

EAST CAROLINA UNIVERSITY

Facility Condition Assessment

Rawl Building (004)

Asset RAWL

Inspected May 10, 2021



TABLE OF CONTENTS

SECTION 1 ASSET OVERVIEW

Asset Executive Summary.....	1.1.1
Asset Summary	1.2.1
Inspection Team Data.....	1.3.1
Definitions	1.4.1
Overview	1.4.1
Recurring Costs	1.4.2
Nonrecurring Costs	1.4.3
Drawings.....	1.4.6
Photographs.....	1.4.6
Sustainability/Energy Analysis.....	1.4.6

SECTION 2 COST SUMMARIES AND TOTALS

Renewal Needs Matrix.....	2.1.1
Renewal Needs by System	2.2.1
Facilities Renewal Plan – Recurring Component Replacement Costs.....	2.3.1
Facilities Renewal Plan – Nonrecurring Project Costs.....	2.4.1

SECTION 3 NONRECURRING PROJECT DETAILS..... 3.1.1

SECTION 4 LIFECYCLE COMPONENT INVENTORY

Renewable Component Inventory	4.1.1
Recurring Costs by Year	4.2.1
Recurring Component Expenditure Projections.....	4.3.1

SECTION 5 DRAWINGS

SECTION 6 PHOTOGRAPHS 6.1.1

SECTION 7 PRELIMINARY ENERGY ASSESSMENT..... 7.1.1

FACILITY CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

ASSET CODE	RAWL	CURRENT REPLACEMENT VALUE	\$29,777,000
ASSET NAME	RAWL BUILDING (004)	FACILITY CONDITION NEEDS INDEX	0.54
ASSET USE	Classroom / Academic	FACILITY CONDITION INDEX	0.37
YEAR BUILT	1959	10-YEAR \$/SF	217.04
GSF	73,524		
INSPECTION DATE	05/10/2021		

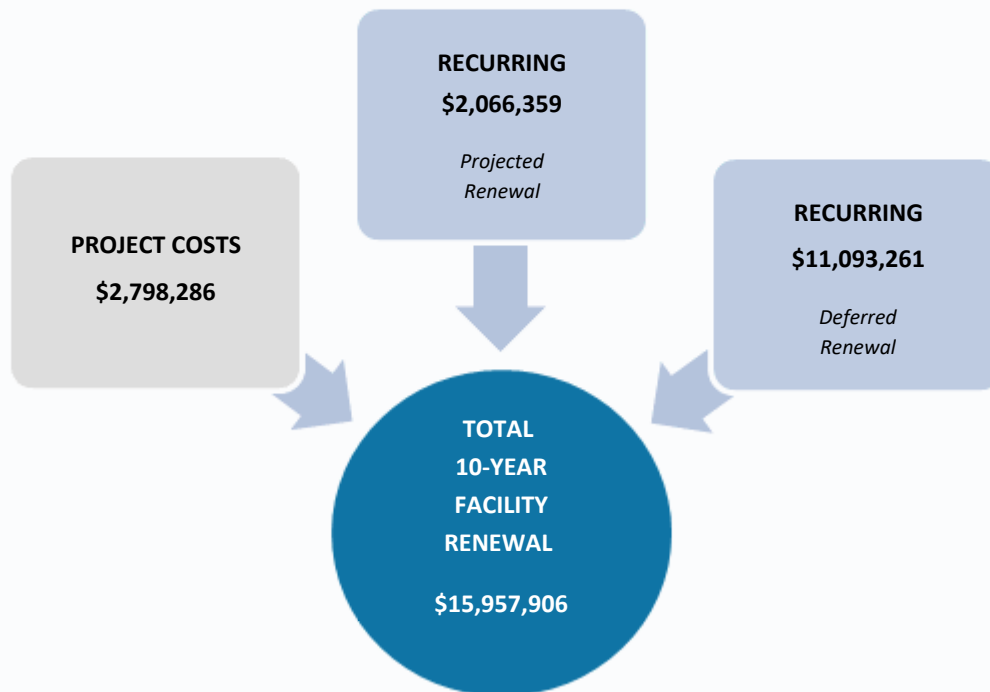
FCNI Scale

The FCNI for this asset is **0.54**

- Excellent Condition (typically new construction)
- Good Condition (maintained within lifecycle)
- Fair Condition (normal renovations required)
- Below Average Condition (major renovation required)
- Poor Condition (total renovation required)
- Replacement Indicated (unless historic)



Total Facility Renewal Costs



Project Costs

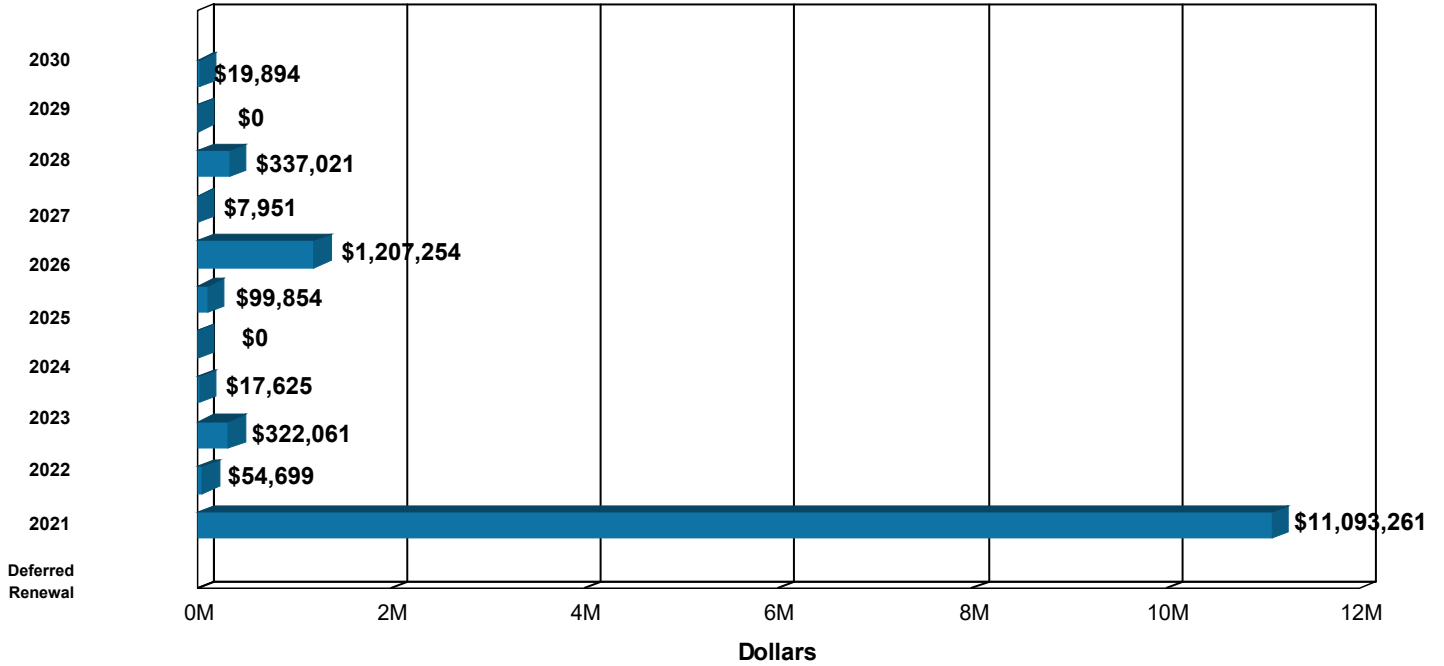
Project Cost by Priority

PLANT ADAPTION	
Priority 1	\$946,082
Priority 2	\$356,273
Priority 3	\$1,495,930
Priority 4	\$0
Priority 5	\$0

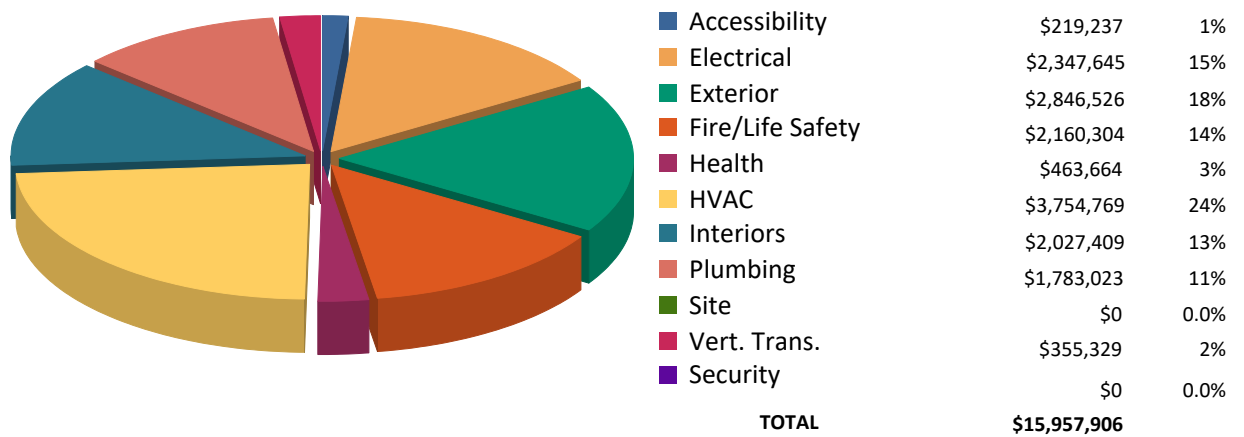
CORRECTIVE ACTION	
Priority 1	\$0
Priority 2	\$0
Priority 3	\$0
Priority 4	\$0
Priority 5	\$0

Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



ASSET SUMMARY

Constructed in 1959, the Rawl Building is a three-story, 73,524 gross square foot classroom and office building located on the main East Carolina University campus. A small south wing addition (the Annex) was constructed the following year to provide additional office space, and a small elevator tower was constructed in the late 1990s on the east end of the building. Each floor has a central double-loaded corridor with offices and classrooms. The exterior is brick, with stone accents around the main entry.

The information in this report was gathered during a site visit that concluded on May 10, 2021.

Site

The site gently slopes to the south, and landscaping is adequate and consists of turf grass, ornamental shrubs, and some mature trees. The concrete sidewalks are in average condition. There are no parking lots directly associated with this facility. No site upgrades are warranted at this time.

Exterior Structure

The brick facades have an average appearance, with some surface staining on upper elevations. Older brick facades should be cleaned and repointed in the near future. The cut stone accents around the main entry also appear adequate at this time. The original single-pane glazing is in poor condition and should be considered for replacement with thermal-pane, metal frame glazing. The newer brick veneer and thermal-pane glazing on the east tower addition is in good condition, and no upgrades are warranted. The glass entry doors at the main elevation are newer and in good condition, as are the glass doors at the east elevator tower and the hollow metal secondary entry egress and service doors. The basement hollow metal service doors are more weathered and due for in-kind replacement. The roof over the main building and elevator tower addition is a modified bitumen system reportedly installed in 2006. It will be due for in-kind replacement in the near future. The older built-up roof on the south annex is in poor condition and past due for replacement.

Interior Finishes/Systems

Floor finishes include carpet, vinyl tile, and ceramic tile. Walls are painted plaster or concrete, with ceramic tile wainscoting in the restrooms. Ceilings are lay-in acoustical tile and painted texture. The broadloom carpeting is older and showing signs of age. It should be replaced with carpet tile. The vinyl tile is worn and should be replaced in the near future as well. The 9x9 vinyl tile should also be tested for asbestos and abated accordingly. Ceramic floor and wall tile in the restrooms is older and should be replaced when the restrooms are updated. The painted walls are showing signs of wear and contact damage and should be repainted in the near future. Lay-in acoustical ceilings are in average condition and should be adequate for the near future. Like the original vinyl tile, the textured ceilings in corridors and select offices should be tested for asbestos and abated if necessary. The original non-rated corridor

doors and aging rated doors are recommended for replacement as well. The non-rated doors should be upgraded to properly rated assemblies.

Accessibility

Access to the building is provided by on-grade access to the main north entry and ramped access at the east entry. Both entrances have been equipped with power assisted door openers. The upper and lower entry doors for the Annex have high thresholds that need to be modified for wheelchair accessibility. Further enhance accessibility to the Annex wing by fitting power assist units to the upper and lower Annex entry doors.

The building has a fully accessible passenger elevator on the east end. The four stair towers have compliant wall-mounted handrails but lack accessible inner switchback railings. Retrofit new accessible inner railings on each stair flight, and replace the stair treads. Also, install metal riser panels and a lower cane guard on the exterior egress stair at the south end of the annex to meet current accessibility standards.

Accessible all-gender restrooms have been created on each floor, but minor accessibility issues still need to be addressed with grab bar layouts and mounting heights of some wall sinks and mirrors. Also, all accessible restrooms should be fitted with power door assists. Accompanying corridor water fountains are aging and not fully accessible. Install new accessible dual-level water fountains in compliant alcoves. Also select one of the two lower floor Annex restrooms to enlarge into an accessible all-gender restroom, and upgrade the nearby single-level water fountain to a fully accessible dual-level fountain set in a wheelchair accessible corridor alcove.

Original interior doors have been fitted with lever hardware and all floors have wall mounted room signage with Braille. These older doors are recommended for replacement and the new door assemblies should maintain lever hardware sets and compliant signage. Lecture room 130 lacks adequate designated accessible seating, and there is no wheelchair access to the small stage. Create wheelchair accessible seating, and install a wheelchair lift to the stage. An assistive listening system for the hearing impaired is also recommended.

Health

The 9x9 vinyl floor tile and mastics, textured ceilings, and mechanical piping insulation are suspected to contain asbestos. It is also assumed that 9x9 vinyl tile is present under the carpeting and that textured ceilings are present above the acoustical lay-in ceilings. These finishes and systems should be sampled, tested, and properly abated as necessary.

Fire/Life Safety

The building appears to have adequate egress pathways, but interior doors are not fire rated and should be replaced with new fire-rated door assemblies. This facility contains a point addressable Notifier fire

alarm and detection system that includes a main fire alarm panel, manual pull stations, smoke detectors, and horn strobe alarms. This system was installed in the early 2000s and should be evaluated for replacement due to technical obsolescence as replacement and compatible components will become difficult to obtain. There is no automatic fire suppression system, only strategically placed dry-type handheld fire extinguishers. It is recommended that an automatic wet-pipe fire suppression system be installed as part of future renovation efforts.

HVAC

Heating and cooling are provided primarily by three constant air volume (CAV) air handling units (AHUs) with a zoned deck, and two fan coil units serve specific spaces. The AHUs are visually timeworn, as corrosion and air leaks were observed during the inspection. Restroom exhaust is handled by two centrifugal exhaust fans, and a propeller exhaust fan serves the main mechanical room. The AHUs, fan coil units, and exhaust fan have exceeded their statistical service lives and should be considered for replacement. Variable air volume (VAV) capable air handling units are recommended.

Chilled water is generated by a 225 ton water-cooled centrifugal chiller, and a cooling tower and condenser water pump provide heat rejection. A pump circulates the chilled water throughout the facility. These 1990s components are visually timeworn and will be due for replacement within the next ten years. However, it was reported that there is a future project to be connect the building to the campus chilled water loop. This would include removing the existing chilled water equipment, connecting to the loop, and installing new mechanical components in the mechanical spaces.

A shell-and-tube heat exchanger uses steam from the central steam plant to generate heating hot water, which is circulated by two 3 hp inline centrifugal pumps. Pressure reducing valves (PRVs) reduce the high pressure steam to low pressure to be used in local components. Condensate from the heat exchanger is collected and transferred back to the central plant by two condensate receivers. The heat exchanger, pump, PRVs, and condensate receivers should be considered for near-term replacement.

The multizone CAV HVAC distribution network is original and consists of insulated metallic conduit, insulated mechanical piping, valves, diffusers, and similar elements. The hybrid HVAC controls include original pneumatic systems and some recent upgrades to direct digital (DDC). It is recommended that the distribution network and controls be removed and replaced with a modern, energy efficient VAV system with full direct digital controls. At the time of future HVAC distribution duct and equipment redesign and replacement, the current issue with equipment access should be resolved. Two air compressors serve the HVAC controls; one was installed in 2001 and the other in 2019. The 2001 air compressor is due for replacement. However, both may be removed from future budgeting with an upgrade to full DDC.

Electrical

Main electrical service is fed from a 500 kVA, oil-filled transformer, where power is reduced to 277/480 volts and routed to a 1,600 amp main switchboard. Power is further reduced to 120/208 volts through secondary step-down transformers and distributed at 120/208 and 277/480 volts by individual

conductors in metallic conduit to secondary panelboards for use in local devices. Downline distribution system components beyond the main service elements include distribution feeders, conduits, local panelboards, load centers, safety switches, fused disconnects, receptacles, switches, and similar terminal elements. The switchboards, step-down transformers, and distribution system are original and should be considered for replacement, as they have exceeded their statistical lifecycles and are not up to current standards. The oil-filled transformer is expected to remain viable beyond the next ten years.

Two automatic transfer switches (150 and 225 amps) transfer emergency power to life safety devices and the elevator. These get emergency power from the Bate building generator. No issues with these switches were observed or reported, and they are expected to remain viable for the next ten years.

There are variable frequency drives (VFDs) associated with the air handling units, fan coil units, and heating hot water pumps. They are currently used as soft starts for the motors and are not able to provide throttling due to the current HVAC controls. It is recommended that they be replaced as part of any future HVAC renovations.

The 1985 vintage interior lighting was modified in 2016 and consists of recessed and suspended T8 fluorescent fixtures. Suspected recessed LED fixtures with lighting controls were observed in select classrooms. The older fixtures were retrofitted to utilize higher efficiency fluorescent lamps but otherwise remain mostly original. The classroom lighting is dimmable fluorescent. Retrofit efforts have extended the life of the old design fluorescent fixtures by about ten years, making their replacement necessary in about 2026. By that time, the lighting will have fulfilled its financially viable life expectancy. Lighting technology is rapidly advancing, and expectations for lamp durability, quality, intensity control, and efficiency are increasing with the advancement of cost-effective LED lighting options. The lighting is recommended for upgrade to LED technology. This should include installation of dimmable LED fixtures for the classrooms to maintain this function and the addition of automated occupancy sensing/timer controls for other sporadically used commonly occupied spaces to save energy and reduce operational costs by extending lamp life. Cost adjustments have been made to the lighting replacement to account for dimming and on/off timer control. The LED fixtures should remain viable for the next ten years.

Exterior lighting consists of HID sconces and CFL and LED fixtures. Much of the lighting has been relamped with LED component lighting. Some remaining older fixtures have not been converted to LED. While the retrofitted lighting operates more efficiently than originally, an energy retrofit of this type does not always restore the structure and lens of the fixture. The fixtures overall should be budgeted for replacement with purpose built LED fixtures of matching and aesthetically appropriate design to enhance lighting quality, lower costs through longer lamp life, and lower energy costs.

Plumbing

Potable water supply, sanitary sewer, and stormwater handling systems serve this facility. Supply piping is copper with soldered connections. Drain piping is cast-iron with bell-and-spigot connections. The piping is original and due for replacement. Two backflow preventers installed around 2010 serve the water main. They should also be evaluated for replacement within the next ten years. A sump pump in the basement mechanical room appears to have been installed within the last five years. No issues were observed or reported, and it should remain viable for the next ten years. The standard restrooms have

older wall-mounted sinks, tankless toilets, and newer wall-mounted urinals. The older fixtures in the main building are showing wear and should be replaced in-kind in the near future. The original fixtures in the two annex restrooms are in poor condition and also due for replacement. Newer urinals should be adequate for the near future. Wall-mounted service sinks in janitor closets and the annex are much older and due for replacement. The wall-mounted lavatories, urinals, and tankless toilets in the newer all-gender restrooms are in good condition and should outlast the scope of this report.

Vertical Transportation

The three-stop hydraulic passenger elevator has a capacity of 2,500 pounds and was installed in 1998. No issues were observed or reported during the inspection. However, the elevator should be evaluated for modernization within the next ten years due to expected lifecycle depletion. No detailed elevator testing was conducting during this assessment.

Note: The renewal needs outlined in this report were identified from the visual inspection and staff interviews. Our professional architectural and engineering inspectors examined the accessible equipment and various building components to determine what repairs or modifications may be necessary to restore the systems and asset to an acceptable condition, or to a level defined by the Client. The estimated costs represent correction of existing deficiencies and anticipated lifecycle failures within a ten-year period. These recommendations are to bring the facility to modern standards without any anticipation of change to facility space layout or function. The total costs include variable project delivery costs as determined by the Owner. The costs developed do not represent the cost of a complete facility renovation. Soft costs not represented in this report include telecommunications, security, furniture, window treatment, space change, program issues, relocation, swing space, contingency, or costs that could not be identified or determined from the visual inspection and available building information.

INSPECTION TEAM DATA

Report Development

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Project Manager

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Date of Inspection

May 10, 2021

Inspection Team Personnel

NAME	POSITION	SPECIALTY
Andrew Derrick	Project Engineer	Mechanical, Electrical, Plumbing, Energy, Fire/Life Safety, Health
Carl Turner, AIA	Senior Project Architect	Interior Finishes, Exterior Structure, ADA Compliance, Site, Fire/Life Safety, Health

Client Contact

NAME	POSITION
Griffin L. Avin, CEFP	Director of Facilities Services, Health Sciences Campus Chief Sustainability Officer

DEFINITIONS

The following information is a clarification of the Facility Condition Assessment report using example definitions.

Overview

Recurring and Nonrecurring Facility Renewal Costs

Facility renewal costs are divided into two main categories – recurring and nonrecurring. Recurring costs are cyclical and consist primarily of major repairs to or replacement/rebuilding of facility systems and components (e.g., roof or HVAC system replacement at or past the end of its normal useful life). The tool for projecting the recurring renewal costs is the Renewable Component Inventory, which is explained in detail below. Nonrecurring costs typically consist of modifications or repairs necessary to comply with fire/life safety or accessibility code requirements or to address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within. For these nonrecurring costs, projects have been developed and include estimated material and labor costs.

Facility Condition Needs Index (FCNI)

The FCNI provides a lifecycle cost comparison. It is a ratio of the sum of the recurring and nonrecurring renewal costs over ten years to the current replacement value of the asset. The current replacement value is based on replacement with current construction standards for the facility use type, and not original design parameters. This index gives the university a comparison within all buildings for identifying worst case/best case building conditions.

$$\text{FCNI} = \frac{\text{Nonrecurring Projects} + \text{10-Year Recurring Component Renewal}}{\text{Current Replacement Value}}$$

Facility Condition Index (FCI)

The FCI is a ratio of the Deferred Renewal costs to the current replacement value.

$$\text{FCI} = \frac{\text{Deferred Renewal}}{\text{Current Replacement Value}}$$

Material and Labor Cost Factors and Additional Markups

The project costs are adjusted from the national averages to reflect conditions in Greenville using the R. S. Means City Cost Index for material and labor cost factors. The percentage adjustment of the national average is shown in the table below. Also included in the renewal costs are the construction markup (general contractor profit and overhead, construction management, permitting, accounting, site security, insurance, bonds, sales tax, institutional fees, site utilities, refuse fees, and insurance) and professional fees (architect or engineer design fees and in-house design costs).

GLOBAL MARKUP	%
Local Labor Index	71.3
Local Materials Index	100.7
Construction Markup	20.0
Professional Fees	16.0

Recurring Costs

Renewable Component Inventory and Cost Projections

The Renewable Component Inventory (starting on page 4.1.1) is based on industry standard lifecycle expectancies applied to an inventory of major systems and components within a facility. Each indicated component has the following associated information:

CATEGORY	DESCRIPTION
Component Code	A four-digit code assigned by AMS to the component
Component Description	Description of the individual component
Identifier	Identifying information can be entered as necessary.
Customer ID	Customer-provided equipment ID number
Location	The location of each component can be entered if applicable.
Quantity	The quantity of the listed component
Units	The unit of measure associated with the quantity
Complexity Factor	Adjusts the component replacement costs when it is anticipated that the actual cost will deviate from the average for that component
Total Cost	The unit cost multiplied by quantity, in today's dollars (note that this is a one-time renewal/replacement cost)
Install Date	This is the year that the component was or is estimated to have been installed. When this data is not available, the default is the year the asset was constructed.
Useful Life	Average life expectancy of the component
Useful Life Adjustment	An optional adjustment that lengthens or reduces the first lifecycle of the component
Replacement Year	Expresses when the next replacement should occur and is the sum of the install date, useful life, and any useful life adjustment

The component listing forms the basis of the Recurring Costs by Year report, which provides a year-by-year list of projected recurring renewal costs (in future year dollars) over the next ten years. Each individual component is assigned a replacement year based on lifecycles. For items already past the end of their lifecycle, the replacement year is shown as Deferred Renewal.

For a longer term perspective, the Recurring Component Expenditure Projections Graph presents recurring renewal cost projections over a 50-year period (starting from the date the report is run) based on each individual item's renewal cost and life span. Some components might require renewal several times within the 50-year model, while others might not occur at all. The vertical bars on the graph represent the accumulated total costs for each individual year. The average annual cost per gross square foot (\$/GSF) is shown at the bottom of the graph. In this calculation, costs are not escalated. This figure can be utilized to assess the adequacy of existing capital renewal and repair budgets.

Recurring Cost Classifications

- **Deferred Renewal**
Recurring repairs, generated by the Renewable Component Inventory, that are past due for completion and have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral could impair the proper functioning of the facility. Deferred Renewal upgrades should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.
- **Projected Renewal**
Recurring renewal efforts, generated by the Renewable Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

As previously mentioned, modifications or repairs necessary to comply with fire/life safety or accessibility code requirements and those that address isolated, nonrecurring deficiencies that could negatively affect the structure of the facility or the systems and components within are not included in the Renewable Component Inventory. For each such deficiency identified during the facility inspection, a project with an estimated cost to rectify said deficiency is recommended. These projects each have a unique identifier and are categorized by system type, priority, and classification, which are defined below. The costs in these projects are also indexed to local conditions and markups applied as the situation dictates.

Project Number

Each project has a unique number consisting of three elements, the asset identification number, system code, and a sequential number assigned by the FCA software. For example, the third fire/life safety project identified for asset 0001 would have a project number of 0001FS03 (0001 for the asset number, FS for fire/life safety, and 03 being the next sequential number for a fire/life safety project).

Project Classifications

- **Plant Adaption**
Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).
- **Corrective Action**
Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

Recurring renewal needs do not receive individual prioritization, as the entire data set of needs in this category is year-based. Each separate component has a distinct need year, rendering further prioritization unnecessary. Each nonrecurring renewal project, however, has a priority assigned to indicate the criticality of the recommended work. The prioritization utilized for this subset of the data is as follows.

- **Priority 1 – High**
Items in this category include:
 - a. correcting a cited safety hazard
 - b. stopping accelerated deterioration
 - c. returning a facility to normal operation
- **Priority 2 – Medium**
Items in this category include:
 - a. repairs to prevent further deterioration
 - b. improvements to facility approach/entry and access to goods and services (DOJ ADA title III, priorities 1 and 2)
 - c. correction of potential safety hazards

- **Priority 3 – Low**

Items in this category include:

- a. improving access to restrooms and other amenities (DOJ ADA title III, priorities 3 and 4)
- b. bringing a facility into compliance with current building codes as grandfather clauses expire
- c. increasing usability following an occupancy or use change
- d. actions that are recommended but not required by code

Project Subclass

Subclass ratings are assigned to accessibility upgrade activities based on the four Department of Justice priority rankings recommended by the Title III regulations for planning readily achievable barrier removal projects. These ratings are:

- DOJ1 Accessible approach and entrance
- DOJ2 Access to goods and services
- DOJ3 Access to restrooms
- DOJ4 Any other necessary measures

Category Codes

CATEGORY CODE*	SYSTEM DESCRIPTION
AC1A – AC4B	ACCESSIBILITY
EL1A – EL8A	ELECTRICAL
ES1A – ES6E	EXTERIOR STRUCTURE
FS1A – FS6A	FIRE/LIFE SAFETY
HE1A – HE7A	HEALTH
HV1A – HV8B	HVAC
IS1A – IS6D	INTERIOR FINISHES/SYSTEMS
PL1A – PL5A	PLUMBING
SI1A – SI4A	SITE
VT1A – VT7A	VERTICAL TRANSPORTATION

<i>Example:</i> Category Code = EL5A	
EL	System Description
5	Component Description
A	Element Description

Priority Sequence

A Priority Sequence number is automatically assigned to each project to rank the projects in order of relative criticality and show the recommended execution order. This number is calculated based on the Priority Class and identified system of each project.

<i>Example</i>			
Priority Class	Category Code	Project Number	Priority Sequence
1	HV2C	0001HV04	01
1	PL1D	0001PL02	02
2	IS1E	0001IS06	03
2	EL4C	0001EL03	04

Drawings

Floor plans for this facility are provided as a reference.

Photographs

A code shown on the Photo Log identifies the asset number, photo sequence, and a letter designation for architect (a) or engineer (e).

<i>Example:</i>	
Photo Number: 0001006e	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

Sustainability/Energy Analysis

Energy/resource conservation measures (ECMs) are recommendations that will reduce resource consumption or the rate of growth in consumption. Examples include improving the efficiency of an HVAC system (e.g., digital motor speed controls, exhaust energy recovery, retrocommissioning) or directly reducing the consumption of a resource (e.g., low flow plumbing fixtures, high-efficiency lighting, or structural insulation improvement). Where significant conservation opportunities are evident for this facility, ECMs are identified and tabulated in Section 7 as a basis for further viability investigation.

FACILITY CONDITION ASSESSMENT

SECTION 2

**COST SUMMARIES
AND TOTALS**

RENEWAL NEEDS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
ACCESSIBILITY	0	219,237	0	0	0	0	0	0	0	0	0	0	0	0	\$219,237
EXTERIOR	0	0	0	2,593,363	0	0	8,123	0	0	227,582	0	0	0	17,458	\$2,846,526
INTERIOR	0	0	0	1,727,415	0	262,601	0	0	0	0	0	34,957	0	2,437	\$2,027,409
PLUMBING	0	0	0	1,736,433	0	0	0	0	46,589	0	0	0	0	0	\$1,783,023
HVAC	0	0	280,864	3,026,303	54,699	47,996	0	0	0	336,956	7,951	0	0	0	\$3,754,769
FIRE/LIFE SAFETY	946,082	0	888,439	325,783	0	0	0	0	0	0	0	0	0	0	\$2,160,304
ELECTRICAL	0	0	0	1,683,964	0	11,463	9,501	0	0	642,717	0	0	0	0	\$2,347,645
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
VERT. TRANS.	0	0	0	0	0	0	0	0	53,265	0	0	302,064	0	0	\$355,329
HEALTH/EQUIP.	0	137,036	326,628	0	0	0	0	0	0	0	0	0	0	0	\$463,664
SUBTOTAL	\$946,082	\$356,273	\$1,495,930	\$11,093,261	\$54,699	\$322,061	\$17,625	\$0	\$99,854	\$1,207,254	\$7,951	\$337,021	\$0	\$19,894	\$15,957,906
TOTAL NONRECURRING PROJECT NEEDS			\$2,798,286	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										\$13,159,620	

CURRENT REPLACEMENT VALUE	\$29,777,000
FACILITY CONDITION NEEDS INDEX	0.54
FACILITY CONDITION INDEX	0.37

GSF	TOTAL 10-YEAR FACILITY RENEWAL NEEDS	10-YEAR NEEDS/SF
73,524	\$15,957,906	\$217.04

RENEWAL NEEDS BY SYSTEM

All costs shown as Present Value

CATEGORY	NONRECURRING PROJECT COSTS	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	\$219,237	\$0	\$219,237
EXTERIOR	\$0	\$2,846,526	\$2,846,526
INTERIOR	\$0	\$2,027,409	\$2,027,409
PLUMBING	\$0	\$1,783,023	\$1,783,023
HVAC	\$280,864	\$3,473,905	\$3,754,769
FIRE/LIFE SAFETY	\$1,834,521	\$325,783	\$2,160,304
ELECTRICAL	\$0	\$2,347,645	\$2,347,645
SITE	\$0	\$0	\$0
VERT. TRANS	\$0	\$355,329	\$355,329
HEALTH	\$463,664	\$0	\$463,664
TOTALS	\$2,798,286	\$13,159,620	\$15,957,906

FACILITIES RENEWAL PLAN
 RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
RAWL EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK			B2010	Deferred Renewal	388,920
RAWL WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	ORIG SINGLE-PANE			B2010	Deferred Renewal	2,155,877
RAWL DR28	DOOR OPERATOR, POWER-ASSIST	ELEV TOWER ENTRY			B2030	Deferred Renewal	17,458
RAWL RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP			SOUTH ANNEX	B3010	Deferred Renewal	31,108
RAWL DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	RATED STAIR DOORS			C1020	Deferred Renewal	89,727
RAWL DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED				C1020	Deferred Renewal	788,854
RAWL DR24	DOOR LOCK, COMMERCIAL-GRADE			ELEV MACH RM	C1020	Deferred Renewal	745
RAWL DR24	DOOR LOCK, COMMERCIAL-GRADE			ROOF ACCESS	C1020	Deferred Renewal	745
RAWL DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DRS		BASEMENT	C1020	Deferred Renewal	2,979
RAWL DR24	DOOR LOCK, COMMERCIAL-GRADE	NON-RATED INT DRS			C1020	Deferred Renewal	157,118
RAWL DR26	DOOR PANIC HARDWARE	SECONDARY ENTRIES			C1020	Deferred Renewal	7,310
RAWL DR26	DOOR PANIC HARDWARE	RATED DOORS		STAIRS	C1020	Deferred Renewal	29,239
RAWL DR26	DOOR PANIC HARDWARE	ENTRY		ELEV TOWER	C1020	Deferred Renewal	2,437
RAWL IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CERAMIC TILE WAINSCOT			C3010	Deferred Renewal	91,717
RAWL IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	UPGRADE TO CARPET TILE			C3020	Deferred Renewal	114,734
RAWL IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE			C3020	Deferred Renewal	100,102

FACILITIES RENEWAL PLAN
 RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
RAWL IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	9X9 VINYL TILE			C3020	Deferred Renewal	300,371
RAWL IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC TILE			C3020	Deferred Renewal	41,339
RAWL FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	Deferred Renewal	2,660
RAWL FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	PC		RRS	D2010	Deferred Renewal	7,170
RAWL FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	Deferred Renewal	3,897
RAWL PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	D2020	Deferred Renewal	686,243
RAWL PD02	DRAIN PIPING SYSTEM - CLASSROOM	BELL & SPIGOT CAST-IRON		THROUGHOUT	D2030	Deferred Renewal	1,036,463
RAWL CT05	COOLING TOWER (251-300 TONS)	CT-1		EXT	D3030	Deferred Renewal	115,820
RAWL AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	004-AHU-005		247	D3040	Deferred Renewal	9,008
RAWL AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	004-AHU-004		009	D3040	Deferred Renewal	9,008
RAWL AH06	AIR HANDLING UNIT - INDOOR (6-9 HP)	004-AHU-002		145	D3040	Deferred Renewal	55,834
RAWL AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	004-AHU-003		246	D3040	Deferred Renewal	81,604
RAWL AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	004-AHU-001		147	D3040	Deferred Renewal	81,604
RAWL FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-1		ROOF	D3040	Deferred Renewal	7,951
RAWL FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-3		147	D3040	Deferred Renewal	2,772
RAWL HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, ZONED		THROUGHOUT	D3040	Deferred Renewal	2,266,131

FACILITIES RENEWAL PLAN
 RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
RAWL HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		147	D3040	Deferred Renewal	41,171
RAWL HX10	PRESSURE REDUCING VALVE, STEAM SYSTEM (2.5")	PRV-1		147	D3040	Deferred Renewal	5,525
RAWL BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		THROUGHOUT	D3060	Deferred Renewal	349,876
RAWL FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, NOTIFIER		147	D4030	Deferred Renewal	37,851
RAWL FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	Deferred Renewal	287,932
RAWL SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	ORIG, 277/480		THROUGHOUT	D5010	Deferred Renewal	1,553,399
RAWL SG05	MAIN SWITCHBOARD W/BREAKERS (1200-1600 AMP)	MDP		147	D5010	Deferred Renewal	128,638
RAWL LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN		EXT	D5020	Deferred Renewal	938
RAWL LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID SCONCE		EXT	D5020	Deferred Renewal	988
RAWL PH01	PUMP - ELECTRIC (<=10 HP)	HWP-1		147	D3040	2021	4,936
RAWL PH01	PUMP - ELECTRIC (<=10 HP)	HWP-2		147	D3040	2021	4,936
RAWL PH04	PUMP - ELECTRIC (20 - 25 HP)	CWP-1		12A	D3040	2021	21,517
RAWL PH04	PUMP - ELECTRIC (20 - 25 HP)	CHWP-1		12A	D3040	2021	21,517
RAWL AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC-1		147	D3060	2021	1,794
RAWL IW01	WALL FINISH - PAINT, STANDARD	PAINTED			C3010	2022	262,601
RAWL PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-1		147	D3040	2022	23,998
RAWL PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-2		009	D3040	2022	23,998

FACILITIES RENEWAL PLAN
 RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
RAWL VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD 004-AHU-005		247	D5010	2022	701
RAWL VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD 004-AHU-004		009	D5010	2022	701
RAWL VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD 004-AHU-002		145	D5010	2022	4,764
RAWL VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD 004-AHU-003		246	D5010	2022	5,298
RAWL DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERVICE DRS		BASEMENT	B2030	2023	8,123
RAWL VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD HWP-1		147	D5010	2023	2,102
RAWL VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD HWP-2		147	D5010	2023	2,102
RAWL VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD 004-AHU-001		147	D5010	2023	5,298
RAWL VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			D1010	2025	53,265
RAWL FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	2025	14,632
RAWL FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	2025	27,279
RAWL BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-WM-1		EXT	D2020	2025	2,339
RAWL BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-WM-2		EXT	D2020	2025	2,339
RAWL RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP			MAIN BLDG & LINK	B3010	2026	227,582
RAWL CH02	CHILLER - WATER-COOLED CENTRIFUGAL OR SCREW (150-350 TONS)	CH-1		12A	D3030	2026	336,956
RAWL LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LOW WATTAGE T8		ALL AREAS, SELECT CLASSROOMS	D5020	2026	642,717

FACILITIES RENEWAL PLAN
 RECURRING COMPONENT REPLACEMENT COSTS

All costs shown as Present Value

ASSET CODE COMP CODE	COMPONENT	IDENTIFIER	CUSTOMER ID	LOCATION	UNI- FORMAT	REPLACEMENT YEAR	REPLACEMENT COST
RAWL FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	D3040	2027	7,951
RAWL IC04	CEILING FINISH - PAINTED OR STAINED, STANDARD	PAINTED			C3030	2028	34,957
RAWL VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		101	D1010	2028	302,064
RAWL DR28	DOOR OPERATOR, POWER-ASSIST	MAIN S ENTRY			B2030	2030	17,458
RAWL DR26	DOOR PANIC HARDWARE	MAIN ENTRY		S ENTRY	C1020	2030	2,437
TOTAL							\$13,159,620

FACILITIES RENEWAL PLAN
NONRECURRING PROJECT COSTS

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
RAWLFS02	RATED CORRIDOR DOOR UPGRADES	C1020	1	Plant Adaption	946,082
RAWLAC04	ANNEX UPPER AND LOWER ENTRY DOOR ACCESS UPGRADES	B2030	2	Plant Adaption	22,397
RAWLAC01	LECTURE ROOM 130 ACCESSIBILITY UPGRADES	C1010	2	Plant Adaption	31,582
RAWLAC03	STAIR TOWER RAILING UPGRADES	C2020	2	Plant Adaption	65,171
RAWLAC02	RESTROOM ACCESSIBILITY UPGRADES	D2010	2	Plant Adaption	100,087
RAWLHE01	ASBESTOS ABATEMENT - MECHANICAL SYSTEMS	F2020	2	Plant Adaption	137,036
RAWLHV01	CHILLED WATER LOOP CONNECTION	D3040	3	Plant Adaption	280,864
RAWLFS01	FIRE SPRINKLER SYSTEM INSTALLATION	D4010	3	Plant Adaption	888,439
RAWLHE02	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	F2020	3	Plant Adaption	326,628
TOTAL					\$2,798,286

FACILITY CONDITION ASSESSMENT

SECTION 3

NONRECURRING
PROJECT DETAILS

All costs shown as Present Value

RATED CORRIDOR DOOR UPGRADES			
Project Number:	RAWLFS02	Category Code:	
Priority Sequence:	1	FS5F	
Priority Class:	Immediate	System:	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	Component:	EGRESS PATH
Date Basis:	6/10/2021	Element:	FIRE DOORS/HARDWARE

Code Application:

IBC 713

Subclass/Savings:

Not Applicable

Project Location:

Undefined: Floor(s) 1,2,3,B

Description

The older non-rated corridor doors on all floors, including the annex, should be replaced with new flush wood fire-rated doors with metal frames.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Rated door and rated metal frame installation	LEAF	211	\$2,278	\$480,578	\$551	\$116,170	\$596,748
Lever actuated door hardware	EA	211	\$414	\$87,331	\$166	\$34,984	\$122,315
Base Material/Labor Costs				\$567,909		\$151,154	
Indexed Material/Labor Costs				\$571,884		\$107,773	\$679,657
Construction Mark Up at 20.0%							\$135,931
Original Construction Cost							\$815,588
Date of Original Estimate:	6/10/2021		Inflation			\$0	
Current Year Construction Cost							\$815,588
Professional Fees at 16.0%							\$130,494
TOTAL PROJECT COST							\$946,082

All costs shown as Present Value

ASBESTOS ABATEMENT - MECHANICAL SYSTEMS			
Project Number:	RAWLHE01	Category Code:	
Priority Sequence:	2	HE6B	
Priority Class:	Critical	System:	HEALTH
Project Class:	Plant Adaption	Component:	HAZARDOUS MATERIAL
Date Basis:	5/26/2021	Element:	MECHANICAL ASBESTOS

Code Application:		Subclass/Savings:	Project Location:
EPA	40 CFR 61.M, 763	Not Applicable	Floor-wide: Floor(s) 1,2,3,B
OSHA	29 CFR 1910.1001, 1926.1101		

Description

There is asbestos on utility piping. Prior to future renovation of these systems, this asbestos will have to be properly removed.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
HVAC system - abate asbestos from utility piping	SF	73,524	\$0.24	\$17,646	\$0.60	\$44,114	\$61,760
Plumbing system - abate asbestos from supply piping network	SF	73,524	\$0.24	\$17,646	\$0.60	\$44,114	\$61,760
Base Material/Labor Costs				\$35,292		\$88,229	
Indexed Material/Labor Costs				\$35,539		\$62,907	\$98,446
Construction Mark Up at 20.0%							\$19,689
Original Construction Cost							\$118,135
Date of Original Estimate:	5/26/2021				Inflation	\$0	
Current Year Construction Cost							\$118,135
Professional Fees at 16.0%							\$18,902
TOTAL PROJECT COST							\$137,036

All costs shown as Present Value

ANNEX UPPER AND LOWER ENTRY DOOR ACCESS UPGRADES			
Project Number:	RAWLAC04	Category Code:	
Priority Sequence:	3	AC2A	
Priority Class:	Critical	System:	ACCESSIBILITY
Project Class:	Plant Adaption	Component:	BUILDING ENTRY
Date Basis:	5/10/2021	Element:	GENERAL

Code Application:		Subclass/Savings:	Project Location:
ADAAG	403.6, 405,505	Not Applicable	Undefined: Floor(s) 1,B

Description

The upper and lower floor entry doors for the annex have a high threshold that is a barrier for wheelchair access. Modify the concrete thresholds to meet current ramped threshold designs. Also install power assist units at each door to further improve accessibility.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Accessible ramped concrete entry door threshold modification allowance	EA	2	\$700	\$1,400	\$1,500	\$3,000	\$4,400
Door operator, signage and controls	EA	2	\$5,002	\$10,004	\$1,730	\$3,460	\$13,464
Base Material/Labor Costs				\$11,404		\$6,460	
Indexed Material/Labor Costs				\$11,484		\$4,606	\$16,090
Construction Mark Up at 20.0%							\$3,218
Original Construction Cost							\$19,308
Date of Original Estimate:	5/10/2021		Inflation			\$0	
Current Year Construction Cost							\$19,308
Professional Fees at 16.0%							\$3,089
TOTAL PROJECT COST							\$22,397

All costs shown as Present Value

RESTROOM ACCESSIBILITY UPGRADES			
Project Number:	RAWLAC02	Category Code:	
Priority Sequence:	4	AC3E	
Priority Class:	Critical	System:	ACCESSIBILITY
Project Class:	Plant Adaption	Component:	INTERIOR PATH OF TRAVEL
Date Basis:	6/10/2021	Element:	RESTROOMS/BATHROOMS

Code Application:		Subclass/Savings:	Project Location:
ADAAG	211, 602, 309, 604, 605, 606, 607, 608	DOJ3 - Restrooms	Undefined: Floor(s) 1,2,3

Description

Each floor has accessible restrooms, but some components of these facilities still do not meet current accessibility standards. Upgrade grab bars in each accessible restroom, replace noncompliant room signage, adjust noncompliant mirror heights, and replace noncompliant wall sinks. Also install power door assists on each of the accessible restrooms. Accompanying corridor water fountains are aging and not fully accessible. Install accessible dual-level water fountains in alcoves. The lower floor of the Annex has older restrooms, and one should be selected to expand into an accessible all-gender restroom to serve this lower floor. Also replace the nonaccessible water fountain in this area with a new dual-level fountain set in a wheelchair accessible corridor alcove.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Door operator, signage, and controls	EA	6	\$5,003	\$30,017	\$1,730	\$10,382	\$40,399
Grab bars (per stall)	SYS	6	\$193	\$1,158	\$454	\$2,724	\$3,882
Mirror height adjustments	EA	2	\$50.00	\$100	\$85.00	\$170	\$270
ADA compliant signage	EA	3	\$72.36	\$217	\$21.28	\$64	\$281
ADA compliant lavatory	EA	3	\$838	\$2,513	\$312	\$935	\$3,448
Dual-level drinking fountain	EA	4	\$1,657	\$6,628	\$509	\$2,037	\$8,666
Alcove construction for drinking fountain	EA	4	\$1,195	\$4,778	\$5,099	\$20,396	\$25,174
Base Material/Labor Costs				\$45,411		\$36,708	
Indexed Material/Labor Costs				\$45,729		\$26,173	\$71,902
Construction Mark Up at 20.0%							\$14,380
Original Construction Cost							\$86,282
Date of Original Estimate:	6/10/2021					Inflation	\$0
Current Year Construction Cost							\$86,282
Professional Fees at 16.0%							\$13,805
TOTAL PROJECT COST							\$100,087

All costs shown as Present Value

LECTURE ROOM 130 ACCESSIBILITY UPGRADES			
Project Number:	RAWLAC01	Category Code:	
Priority Sequence:	5	AC4B	
Priority Class:	Critical	System:	ACCESSIBILITY
Project Class:	Plant Adaption	Component:	GENERAL
Date Basis:	6/10/2021	Element:	OTHER

Code Application:		Subclass/Savings:	Project Location:
ADAAG	219.3, 706.1, 806	DOJ2 - Access to Goods & Services	Undefined: Floor(s) 1

Description

First floor lecture room 130 lacks adequate designated accessible seating, and there is no wheelchair access to the small stage. Create wheelchair accessible seating, and install a wheelchair lift to the stage. An assistive listening system for the hearing impaired is also recommended.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Table and seating modifications	LOT	3	\$1,206	\$3,618	\$756	\$2,269	\$5,886
Infrared transmitter and headphone receiver sets	SYS	1	\$2,071	\$2,071	\$1,816	\$1,816	\$3,887
Stage wheelchair lift	SYS	1	\$9,931	\$9,931	\$5,675	\$5,675	\$15,606
Base Material/Labor Costs				\$15,620		\$9,760	
Indexed Material/Labor Costs				\$15,730		\$6,959	\$22,688
Construction Mark Up at 20.0%							\$4,538
Original Construction Cost							\$27,226
Date of Original Estimate:	6/10/2021					Inflation	\$0
Current Year Construction Cost							\$27,226
Professional Fees at 16.0%							\$4,356
TOTAL PROJECT COST							\$31,582

All costs shown as Present Value

STAIR TOWER RAILING UPGRADES			
Project Number:	RAWLAC03	Category Code:	
Priority Sequence:	6	AC3B	
Priority Class:	Critical	System:	ACCESSIBILITY
Project Class:	Plant Adaption	Component:	INTERIOR PATH OF TRAVEL
Date Basis:	6/10/2021	Element:	STAIRS AND RAILINGS

Code Application:		Subclass/Savings:	Project Location:
IBC	1003.3	DOJ2 - Access to Goods & Services	Floor-wide: Floor(s) 1,2,3,B
ADAAG	505		

Description

The four stair towers have compliant wall-mounted handrails but lack accessible inner switchback railings. Install new accessible switchback handrails on each stair run and new rubber stair treads. Also install metal riser panels and a lower cane guard on the exterior egress stair at the south end of the annex to meet current accessibility standards.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Metal riser panels and metal cane guard allowance	LOT	1	\$2,850	\$2,850	\$1,850	\$1,850	\$4,700
Switchback handrail/guardrail system per floor	FLR	8	\$1,768	\$14,142	\$1,135	\$9,080	\$23,222
Stair tread and landing finish upgrades per floor	FLR	8	\$1,975	\$15,799	\$1,053	\$8,422	\$24,221
Base Material/Labor Costs				\$32,791		\$19,352	
Indexed Material/Labor Costs				\$33,021		\$13,798	\$46,818
Construction Mark Up at 20.0%							\$9,364
Original Construction Cost							\$56,182
Date of Original Estimate:	6/10/2021					Inflation	\$0
Current Year Construction Cost							\$56,182
Professional Fees at 16.0%							\$8,989
TOTAL PROJECT COST							\$65,171

All costs shown as Present Value

FIRE SPRINKLER SYSTEM INSTALLATION			
Project Number:	RAWLFS01	Category Code:	
Priority Sequence:	7	FS3A	
Priority Class:	Noncritical	System:	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	Component:	SUPPRESSION
Date Basis:	5/26/2021	Element:	SPRINKLERS

Code Application:		Subclass/Savings:	Project Location:
NFPA	1, 13, 13R, 101	Not Applicable	Floor-wide: Floor(s) 1,2,3,B

Description

As part of future renovation efforts, it is recommended that an automatic, wet-pipe sprinkler system be installed to fully protect this facility.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Install a wet-pipe sprinkler system, including valves, piping, sprinkler heads, piping supports, etc.	SF	73,524	\$4.62	\$339,681	\$5.65	\$415,411	\$755,091
Base Material/Labor Costs				\$339,681		\$415,411	
Indexed Material/Labor Costs				\$342,059		\$296,188	\$638,246
Construction Mark Up at 20.0%							\$127,649
Original Construction Cost							\$765,896
Date of Original Estimate:	5/26/2021					Inflation	\$0
Current Year Construction Cost							\$765,896
Professional Fees at 16.0%							\$122,543
TOTAL PROJECT COST							\$888,439

All costs shown as Present Value

ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS			
Project Number:	RAWLHE02	Category Code:	
Priority Sequence:	8	HE6A	
Priority Class:	Noncritical	System:	HEALTH
Project Class:	Plant Adaption	Component:	HAZARDOUS MATERIAL
Date Basis:	6/10/2021	Element:	STRUCTURAL ASBESTOS

Code Application:		Subclass/Savings:	Project Location:
EPA	40 CFR 61.M, 763	Not Applicable	Undefined: Floor(s) 1,2,3,B
OSHA	29 CFR 1910.1001, 1926.1101		

Description

The 9x9 vinyl floor tile and mastics and textured ceilings are suspected to contain asbestos. It is also assumed that 9x9 vinyl flooring is present under the carpeting and that textured ceilings are present above the acoustical lay-in ceilings. These finishes should be sampled and tested. Assuming a positive test result, they should be abated prior to upgrading interior finishes in these areas.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Typical asbestos abatement of floor tile and mastic	SF	62,500	\$0.31	\$19,375	\$2.18	\$136,250	\$155,625
Typical asbestos abatement of textured ceiling finishes for standard height ceilings	SF	62,500	\$0.14	\$8,750	\$2.45	\$153,125	\$161,875
Base Material/Labor Costs				\$28,125		\$289,375	
Indexed Material/Labor Costs				\$28,322		\$206,324	\$234,646
Construction Mark Up at 20.0%							\$46,929
Original Construction Cost							\$281,575
Date of Original Estimate:	6/10/2021				Inflation		\$0
Current Year Construction Cost							\$281,576
Professional Fees at 16.0%							\$45,052
TOTAL PROJECT COST							\$326,628

All costs shown as Present Value

CHILLED WATER LOOP CONNECTION			
Project Number:	RAWLHV01	Category Code:	
Priority Sequence:	9	HV7D	
Priority Class:	Noncritical	System:	HVAC
Project Class:	Plant Adaption	Component:	INFRASTRUCTURE
Date Basis:	5/26/2021	Element:	CHILLED WATER DIST.

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Undefined: Floor(s) B

Description

As part of future renovation efforts, it is recommended that the building be connected to the central chilled water loop. The cost proposal that was provided included dismantling and removing the existing chilled water generation equipment, connecting to the chilled water loop, and adding new mechanical systems.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Demolish existing equipment, connect to existing loop, add mechanical systems	EA	1	\$80,000	\$80,000	\$170,000	\$170,000	\$250,000
Base Material/Labor Costs				\$80,000		\$170,000	
Indexed Material/Labor Costs				\$80,560		\$121,210	\$201,770
Construction Mark Up at 20.0%							\$40,354
Original Construction Cost							\$242,124
Date of Original Estimate:	5/26/2021					Inflation	\$0
Current Year Construction Cost							\$242,124
Professional Fees at 16.0%							\$38,740
TOTAL PROJECT COST							\$280,864

FACILITY CONDITION ASSESSMENT

SECTION 4

LIFECYCLE COMPONENT
INVENTORY

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK			39,870	SF	1.27	\$388,920	1959	30	31	DR
EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK		TOWER	3,580	SF	1.27	\$34,922	1998	30	4	2032
EW01	WALL, EXTERIOR, MASONRY POINTING	CUT STONE ACCENTS			1,340	SF	1.27	\$13,071	1999	30	4	2033
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	ORIG SINGLE-PANE			11,090	SF	1.27	\$2,155,877	1959	40	21	DR
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	THERMAL-PANE		ELEV TOWER	110	SF	1.27	\$21,384	1998	40		2038
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	MAIN ENTRY		S ENTRY	2	LEAF	1.00	\$5,770	2010	25		2035
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	ENTRY		ELEV TOWER	2	LEAF	1.00	\$5,770	2000	25	7	2032
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERVICE DRS		BASEMENT	4	LEAF	1.00	\$8,123	1980	40	3	2023
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY ENTRIES			6	LEAF	1.00	\$12,185	2000	40		2040
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			ELEV MACH RM	1	LEAF	1.00	\$2,031	1997	40		2037
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			ROOF ACCESS	1	LEAF	1.00	\$2,031	2000	40		2040
DR28	DOOR OPERATOR, POWER-ASSIST	MAIN S ENTRY			2	EA	1.00	\$17,458	2010	20		2030
DR28	DOOR OPERATOR, POWER-ASSIST	ELEV TOWER ENTRY			2	EA	1.00	\$17,458	2000	20		DR
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP			MAIN BLDG & LINK	22,435	SF	1.50	\$227,582	2006	20		2026
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP			SOUTH ANNEX	3,680	SF	1.25	\$31,108	1997	20	3	DR

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED				211	LEAF	1.00	\$788,854	1959	40	21	DR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	RATED STAIR DOORS			24	LEAF	1.00	\$89,727	1980	40		DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	NON-RATED INT DRS			211	EA	1.00	\$157,118	1959	20	41	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DRS		BASEMENT	4	EA	1.00	\$2,979	1980	20	20	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			ELEV MACH RM	1	EA	1.00	\$745	1997	20	3	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			ROOF ACCESS	1	EA	1.00	\$745	2000	20		DR
DR26	DOOR PANIC HARDWARE	RATED DOORS		STAIRS	24	EA	1.00	\$29,239	1980	20	20	DR
DR26	DOOR PANIC HARDWARE	MAIN ENTRY		S ENTRY	2	EA	1.00	\$2,437	2010	20		2030
DR26	DOOR PANIC HARDWARE	SECONDARY ENTRIES			6	EA	1.00	\$7,310	2000	20		DR
DR26	DOOR PANIC HARDWARE	ENTRY		ELEV TOWER	2	EA	1.00	\$2,437	2000	20		DR
IW01	WALL FINISH - PAINT, STANDARD	PAINTED			117,340	SF	1.00	\$262,601	2010	12		2022
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CERAMIC TILE WAINSCOT			2,390	SF	1.00	\$91,717	1959	30	31	DR
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	UPGRADE TO CARPET TILE			9,370	SF	1.00	\$114,734	2000	12	8	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	9X9 VINYL TILE			46,870	SF	1.00	\$300,371	1959	20	41	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE			15,620	SF	1.00	\$100,102	1990	20	10	DR

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC TILE			1,300	SF	1.00	\$41,339	1959	30	31	DR
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	LAY-IN ACOUSTICAL			46,870	SF	1.00	\$472,991	2016	30		2046
IC04	CEILING FINISH - PAINTED OR STAINED, STANDARD	PAINTED			15,620	SF	1.00	\$34,957	2010	24	-6	2028
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		101	1	EA	1.00	\$302,064	1998	25	5	2028
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			1	EA	1.00	\$53,265	1998	12	15	2025
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	11	EA	1.00	\$14,632	1990	35		2025
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		ALL-GENDER RRS	5	EA	1.00	\$6,651	2000	35		2035
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	2	EA	1.00	\$2,660	1959	35	26	DR
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	PC		RRS	4	EA	1.00	\$7,170	1959	35	26	DR
FX10	PLUMBING FIXTURE - URINAL	PC		RRS	8	EA	1.00	\$16,943	2010	35		2045
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	14	EA	1.00	\$27,279	1990	35		2025
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		ALL-GENDER RRS	5	EA	1.00	\$9,742	2000	35		2035
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	2	EA	1.00	\$3,897	1959	35	26	DR
BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-WM-1		EXT	1	EA	1.00	\$2,339	2010	10	5	2025
BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-WM-2		EXT	1	EA	1.00	\$2,339	2010	10	5	2025

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	73,524	SF	0.96	\$686,243	1959	35	26	DR
PD02	DRAIN PIPING SYSTEM - CLASSROOM	BELL & SPIGOT CAST-IRON		THROUGHOUT	73,524	SF	0.96	\$1,036,463	1959	40	21	DR
PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1		147	1	EA	1.00	\$680	2017	20		2037
CH02	CHILLER - WATER-COOLED CENTRIFUGAL OR SCREW (150-350 TONS)	CH-1		12A	225	TON	1.00	\$336,956	1996	30		2026
CT05	COOLING TOWER (251-300 TONS)	CT-1		EXT	300	TON	1.00	\$115,820	1996	23	1	DR
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	004-AHU-005		247	1	HP	1.00	\$9,008	1959	25	36	DR
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	004-AHU-004		009	1	HP	1.00	\$9,008	1959	25	36	DR
AH06	AIR HANDLING UNIT - INDOOR (6-9 HP)	004-AHU-002		145	7.50	HP	1.00	\$55,834	1959	25	36	DR
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	004-AHU-003		246	10	HP	1.00	\$81,604	1959	25	36	DR
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	004-AHU-001		147	10	HP	1.00	\$81,604	1959	25	36	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-1		ROOF	1	EA	1.00	\$7,951	1959	20	41	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	1	EA	1.00	\$7,951	2007	20		2027
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-3		147	1	HP	1.00	\$2,772	1959	20	41	DR
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, ZONED		THROUGHOUT	73,524	SF	0.96	\$2,266,131	1959	40	21	DR
HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		147	280	GPM	1.00	\$41,171	1959	35	26	DR

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
HX10	PRESSURE REDUCING VALVE, STEAM SYSTEM (2.5")	PRV-1		147	1	EA	1.00	\$5,525	1959	20	41	DR
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-1		147	3	HP	1.00	\$4,936	1996	25		2021
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-2		147	3	HP	1.00	\$4,936	1996	25		2021
PH04	PUMP - ELECTRIC (20 - 25 HP)	CWP-1		12A	25	HP	1.00	\$21,517	1996	25		2021
PH04	PUMP - ELECTRIC (20 - 25 HP)	CHWP-1		12A	25	HP	1.00	\$21,517	1996	25		2021
PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-1		147	1.50	HP	1.00	\$23,998	2002	20		2022
PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-2		009	1.50	HP	1.00	\$23,998	2002	20		2022
AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC-1		147	1	HP	1.00	\$1,794	2001	20		2021
AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC-2		147	2	HP	1.00	\$3,588	2019	20		2039
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		THROUGHOUT	73,524	SF	0.96	\$349,876	1959	18	43	DR
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, NOTIFIER		147	1	EA	1.00	\$37,851	2002	15	3	DR
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	73,524	SF	0.96	\$287,932	2002	18		DR
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	ORIG, 277/480		THROUGHOUT	73,524	SF	0.96	\$1,553,399	1959	40	21	DR
SG05	MAIN SWITCHBOARD W/BREAKERS (1200-1600 AMP)	MDP		147	1,600	AMP	1.00	\$128,638	1959	20	41	DR
TX17	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (300-500 KVA)	TX-1		EXT	500	KVA	1.00	\$71,140	2000	35		2035

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD 004-AHU-005		247	1	HP	1.00	\$701	2010	12		2022
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD 004-AHU-004		009	1	HP	1.00	\$701	2010	12		2022
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD HWP-1		147	3	HP	1.00	\$2,102	2011	12		2023
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD HWP-2		147	3	HP	1.00	\$2,102	2011	12		2023
VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD 004-AHU-002		145	7.50	HP	1.00	\$4,764	2010	12		2022
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD 004-AHU-003		246	10	HP	1.00	\$5,298	2010	12		2022
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD 004-AHU-001		147	10	HP	1.00	\$5,298	2011	12		2023
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN		EXT	4	EA	1.00	\$938	1995	15	10	DR
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID SCONCE		EXT	1	EA	1.00	\$988	1995	15	10	DR
LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	LED SCONCE		EXT	3	EA	1.00	\$1,245	2017	15		2032
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LED		SELECT CLASSROOMS	18,381	SF	1.07	\$199,335	2016	20		2036
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LOW WATTAGE T8		ALL AREAS, SELECT CLASSROOMS	55,143	SF	1.15	\$642,717	1985	20	21	2026
GN15	SWITCH - AUTO TRANSFER, 480 V (100-400 AMP)	ATS-ESR		146	225	AMP	1.00	\$9,251	2010	25		2035
GN15	SWITCH - AUTO TRANSFER, 480 V (100-400 AMP)	ATS-EER		146	150	AMP	1.00	\$6,167	2010	25		2035
SF01	SEATING, FIXED, FOLDING, STANDARD	FIXED SEATING		130	95	EA	1.00	\$33,482	2000	40		2040

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
Grand Total:								\$14,088,001				

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

DEFERRED RENEWAL									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK			B2010	39,870	SF	\$388,920	DR
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	ORIG SINGLE-PANE			B2010	11,090	SF	\$2,155,877	DR
DR28	DOOR OPERATOR, POWER-ASSIST	ELEV TOWER ENTRY			B2030	2	EA	\$17,458	DR
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP			SOUTH ANNEX	B3010	3,680	SF	\$31,108	DR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED				C1020	211	LEAF	\$788,854	DR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	RATED STAIR DOORS			C1020	24	LEAF	\$89,727	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	NON-RATED INT DRS			C1020	211	EA	\$157,118	DR
DR26	DOOR PANIC HARDWARE	RATED DOORS		STAIRS	C1020	24	EA	\$29,239	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DRS		BASEMENT	C1020	4	EA	\$2,979	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			ELEV MACH RM	C1020	1	EA	\$745	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			ROOF ACCESS	C1020	1	EA	\$745	DR
DR26	DOOR PANIC HARDWARE	SECONDARY ENTRIES			C1020	6	EA	\$7,310	DR

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

DR26	DOOR PANIC HARDWARE	ENTRY		ELEV TOWER	C1020	2	EA	\$2,437	DR
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CERAMIC TILE WAINSCOT			C3010	2,390	SF	\$91,717	DR
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	UPGRADE TO CARPET TILE			C3020	9,370	SF	\$114,734	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	9X9 VINYL TILE			C3020	46,870	SF	\$300,371	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE			C3020	15,620	SF	\$100,102	DR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC TILE			C3020	1,300	SF	\$41,339	DR
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	2	EA	\$2,660	DR
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	PC		RRS	D2010	4	EA	\$7,170	DR
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	2	EA	\$3,897	DR
PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	D2020	73,524	SF	\$686,243	DR
PD02	DRAIN PIPING SYSTEM - CLASSROOM	BELL & SPIGOT CAST-IRON		THROUGHOUT	D2030	73,524	SF	\$1,036,463	DR
CT05	COOLING TOWER (251-300 TONS)	CT-1		EXT	D3030	300	TON	\$115,820	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-1		ROOF	D3040	1	EA	\$7,951	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-3		147	D3040	1	HP	\$2,772	DR

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, ZONED		THROUGHOUT	D3040	73,524	SF	\$2,266,131	DR
HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		147	D3040	280	GPM	\$41,171	DR
HX10	PRESSURE REDUCING VALVE, STEAM SYSTEM (2.5")	PRV-1		147	D3040	1	EA	\$5,525	DR
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	004-AHU-003		246	D3040	10	HP	\$81,604	DR
AH06	AIR HANDLING UNIT - INDOOR (6-9 HP)	004-AHU-002		145	D3040	7.50	HP	\$55,834	DR
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	004-AHU-001		147	D3040	10	HP	\$81,604	DR
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	004-AHU-005		247	D3040	1	HP	\$9,008	DR
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	004-AHU-004		009	D3040	1	HP	\$9,008	DR
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		THROUGHOUT	D3060	73,524	SF	\$349,876	DR
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, NOTIFIER		147	D4030	1	EA	\$37,851	DR
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	73,524	SF	\$287,932	DR
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	ORIG, 277/480		THROUGHOUT	D5010	73,524	SF	\$1,553,399	DR
SG05	MAIN SWITCHBOARD W/BREAKERS (1200-1600 AMP)	MDP		147	D5010	1,600	AMP	\$128,638	DR
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN		EXT	D5020	4	EA	\$938	DR

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID SCONCE		EXT	D5020	1	EA	\$988	DR
TOTAL DEFERRED RENEWAL COST								\$11,093,261.15	

2021									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
PH04	PUMP - ELECTRIC (20 - 25 HP)	CWP-1		12A	D3040	25	HP	\$21,517	2021
PH04	PUMP - ELECTRIC (20 - 25 HP)	CHWP-1		12A	D3040	25	HP	\$21,517	2021
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-1		147	D3040	3	HP	\$4,936	2021
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-2		147	D3040	3	HP	\$4,936	2021
AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC-1		147	D3060	1	HP	\$1,794	2021
2021 PROJECTED COMPONENT REPLACEMENT COST								\$54,699.00	

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

2022									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
IW01	WALL FINISH - PAINT, STANDARD	PAINTED			C3010	117,340	SF	\$270,479	2022
PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-1		147	D3040	1.50	HP	\$24,718	2022
PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-2		009	D3040	1.50	HP	\$24,718	2022
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD 004-AHU-003		246	D5010	10	HP	\$5,457	2022
VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD 004-AHU-002		145	D5010	7.50	HP	\$4,907	2022
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD 004-AHU-005		247	D5010	1	HP	\$722	2022
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD 004-AHU-004		009	D5010	1	HP	\$722	2022
2022 PROJECTED COMPONENT REPLACEMENT COST								\$331,722.47	

2023									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERVICE DRS		BASEMENT	B2030	4	LEAF	\$8,618	2023
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD 004-AHU-001		147	D5010	10	HP	\$5,621	2023
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD HWP-1		147	D5010	3	HP	\$2,230	2023
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD HWP-2		147	D5010	3	HP	\$2,230	2023
2023 PROJECTED COMPONENT REPLACEMENT COST								\$18,697.86	

No Projected Component Replacement Cost for Asset No. RAWL for 2024

2025									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			D1010	1	EA	\$59,950	2025
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	11	EA	\$16,469	2025

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	14	EA	\$30,703	2025
BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-WM-1		EXT	D2020	1	EA	\$2,633	2025
BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-WM-2		EXT	D2020	1	EA	\$2,633	2025
2025 PROJECTED COMPONENT REPLACEMENT COST								\$112,386.93	

2026									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP			MAIN BLDG & LINK	B3010	22,435	SF	\$263,829	2026
CH02	CHILLER - WATER-COOLED CENTRIFUGAL OR SCREW (150-350 TONS)	CH-1		12A	D3030	225	TON	\$390,624	2026
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LOW WATTAGE T8		ALL AREAS, SELECT CLASSROOMS	D5020	55,143	SF	\$745,085	2026
2026 PROJECTED COMPONENT REPLACEMENT COST								\$1,399,538.31	

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

2027									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	D3040	1	EA	\$9,494	2027
2027 PROJECTED COMPONENT REPLACEMENT COST								\$9,493.66	

2028									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
IC04	CEILING FINISH - PAINTED OR STAINED, STANDARD	PAINTED			C3030	15,620	SF	\$42,992	2028
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		101	D1010	1	EA	\$371,501	2028
2028 PROJECTED COMPONENT REPLACEMENT COST								\$414,493.12	

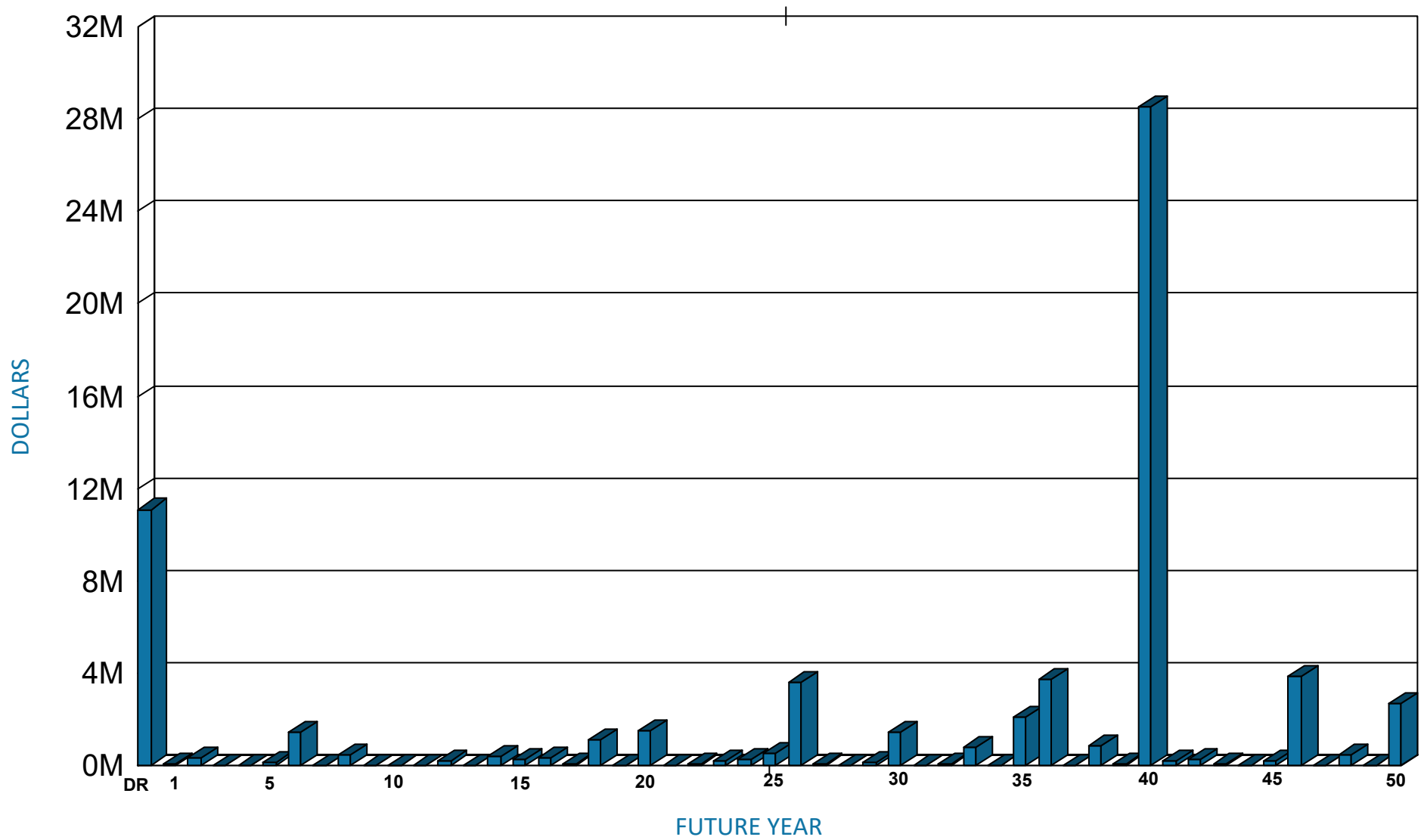
No Projected Component Replacement Cost for Asset No. RAWL for 2029

RECURRING NEEDS BY YEAR

All costs shown as Future Value using a 3% average inflation rate

2030									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
DR28	DOOR OPERATOR, POWER-ASSIST	MAIN S ENTRY			B2030	2	EA	\$22,779	2030
DR26	DOOR PANIC HARDWARE	MAIN ENTRY		S ENTRY	C1020	2	EA	\$3,179	2030
2030 PROJECTED COMPONENT REPLACEMENT COST								\$25,957.80	

RECURRING COMPONENT EXPENDITURE PROJECTIONS

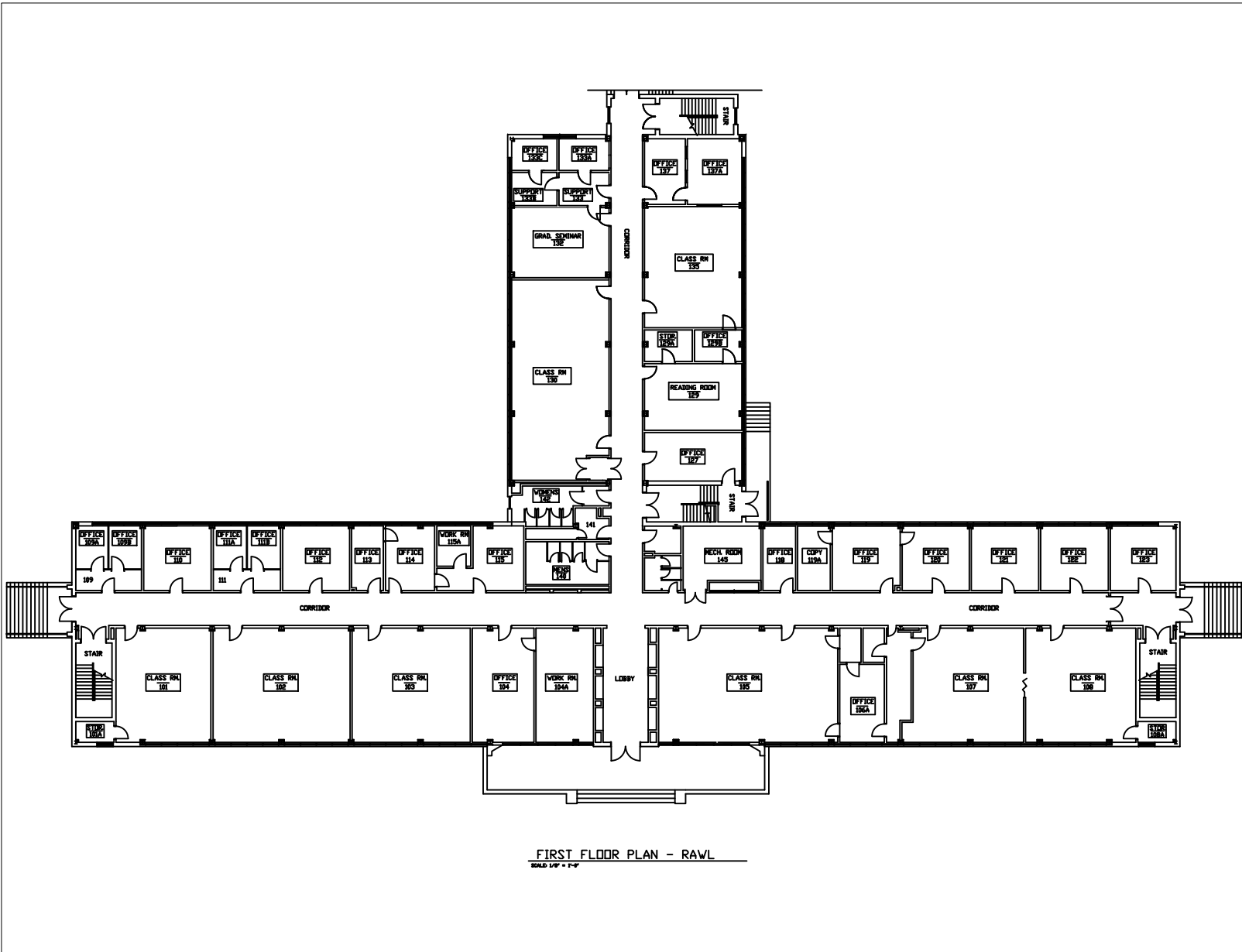


Average Annual Renewal Cost per SF \$8.46

FACILITY CONDITION ASSESSMENT

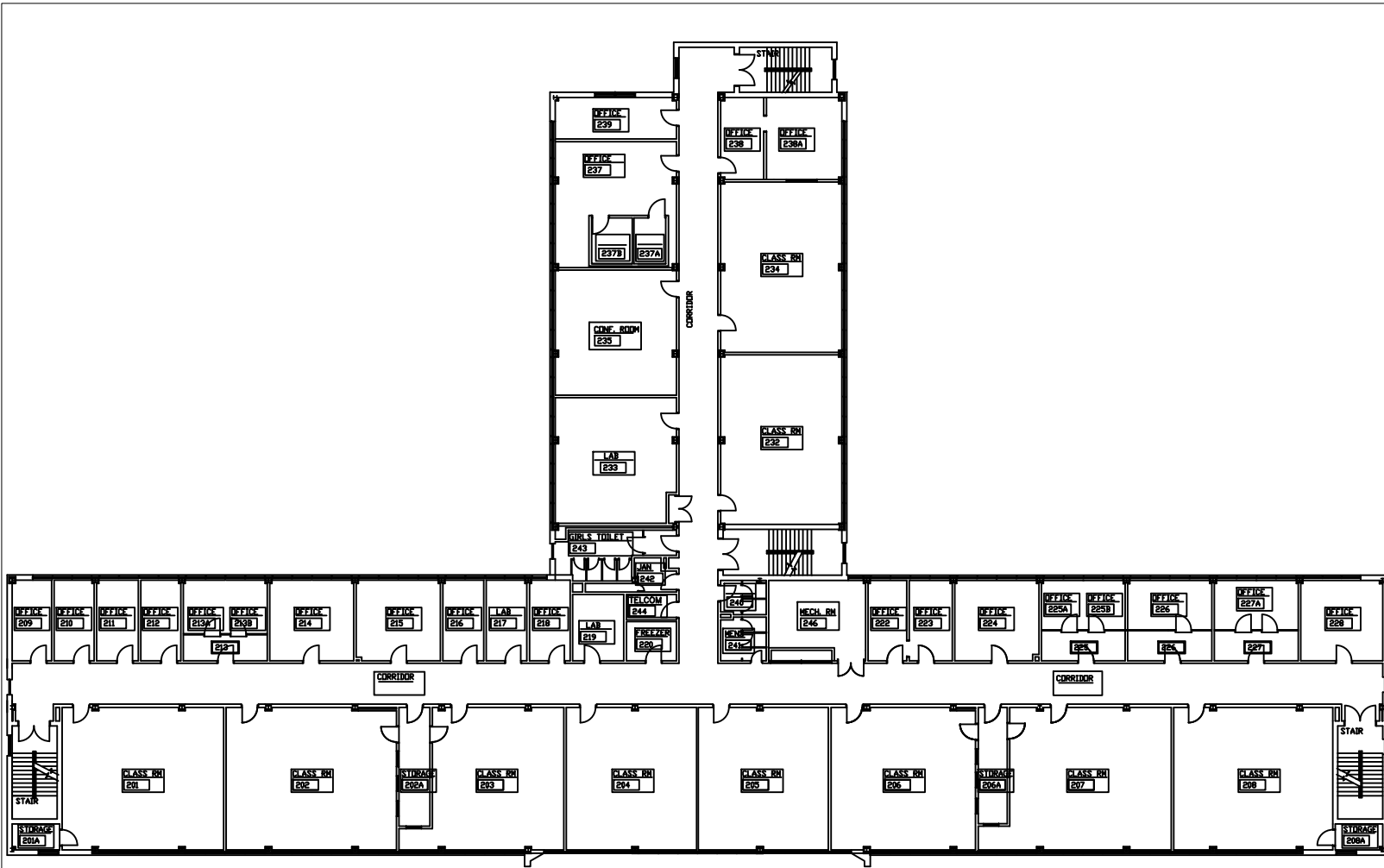
SECTION 5

DRAWINGS



FIRST FLOOR PLAN - RAWL

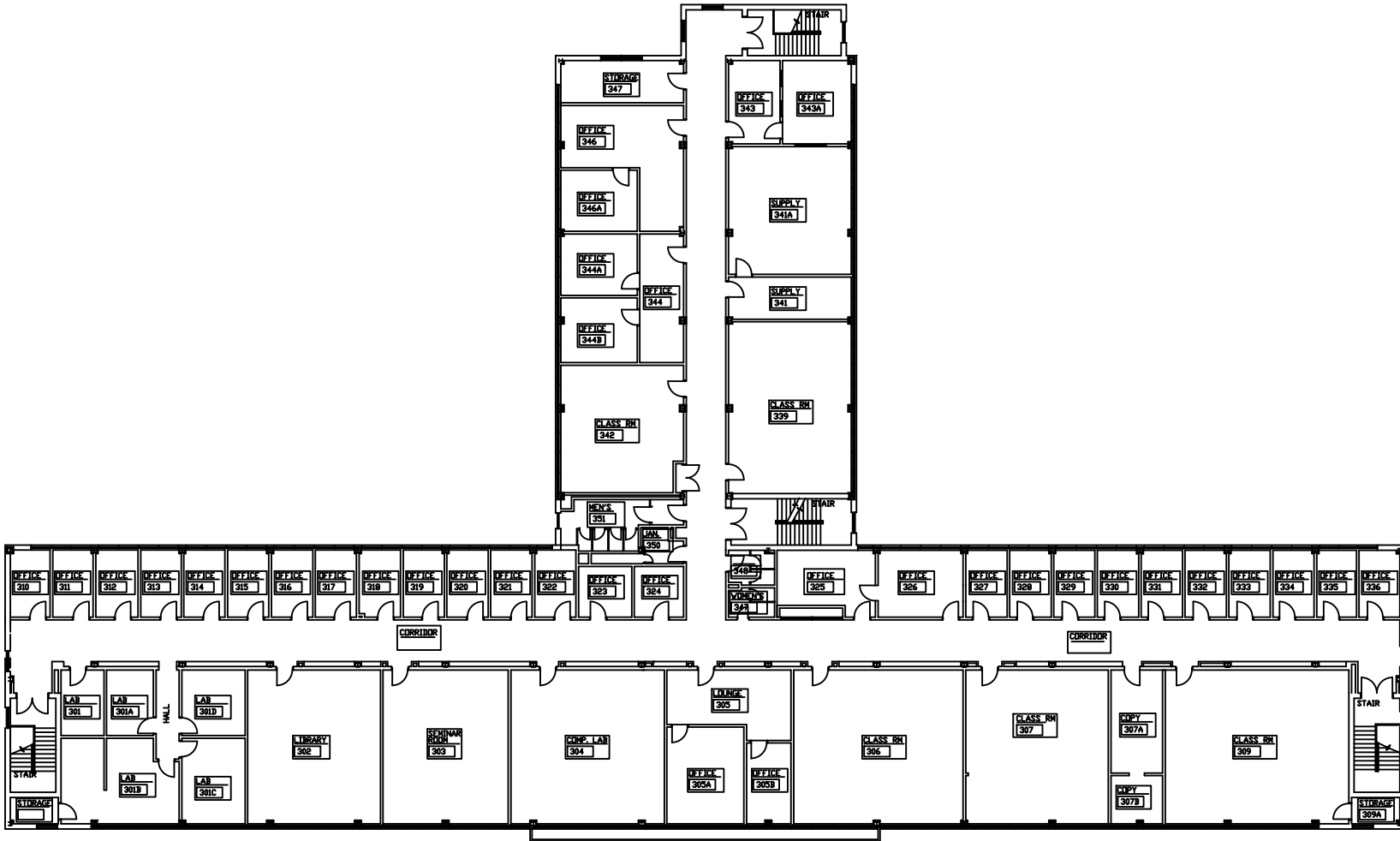
SCALE 1/8" = 1'-0"



SECOND FLOOR PLAN-RAWL

SCALE 1/8" = 1'-0"

UPDATED 11/11/08



THIRD FLOOR PLAN- RAWL
SCALE 1/8" = 1'-0"

FACILITY CONDITION ASSESSMENT

SECTION 6

PHOTOGRAPHS



RAWL001a 5/10/2021
Accessible elevator control panel
East elevator tower addition



RAWL001e 5/10/2021
Water-cooled centrifugal chiller
Room 12A



RAWL002a 5/10/2021
Main built-up roof
Main roof



RAWL002e 5/10/2021
Chilled water and condenser water pumps
Room 12A



RAWL003a 5/10/2021
Hollow metal roof access door
Main roof



RAWL003e 5/10/2021
HID sconce lighting fixture
Exterior entrance



RAWL004a 5/10/2021
Accessible wall rail but wide picket spacing on inner railing
Third floor, stair tower



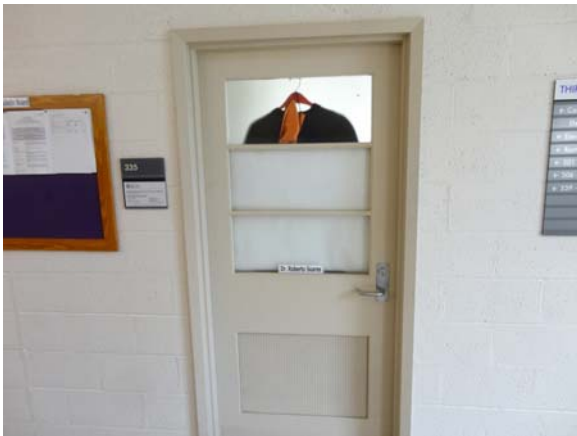
RAWL004e 5/10/2021
Automatic transfer switch
Room 146



RAWL005a 5/10/2021
9x9 vinyl floor tile and textured ceiling
Third floor corridor



RAWL005e 5/10/2021
Automatic transfer switch
Room 146



RAWL006a 5/10/2021
Older non-rated corridor door with newer lever hardware
Third floor corridor



RAWL006e 5/10/2021
Cooling tower
Exterior



RAWL007a 5/10/2021
Newer accessible wall-mounted signage with Braille
Third floor corridor



RAWL007e 5/10/2021
Hydraulic elevator controls
Room 101



RAWL008a 5/10/2021
Older vinyl composite floor tile and acoustical ceiling
Third floor classroom



RAWL008e 5/10/2021
Elevator interior
Elevator



RAWL009a 5/10/2021
Original single-pane glazing
Third floor glazing



RAWL009e 5/10/2021
Elevator interior
Elevator



RAWL010a 5/10/2021
Accessible tankless toilet
Third floor all-gender restroom



RAWL010e 5/10/2021
Ceiling-mounted sconce lighting fixture
Third floor corridor



RAWL011a 5/10/2021
Nonaccessible corner wall sink
Third floor all-gender restroom



RAWL011e 5/10/2021
Local panelboard
Third floor corridor



RAWL012a 5/10/2021
Dissimilar ceramic tile floor repair
Third floor all-gender restroom



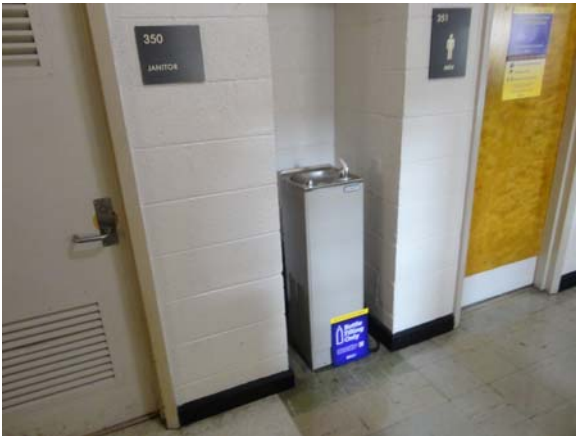
RAWL012e 5/10/2021
Centrifugal rooftop exhaust fan
Roof



RAWL013a 5/10/2021
Three-fixture accessible restroom
Third floor all-gender restroom



RAWL013e 5/10/2021
Centrifugal rooftop exhaust fan
Roof



RAWL014a 5/10/2021
Old nonaccessible freestanding water fountain
Third floor corridor



RAWL014e 5/10/2021
Recessed lay-in LED lighting
Room 339



RAWL015a 5/10/2021
Two older wall-mounted sinks
Third floor men's restroom



RAWL015e 5/10/2021
Smoke detector
Third floor corridor



RAWL016a 5/10/2021
Three newer wall-mounted urinals
Third floor men's restroom



RAWL016e 5/10/2021
Horn strobe fire alarm device
Third floor corridor



RAWL017a 5/10/2021
Standard tankless toilet
Third floor men's restroom



RAWL017e 5/10/2021
Local panelboard
Classroom



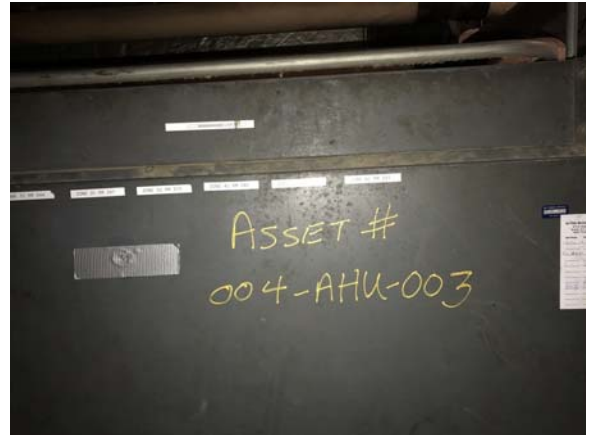
RAWL018a 5/10/2021
Aging original upper glazing
Upper elevation



RAWL018e 5/10/2021
HVAC field panel
Room 246



RAWL019a 5/10/2021
Loose metal stair nosing and aging vinyl tile treads
Second floor, stair tower



RAWL019e 5/10/2021
Air handling unit AHU-003
Room 246



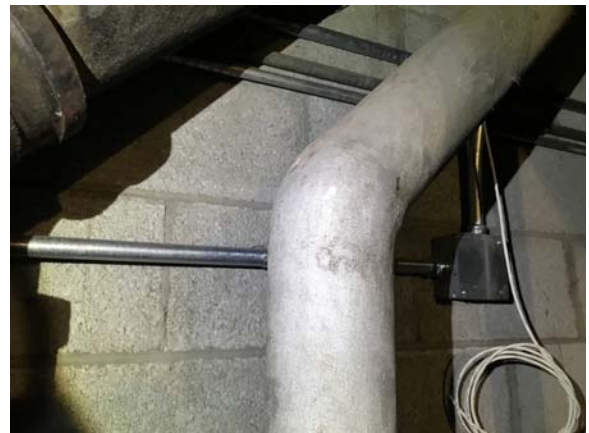
RAWL020a 5/10/2021
Typical original wall-mounted service sink
Second floor janitors closet



RAWL020e 5/10/2021
VFD for AHU-003
Room 246



RAWL021a 5/10/2021
Dissimilar vinyl floor tile repairs
Second floor corridor



RAWL021e 5/10/2021
Potential asbestos insulation on mechanical piping
Room 246



RAWL022a 5/10/2021
Aging freestanding water fountain
Second floor corridor



RAWL022e 5/10/2021
Cast-iron drain piping with bell-and-spigot connection
Room 246



RAWL023a 5/10/2021
Standard wall-mounted lavatories
Second floor women's restroom



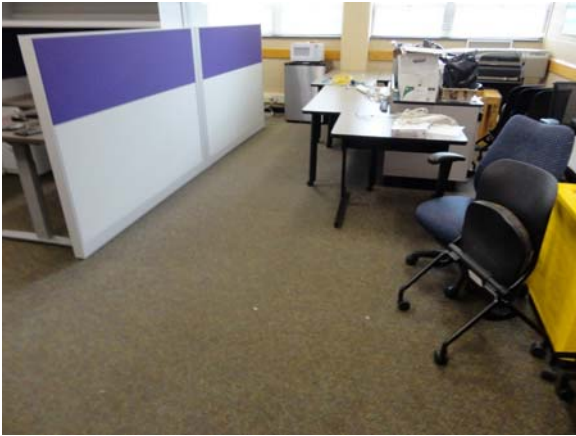
RAWL023e 5/10/2021
Fire alarm annunciator panel
First floor lobby



RAWL024a 5/10/2021
Standard tankless toilet
Second floor women's restroom



RAWL024e 5/10/2021
Air handling unit AHU-002
Room 145



RAWL025a 5/10/2021
Some classrooms have older broadloom carpeting
Second floor classroom



RAWL025e 5/10/2021
VFD for AHU-002
Room 145



RAWL026a 5/10/2021
Acoustical lay-in ceiling
Second floor classroom



RAWL026e 5/10/2021
Fan coil unit AHU-005
Room 247



RAWL027a 5/10/2021
9x9 vinyl flooring
Second floor classroom



RAWL027e 5/10/2021
Potential asbestos insulation on mechanical piping
Room 247



RAWL028a 5/10/2021
Weathered built-up roof
South annex roof



RAWL028e 5/10/2021
VFD for AHU-005
Room 247



RAWL029a 5/10/2021
Newer vinyl composite floor tile
First floor classroom



RAWL029e 5/10/2021
Fan coil unit AHU-004
Room 009



RAWL030a 5/10/2021
Newer lay-in acoustical ceiling
First floor classroom



RAWL030e 5/10/2021
Condensate receiver
Room 009



RAWL031a 5/10/2021
9x9 vinyl flooring and textured ceiling
First floor corridor



RAWL031e 5/10/2021
Oil-filled transformer
Exterior



RAWL032a 5/10/2021
Wall-mounted urinals and older ceramic wall and floor
tile
First floor men's restroom



RAWL032e 5/10/2021
Pressure reducing valve
Room 147



RAWL033a 5/10/2021
Three standard wall lavatories
First floor men's restroom



RAWL033e 5/10/2021
Sump pump
Room 147



RAWL034a 5/10/2021
Partially accessible toilet stall
First floor men's restroom



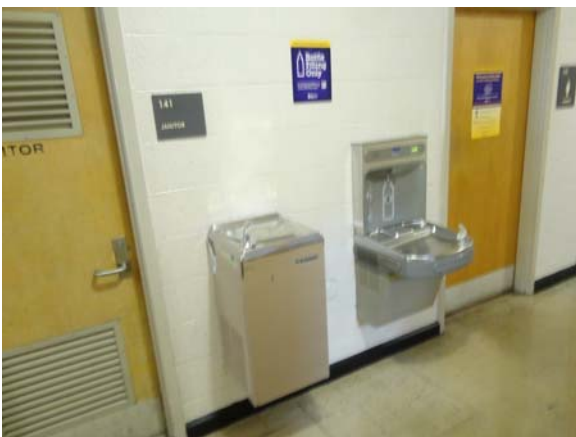
RAWL034e 5/10/2021
Inline heating hot water pumps
Room 147



RAWL035a 5/10/2021
Three-fixture accessible restroom, noting older ceramic
tile
First floor all-gender restroom



RAWL035e 5/10/2021
Heating hot water shell-and-tube heat exchanger
Room 147



RAWL036a 5/10/2021
Older and newer wall-mounted water fountains
First floor corridor



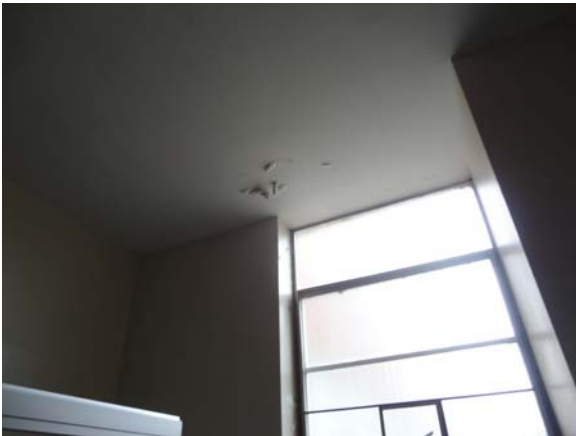
RAWL036e 5/10/2021
Condensate receiver
Room 147



RAWL037a 5/10/2021
Typical finishes in restroom
First floor women's restroom



RAWL037e 5/10/2021
Propeller exhaust fan
Room 147



RAWL038a 5/10/2021
Weathering of painted restroom ceiling
First floor women's restroom



RAWL038e 5/10/2021
Main fire alarm panel
Room 147



RAWL039a 5/10/2021
Fixed seating in lecture room
Lecture room 130



RAWL039e 5/10/2021
Air handling unit AHU-001
Room 147



RAWL040a 5/10/2021
No indication of assistive listening
Lecture room 130



RAWL040e 5/10/2021
VFD for AHU-001
Room 147



RAWL041a 5/10/2021
No wheelchair access to small stage
Lecture room 130



RAWL041e 5/10/2021
Controls air compressor
Room 147



RAWL042a 5/10/2021
Freestanding water fountain
Annex first floor corridor



RAWL042e 5/10/2021
Main switchboard
Room 147



RAWL043a 5/10/2021
Hollow metal entry door
Annex first floor north entry



RAWL044a 5/10/2021
9x9 vinyl floor tile and textured ceiling
Annex basement corridor



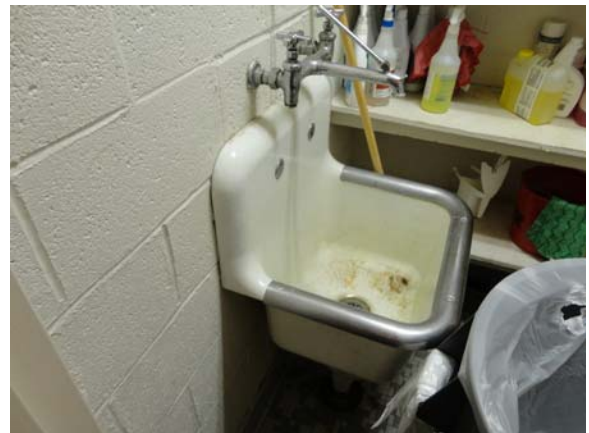
RAWL045a 5/10/2021
Aging single-level water fountain
Annex basement corridor



RAWL046a 5/10/2021
Aging standard fixturing
Annex basement restroom



RAWL047a 5/10/2021
Aging standard fixturing
Annex basement restroom



RAWL048a 5/10/2021
Wall-mounted service sink
Annex basement janitor's closet



RAWL049a 5/10/2021
Exterior window too close to grade
Annex



RAWL050a 5/10/2021
Exterior finishes
West elevation of south annex wing



RAWL051a 5/10/2021
Exterior metal stair with open risers
South end of south annex wing



RAWL052a 5/10/2021
Hollow metal exterior egress doors
South end of south annex wing



RAWL053a 5/10/2021
Exterior finishes
East elevation of south annex wing



RAWL054a 5/10/2021
Exterior finishes
Southeast corner of main building



RAWL055a 5/10/2021
Exterior finishes
South elevation of east wing



RAWL056a 5/10/2021
Hollow metal service door
East elevator tower mechanical room



RAWL057a 5/10/2021
Newer glass entry/egress doors
East entry



RAWL058a 5/10/2021
End elevation, noting new glazing on elevator tower
East elevation



RAWL059a 5/10/2021
Accessible entry ramp
East elevation



RAWL060a 5/10/2021
Exterior corner elevation
Northeast corner elevation



RAWL061a 5/10/2021
On-grade access to main entry
Main north building entry



RAWL062a 5/10/2021
Light staining on upper brick
Upper north elevation



RAWL063a 5/10/2021
Secondary entry/egress with accessible handrails
West entry



RAWL064a 5/10/2021
Exterior finishes
West elevation of south main building



RAWL065a 5/10/2021
Aging hollow metal service doors in areaway
Southwest areaway



RAWL066a 5/10/2021
Deteriorated adhesive wall tile suspected to contain asbestos
Basement mechanical roof

FACILITY CONDITION ASSESSMENT

SECTION 7

PRELIMINARY ENERGY
ASSESSMENT

INTRODUCTION

A Preliminary Energy Assessment (PEA) was conducted to identify energy conservation opportunities. The PEA is intended to be a preliminary energy screening only. The goal is to identify potential energy savings opportunities in a building. It is not equivalent to an American Society of Heating, Refrigeration, or Air Conditioning Engineers (ASHRAE) Level 1, 2, or 3 audit. The PEA has two sections: 1) Benchmarking Data and 2) Energy Conservation Opportunities. Basic building information is provided in **Table 1**.

TABLE 1. BUILDING INFORMATION

Client	East Carolina University
Asset Number	RAWL
Asset Name	Rawl Building (004)
Year Built or Last Energy Renovation	1959

BENCHMARKING DATA

The purpose of benchmarking building performance is to determine how well a building performs in comparison to other similar buildings. For this analysis, buildings were assessed based on their primary use (e.g., education, food sales, food service, etc.) and year constructed. Two metrics -- energy use intensity and energy end use -- are presented for the building manager to use to assess how efficiently the building performs compared to similar buildings.

Metric #1: Energy Use Intensity (EUI)

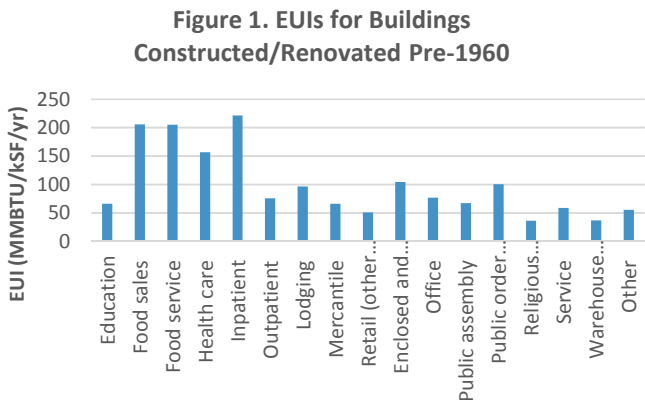
EUI is a measure of energy consumption per square foot of building space per year. The units of measurement are million British thermal units per thousand square foot per year (MMBTU/kSF/yr). The US-DOE EUI can be compared to the actual EUI of the client building to determine how efficient the building is compared to other similar buildings. A building manager can calculate EUI by summing total energy consumption per year (in MMBTU/yr) and dividing it by the building area (in kSF). Benchmarking data from the U.S. Energy Information Administration (EIA) Commercial Building Energy Consumption Survey (CBECS) database was used for this analysis.

Basic information about the building use and the time of the most recent major HVAC or lighting upgrade is provided in **Table 2**. That information is used to determine the Benchmark EUI. The building manager can calculate the Building EUI and compare it to the Benchmark EUI to determine how building efficiency compares to similar buildings (see **Table 3**). In addition, **Figure 1** shows the EUIs of various building types for further comparison.

TABLE 2. BUILDING DETAILS

FCA Building Type	Classroom
Range of Years Constructed/Last Major Energy Renovation	Pre-1960
Benchmark EUI (MMBTU/kSF/yr) =	66.3
Building EUI to be Calculated by Client (MMBTU/kSF/yr) =	

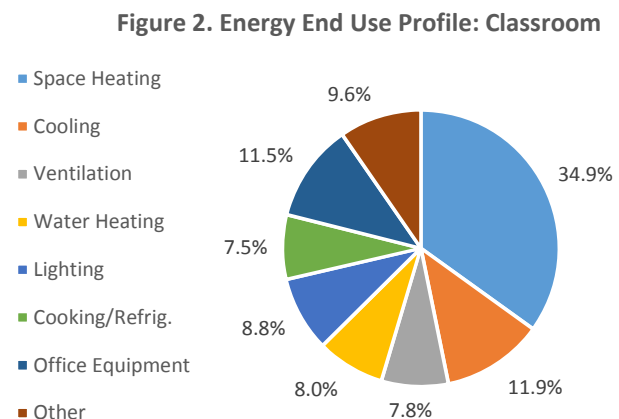
TABLE 3. EUI COMPARISON	
Very Energy Efficient (consumes more than 30% less energy)	EUI < 46.4
Energy Efficient (consumes 10% to 30% less energy)	46.4 <= EUI <= 59.7
Similar (consumes within 10% less or 10% more energy)	59.7 < EUI < 72.9
Energy Inefficient (consumes 10% to 30% more energy)	72.9 <= EUI <= 86.2
Very Energy Inefficient (consumes more than 30% more energy)	EUI > 86.2



Metric #2: Energy End Use

Energy end use data characterizes how energy is used by profiling energy consumption into end use categories such as space heating, cooling, ventilation, lighting, etc. When energy end use data is presented in a pie chart, high energy-consuming activities are readily identified. A building manager can determine the energy end use profile for a building by analyzing trend data from a Building Automation System and/or Energy Management Control System.

TABLE 4. ENERGY END USE PROFILE: CLASSROOM	
Space Heating	34.9%
Cooling	11.9%
Ventilation	7.8%
Water Heating	8.0%
Lighting	8.8%
Cooking/Refrig.	7.5%
Office Equipment	11.5%
Other	9.6%
Total	100.0%



References:

1. U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. "Technologies and Products by Category." Efficient Technologies and Products for Federal Facilities. DOE. <http://energy.gov/eere/femp/efficient-technologies-and-products-federal-facilities>. Accessed: June 2016.
2. U.S. Energy Information Administration [EIA]. "2012 CBECS Survey Data." Commercial Building Energy Consumption Survey. EIA. <http://www.eia.gov/consumption/commercial/data/2012/index.cfm?view=consumption#c1-c12>, Accessed: June 2016.

ENERGY CONSERVATION OPPORTUNITIES

This section presents energy conservation measures (ECMs) recommended for further investigation. Recommended ECMs are categorized into one or more cost categories to indicate an approximate level of resources required to implement the ECM. These cost categories are:

Operation and Maintenance Measures (O&M): O&M actions usually (a) can be completed by in-house maintenance personnel and (b) result in an immediate return on investment.

Low-Cost/No-Cost Measures (LC/NC): LC/NC measures typically (a) can be done by in-house personnel, (b) require little to no investment cost, and (c) result in significant energy savings. In other words, LC/NC measures typically have a quick payback period (less than one year).

Capital Improvement Measures (CAP): CAP measures are major capital investments that usually require significant time (i.e., approximately six months to three years) for planning, design, and implementation. Oftentimes, a request for proposal, design/bid/build (D/B/B), and/or design/build (D/B) package is required. The return on investment for CAP projects ranges significantly, varying from a payback period from one to twenty plus years.

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
Building Envelope - Window/Door Heat Gain/Loss	INCREASE THE R-VALUE OF THE WINDOWS/DOORS. ENERGY STAR qualified fenestration products such as windows and doors can minimize HVAC energy consumption by reducing solar heat gain/loss.	CAP
Building Envelope - Window/Door Air Infiltration	WEATHERSTRIP/CAULK WINDOWS/DOORS. When there is air leakage, weatherstrip around movable components and caulk around rigid components to reduce infiltration and save on heating/cooling costs.	O&M; LC/NC
Lighting - Interior, Controls	INSTALL LIGHTING CONTROLS. Oftentimes, lighting fixtures on switches do not get turned off when a space is unoccupied. Occupancy sensors, photocell sensors, and lighting control systems can help reduce lighting energy consumption. For example, consider installing occupancy sensors in offices, common areas, and other areas that have variable occupancy. In areas where there is natural lighting, consider using photocell sensors to dim or shut off fixtures that aren't needed. Alternatively, install a comprehensive light control system that uses time clock schedules, occupancy sensors, photocell sensors, etc., to monitor and control lighting throughout an entire building.	N/A, Varies
Lighting - Exterior	INSTALL EFFICIENT LIGHTING FIXTURES. While incandescent lamp fixtures have a low initial cost, the lamps are energy inefficient and have a short useful life. Consider CFL and LED lighting instead. HID lamps are necessary in some applications; however, alternatives such as high intensity T5 or LED fixtures should be considered. T12 lamps are an outdated lighting technology that should be replaced with newer technologies such as high intensity fluorescent or LED lamp fixtures.	N/A, Varies
Lighting - Exterior, Controls	INSTALL LIGHTING CONTROLS. Consider using photocell sensors or timeclocks to shut off building/parking lot fixtures during daylight hours.	N/A, Varies
HVAC - Central Heating	INSTALL AN ENERGY-EFFICIENT BOILER. Energy-efficient boilers and condensing boilers achieve higher efficiencies than conventional boilers. Research FEMP designated commercial boilers to find the most energy-efficient options.	CAP

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
HVAC - Central Cooling	INSTALL AN ENERGY-EFFICIENT CHILLER. Energy-efficient chillers, including, but not limited to, magnetic bearing chillers, achieve higher efficiencies than conventional chillers. Research FEMP designated chillers to find the most energy-efficient options.	CAP
HVAC - Cooling Tower Free Cooling	INSTALL A PLATE FRAME HEAT EXCHANGER. A plate frame heat exchanger will allow free cooling during mild summer weather periods so that the chiller does not need to operate.	CAP
HVAC - Cooling Tower Meter	INSTALL A COOLING TOWER METER. A water meter on the cooling tower can be used to determine how much water is evaporated, lost to overflow, or lost to drift. This information can be sent to the water provider to reduce the cost of sewer treatment.	LC/NC
HVAC - Hydronic Dist. Network Insulation	INSULATE THE HVAC PIPING. Insulating HVAC piping reduces heat loss and decreases energy consumption.	CAP
HVAC - Air Dist. Network Insulation	INSULATE DUCTWORK. Insulating HVAC ductwork reduces heat loss and decreases energy consumption.	CAP
HVAC - Air Dist. Network, VAV	INSTALL VARIABLE AIR VOLUME (VAV) SYSTEM. In constant air volume (CAV) systems, more energy is required to heat, cool, and distribute air than in VAV systems. Consider a VAV system to reduce energy consumption, mainly fan energy consumption.	CAP
HVAC - BAS	INSTALL A BAS. Consider installing a BAS so that there is autonomous control of the building HVAC systems.	CAP
HVAC - EMCS	CONNECT BAS TO EMCS. Consider connecting the BAS to a central EMCS so that the system can be monitored and controlled at a central location.	CAP
HVAC - Exhaust Ventilation	INSTALL ENERGY RECOVERY SYSTEM. Energy Recovery Ventilation (ERV) systems exchange heat between outgoing exhaust air and the incoming outdoor air. Investigate the feasibility of installing an ERV system to pre-heat/cool ventilation air.	LC/NC; CAP
HVAC - Unitary Equipment	INSTALL EFFICIENT UNITARY EQUIPMENT. Consider replacing the existing equipment with FEMP recommended/ENERGY STAR qualified unitary equipment.	LC/NC; CAP
HVAC - Unitary Equipment Controls	UPGRADE CONTROLS. Install controls that allow the unitary equipment to be programmed for on/off and/or thermostat setpoints so that the systems operate at appropriate temperatures and do not run when the building/space is unoccupied.	LC/NC; CAP
HVAC - Building Comfort/Tuning	CONDUCT RETROCOMMISSIONING (RCX). RCx the building to identify and address operating deficiencies, optimize HVAC operations, reduce energy bills, and improve occupant comfort.	CAP
Electrical - VFDs	INSTALL VARIABLE FREQUENCY DRIVES. Install VFDs on motors greater than 5 hp to reduce energy consumption by varying motor speed based on system demand.	O&M; LC/NC; CAP
Plumbing - DHW Piping Insulation	INSULATE THE DOMESTIC HOT WATER PIPES. Insulating piping reduces heat loss, thereby reducing the amount of energy consumption.	LC/NC; CAP