design Estimate			UNIT	TOTAL
DESCRIPTION	U/M		TOTAL	COST
<b>Z20/Z60 GC FIELD OVERHEAD</b>				<b>\$88,141</b>
<b>Field Personnel</b>				
Project Manager	3 MO		10549	31,646
Clerk	3 MO		5685	17,054
<b>Field Office Expense</b>				
Field Office Trailer (50'x10')	3 MO		542	1,626
Field Office Lights & HVAC	3 MO		248	743
Office Supplies and Office Equipment Rental	3 MO		433	1,300
Insurance	1 LS		5660	5,660
Scheduling - CPM	1 LS		1238	1,238
<b>Utilities</b>				
Temporary Sanitary (2 Portable Toilets)	3 MO		594	1,783
Cell Phone (x3)	3 MO		132	395
<b>Vehicles &amp; Equipment</b>				
Pick Up Trucks, 3/4 Ton, 4WD	3 MO		1022	3,065
Gas for equipment	3 MO		344	1,031
Misc. Equipment	3 MO		1274	3,821
Storage / Tool Trailer	3 MO		348	1,045
Small Tools	1 LS		2477	2,477
<b>Clean up</b>				
Continuous Cleanup	60 DAY		9.87	592
Final Cleanup	2,500 SF		0.80	2,004
Debris Removal & Disposal (Dumpster, 2 dump/mo)	3 MO		851	2,554
<b>Miscellaneous Expenses</b>				
Mobilization & De-Mobilization	1 LS		2494	2,494
Project Sign	1 EA		928	928
Misc Expenses	1 LS		2477	2,477
<b>QC and Closeout</b>				
Contract Closeout	1 EA		4207	4,207

MEC23 Chiller Replacement		Net SF:	2,500
Schematic Design Estimate		UNIT	TOTAL
DESCRIPTION	U/M	TOTAL	COST
<b>A SUBSTRUCTURE</b>			
<b>A10 FOUNDATION SYSTEM</b>			
None In This Contract			
<b>A20 BASEMENT CONSTRUCTION</b>			
None In This Contract			
<b>B SHELL</b>			
<b>B10 SUPERSTRUCTURE</b>			146,264
<b>B1010 Floor Construction</b>		SF	=
None In This Contract			
<b>B1020 Roof Construction</b>		1135 SF	= 146,264
<b>Rooftop Framing</b>			
6" Concrete on decking, open, galv, 3" deep	560 SF	12.94	7,248
WF & Tube Steel Beams & Columns	15 TON	5,667	85,000
Miscellaneous Steel: Plates, Bolts, Conns, Angles, etc...	3 TON	8,151	24,454
Metal Grating Platform	575 SF	42.90	24,667
Steel Guardrail	60 LF	81.58	4,895
<b>B20 EXTERIOR CLOSURE</b>			8,904
<b>B2010 Exterior Walls</b>		500 SF	= 8,904
Remove & Replace Building Skirt	500 SF	17.81	8,904
<b>B2020 Exterior Windows</b>		SF	=
None In This Contract			
<b>B2030 Exterior Doors</b>		SF	=
None In This Contract			
<b>B30 ROOFING</b>			23,098
<b>B3010 Roof Coverings</b>		2000 SF	= 23,098
Patch & Repair Roofing	2000 SF	11.55	23,098
<b>B3020 Roof Openings</b>		SF	=
None in This Contract			



MEC23 Chiller Replacement		Net SF:	2,500
Schematic Design Estimate		UNIT	TOTAL
DESCRIPTION	U/M	TOTAL	COST
<b>C INTERIORS</b>			
<b>C10 INTERIOR CONSTRUCTION</b>			
None In This Contract			
<b>C20 STAIRCASES</b>			
<b>C2010 Stair Construction</b>	20 LFN	=	5,828
<b>C2012 Prefabricated Metal Stair Assemblies</b>			
Metal Grating Stairs	20 LFN	227	4,546
Demo Stair & Landing	125 SF	10.26	1,282
<b>C2020 Stair Finishes</b>	FLT	=	
None In This Contract			
<b>C30 INTERIOR FINISHES</b>			
None In This Contract			
<b>D SERVICES</b>			
<b>D10 CONVEYING SYSTEMS</b>			
None In This Contract			
<b>D20 PLUMBING</b>			
None In This Contract			
<b>D30 HVAC</b>			
<b>D3020 Heat Generating Systems</b>	TN	=	954,461
None In This Contract			
<b>D3030 Cooling Generating Systems</b>	600 TN	=	699,064
<b>Cooling Towers</b>			
Galvanized Cooling Tower, 600 Ton	1 EA	139464.80	139,465
<b>Water Cooled Chillers</b>			
Water Cooled Centrifugal Chiller, 600 Ton	1 EA	559598.71	559,599
<b>D3040 Distribution Systems</b>	600 TN	=	131,534
<b>HVAC Hydronic Distribution Piping</b>			
8" C/S Sch 40 Pipe w/BW Ftgs, Hgrs & Insul	389 LF	250.53	97,457

MEC23 Chiller Replacement		Net SF:	2,500
Schematic Design Estimate		UNIT	TOTAL
DESCRIPTION	U/M	TOTAL	COST
10" C/S Sch 40 Pipe w/BW Ftgs, Hgrs & Insul	86 LF	340.76	29,305
Piping Heat Trace for Freeze Protection	389 LF	12.27	4,771
<b>D3050 Terminal &amp; Package Units</b>	TN	=	
None in This Contract			
<b>D3060 Controls &amp; Instrumentation</b>	600 TN	=	33,593
<b>Controls System</b>			
DDC for Chiller	1 EA	33592.86	33,593
<b>D3070 Special HVAC Systems &amp; Equipment</b>	600 TN	=	88,091
<b>HVAC Specialties</b>			
Vibration Isolation & Seismic Restraint	1 LS	15727.56	15,728
HVAC Shop Drawings	1 LS	1048.50	1,049
HVAC "As Built" Drawings	1 LS	851.91	852
Submittals and Close Out Documentation	1 LS	786.38	786
Operation & Maintenance Manuals (O & M's)	1 LS	524.25	524
Owner Training For Operating Personnel	1 LS	655.31	655
One Year Contractor Service Warranty	1 LS	524.25	524
Piping / Equipment Labeling & Tagging	1 LS	458.72	459
Hydrostaticly Test HVAC Piping	1 LS	786.38	786
Roof Pipe Supports	26 EA	775.55	20,164
Hydronic Piping Tie-Ins	4 EA	3284.18	13,137
Modular Mechanical Enclosure	1 LS	33426.99	33,427
<b>D3080 Systems Testing &amp; Balancing</b>	600 TN	=	2,179
<b>WaterSide Testing &amp; Balancing</b>			
Start-Up, Test & Balance Cooling Tower	1 EA	933.97	934
Start-Up, Test & Balance Chiller	1 EA	1245.29	1,245
<b>D40 FIRE PROTECTION</b>			
None In This Contract			
<b>D50 ELECTRICAL</b>			271,463
<b>D5010 Electrical Service &amp; Distribution</b>	2500 SF	=	199,472
<b>D5013 Panels</b>			

MEC23 Chiller Replacement		Net SF:	2,500	
Schematic Design Estimate		UNIT	TOTAL	
DESCRIPTION	U/M	TOTAL	COST	
SWBD Circuit breaker, trip unit, 1000 amp	1 EA	3250.07	3,250	
DP_Main lug only, to 480 volt, 1200 amp	1 EA	7138.76	7,139	
Circuit breaker, 480 volt, 3 pole, 15 to 60 amp	6 EA	1082.80	6,497	
Circuit breaker, 480 volt, 3 pole, 70 to 100 amp	2 EA	1293.77	2,588	
Circuit breaker, MA frame, 450-600 amp	1 EA	11194.53	11,195	
Transient voltage surge suppressor	1 EA	2032.80	2,033	
Panel steel support	1 EA	218.90	219	
<b>D5015 Enclosed Switches and Circuit Breakers</b>				
600 volt, 30 amp FDS, 3p, nema 3R, w/fuses	4 EA	713.25	2,853	
600 volt, 60 amp FDS, 3p, nema 3R, w/fuses	2 EA	894.89	1,790	
600 volt, 100 amp FDS, 3p, nema 3R, w/fuses	2 EA	1243.58	2,487	
<b>D5016 Starters &amp; Variable Frequency Drives</b>				
Starter, 600 volt, 5 HP, 3 pole, FBO - Labor Only	4 EA	322.73	1,291	
VFD, 480 volt, 30 HP, 3 pole, FBO - Labor Only	2 EA	1745.38	3,491	
VFD, 480 volt, 40 HP, 3 pole, FBO - Labor Only	2 EA	1745.38	3,491	
Steel support, VFDs/Starters	8 EA	100.04	800	
<b>D5019 Panel Feeders</b>				
3 1/2" EMT w/ 11 coup, 2 elbows & 2 term. per 100'	1140 LF	35.45	40,411	
3 1/2" EMT elbow	12 EA	165.43	1,985	
3 1/2" EMT connector	6 EA	204.82	1,229	
3 1/2" EMT coupling	24 EA	409.16	9,820	
3 1/2" ground bushing	6 EA	110.15	661	
#4/0 THHN wire, copper	1170 LF	8.76	10,255	
500 kcmil THHN wire, copper	4680 LF	18.37	85,989	
<b>D5020 Lighting &amp; Branch Wiring</b>	<b>2500 SF</b>	<b>=</b>	<b>71,991</b>	
<b>D5025 Receptacles</b>				
WPGFI Receptacle, 20 amp, w/box, ring, wp cover	1 EA	132.37	132	
<b>D5026 Receptacle Conduit &amp; Wire</b>				
3/4" EMT w/ 11 coup, 2 bends & 2 term. per 100'	160 LF	6.30	1,008	
3/4" EMT field bend	3 EA	7.44	21	
4" Square box w/cover (ring), support	1 EA	52.32	52	
#12 THHN wire, copper	640 LF	0.73	469	
<b>D5027 Equipment Connections</b>				
Chiller connection	1 EA	559.49	559	
Chilled water pump	2 EA	142.65	285	
Electric heater connection	4 EA	98.76	395	
Heated water pump	2 EA	142.65	285	
<b>D5028 Equipment Conduit &amp; Wire</b>				

MEC23 Chiller Replacement			Net SF:	2,500
Schematic Design Estimate			UNIT	TOTAL
DESCRIPTION		U/M	TOTAL	COST
1" EMT w/ 11 coup, 2 bends & 2 term. per 100'	1200	LF	8.08	9,701
1" EMT field bend	48	EA	8.17	392
1" ground bushing	12	EA	40.29	484
4 11/16" Square box w/cover (ring), support	12	EA	47.84	574
#10 THHN wire, copper	3960	LF	0.89	3,511
#6 THHN wire, copper	1320	LF	1.76	2,328
1 1/4" EMT w/ 11 coup, 2 bends & 2 term. per 100'	420	LF	10.53	4,422
1 1/4" EMT field bend	4	LF	15.28	55
1 1/4" ground bushing	4	EA	46.31	185
4 11/16" Square box w/cover (ring), support	2	EA	47.40	95
#8 THHN wire, copper	500	LF	1.24	621
#4 THHN wire, copper	1500	LF	2.34	3,515
3 1/2" EMT w/ 11 coup, 2 elbows & 2 term. per 100'	340	LF	35.45	12,052
3 1/2" EMT elbow	8	EA	165.43	1,323
3 1/2" EMT connector	4	EA	204.82	819
3 1/2" EMT coupling	16	EA	409.16	6,547
3 1/2" ground bushing	4	EA	110.15	441
#1/0 THHN wire, copper	360	LF	5.21	1,875
500 kcmil THHN wire, copper	1080	LF	18.37	19,844
<b>D5030 Communication &amp; Branch Wiring</b>		<b>SF</b>	<b>=</b>	
None In This Contract				
<b>D5040 Special Electrical Systems</b>		<b>SF</b>	<b>=</b>	
None In This Contract				
<b>E EQUIPMENT &amp; FURNISHINGS</b>				
<b>E10 EQUIPMENT</b>				
None In This Contract				
<b>E20 FURNISHINGS</b>				
None In This Contract				
<b>F SPECIAL CONSTRUCTION &amp; DEMOLITION</b>				
<b>F10 SPECIAL CONSTRUCTION</b>				
None In This Contract				
<b>F20 SELECTIVE BUILDING DEMOLITION</b>				
<b>F2010 Building Elements Demolition</b>	<b>2500</b>	<b>SF</b>	<b>=</b>	<b>48,182</b>

MEC23 Chiller Replacement		Net SF:	2,500
Schematic Design Estimate		UNIT	TOTAL
DESCRIPTION	U/M	TOTAL	COST
<b>F2019C Mechanical Interior Demolition</b>			
<b>HVAC Demolition</b>			
Remove Roof Mounted Water Chiller	2 EA	16399.30	32,799
Demo Steel Pipe, 8"	389 LF	29.81	11,594
<b>F2019D Electrical Interior Demolition</b>			
30 amp safety switch - DEMO	9 EA	47.42	427
100 amp safety switch - DEMO	1 EA	79.69	80
200 amp safety switch - DEMO	1 EA	115.92	116
3/4 HP motor connection - DEMO	2 EA	54.01	108
5 HP motor connection - DEMO	4 EA	64.55	258
15HP motor connection - DEMO	3 EA	90.89	273
75 HP motor connection - DEMO	1 EA	206.81	207
100 HP motor connection - DEMO	1 EA	322.73	323
1/2" - 1" EMT feeder - DEMO	900 LF	1.48	1,328
1 1/4" - 1 1/2" EMT feeder - DEMO	100 LF	1.78	178
2" - 3" EMT feeder - DEMO	200 LF	2.46	493
<b>F2020 Hazardous Components Abatement</b>	<b>SF</b>	<b>=</b>	
<b>None In This Contract</b>			
<b>PROJECT SUBTOTAL =====&gt;</b>		<b>\$</b>	<b>1,458,200</b>