Medi-Sota

Proactive Facilities Planning in a Dynamic Market: Forecasting Construction Costs, Drivers, and Disruptors for Future

KRAUS-ANDERSON®

Today's Speakers

John Peyerl

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Mark Sigel, PE

MEP Systems Manager

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Pre-Construction

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Director, Facility Assessment

Today's discussion- Key Takeaways

- Integration of construction forecasting into Facilities Planning
- What is the '23-'24 construction costs outlook?
- How a MEP Assessment helped Windom Area Health

WINDOM MEP ASSESSMENT

Windom Area Health

- Municipally-owned facility since 1975
- Sanford Managed since 1989
- Completed Facility Assessment in 2019
- Developed roadmap for the MEP systems

INTEGRATION OF CONSTRUCTION FORECASTING INTO FACILITIES PLANNING

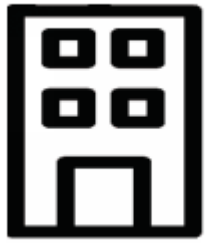
Facility Condition Assessment- What do we investigate?

SUBSTRUCTURES

SHELL/EXTERIOR

MEP SYSTEMS

EQUIPMENT



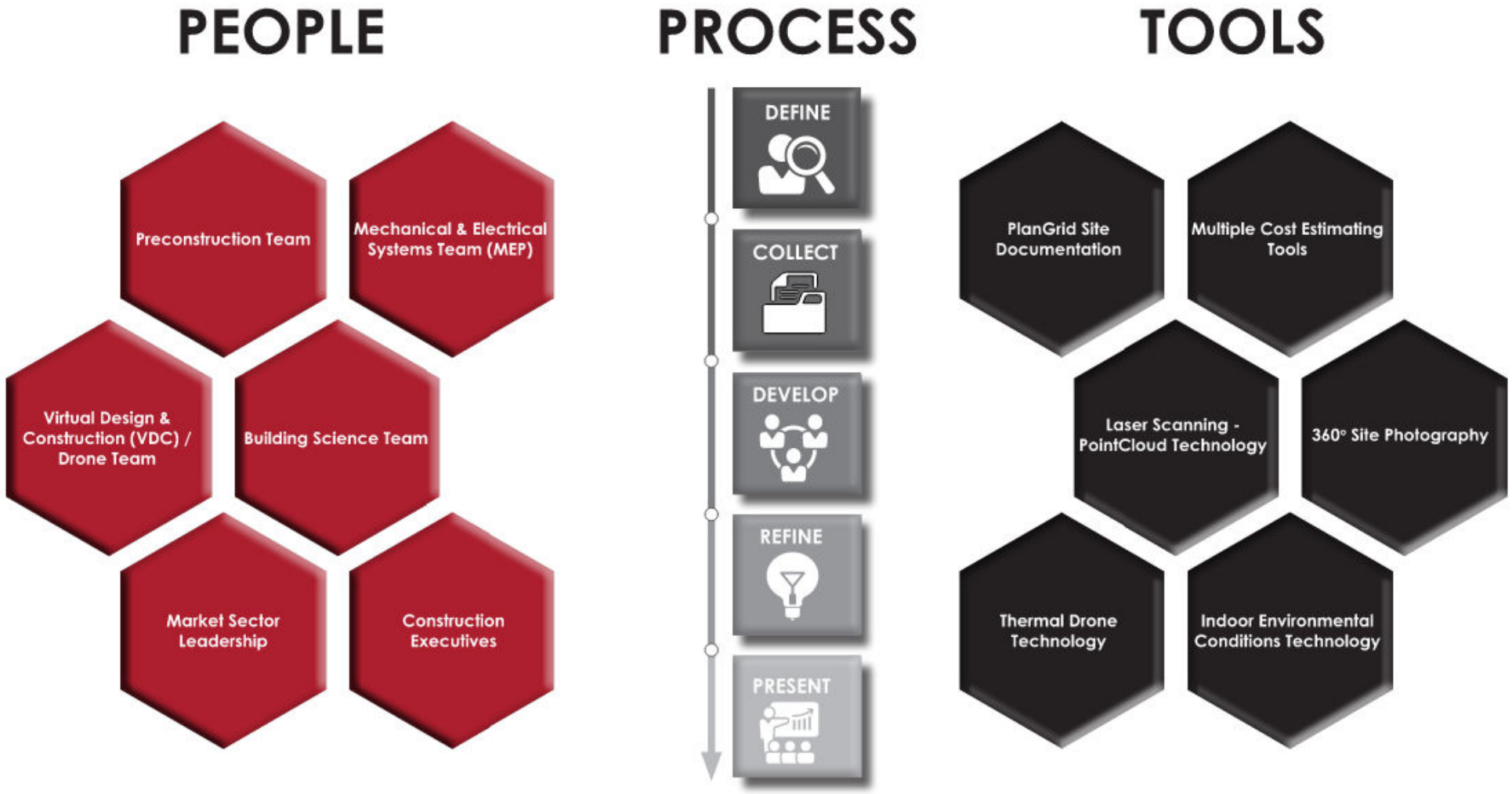
INTERIORS

CONVEYANCE

SPECIALTY CONSTRUCTION

BUILDING SITEWORK

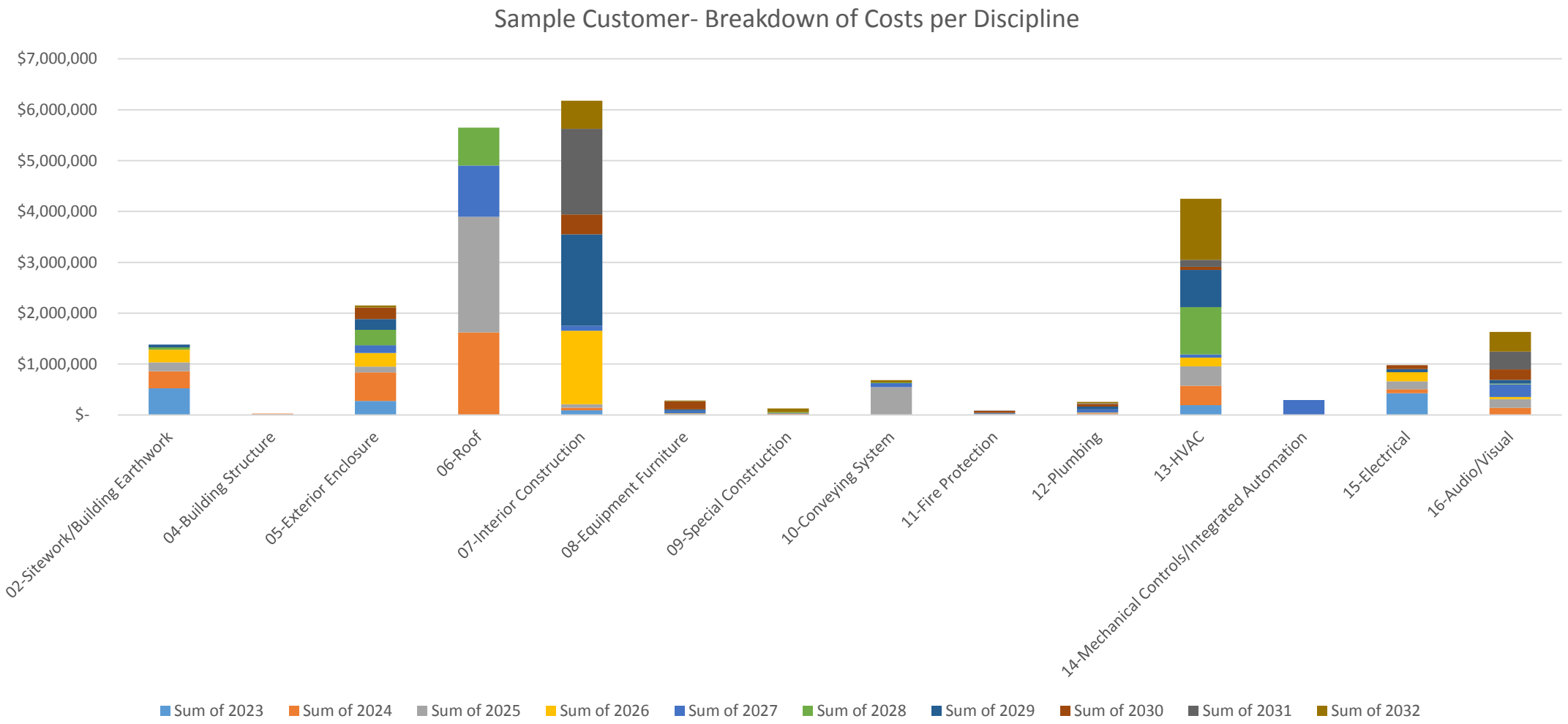
Facility Assessments Require:



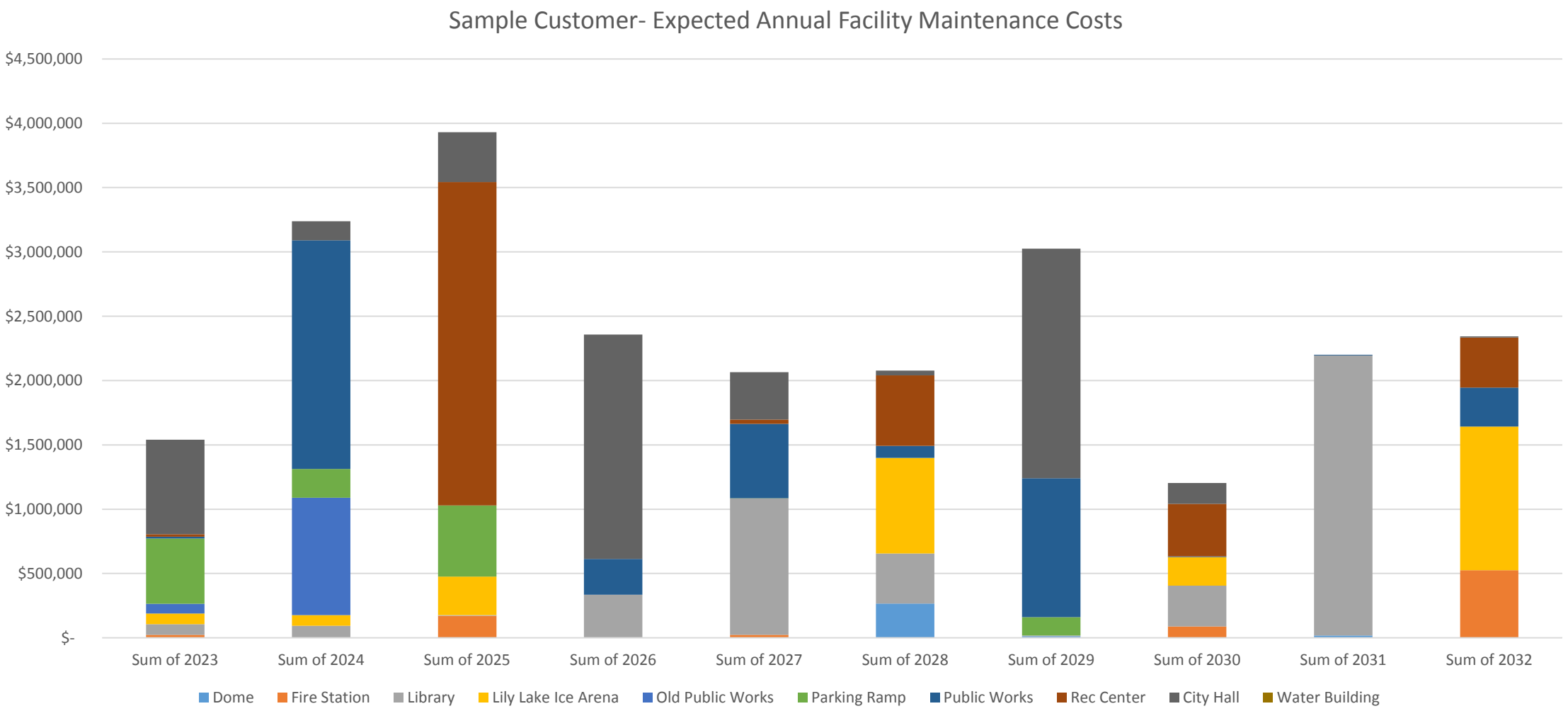
Facility Assessment Process

- Site information gathering (Define & Collect)
- Analysis (Develop & Refine)
- Review (Present)

Gathering Data- Being Strategic



Gathering Data- Being Strategic



Analysis- “Measure the facility”

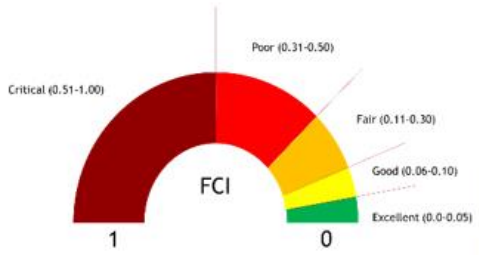
- Facilities are measured based upon IFMA Standard to calculate the FCI = Facility Condition Index
- It’s a way to measure: Is the facility worth the investment?

$$FCI = \frac{\text{Deferred Maintenance Deficiencies}}{\text{Building Replacement Costs}}$$

Gathering Data- Being Strategic

Facility Condition Index (FCI)

$$FCI = \frac{\text{Deferred Maintenance Totals}}{\text{Building Replacement Costs}}$$



Dome

Expected 10-year DM Costs: $300,000.00
FCI= "Excellent"

Fire Station

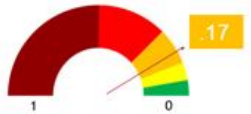
Expected 10-year DM Costs: $835,000.00
FCI: "Good"

Library

Expected 10-year DM Costs: $4,400,000.00
FCI: "Fair"

Lily Lake Ice Arena

Expected 10-year DM Costs: $2,500,000.00
FCI= "Fair"



City Hall/Police Station

Expected 10-year DM Costs: $5,300,000.00
FCI: "Poor"

Old Public Works

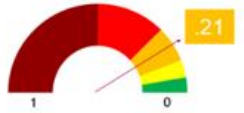
Expected 10-year DM Costs: $1,000,000.00
FCI= "Poor"

Parking Ramp

Expected 10-year DM Costs: $1,400,000.00
FCI: "Good"

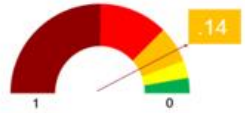
Public Works

Expected 10-year DM Costs: $4,100,000.00
FCI: "Fair"



Rec. Center

Expected 10-year DM Costs: $3,900,000
FCI= "Fair"



Water Building

Expected 10-year DM Costs: $7,000.00
FCI: "Excellent"

Gathering Data- Being Strategic

- Customers need to know the current status of facility
  - *Need to gather the data*
  - *Make data driven decisions*
- Customers facilities not well documented
  - *Knowledge transfer needed*
  - *Need to have a long-term maintenance plan*
- Customers need to make strategic decisions
  - *Develop financial model*
  - *Invest, Divest, Remodel, Rebuild, Expand*
  - *Master Planning Services*

CONSTRUCTION OUTLOOK

Construction Outlook

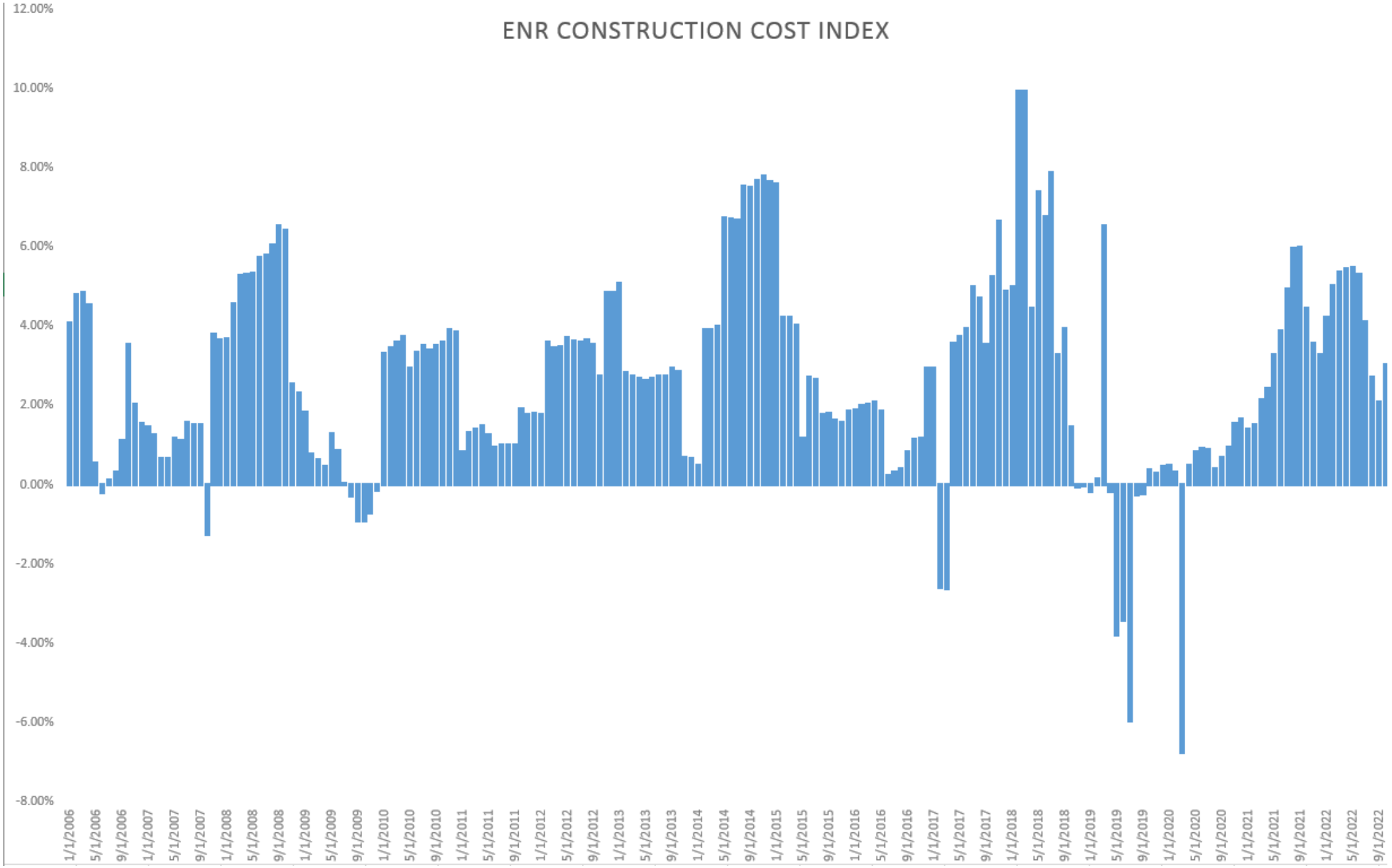
- What Happened?

- Current State

- Methods for Risk Mitigation

What Happened?

Current State


ENR CONSTRUCTION COST INDEX
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
-2.00%
-4.00%
-6.00%
-8.00%
1/1/2006
5/1/2006
9/1/2006
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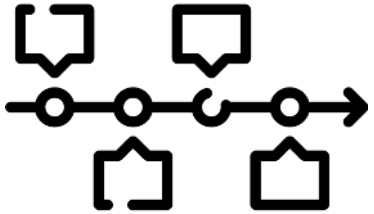
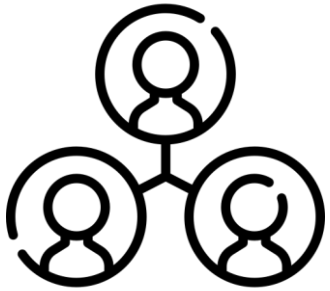
Mitigate Risk

EARLY PROCUREMENT

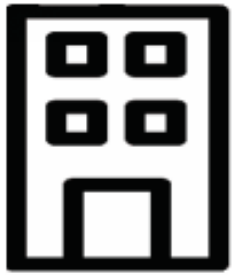


HOLD TIMELINES



TRUSTED TEAM

APPROPRIATE CONTINGENCIES



FACILITY ASSESSMENTS

WINDOM MEP ASSESSMENT

Key Findings- Narrative

- Identify age and condition of MEP Systems
- MEP System ability to serve existing space
- MEP Ability to support Hospital Growth

WINDOM AREA HOSPITAL
Windom, Minnesota
Mechanical/Electrical/Plumbing Infrastructure Planning
November 2019
KRAUS-ANDERSON

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1 MEP INFRASTRUCTURE PLANNING NARRATIVE

Windom Area Hospital was originally constructed in 1974 and has grown with multiple additions and renovations to the present day. The purpose of this assessment is to document existing mechanical/electrical/plumbing (MEP) system age and conditions so that Windom Area Hospital is informed and equipped to make long-term strategic decisions to support future growth.

CHILLED WATER SYSTEM

A water-cooled chiller system was installed as part of the original hospital construction. In 1990, the water-cooled chiller system was replaced with an air-cooled chiller. In 2017, a new air-cooled chiller was installed to replace the 1990 air-cooled chiller. Maintenance staff reported that the present chiller adequately cools the hospital in the summer and is loaded to approximately 50% of its rated capacity. Chilled water is pumped to building air handling units via two base mounted pumps. The pumping system is a constant volume system. The two pumps are not the same capacity and are not piped in a parallel configuration for back-up. One of the pumps was installed with the new chiller in 2017 and the other pump was installed in 1990.

Five of the air handling units are connected to the chilled water system (S-1, S-2, S-3, S-4, and S-5). All of the rooftop units are DX (direct expansion) cooling and not connected to the chilled water system. Air units S-1, S-2, and S-3 do not have a control valve on the cooling coil. Manual valves are used to control discharge air temperature on those units.

STEAM HEATING SYSTEM

Two low pressure steam boilers were installed as part of the original construction. In 2018, two new low pressure steam boilers were installed to replace the original boilers. Per maintenance staff, one boiler is able to handle the heating load of the hospital during the winter months, with the other boiler serving as a back-up. The boilers are dual fuel with natural gas and propane as the fuel sources.

Steam from the boilers is used in heat exchangers to create hot water which is pumped to various hospital areas to provide heat. The heat exchangers from the 1974 building are still in operation today. The heat exchangers are installed without a back-up heat exchanger. The heating pumps are installed with one pump on and the other providing back-up in case of failure. Installed in 2003, the patient room addition heating system is the only pumping system in the hospital with variable speed drives installed. All of the other heating water pumping systems are constant volume.

Air-cooled chiller located on grade

Steam boiler installed in 2018

Steam header located above the two steam boilers

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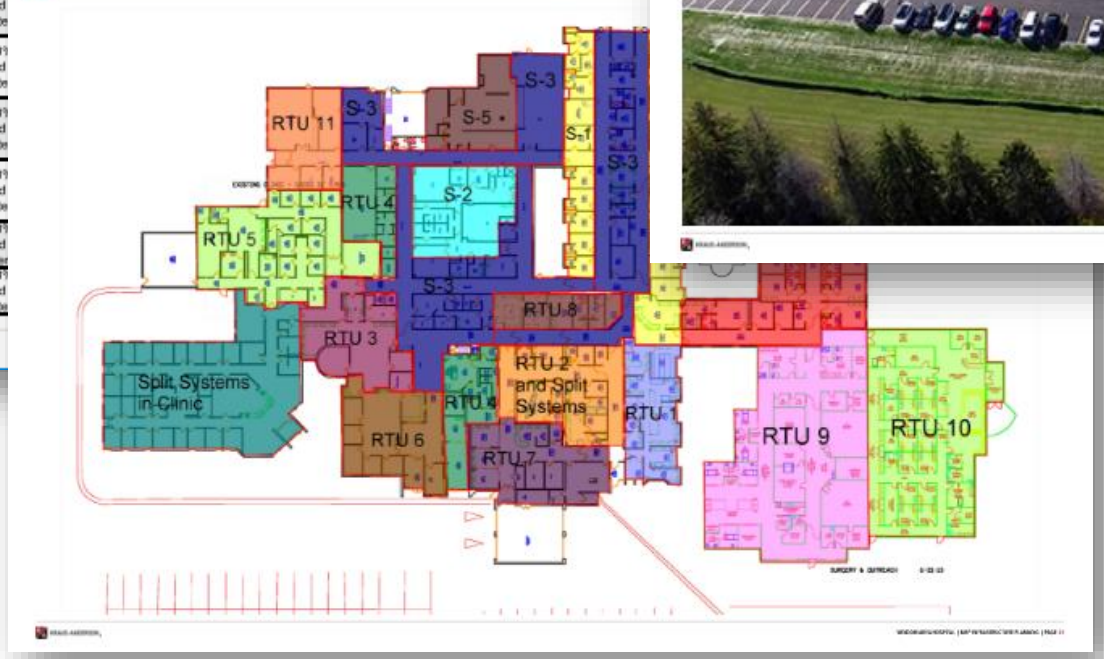
Key Findings- MEP Age/Condition

2 EXISTING AIR UNITS TABLE

Air unit	Date installed	Area Served	CFM (from existing design plans)	Cooling source	Heating source	Filtration	Return Fan	Humidification	Temperature Controls
S-1 (Constant Volume Indoor Unit)	1974	Old patient rooms/call rooms/sleep study	4500	Chilled water	Steam	30% before fan and 90% after fan	No; unit is 100% outside air	Steam Injection	Pneumatic; discharge air and damper control on JCI system
S-2 (Constant Volume Indoor Unit)	1974	Physical Therapy	5100	Chilled water	Steam	30% before fan and 90% after fan	Yes	Steam Injection	Pneumatic; discharge air and damper control on JCI system
S-3 (Constant Volume Indoor Unit)	1974	Dining/Corridors/PT	14900	Chilled water	Steam	30% before fan and 90% after fan	Yes	Steam Injection	Pneumatic; discharge air and damper control on JCI system
S-4 (Variable Air Volume Indoor Unit)	2003	Patient rooms/Delivery	12400	Chilled water	Hot Water	30% before fan and 80% after fan	Yes; Plenum return system	Steam Injection	Electric and fully on JCI system
S-5 (Kitchen unit, Constant Volume Indoor Unit)	2006	Kitchen	5200	Chilled water	Hot Water	30% and 80% before fan	No, but unit does have return air interlocked with 2 grease hood exhaust fans and	None	Electric and fully on JCI system
RTU 1 (Aaon Unit Constant Volume)	2006	Lab	2110	DX single compressor	Hot Water Glycol	30% and			
RTU 2 (Aaon Unit Constant Volume)	2006	Xray	2110	DX Dual compressor	Hot Water Glycol	30% and			
RTU 3 (Aaon Unit Constant Volume)	2006	Waiting/Office	3150	DX Dual compressor	Hot Water Glycol	30% and			
RTU 4 (Aaon Unit Constant Volume)	2006	Cardiac Rehab/X-ray/Materials Storage/Outreach Services	3150	DX Dual compressor	Hot Water Glycol	30% and			
RTU 5 (York Unit Constant Volume)	2017	Woundcare	2500	DX Dual compressor	No heat	30% and			
RTU 6 (Trane Unit Constant Volume)	1997	Business Office	3800	DX Dual compressor	No heat	30% and			

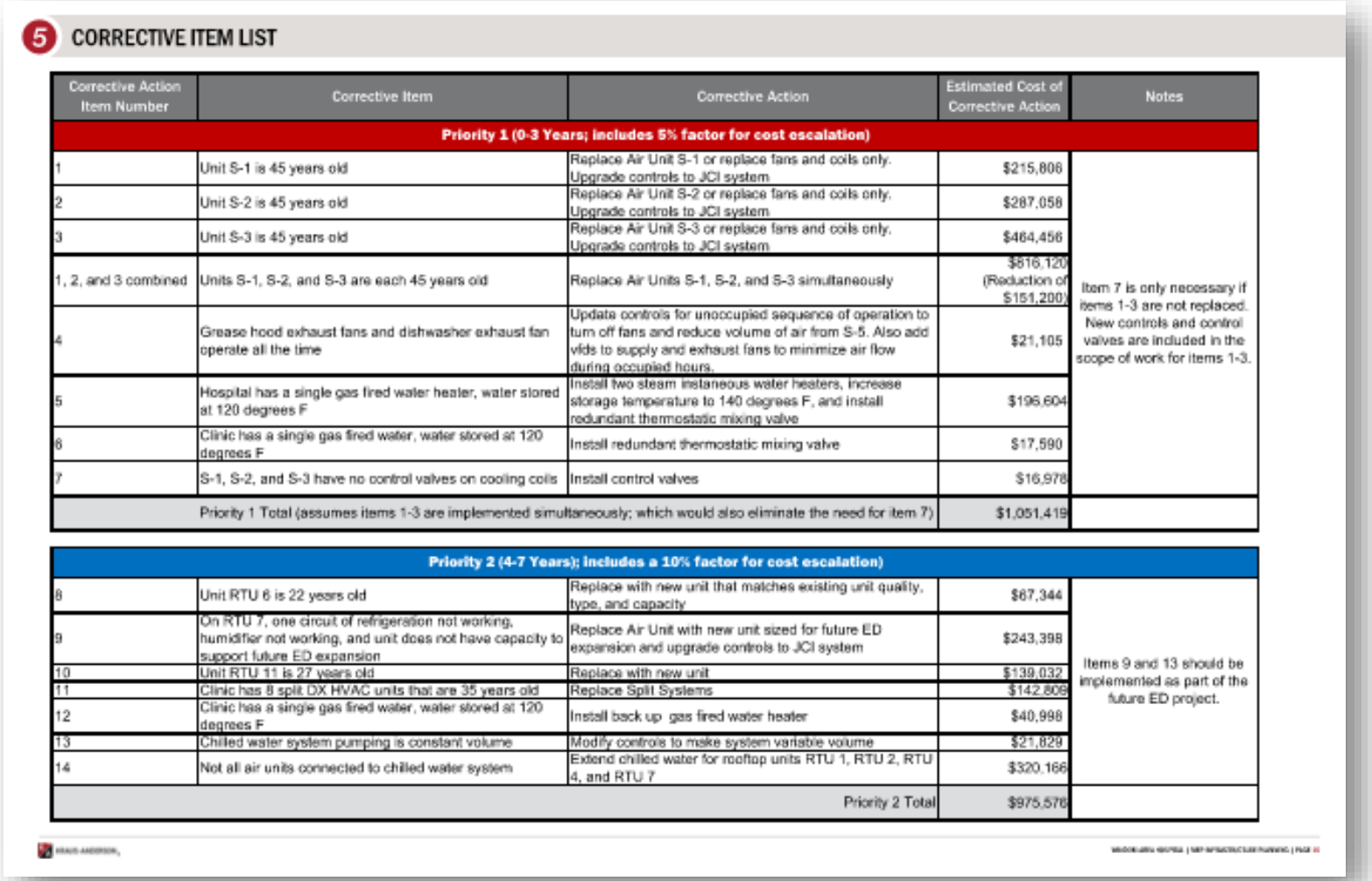
3 AIR UNIT ZONING MAP



4 ROOF AERIAL IMAGE

Corrective Items List

- Identifies:
  - *Prioritization*
  - *Costs*
  - *Timing*
- Able to secure grants



5 CORRECTIVE ITEM LIST

Corrective Action Item Number	Corrective Item	Corrective Action	Estimated Cost of Corrective Action	Notes
Priority 1 (0-3 Years; includes 5% factor for cost escalation)				
1	Unit S-1 is 45 years old	Replace Air Unit S-1 or replace fans and coils only. Upgrade controls to JCI system	$215,806	Item 7 is only necessary if items 1-3 are not replaced. New controls and control valves are included in the scope of work for items 1-3.
2	Unit S-2 is 45 years old	Replace Air Unit S-2 or replace fans and coils only. Upgrade controls to JCI system	$287,058	
3	Unit S-3 is 45 years old	Replace Air Unit S-3 or replace fans and coils only. Upgrade controls to JCI system	$464,456	
1, 2, and 3 combined	Units S-1, S-2, and S-3 are each 45 years old	Replace Air Units S-1, S-2, and S-3 simultaneously	$816,120 (Reduction of $151,200)	
4	Grease hood exhaust fans and dishwasher exhaust fan operate all the time	Update controls for unoccupied sequence of operation to turn off fans and reduce volume of air from S-5. Also add vfds to supply and exhaust fans to minimize air flow during occupied hours.	$21,105	
5	Hospital has a single gas fired water heater, water stored at 120 degrees F	Install two steam instaneous water heaters, increase storage temperature to 140 degrees F, and install redundant thermostatic mixing valve	$196,604	
6	Clinic has a single gas fired water, water stored at 120 degrees F	Install redundant thermostatic mixing valve	$17,590	
7	S-1, S-2, and S-3 have no control valves on cooling coils	Install control valves	$16,978	
	Priority 1 Total (assumes items 1-3 are implemented simultaneously; which would also eliminate the need for item 7)		$1,051,419	
Priority 2 (4-7 Years); includes a 10% factor for cost escalation)				
8	Unit RTU 6 is 22 years old	Replace with new unit that matches existing unit quality, type, and capacity	$87,344	Items 9 and 13 should be implemented as part of the future ED project.
9	On RTU 7, one circuit of refrigeration not working, humidifier not working, and unit does not have capacity to support future ED expansion	Replace Air Unit with new unit sized for future ED expansion and upgrade controls to JCI system	$243,398	
10	Unit RTU 11 is 27 years old	Replace with new unit	$139,032	
11	Clinic has 8 split DX HVAC units that are 35 years old	Replace Split Systems	$142,809	
12	Clinic has a single gas fired water, water stored at 120 degrees F	Install back up gas fired water heater	$40,998	
13	Chilled water system pumping is constant volume	Modify controls to make system variable volume	$21,829	
14	Not all air units connected to chilled water system	Extend chilled water for rooftop units RTU 1, RTU 2, RTU 4, and RTU 7	$320,166	
		Priority 2 Total	$975,576	

Current & Future State

- Windom has leveraged assessment to complete the following:
  - *Water Heater Replacement*
  - *Air Unit Replacement (5 total units)*
  - *ED project coordination/MEP Infrastructure*
  - *New MOB planning*
- Assessment became part of strategic planning process
  - *Helped annual budgeting process*
  - *Helped in overall master planning for future steps*

Key Takeaways

- Integration of construction forecasting into Facilities Planning
- What is the ‘23-’24 construction costs outlook?
- How a MEP Assessment helped Windom Area Health

QUESTIONS?

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THANK YOU!

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