

EAST CAROLINA UNIVERSITY

Facility Condition Assessment

Harold H. Bate Building (095)

Asset BATE

Inspected May 11, 2021



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FACILITY CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

ASSET CODE	BATE	CURRENT REPLACEMENT VALUE	\$64,832,000
ASSET NAME	HAROLD H. BATE BUILDING (095)	FACILITY CONDITION NEEDS INDEX	0.32
ASSET USE	Classroom / Academic	FACILITY CONDITION INDEX	0.06
YEAR BUILT	1988	10-YEAR \$/SF	126.01
GSF	165,000		
INSPECTION DATE	05/11/2021		

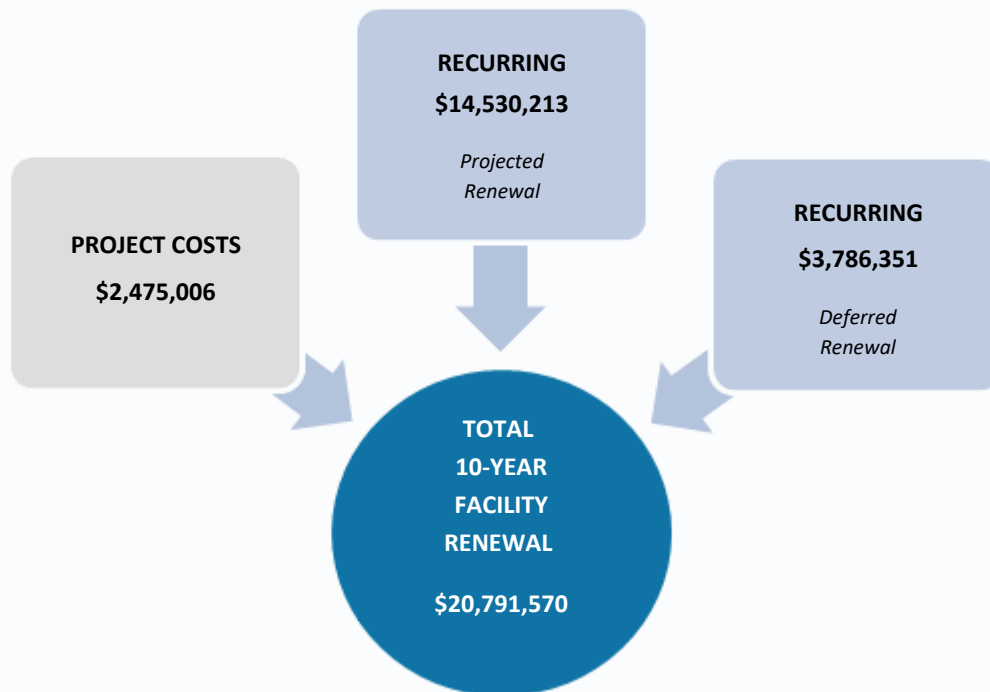
FCNI Scale

The FCNI for this asset is **0.32**

- 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

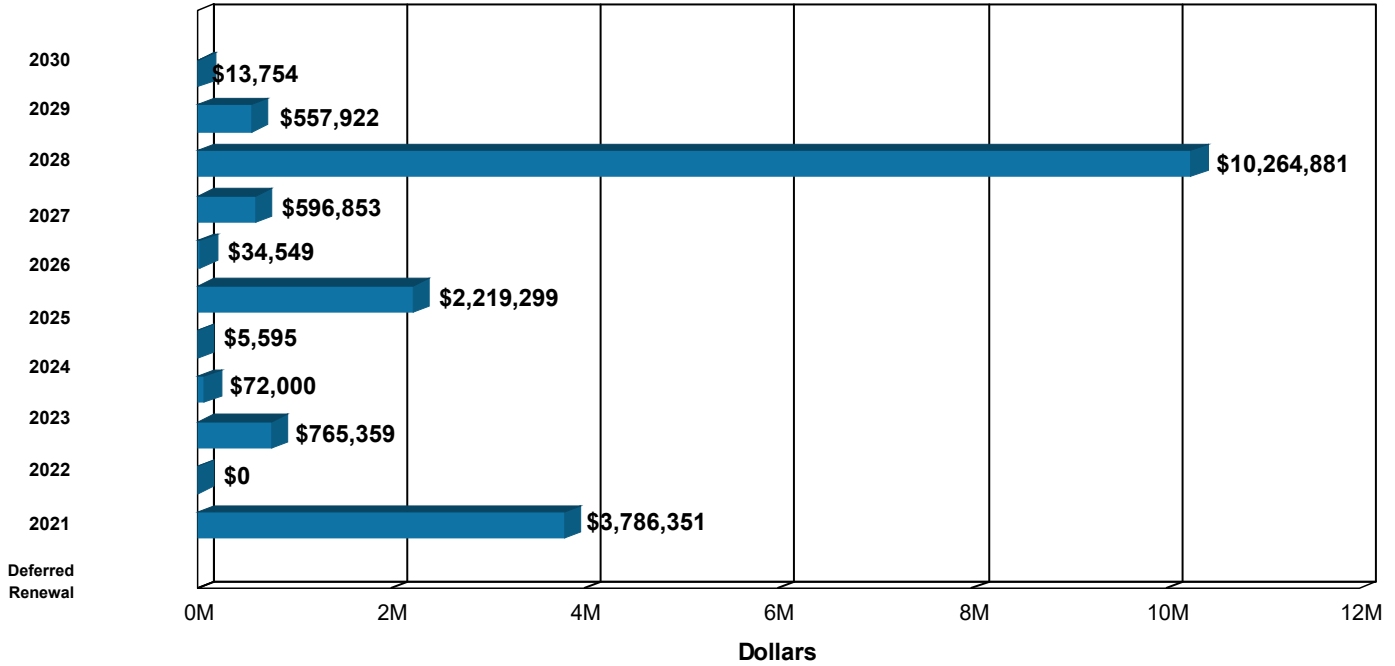
Project Cost by Priority

PLANT ADAPTION	
Priority 1	\$0
Priority 2	\$276,660
Priority 3	\$2,198,346
Priority 4	\$0
Priority 5	\$0

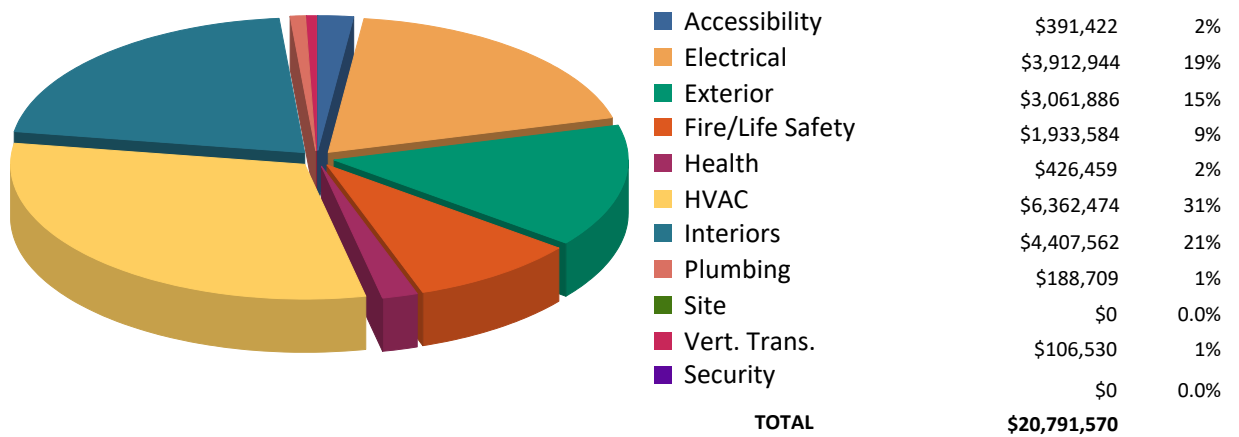
CORRECTIVE ACTION	
Priority 1	\$0
Priority 2	\$0
Priority 3	\$0
Priority 4	\$0
Priority 5	\$0

Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



ASSET SUMMARY

The Harold H. Bate Building is a 1988, three-story classroom and office facility on the main campus of East Carolina University. Each floor contains a mixture of offices and classrooms. The first floor also features approximately 30 tiered seminar rooms and there is a small partial mechanical basement. The exterior facades are brick with bands of original metal-framed glazing and a newer modified bitumen roof. The Harold H. Bate Building totals 165,000 gross square feet.

The information in this report was gathered during a site visit that concluded on May 11, 2021.

Site

The site is relatively flat and landscaping around the building consists of planting beds, ornamental shrubs, and trees. The planting is adequate and no upgrades are warranted. The walkways around the building are largely brick pavers that are in adequate condition. Adjoining parking areas are not directly associated with the building and considered part of campus infrastructure.

Exterior Structure

The brick facades have some signs of staining and the building should be cleaned and selectively repointed and recaulked as needed. The metal-framed glazing is at or near the end of its normal lifecycle and should be replaced. A number of panels on the first floor atrium glazing are fogged indicating accelerated weathering. The primary and secondary glass entry/egress doors are aging and should be replaced in kind in the near future. The secondary hollow-metal service doors are also showing age and should be considered for replacement within the next eight to ten years. The built-up roof was installed around 2009 and is in average condition for its age. It should be replaced within the next nine to ten years.

Interior Finishes/Systems

Interior finishes are in average condition. Carpeting in the offices and meeting rooms varies in age and condition. Due to a short lifecycle, all of the existing broadloom carpeting and carpet tile will need to be replaced. Most of the vinyl composite tile flooring is older and should also be replaced in kind. The newer vinyl and LVT flooring is adequate and no upgrades are warranted. Ceramic floor and wall tile finishes in the upgraded restrooms are in good condition and no finish upgrades are needed at this time.

Walls are painted and vary in condition. Repaint the interior walls in phases over the next few years. Slat wood acoustical wall treatments in the tiered seminar rooms are original but still functional and no upgrades are recommended. Acoustical ceiling systems also vary in age and condition but most are newer and should be serviceable for the near future. The remaining older acoustical ceilings should be replaced in kind.

The interior corridor and standard interior doors are aging original flush wood assemblies that are due for replacement. Casework in the break areas and workstations is older and also due for replacement. The molded plastic fixed seating in the seminar rooms is showing wear and should be upgraded. Replace this seating with new fixed seats in a similar row configuration. Ensure that ADA requirements are followed with the new seating layout.

Accessibility

Handicapped access is provided by an on-grade entrance on the east elevation and a ramp system on the west. Entry steps also have accessible handrails.

The two passenger elevators have accessible control panels but lack accessible two-way communication and new call systems should be installed. The stair towers have accessible inner and outer railing designs and the interior doors have lever hardware and wall-mounted Braille signage on all floors. The restrooms on each floor have been updated with accessible fixtures and adequate circulation clearances.

The water fountains vary in age and accessibility. Several of the dual-level fountain areas have both fountains set at the same height and many of these dual fountains are two different ages and designs. Upgrade a percentage of older fountains with new dual-level fully accessible units. Also, the large and small tiered seminar rooms lack accessible side aisle handrails and do not have assistive listening capability for the hearing impaired. Install ALC systems in each classroom along with ADA-compliant side aisle handrails.

Health

No health-related issues were observed or reported at the time of the inspection.

Fire/Life Safety

This facility contains a point addressable fire alarm and detection system with a Notifier main fire alarm panel, manual pull stations, smoke detectors, and horn and strobe alarm systems. The panel and devices were being updated on the day of the inspection.

This facility is not protected via an automatic fire suppression system. Fire suppression is handled manually via strategically placed dry-type handheld fire extinguishers. As a part of future renovation efforts, it is recommended that an automatic wet-pipe fire suppression system be installed.

HVAC

The main HVAC system provides heating and cooling via a constant air volume (CAV) belt-driven air handling unit with an associated belt-driven return fan. The air handling unit utilizes chilled water and steam heat. Two heating only fan coil units serve the space near the large windows on the second floor.

Exhaust for the restrooms is handled by two centrifugal exhaust fans. A propeller exhaust fan serves the main mechanical room and a utility exhaust fan serves the elevator machine room. The air handling unit, fan coil units, and the exhaust fans have exceeded their respective statistical service lives and should be considered for removal and replacement with modern systems. Variable air volume (VAV) capable air handling units are recommended.

Two computer AC units with associated dry-coolers provide cooling for the server room. Installed in 2007 and 2015, the dry-coolers and 2015 computer AC unit are expected to remain viable for the next ten years. The 2007 computer AC unit should be evaluated for replacement within the next ten years due to lifecycle depletion.

Chilled water is supplied by the central plant and heating hot water is generated through a shell-and-tube heat exchanger utilizing low pressure steam generated at the central steam plant and circulated through the fan coil units via two inline heating hot water pumps. High pressure steam is reduced to low pressure steam through pressure reducing valves. Condensate generated from the heat exchanger and the air handling unit is collected and transferred back to the central plant via two condensate receivers. The heat exchanger, pressure reducing valves, and the condensate receivers should be considered for replacement as they have exceeded their respective service lives. The pumps should also be upgraded. The current heat exchanger and heating hot water pumps appear to be undersized to provide adequate circulation of heating hot water throughout the entire facility if VAV terminal reheat boxes are installed. Therefore, a cost adjustment has been applied to accommodate a larger heat exchanger and pumps.

The HVAC distribution network is a CAV design and original. The distribution network consists of insulated metallic conduit, insulated mechanical piping, valves, diffusers, and similar elements. The HVAC controls are a direct digital (DDC) and pneumatic hybrid with the pneumatic systems original with some recent upgrades to DDC. It is recommended that the HVAC distribution network and controls be removed and replaced with a modern, energy-efficient VAV system with terminal reheat boxes with full DDC. The controls air compressor should be evaluated for replacement and/or removal, depending upon the future needs with an upgrade to a full DDC system. Future replacement and redesign work should consider maintenance and renewal access to the componentry where this is currently a problem.

Electrical

Main electrical service is fed to this facility to a 1,500 kVA transformer where power is reduced to 277/480 volts and routed to a main 2,500 amp switchboard. Power is further reduced to 120/208 volts through secondary step-down transformers. Power is distributed at 120/208 and 277/480 volts via individual conductors in metallic conduit to secondary panelboards for use in local devices. The distribution system consists of downline electrical system components beyond the main electrical service elements including the distribution feeders, conduits, local panelboards, load centers, safety switches, fused disconnects, receptacles, switches, and similar terminal elements. The switchboards, transformers, and electrical distribution system are original and should be evaluated for replacement within the next ten years due to lifecycle depletion. The transformer was replaced in the early 2000s and is expected to remain viable for the next ten years.

Variable frequency drives (VFDs) are associated with the air handling unit supply fan and exhaust fan. The drives 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 during any future HVAC renovations. A motor control center in the main mechanical room is original. It is recommended for replacement and/or removal, depending upon future needs as it may be replaced with individual breakers and VFDs.

The emergency power network consists of a 350-kW diesel-fired generator and two 225-amp automatic transfer switches. The network provides emergency power to the elevator, select mechanical systems, and life safety systems including lighting. The components were installed in 2014 and are expected to remain viable for the next ten years.

The interior lighting was replaced in 2017 and consists of recessed lay-in LED fixtures and recessed can fixtures with lighting controls. LED retrofits were observed in select spaces. No issues were observed or reported, and the lighting is expected to remain viable for the next ten years.

Automated on/off timer lighting controls and occupancy sensing on/off lighting controls are recommended to be added throughout to save energy and reduce operational costs through extended lamp life. Timers should be controlled by building automation systems or be otherwise digitally programmable. The occupancy sensors should be preset for preferred inactivity periods for activation. A cost adjustment has been added to the vintage lighting.

The exterior lighting consists of sodium vapor wall packs, recessed can fixtures, and an LED sconce. While currently functional, the non-LED exterior lighting is less efficient and requires more frequent maintenance than modern LED-based outdoor lighting. It is recommended that the exterior lighting be replaced with LED fixtures. The LED sconce was installed within the last three years and is expected to remain viable for the next ten years.

Plumbing

Potable water supply, sanitary sewer, and stormwater handling systems serve this facility. The supply piping is copper with soldered connections. The drain piping is cast-iron with hubless connections. The majority of the supply and drain piping is original and expected to remain viable for the next ten years. A backflow preventer in the basement mechanical room is associated with the water main. It appears to have been installed within the last ten years and should be evaluated for replacement within the decade due to lifecycle depletion.

Domestic hot water is generated through a residential style electric water heater with an associated fractional horsepower circulation pump. An instantaneous electric water heater serves a third-floor break room. A project has been created at the client's request to centralize all of the domestic hot water systems into the main mechanical area. Assumptions for this project include a gas-fired water heater, expansion tank, circulation pumps, rework of the distribution, and similar items.

A sump pump in the main mechanical room was installed within the last ten years. Due to service life depletion, it should be expected that the pump will need to be replaced within the next ten years.

The plumbing fixtures are newer wall-hung lavatories, urinals, and tankless water closets. These newer fixtures are still in good condition and no upgrades are needed. The original, tiled floor service sinks are aging and should be upgraded. The kitchen sinks in the various break areas are in average condition for their age and should be replaced in kind as part of recommended break area casework upgrades.

Vertical Transportation

Two hydraulic-controlled passenger elevators with rated capacities of 3,500 pounds serve this facility. The three-stop elevators are original and were modernized in 2004. No issues were observed or reported during the inspection. However, the elevator cab should be evaluated for upgrade within the next ten years due to 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 11, 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	276,660	114,762	0	0	0	0	0	0	0	0	0	0	0	\$391,422
EXTERIOR	0	0	0	307,344	0	0	0	0	2,182,404	0	0	14,216	557,922	0	\$3,061,886
INTERIOR	0	0	0	1,711,164	0	709,813	0	0	0	0	595,208	1,379,600	0	11,777	\$4,407,562
PLUMBING	0	0	150,000	0	0	0	31,293	0	7,416	0	0	0	0	0	\$188,709
HVAC	0	0	0	1,297,783	0	55,546	40,707	5,595	0	34,549	1,645	4,926,649	0	0	\$6,362,474
FIRE/LIFE SAFETY	0	0	1,933,584	0	0	0	0	0	0	0	0	0	0	0	\$1,933,584
ELECTRICAL	0	0	0	363,530	0	0	0	0	29,480	0	0	3,517,958	0	1,977	\$3,912,944
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
VERT. TRANS.	0	0	0	106,530	0	0	0	0	0	0	0	0	0	0	\$106,530
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	426,459	0	0	\$426,459
SUBTOTAL	\$0	\$276,660	\$2,198,346	\$3,786,351	\$0	\$765,359	\$72,000	\$5,595	\$2,219,299	\$34,549	\$596,853	\$10,264,881	\$557,922	\$13,754	\$20,791,570
TOTAL NONRECURRING PROJECT NEEDS			\$2,475,006	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										\$18,316,564	

CURRENT REPLACEMENT VALUE	\$64,832,000
FACILITY CONDITION NEEDS INDEX	0.32
FACILITY CONDITION INDEX	0.06

GSF	TOTAL 10-YEAR FACILITY RENEWAL NEEDS	10-YEAR NEEDS/SF
165,000	\$20,791,570	\$126.01

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	\$391,422	\$0	\$391,422
EXTERIOR	\$0	\$3,061,886	\$3,061,886
INTERIOR	\$0	\$4,407,562	\$4,407,562
PLUMBING	\$150,000	\$38,709	\$188,709
HVAC	\$0	\$6,362,474	\$6,362,474
FIRE/LIFE SAFETY	\$1,933,584	\$0	\$1,933,584
ELECTRICAL	\$0	\$3,912,944	\$3,912,944
SITE	\$0	\$0	\$0
VERT. TRANS	\$0	\$106,530	\$106,530
HEALTH	\$0	\$426,459	\$426,459
TOTALS	\$2,475,006	\$18,316,564	\$20,791,570

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
BATE EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK FACADES		ALL ELEVS	B2010	Deferred Renewal	255,411
BATE DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	EGRESS		N STAIR	B2030	Deferred Renewal	2,885
BATE DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			STAIR EGRESS	B2030	Deferred Renewal	2,885
BATE DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			NE ENTRY	B2030	Deferred Renewal	8,656
BATE DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	SECONDARY EGRESS		EAST ELEV	B2030	Deferred Renewal	8,656
BATE DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			SW ENTRY	B2030	Deferred Renewal	11,541
BATE DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			NW ENTRY	B2030	Deferred Renewal	17,311
BATE DR24	DOOR LOCK, COMMERCIAL-GRADE	EXT SERVICE		EAST & WEST	C1020	Deferred Renewal	2,234
BATE DR24	DOOR LOCK, COMMERCIAL-GRADE			CORRIDORS	C1020	Deferred Renewal	98,292
BATE DR24	DOOR LOCK, COMMERCIAL-GRADE	STANDARD DOORS			C1020	Deferred Renewal	212,221
BATE DR26	DOOR PANIC HARDWARE	EXT EGRESS		NE STAIR	C1020	Deferred Renewal	1,218
BATE DR26	DOOR PANIC HARDWARE	EXT EGRESS		N STAIR	C1020	Deferred Renewal	1,218
BATE DR26	DOOR PANIC HARDWARE	EXT DR		STAIR EGRESS	C1020	Deferred Renewal	1,218
BATE DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		SOUTH ELEV	C1020	Deferred Renewal	1,218
BATE DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		WEST ELEV	C1020	Deferred Renewal	2,437

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
BATE DR26	DOOR PANIC HARDWARE	EXT DRS		NE ENTRY	C1020	Deferred Renewal	3,655
BATE DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		EAST ELEV	C1020	Deferred Renewal	3,655
BATE DR26	DOOR PANIC HARDWARE	EXT DRS		SW ENTRY	C1020	Deferred Renewal	4,873
BATE DR26	DOOR PANIC HARDWARE	EXT DRS		NW ENTRY	C1020	Deferred Renewal	7,310
BATE DR26	DOOR PANIC HARDWARE	ACCESS		STAIR TOWER	C1020	Deferred Renewal	19,492
BATE DR26	DOOR PANIC HARDWARE	ISOLATION DRS		CORRIDORS	C1020	Deferred Renewal	68,224
BATE CW01	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD			BREAK AREAS, WORK STATIONS	C1030	Deferred Renewal	134,815
BATE IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	Deferred Renewal	343,794
BATE IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VCT			C3020	Deferred Renewal	131,376
BATE IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG			C3030	Deferred Renewal	673,914
BATE VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			D1010	Deferred Renewal	53,265
BATE VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-2			D1010	Deferred Renewal	53,265
BATE AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-001, HEAT ONLY		2ND FL COMMUNAL SPACE	D3040	Deferred Renewal	9,008
BATE AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-002, HEAT ONLY		2ND FL COMMUNAL SPACE	D3040	Deferred Renewal	9,008
BATE AH13	AIR HANDLING UNIT - INDOOR (45-63 HP)	AHU-001		1040A	D3040	Deferred Renewal	287,133

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
BATE FN07	FAN - AXIAL, RETURN, 1.5" SP (>20 HP) 38,500 CFM	AHU-001 RF		1040A	D3040	Deferred Renewal	99,469
BATE FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-3		ROOF	D3040	Deferred Renewal	7,951
BATE FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-4		ROOF	D3040	Deferred Renewal	7,951
BATE FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-2		1040A	D3040	Deferred Renewal	2,772
BATE HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		1040A	D3040	Deferred Renewal	4,466
BATE HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-3		1040A	D3040	Deferred Renewal	4,466
BATE HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-4		1040A	D3040	Deferred Renewal	4,466
BATE HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-5		1040A	D3040	Deferred Renewal	4,466
BATE HX10	PRESSURE REDUCING VALVE, STEAM SYSTEM (2.5")	PRV-1		1040A	D3040	Deferred Renewal	5,525
BATE HX12	PRESSURE REDUCING VALVE, STEAM SYSTEM (4")	PRV-6		1040A	D3040	Deferred Renewal	9,824
BATE PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-2		1040A	D3040	Deferred Renewal	15,999
BATE PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		1040A	D3040	Deferred Renewal	44,621
BATE AC02	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (6-10 TOTAL HP)	CAC		1040A	D3060	Deferred Renewal	20,015
BATE BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		THROUGHOUT	D3060	Deferred Renewal	760,644
BATE MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	MCC		1040A	D5010	Deferred Renewal	154,059
BATE SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MSB		1041	D5010	Deferred Renewal	207,595

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
BATE LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN		EXT	D5020	Deferred Renewal	1,876
BATE IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	2022	171,897
BATE IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	BROADLOOM		OFFS, MTG	C3020	2022	537,916
BATE AH36	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (3-10 TON)	CRAC-2		3003	D3050	2022	55,546
BATE FX04	PLUMBING FIXTURE - SINK, KITCHEN	SST		BREAK AREAS	D2010	2023	25,915
BATE FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	CER TILE FLOOR MOUNT		JAN CLOS	D2010	2023	5,378
BATE HX04	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (20-85 GPM)	HX-1		1040A	D3040	2023	40,707
BATE FN32	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	EF-1		1036	D3040	2024	5,595
BATE WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	EXTERIOR GLAZING			B2010	2025	2,182,404
BATE BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-1		1040A	D2020	2025	2,339
BATE PP02	GREYWATER LIFT STATION	SUMP-1		ELEV PIT	D2030	2025	5,077
BATE VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD AHU-001 SF		1040A	D5010	2025	14,740
BATE VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD AHU-001 RF		1040A	D5010	2025	14,740
BATE PH01	PUMP - ELECTRIC (<=10 HP)	HWP-5		1040A	D3040	2026	17,275
BATE PH01	PUMP - ELECTRIC (<=10 HP)	HWP-6		1040A	D3040	2026	17,275
BATE IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	2027	57,292

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
BATE IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	BROADLOOM		OFFS, MTG	C3020	2027	215,142
BATE IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE			C3020	2027	322,774
BATE PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		1040A	D3040	2027	1,645
BATE DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	EGRESS		NE STAIR	B2030	2028	2,031
BATE DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY EGRESS		SOUTH ELEV	B2030	2028	2,031
BATE DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY EGRESS		WEST ELEV	B2030	2028	4,062
BATE DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERVICE		EAST & WEST	B2030	2028	6,093
BATE DR01	DOOR AND FRAME, INTERIOR, NON-RATED	STANDARD DOORS			C1020	2028	616,917
BATE DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ACCESS		STAIR TOWER	C1020	2028	59,818
BATE DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ISOLATION DRS		CORRIDOR	C1020	2028	209,364
BATE DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED			CORRIDORS	C1020	2028	493,501
BATE HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, VAV		THROUGHOUT	D3040	2028	4,926,649
BATE SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	277/480		THROUGHOUT	D5010	2028	3,377,143
BATE TX20	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (1000-1500 KVA)	TX-BATE		1041	D5010	2028	140,815
BATE SF01	SEATING, FIXED, FOLDING, STANDARD	FIXED MOLDED PLASTIC		TIERED SEM RMS	E2010	2028	426,459
BATE RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	FLAT ROOF			B3010	2029	557,922

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
BATE	DR03	DOOR - OVERHEAD, INTERIOR	ROLL DOWN GATE		BATE EXPRESS	C1020	2030	11,777
BATE	LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID WP		EXT	D5020	2030	1,977
TOTAL								\$18,316,564

FACILITIES RENEWAL PLAN
NONRECURRING PROJECT COSTS

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
BATEAC01	UPGRADE COMMUNICATION UNIT IN ELEVATORS	C1010	2	Plant Adaption	5,594
BATEAC02	TIERED SEMINAR ROOM ACCESSIBILITY UPGRADES	C1010	2	Plant Adaption	271,066
BATEAC03	WATER FOUNTAIN ACCESSIBILITY UPGRADES	D2010	3	Plant Adaption	114,762
BATEPL01	CENTRALIZE DOMESTIC HOT WATER SYSTEM	D2020	3	Plant Adaption	150,000
BATEFS01	FIRE SPRINKLER SYSTEM INSTALLATION	D4010	3	Plant Adaption	1,933,584
TOTAL					\$2,475,006

FACILITY CONDITION ASSESSMENT

SECTION 3

NONRECURRING
PROJECT DETAILS

All costs shown as Present Value

UPGRADE COMMUNICATION UNIT IN ELEVATORS			
Project Number:	BATEAC01	Category Code:	
Priority Sequence:	1	AC3A	
Priority Class:	Critical	System:	ACCESSIBILITY
Project Class:	Plant Adaption	Component:	INTERIOR PATH OF TRAVEL
Date Basis:	6/15/2021	Element:	LIFTS/RAMPS/ELEVATORS

Code Application:

ADAAG 407

Subclass/Savings:

DOJ2 - Access to Goods & Services

Project Location:

Item Only: Floor(s) 1

Description

The two existing passenger elevators have nonaccessible emergency phone systems that should be upgraded to hands-free accessible, two-way communication units.

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
ADA-compliant, hands-free elevator emergency telephone	EA	2	\$1,312	\$2,625	\$965	\$1,929	\$4,554
Base Material/Labor Costs				\$2,625		\$1,929	
Indexed Material/Labor Costs				\$2,643		\$1,376	\$4,019
Construction Mark Up at 20.0%							\$804
Original Construction Cost							\$4,822
Date of Original Estimate:	6/15/2021					Inflation	\$0
Current Year Construction Cost							\$4,823
Professional Fees at 16.0%							\$772
TOTAL PROJECT COST							\$5,594

All costs shown as Present Value

TIERED SEMINAR ROOM ACCESSIBILITY UPGRADES			
Project Number:	BATEAC02	Category Code:	
Priority Sequence:	2	AC3B	
Priority Class:	Critical	System:	ACCESSIBILITY
Project Class:	Plant Adaption	Component:	INTERIOR PATH OF TRAVEL
Date Basis:	6/15/2021	Element:	STAIRS AND RAILINGS

Code Application:

Subclass/Savings:

Project Location:

ADAAG

219.3, 706.1, 505

DOJ2 - Access to Goods & Services

Floor-wide: Floor(s) 1

Description

The large and small tiered seminar rooms lack accessible side aisle handrails as well as assistive listening capability for the hearing impaired. Install ALC systems in each classroom along with ADA-compliant side aisle handrails.

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
Infrared transmitter and headphone receiver sets	SYS	30	\$2,071	\$62,141	\$1,816	\$54,480	\$116,621
Wall-mounted handrail system, painted	LF	900	\$68.81	\$61,929	\$48.23	\$43,407	\$105,336
Base Material/Labor Costs				\$124,070		\$97,887	
Indexed Material/Labor Costs				\$124,938		\$69,793	\$194,731
Construction Mark Up at 20.0%							\$38,946
Original Construction Cost							\$233,678
Date of Original Estimate:	6/15/2021					Inflation	\$0
Current Year Construction Cost							\$233,678
Professional Fees at 16.0%							\$37,388
TOTAL PROJECT COST							\$271,066

All costs shown as Present Value

FIRE SPRINKLER SYSTEM INSTALLATION			
Project Number:	BATEFS01	Category Code:	
Priority Sequence:	3	FS3A	
Priority Class:	Noncritical	System:	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	Component:	SUPPRESSION
Date Basis:	5/28/2021	Element:	SPRINKLERS

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

Description

As a part of future renovation efforts, it is recommended that this facility be fully protected by an automatic, wet-pipe sprinkler system.

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	165,000	\$4.48	\$739,200	\$5.48	\$904,200	\$1,643,400
Base Material/Labor Costs				\$739,200		\$904,200	
Indexed Material/Labor Costs				\$744,374		\$644,695	\$1,389,069
Construction Mark Up at 20.0%							\$277,814
Original Construction Cost							\$1,666,883
Date of Original Estimate:	5/28/2021					Inflation	\$0
Current Year Construction Cost							\$1,666,883
Professional Fees at 16.0%							\$266,701
TOTAL PROJECT COST							\$1,933,584

All costs shown as Present Value

WATER FOUNTAIN ACCESSIBILITY UPGRADES			
Project Number:	BATEAC03	Category Code:	
Priority Sequence:	4	AC3F	
Priority Class:	Noncritical	System:	ACCESSIBILITY
Project Class:	Plant Adaption	Component:	INTERIOR PATH OF TRAVEL
Date Basis:	6/15/2021	Element:	DRINKING FOUNTAINS

Code Application:

Subclass/Savings:

Project Location:

ADAAG

211, 602

DOJ2 - Access to Goods & Services

Floor-wide: Floor(s) 1,2,3

Description

The existing water fountains vary in age and accessibility. A number of the dual-level fountain areas have both fountains set at the same height and many of these dual fountains have fountains with two different ages and designs. Upgrade a percentage of older fountains with new dual-level, fully accessible units.

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
Dual-level drinking fountain	EA	12	\$1,657	\$19,885	\$509	\$6,112	\$25,997
Alcove construction for drinking fountain	EA	12	\$1,195	\$14,335	\$5,099	\$61,187	\$75,522
Base Material/Labor Costs				\$34,220		\$67,299	
Indexed Material/Labor Costs				\$34,460		\$47,984	\$82,444
Construction Mark Up at 20.0%							\$16,489
Original Construction Cost							\$98,933
Date of Original Estimate:	6/15/2021		Inflation			\$0	
Current Year Construction Cost							\$98,933
Professional Fees at 16.0%							\$15,829
TOTAL PROJECT COST							\$114,762

All costs shown as Present Value

CENTRALIZE DOMESTIC HOT WATER SYSTEM			
Project Number:	BATEPL01	Category Code:	
Priority Sequence:	5	PL1E	
Priority Class:	Noncritical	System:	PLUMBING
Project Class:	Plant Adaption	Component:	DOMESTIC WATER
Date Basis:	5/11/2021	Element:	HEATING

Code Application:

Not Applicable

Subclass/Savings:

Not Applicable

Project Location:

Undefined: Floor(s) 1

Description

At the client's request, it is recommended that the domestic hot water generation system be located in one centralized location in the main mechanical room. This project includes a domestic water heater, circulation pumps, changes to the domestic hot water distribution, expansion tank, etc. An estimate of \$150,000 was provided by the client.

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
Centralize the domestic hot water system to main mechanical room	EA	1	\$60,000	\$60,000	\$90,000	\$90,000	\$150,000
Base Material/Labor Costs				\$60,000		\$90,000	
Indexed Material/Labor Costs				\$60,000		\$90,000	\$150,000
No GCM Required							\$0
Original Construction Cost							\$150,000
Date of Original Estimate:	5/11/2021					Inflation	\$0
Current Year Construction Cost							\$150,000
No Professional Fees Required							\$0
TOTAL PROJECT COST							\$150,000

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	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK FACADES		ALL ELEVS	29,690	SF	1.12	\$255,411	1988	30	2	DR
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	EXTERIOR GLAZING			12,730	SF	1.12	\$2,182,404	1988	40	-3	2025
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			NE ENTRY	3	LEAF	1.00	\$8,656	1988	25	7	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	EGRESS		N STAIR	1	LEAF	1.00	\$2,885	1988	25	7	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			NW ENTRY	6	LEAF	1.00	\$17,311	1988	25	7	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			SW ENTRY	4	LEAF	1.00	\$11,541	1988	25	7	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			STAIR EGRESS	1	LEAF	1.00	\$2,885	1988	25	7	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	SECONDARY EGRESS		EAST ELEV	3	LEAF	1.00	\$8,656	1988	25	7	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	EGRESS		NE STAIR	1	LEAF	1.00	\$2,031	1988	40		2028
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERVICE		EAST & WEST	3	LEAF	1.00	\$6,093	1988	40		2028
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY EGRESS		WEST ELEV	2	LEAF	1.00	\$4,062	1988	40		2028
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY EGRESS		SOUTH ELEV	1	LEAF	1.00	\$2,031	1988	40		2028
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	FLAT ROOF			55,000	SF	1.50	\$557,922	2009	20		2029
DR01	DOOR AND FRAME, INTERIOR, NON-RATED	STANDARD DOORS			285	LEAF	1.00	\$616,917	1988	40		2028
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ISOLATION DRS		CORRIDOR	56	LEAF	1.00	\$209,364	1988	40		2028

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ACCESS		STAIR TOWER	16	LEAF	1.00	\$59,818	1988	40		2028
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED			CORRIDORS	132	LEAF	1.00	\$493,501	1988	40		2028
DR03	DOOR - OVERHEAD, INTERIOR	ROLL DOWN GATE		BATE EXPRESS	120	SF	1.00	\$11,777	2000	30		2030
DR24	DOOR LOCK, COMMERCIAL-GRADE	STANDARD DOORS			285	EA	1.00	\$212,221	1988	20	12	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			CORRIDORS	132	EA	1.00	\$98,292	1988	20	12	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	EXT SERVICE		EAST & WEST	3	EA	1.00	\$2,234	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	ISOLATION DRS		CORRIDORS	56	EA	1.00	\$68,224	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	ACCESS		STAIR TOWER	16	EA	1.00	\$19,492	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT DRS		NE ENTRY	3	EA	1.00	\$3,655	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT EGRESS		NE STAIR	1	EA	1.00	\$1,218	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT EGRESS		N STAIR	1	EA	1.00	\$1,218	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT DRS		NW ENTRY	6	EA	1.00	\$7,310	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		WEST ELEV	2	EA	1.00	\$2,437	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT DRS		SW ENTRY	4	EA	1.00	\$4,873	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT DR		STAIR EGRESS	1	EA	1.00	\$1,218	1988	20	12	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
DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		SOUTH ELEV	1	EA	1.00	\$1,218	1988	20	12	DR
DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		EAST ELEV	3	EA	1.00	\$3,655	1988	20	12	DR
CW01	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD			BREAK AREAS, WORK STATIONS	250	LF	1.00	\$134,815	1988	20	12	DR
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			153,620	SF	1.00	\$343,794	2000	12	8	DR
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			76,810	SF	1.00	\$171,897	2010	12		2022
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			25,600	SF	1.00	\$57,292	2015	12		2027
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD			RESTROOMS	7,920	SF	1.00	\$303,931	2010	30		2040
IW08	WALL FINISH - WOOD PANEL, STANDARD	ACOUS WD WALL PANELS		TIERED SEM ROOMS	10,560	SF	0.50	\$97,155	1988	40	15	2043
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	BROADLOOM		OFFS, MTG	43,930	SF	1.00	\$537,916	2010	12		2022
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	BROADLOOM		OFFS, MTG	17,570	SF	1.00	\$215,142	2015	12		2027
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE			26,360	SF	1.00	\$322,774	2015	12		2027
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VCT			20,500	SF	1.00	\$131,376	1988	20	12	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VCT			8,790	SF	1.00	\$56,332	2010	20	1	2031
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CER FLR TILE		RESTROOMS	2,340	SF	1.00	\$74,411	2010	30		2040
IF13	FLOORING - LAMINATE PLANK, PREMIUM			SELECT MEETING RMS	1,170	SF	1.00	\$13,046	2015	15	5	2035

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG			66,780	SF	1.00	\$673,914	1988	30	2	DR
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG			33,390	SF	1.00	\$336,957	2010	30		2040
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG			11,130	SF	1.00	\$112,319	2015	30		2045
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		1036	1	EA	1.00	\$302,064	2004	25	3	2032
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-2		1036	1	EA	1.00	\$302,064	2004	25	3	2032
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			1	EA	1.00	\$53,265	2004	12	4	DR
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-2			1	EA	1.00	\$53,265	2004	12	4	DR
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	34	EA	1.00	\$45,227	2010	35		2045
FX04	PLUMBING FIXTURE - SINK, KITCHEN	SST		BREAK AREAS	12	EA	1.00	\$25,915	1988	35		2023
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	CER TILE FLOOR MOUNT		JAN CLOS	3	EA	1.00	\$5,378	1988	35		2023
FX10	PLUMBING FIXTURE - URINAL	PC		RRS	14	EA	1.00	\$29,651	2010	35		2045
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	45	EA	1.00	\$87,682	2010	35		2045
BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-1		1040A	1	EA	1.00	\$2,339	2010	10	5	2025
PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	165,000	SF	0.93	\$1,491,917	1988	35	9	2032
PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON, HUBLESS		THROUGHOUT	165,000	SF	0.93	\$2,253,306	1988	40	4	2032

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTR DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
PP02	GREYWATER LIFT STATION	SUMP-1		ELEV PIT	2	HP	1.00	\$5,077	2005	20		2025
CH20	DRY COOLER - REFRIGERANT OR GLYCOL	DRY-COOL-1		ROOF	5	TON	1.00	\$2,830	2015	25		2040
CH20	DRY COOLER - REFRIGERANT OR GLYCOL	DRY-COOL-2		ROOF	5	TON	1.00	\$2,830	2007	25		2032
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-001, HEAT ONLY		2ND FL COMMUNAL SPACE	1	HP	1.00	\$9,008	1988	25	7	DR
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-002, HEAT ONLY		2ND FL COMMUNAL SPACE	1	HP	1.00	\$9,008	1988	25	7	DR
AH13	AIR HANDLING UNIT - INDOOR (45-63 HP)	AHU-001		1040A	60	HP	1.00	\$287,133	1988	25	7	DR
FN07	FAN - AXIAL, RETURN, 1.5" SP (>20 HP) 38,500 CFM	AHU-001 RF		1040A	60	HP	1.00	\$99,469	1988	20	12	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-3		ROOF	1	EA	1.00	\$7,951	1988	20	12	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-4		ROOF	1	EA	1.00	\$7,951	1988	20	12	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-2		1040A	1	HP	1.00	\$2,772	1988	20	12	DR
FN32	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	EF-1		1036	1	HP	1.00	\$5,595	2004	20		2024
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, VAV		THROUGHOUT	165,000	SF	0.93	\$4,926,649	1988	40		2028
HX04	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (20-85 GPM)	HX-1		1040A	80	GPM	3.00	\$40,707	1988	35		2023
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		1040A	1	EA	1.00	\$4,466	1988	20	12	DR

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-3		1040A	1	EA	1.00	\$4,466	1988	20	12	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-4		1040A	1	EA	1.00	\$4,466	1988	20	12	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-5		1040A	1	EA	1.00	\$4,466	1988	20	12	DR
HX10	PRESSURE REDUCING VALVE, STEAM SYSTEM (2.5")	PRV-1		1040A	1	EA	1.00	\$5,525	1988	20	12	DR
HX12	PRESSURE REDUCING VALVE, STEAM SYSTEM (4")	PRV-6		1040A	1	EA	1.00	\$9,824	1988	20	12	DR
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-5		1040A	1.50	HP	7.00	\$17,275	2005	25	-4	2026
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-6		1040A	1.50	HP	7.00	\$17,275	2005	25	-4	2026
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		1040A	1	HP	1.00	\$1,645	2002	25		2027
PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-2		1040A	1	HP	1.00	\$15,999	1988	20	12	DR
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		1040A	6	HP	1.00	\$44,621	1988	20	12	DR
AH36	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (3-10 TON)	CRAC-1		3003	5	TON	1.00	\$55,546	2015	15	2	2032
AH36	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (3-10 TON)	CRAC-2		3003	5	TON	1.00	\$55,546	2007	15		2022
AC02	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (6-10 TOTAL HP)	CAC		1040A	10	HP	1.00	\$20,015	1988	20	12	DR
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		THROUGHOUT	165,000	SF	0.93	\$760,644	1988	18	14	DR
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, SIEMENS, NEW INSTALL		1041	1	EA	1.00	\$37,851	2021	15	3	2039

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
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	165,000	SF	0.93	\$625,974	2021	18		2039
MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	MCC		1040A	5	EA	0.40	\$154,059	1988	25	7	DR
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	277/480		THROUGHOUT	165,000	SF	0.93	\$3,377,143	1988	40		2028
SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MSB		1041	2,500	AMP	1.00	\$207,595	1988	20	12	DR
TX20	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (1000-1500 KVA)	TX-BATE		1041	1,500	KVA	1.00	\$140,815	1988	40		2028
VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD AHU-001 SF		1040A	60	HP	1.00	\$14,740	2009	16		2025
VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD AHU-001 RF		1040A	60	HP	1.00	\$14,740	2009	16		2025
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN		EXT	8	EA	1.00	\$1,876	1988	15	17	DR
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID WP		EXT	2	EA	1.00	\$1,977	2015	15		2030
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	LED SCONCE		EXT	1	EA	1.00	\$988	2017	15		2032
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LED		THROUGHOUT	165,000	SF	1.07	\$1,789,366	2017	20		2037
GN04	GENERATOR - DIESEL (200-500 KW)	EGEN		EXT	350	KW	1.00	\$171,028	2014	25		2039
GN15	SWITCH - AUTO TRANSFER, 480 V (100-400 AMP)	ATS-EM		1041	225	AMP	1.00	\$9,251	2014	25		2039
GN15	SWITCH - AUTO TRANSFER, 480 V (100-400 AMP)	ATS-EE		1041	225	AMP	1.00	\$9,251	2014	25		2039
SF01	SEATING, FIXED, FOLDING, STANDARD	FIXED MOLDED PLASTIC		TIERED SEM RMS	1,210	EA	1.00	\$426,459	1988	40		2028

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR	
Grand Total:								\$26,527,540					

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 FACADES		ALL ELEVS	B2010	29,690	SF	\$255,411	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			NE ENTRY	B2030	3	LEAF	\$8,656	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	EGRESS		N STAIR	B2030	1	LEAF	\$2,885	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			NW ENTRY	B2030	6	LEAF	\$17,311	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			SW ENTRY	B2030	4	LEAF	\$11,541	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			STAIR EGRESS	B2030	1	LEAF	\$2,885	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	SECONDARY EGRESS		EAST ELEV	B2030	3	LEAF	\$8,656	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	EXT SERVICE		EAST & WEST	C1020	3	EA	\$2,234	DR
DR26	DOOR PANIC HARDWARE	EXT DRS		NE ENTRY	C1020	3	EA	\$3,655	DR
DR26	DOOR PANIC HARDWARE	EXT EGRESS		NE STAIR	C1020	1	EA	\$1,218	DR
DR26	DOOR PANIC HARDWARE	EXT EGRESS		N STAIR	C1020	1	EA	\$1,218	DR
DR26	DOOR PANIC HARDWARE	EXT DRS		NW ENTRY	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	EXT SECONDARY EGRESS		WEST ELEV	C1020	2	EA	\$2,437	DR
DR26	DOOR PANIC HARDWARE	EXT DRS		SW ENTRY	C1020	4	EA	\$4,873	DR
DR26	DOOR PANIC HARDWARE	EXT DR		STAIR EGRESS	C1020	1	EA	\$1,218	DR
DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		SOUTH ELEV	C1020	1	EA	\$1,218	DR
DR26	DOOR PANIC HARDWARE	EXT SECONDARY EGRESS		EAST ELEV	C1020	3	EA	\$3,655	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	STANDARD DOORS			C1020	285	EA	\$212,221	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			CORRIDORS	C1020	132	EA	\$98,292	DR
DR26	DOOR PANIC HARDWARE	ISOLATION DRS		CORRIDORS	C1020	56	EA	\$68,224	DR
DR26	DOOR PANIC HARDWARE	ACCESS		STAIR TOWER	C1020	16	EA	\$19,492	DR
CW01	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD			BREAK AREAS, WORK STATIONS	C1030	250	LF	\$134,815	DR
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	153,620	SF	\$343,794	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VCT			C3020	20,500	SF	\$131,376	DR
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG			C3030	66,780	SF	\$673,914	DR
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			D1010	1	EA	\$53,265	DR

RECURRING NEEDS BY YEAR

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

VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-2			D1010	1	EA	\$53,265	DR
FN07	FAN - AXIAL, RETURN, 1.5" SP (>20 HP) 38,500 CFM	AHU-001 RF		1040A	D3040	60	HP	\$99,469	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-3		ROOF	D3040	1	EA	\$7,951	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-4		ROOF	D3040	1	EA	\$7,951	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-2		1040A	D3040	1	HP	\$2,772	DR
HX10	PRESSURE REDUCING VALVE, STEAM SYSTEM (2.5")	PRV-1		1040A	D3040	1	EA	\$5,525	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		1040A	D3040	1	EA	\$4,466	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-3		1040A	D3040	1	EA	\$4,466	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-4		1040A	D3040	1	EA	\$4,466	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-5		1040A	D3040	1	EA	\$4,466	DR
HX12	PRESSURE REDUCING VALVE, STEAM SYSTEM (4")	PRV-6		1040A	D3040	1	EA	\$9,824	DR
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		1040A	D3040	6	HP	\$44,621	DR
PH13	CONDENSATE RECEIVER, ELECTRIC, 1 PUMP	CP-2		1040A	D3040	1	HP	\$15,999	DR
AH13	AIR HANDLING UNIT - INDOOR (45-63 HP)	AHU-001		1040A	D3040	60	HP	\$287,133	DR

RECURRING NEEDS BY YEAR

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

AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-001, HEAT ONLY		2ND FL COMMUNAL SPACE	D3040	1	HP	\$9,008	DR
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-002, HEAT ONLY		2ND FL COMMUNAL SPACE	D3040	1	HP	\$9,008	DR
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		THROUGHOUT	D3060	165,000	SF	\$760,644	DR
AC02	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (6-10 TOTAL HP)	CAC		1040A	D3060	10	HP	\$20,015	DR
SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MSB		1041	D5010	2,500	AMP	\$207,595	DR
MC02	MOTOR CONTROL CENTER VERTICAL SECTION, 600V (400-600A) W/STARTERS	MCC		1040A	D5010	5	EA	\$154,059	DR
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN		EXT	D5020	8	EA	\$1,876	DR
TOTAL DEFERRED RENEWAL COST								\$3,786,350.69	

No Projected Component Replacement Cost for Asset No. BATE for 2021

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	PT WALLS			C3010	76,810	SF	\$177,054	2022
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	BROADLOOM		OFFS, MTG	C3020	43,930	SF	\$554,054	2022
AH36	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (3-10 TON)	CRAC-2		3003	D3050	5	TON	\$57,212	2022
2022 PROJECTED COMPONENT REPLACEMENT COST								\$788,319.96	

2023									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	CER TILE FLOOR MOUNT		JAN CLOS	D2010	3	EA	\$5,705	2023
FX04	PLUMBING FIXTURE - SINK, KITCHEN	SST		BREAK AREAS	D2010	12	EA	\$27,493	2023
HX04	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (20-85 GPM)	HX-1		1040A	D3040	80	GPM	\$43,186	2023

RECURRING NEEDS BY YEAR

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

2023 PROJECTED COMPONENT REPLACEMENT COST

\$76,384.45

2024

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
FN32	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	EF-1		1036	D3040	1	HP	\$6,114	2024
								2024 PROJECTED COMPONENT REPLACEMENT COST	\$6,113.80

2025

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	EXTERIOR GLAZING			B2010	12,730	SF	\$2,456,315	2025
BF02	BACKFLOW PREVENTER (1-2 INCHES)	BFP-1		1040A	D2020	1	EA	\$2,633	2025
PP02	GREYWATER LIFT STATION	SUMP-1		ELEV PIT	D2030	2	HP	\$5,714	2025

RECURRING NEEDS BY YEAR

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

VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD AHU-001 SF		1040A	D5010	60	HP	\$16,590	2025
VF10	VARIABLE FREQUENCY DRIVE (50-75 HP)	VFD AHU-001 RF		1040A	D5010	60	HP	\$16,590	2025
2025 PROJECTED COMPONENT REPLACEMENT COST								\$2,497,841.13	

2026									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-5		1040A	D3040	1.50	HP	\$20,026	2026
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-6		1040A	D3040	1.50	HP	\$20,026	2026
2026 PROJECTED COMPONENT REPLACEMENT COST								\$40,052.19	

2027									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	25,600	SF	\$68,409	2027

RECURRING NEEDS BY YEAR

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

IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	BROADLOOM		OFFS, MTG	C3020	17,570	SF	\$256,891	2027
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE			C3020	26,360	SF	\$385,409	2027
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		1040A	D3040	1	HP	\$1,964	2027
2027 PROJECTED COMPONENT REPLACEMENT COST								\$712,673.72	

2028									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	EGRESS		NE STAIR	B2030	1	LEAF	\$2,498	2028
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERVICE		EAST & WEST	B2030	3	LEAF	\$7,493	2028
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY EGRESS		WEST ELEV	B2030	2	LEAF	\$4,995	2028
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY EGRESS		SOUTH ELEV	B2030	1	LEAF	\$2,498	2028
DR01	DOOR AND FRAME, INTERIOR, NON-RATED	STANDARD DOORS			C1020	285	LEAF	\$758,730	2028
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ISOLATION DRS		CORRIDOR	C1020	56	LEAF	\$257,491	2028

RECURRING NEEDS BY YEAR

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

DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ACCESS		STAIR TOWER	C1020	16	LEAF	\$73,569	2028
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED			CORRIDORS	C1020	132	LEAF	\$606,944	2028
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, VAV		THROUGHOUT	D3040	165,000	SF	\$6,059,156	2028
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	277/480		THROUGHOUT	D5010	165,000	SF	\$4,153,460	2028
TX20	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (1000-1500 KVA)	TX-BATE		1041	D5010	1,500	KVA	\$173,184	2028
SF01	SEATING, FIXED, FOLDING, STANDARD	FIXED MOLDED PLASTIC		TIERED SEM RMS	E2010	1,210	EA	\$524,490	2028
2028 PROJECTED COMPONENT REPLACEMENT COST								\$12,624,509.14	

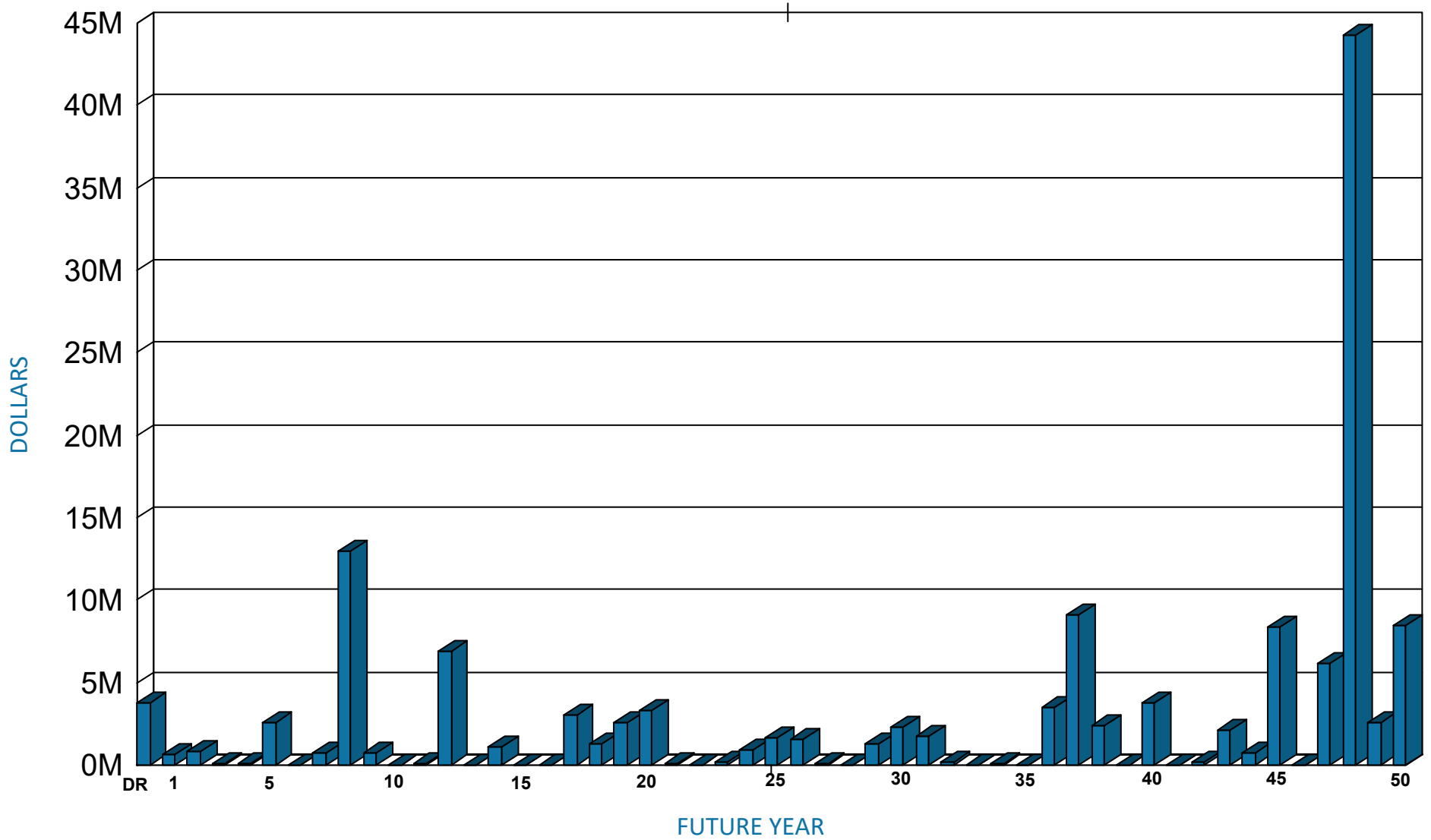
2029									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	FLAT ROOF			B3010	55,000	SF	\$706,759	2029
2029 PROJECTED COMPONENT REPLACEMENT COST								\$706,759.44	

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
DR03	DOOR - OVERHEAD, INTERIOR	ROLL DOWN GATE		BATE EXPRESS	C1020	120	SF	\$15,366	2030
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID WP		EXT	D5020	2	EA	\$2,579	2030
2030 PROJECTED COMPONENT REPLACEMENT COST								\$17,945.45	

RECURRING COMPONENT EXPENDITURE PROJECTIONS

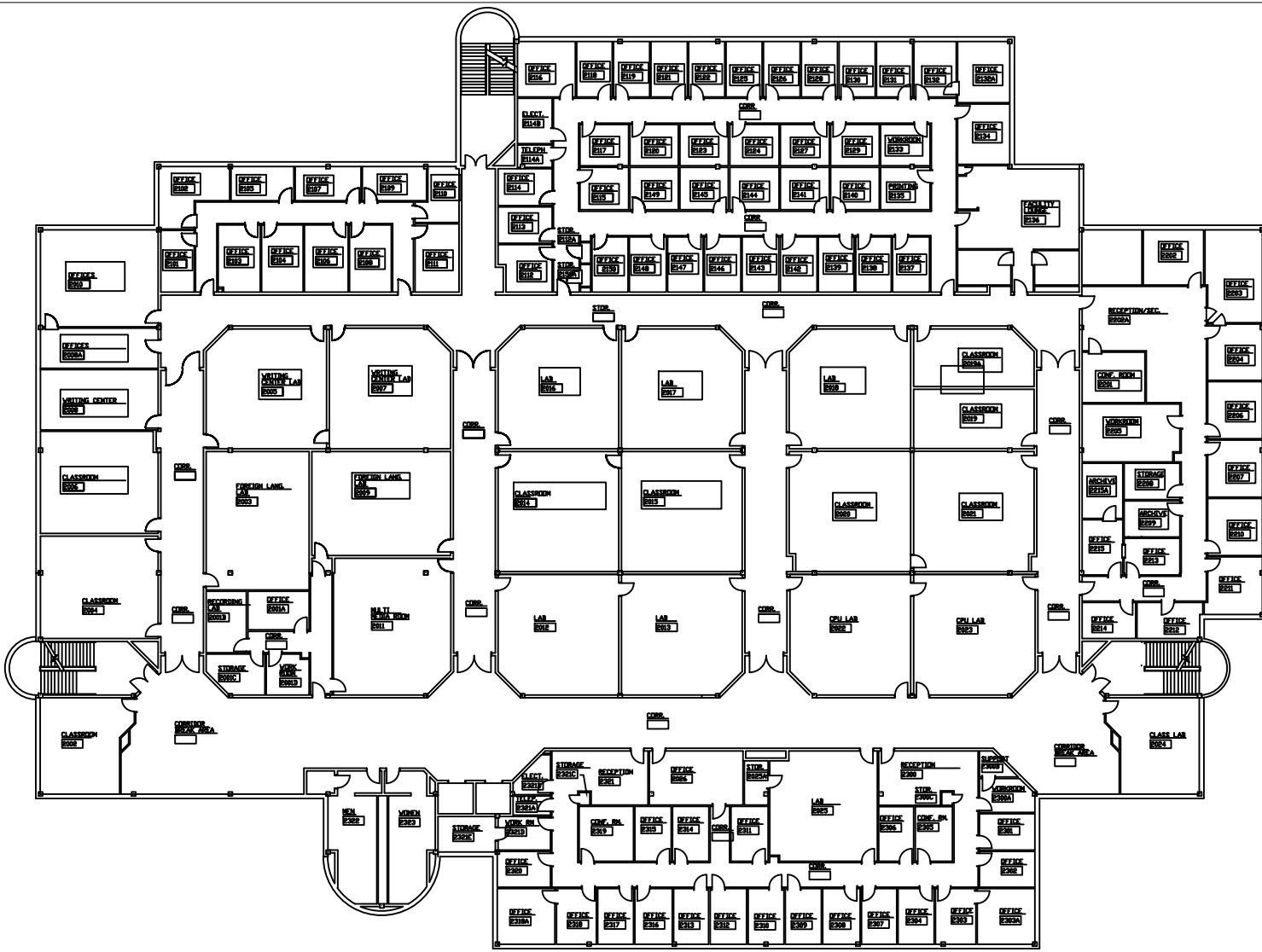


Average Annual Renewal Cost per SF \$7.01

FACILITY CONDITION ASSESSMENT

SECTION 5

DRAWINGS



BATE BUILDING

SECOND FLOOR PLAN PART A
DATE 1/17/07

FACILITY CONDITION ASSESSMENT

SECTION 6

PHOTOGRAPHS



BATE001a 5/11/2021
Building site signage
West site



BATE001e 5/11/2021
Dry-cooler condensing unit for computer AC unit
Roof



BATE002a 5/11/2021
Large, flat, built-up roof with low parapet wall and cap
flashing
Main roof



BATE002e 5/11/2021
Dry-cooler condensing unit for computer AC unit
Roof



BATE003a 5/11/2021
Low perimeter parapet walls and metal cap flashing
detail
Main roof



BATE003e 5/11/2021
Centrifugal rooftop exhaust fan
Roof



BATE004a 5/11/2021
Minor issue with cap sheet
Main roof



BATE004e 5/11/2021
Centrifugal rooftop exhaust fan
Roof



BATE005a 5/11/2021
Restricted roof drain
Main roof



BATE005e 5/11/2021
Recessed LED lighting fixtures
Third floor corridor



BATE006a 5/11/2021
Older VCT, acoustical ceiling, and painted block walls
Third floor corridor



BATE006e 5/11/2021
LED lighting fixtures
Room 3001



BATE007a 5/11/2021
Accessible wall-mounted room signage
Third floor corridor



BATE007e 5/11/2021
Secondary step-down transformers
Room 3103B



BATE008a 5/11/2021
Newer carpet tile and acoustical ceilings
Third floor, select offices



BATE008e 5/11/2021
Local panelboard
Room 3103B



BATE009a 5/11/2021
Newer LVT flooring
Third floor, select classrooms



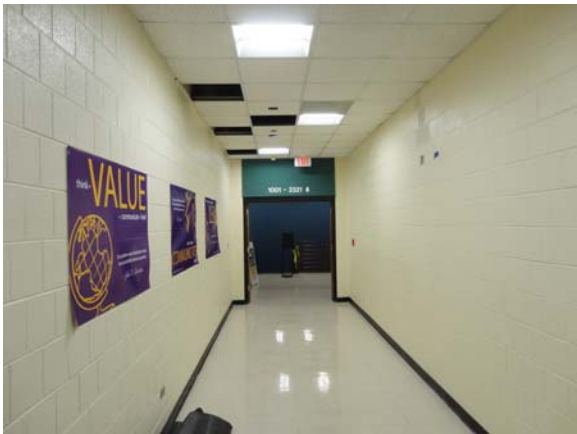
BATE009e 5/11/2021
Instantaneous electric water heater
Room 3122



BATE010a 5/11/2021
Various ages of water fountains
Third floor corridor



BATE010e 5/11/2021
Installation of new fire alarm and detection system and
fire proofing
Third floor corridor



BATE011a 5/11/2021
Older VCT, acoustical ceiling, and painted block walls
Third floor corridor



BATE011e 5/11/2021
Local thermostat
Room 3015



BATE012a 5/11/2021
Casework
Third floor, typical workroom



BATE012e 5/11/2021
Elevator interior
Elevator 1



BATE013a 5/11/2021
Older roll carpeting
Third floor, office



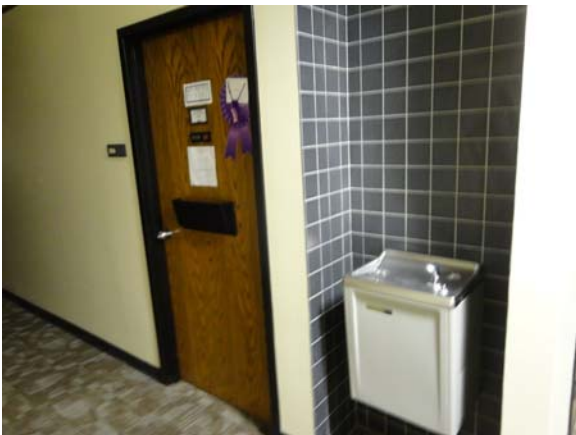
BATE013e 5/11/2021
Elevator interior
Elevator 1



BATE014a 5/11/2021
Older acoustical ceiling
Third floor, office



BATE014e 5/11/2021
Recessed can LED lighting fixtures
Second floor, communal space



BATE015a 5/11/2021
Older single-level water fountain
Third floor corridor



BATE015e 5/11/2021
Vintage horn with neon strobe fire alarm device
Second floor corridor



BATE016a 5/11/2021
Typical flush wood original door with knob hardware
Third floor corridor



BATE016e 5/11/2021
LED lighting fixtures
Room 1031



BATE017a 5/11/2021
Older roll carpeting and acoustical ceiling
Third floor, office



BATE017e 5/11/2021
Computer AC unit
Room 3003



BATE018a 5/11/2021
Newer carpet tile and acoustical ceiling
Third floor, staff lounge



BATE018e 5/11/2021
Computer AC unit
Room 3003



BATE019a 5/11/2021
Wall-hung lavatories
Third floor, men's SE restroom



BATE019e 5/11/2021
Propeller-style exhaust fan
Room 1040A



BATE020a 5/11/2021
Wall-hung urinal
Third floor, men's SE restroom



BATE020e 5/11/2021
Heating hot water shell-and-tube heat exchanger
Room 1040A



BATE021a 5/11/2021
Partially accessible toilet stall
Third floor, men's SE restroom



BATE021e 5/11/2021
Heating hot water pumps
Room 1040A



BATE022a 5/11/2021
Ceramic floor and wall tile and painted ceiling
Third floor, men's SE restroom



BATE022e 5/11/2021
Condensate receiver
Room 1040A



BATE023a 5/11/2021
Wall-hung lavatories
Third floor, women's SE restroom



BATE023e 5/11/2021
Pressure reducing valves
Room 1040A



BATE024a 5/11/2021
Partially accessible toilet stall
Third floor, women's SE restroom



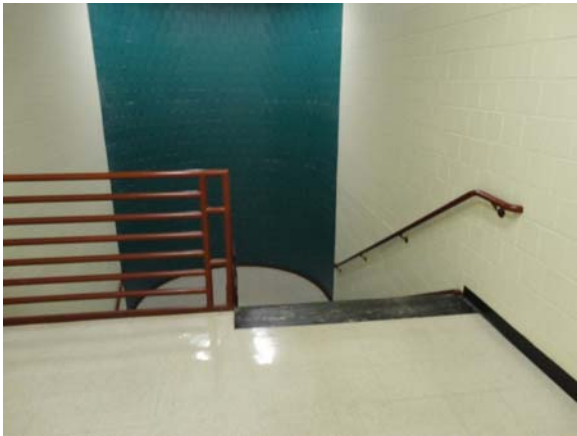
BATE024e 5/11/2021
Sump pump
Room 1040A



BATE025a 5/11/2021
Two water fountains mounted as same height
Third floor corridor



BATE025e 5/11/2021
Air handling unit AHU-001
Room 1040A



BATE026a 5/11/2021
Accessible inner and outer stair rails
Third floor, stair tower



BATE026e 5/11/2021
VFD for return fan for AHU-001
Room 1040A



BATE027a 5/11/2021
Upgraded rubber stair treads
Third floor, stair tower



BATE027e 5/11/2021
VFD for supply fan for AHU-001
Room 1040A



BATE028a 5/11/2021
Newer single-level water fountain with bottle filler
Third floor corridor



BATE028e 5/11/2021
Supply fan for AHU-001
Room 1040A



BATE029a 5/11/2021
Original casework and sink
Third floor, small break area



BATE029e 5/11/2021
Return fan for AHU-001
Room 1040A



BATE030a 5/11/2021
Wall-hung lavatories
Third floor, main women's restroom



BATE030e 5/11/2021
Motor control center
Room 1040A



BATE031a 5/11/2021
Standard toilet stall
Third floor, main women's restroom



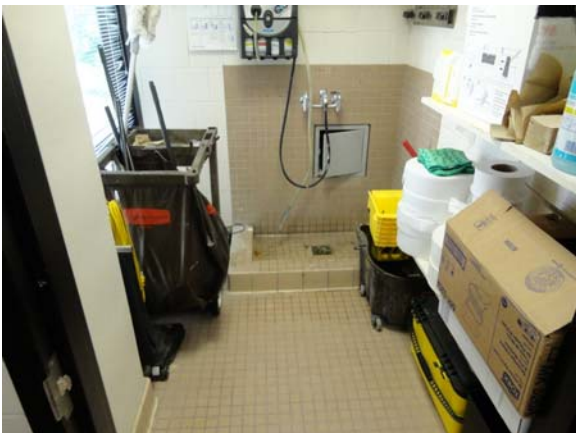
BATE031e 5/11/2021
Controls air compressor
Room 1040A



BATE032a 5/11/2021
Accessible toilet stall
Third floor, main women's restroom



BATE032e 5/11/2021
Oil-filled transformer
Site



BATE033a 5/11/2021
Original, ceramic tile, floor-mounted mop sink
Third floor, janitor's closet



BATE033e 5/11/2021
HID wallpack
Exterior



BATE034a 5/11/2021
Wall-hung lavatories
Third floor, main men's restroom



BATE034e 5/11/2021
Diesel-fired emergency generator
Exterior



BATE035a 5/11/2021
Accessible wall-hung urinals
Third floor, main men's restroom



BATE035e 5/11/2021
Main fire alarm panel
Room 1041



BATE036a 5/11/2021
Standard toilet stall
Third floor, main men's restroom



BATE036e 5/11/2021
Main switchboard
Room 1041



BATE037a 5/11/2021
Accessible toilet stall
Third floor, main men's restroom



BATE037e 5/11/2021
Automatic transfer switch
Room 1041



BATE038a 5/11/2021
Nonaccessible phone in elevator cab
Passenger elevator cab



BATE038e 5/11/2021
Automatic transfer switch
Room 1041



BATE039a 5/11/2021
Older vinyl flooring and acoustical ceiling
Second floor corridor



BATE039e 5/11/2021
Recessed can lighting fixtures
Exterior



BATE040a 5/11/2021
Typical wall-hung lavatories
Second floor, main women's restroom



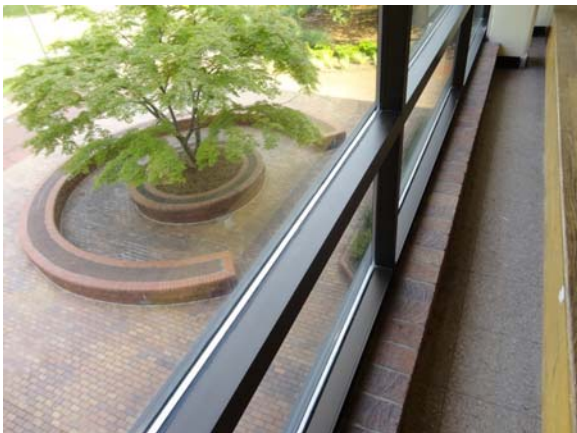
BATE040e 5/11/2021
Elevator 1 hydraulic controls
Room 1036



BATE041a 5/11/2021
Older vinyl flooring and acoustical ceiling
Second floor, commons



BATE041e 5/11/2021
Elevator 2 hydraulic controls
Room 1036



BATE042a 5/11/2021
Original thermal-pane, metal-framed windows
Second floor



BATE042e 5/11/2021
Utility-style exhaust fan
Room 1036



BATE043a 5/11/2021
Older broadloom carpeting and acoustical ceiling
Second floor, meeting room



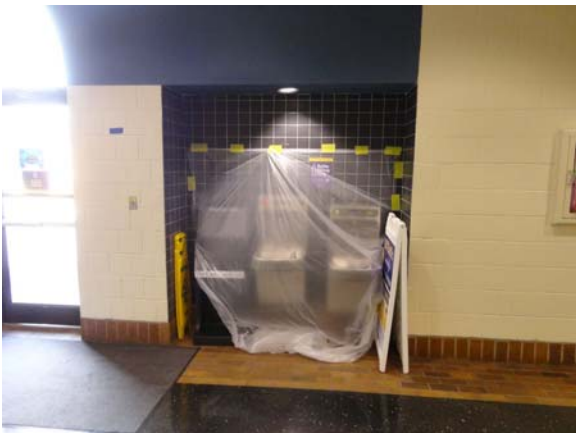
BATE044a 5/11/2021
Older VCT and acoustical ceiling
Second floor, class lab



BATE045a 5/11/2021
Older water fountains
Second floor, corridor



BATE046a 5/11/2021
Newer carpet tile and acoustical ceiling
Second floor conference room



BATE047a 5/11/2021
Multi-level water fountains
Second floor corridor



BATE048a 5/11/2021
Slat wood acoustical panels
First floor, tiered classroom



BATE049a 5/11/2021
Fixed seating
First floor, larger tiered classroom



BATE050a 5/11/2021
No side aisle handrails
First floor, larger tiered classroom



BATE051a 5/11/2021
Roll down shutter for food service area
First floor, Bate Express



BATE052a 5/11/2021
Casework and sink in food service area
First floor, Bate Express



BATE053a 5/11/2021
Typical tiered classroom finishes
First floor, small tiered classroom



BATE054a 5/11/2021
Fixed seating chairs
First floor, small tiered classroom



BATE055a 5/11/2021
Casework detail in small staff kitchen
First floor events warming kitchen



BATE056a 5/11/2021
Fogging on atrium glass
First floor



BATE057a 5/11/2021
Hollow-metal service doors
First floor, mechanical area



BATE058a 5/11/2021
Brick facades with bands of glazing
Corner elevation



BATE059a 5/11/2021
Brick facades with bands of glazing
Southeast corner elevation



BATE060a 5/11/2021
Staining and streaking on exterior masonry
South end of east elevation



BATE061a 5/11/2021
Brick facades with bands of glazing
Northeast elevation



BATE062a 5/11/2021
Ramped access to building
Northeast elevation



BATE063a 5/11/2021
Fogging atrium glazing
Northeast elevation



BATE064a 5/11/2021
Brick facades with bands of glazing
North elevation



BATE065a 5/11/2021
On-grade building entry with power door assist
Northwest elevation



BATE066a 5/11/2021
Main plaza entry
Northwest elevation



BATE067a 5/11/2021
Glass entry doors
Northwest corner elevation



BATE068a 5/11/2021
Hollow-metal service doors
West elevation



BATE069a 5/11/2021
Signs of efflorescence on plaza steps
Southwest corner plaza



BATE070a 5/11/2021
Fogging on atrium glazing
Southwest corner elevation

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	BATE
Asset Name	Harold H. Bate Building
Year Built or Last Energy Renovation	1988

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)

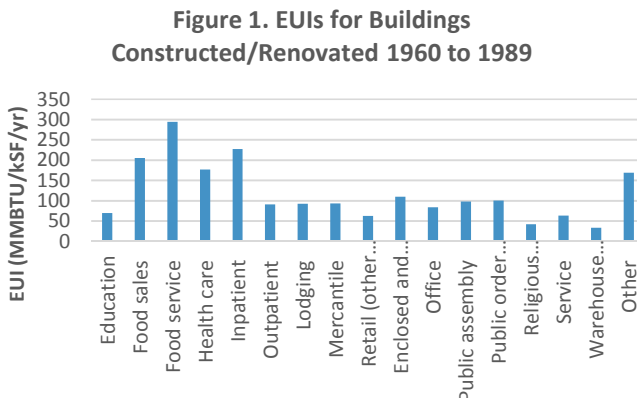
EUI is a measure of energy consumption per square foot of building space per year. The units of measurement are million British thermal units per thousand square foot per year (MMBTU/kSF/yr). The US-DOE EUI can be compared to the actual EUI of the client building to determine how efficient the building 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	1960 to 1989
Benchmark EUI (MMBTU/kSF/yr) =	70.1
Building EUI to be Calculated by Client (MMBTU/kSF/yr) =	

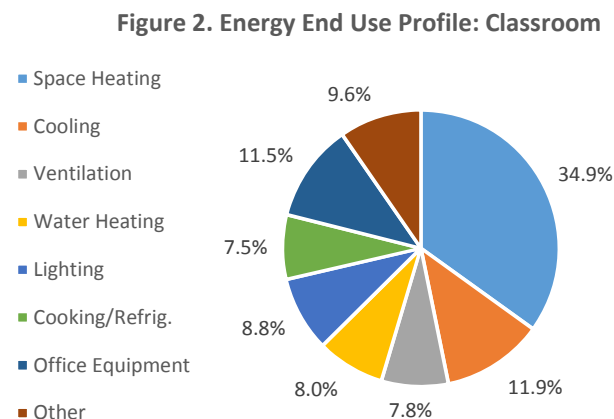
TABLE 3. EUI COMPARISON	
Very Energy Efficient (consumes more than 30% less energy)	EUI < 49.1
Energy Efficient (consumes 10% to 30% less energy)	49.1 <= EUI <= 63.1
Similar (consumes within 10% less or 10% more energy)	63.1 < EUI < 77.1
Energy Inefficient (consumes 10% to 30% more energy)	77.1 <= EUI <= 91.1
Very Energy Inefficient (consumes more than 30% more energy)	EUI > 91.1



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	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 bay, T5 lighting fixtures or LED fixtures should be considered as an alternate. T12 lamps are an outdated lighting technology that should be replaced with newer technologies such as T8, T5, or LED lamp fixtures.	N/A, Varies
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

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
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
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
Plumbing - DHW Heater Efficiency	INSTALL A HIGH-EFFICIENCY WATER HEATER. High efficiency/ENERGY STAR water heaters consume less energy. Consider condensing water heaters that capture the latent heat from water vapor contained in the flue gases.	LC/NC; CAP