EAST CAROLINA UNIVERSITY

Facility Condition Assessment

Brewster Building (008)
Asset BREW

Inspected May 12, 2021

Revised 10/21/21

ISES CORPORATION

TABLE OF CONTENTS

FACILITY CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

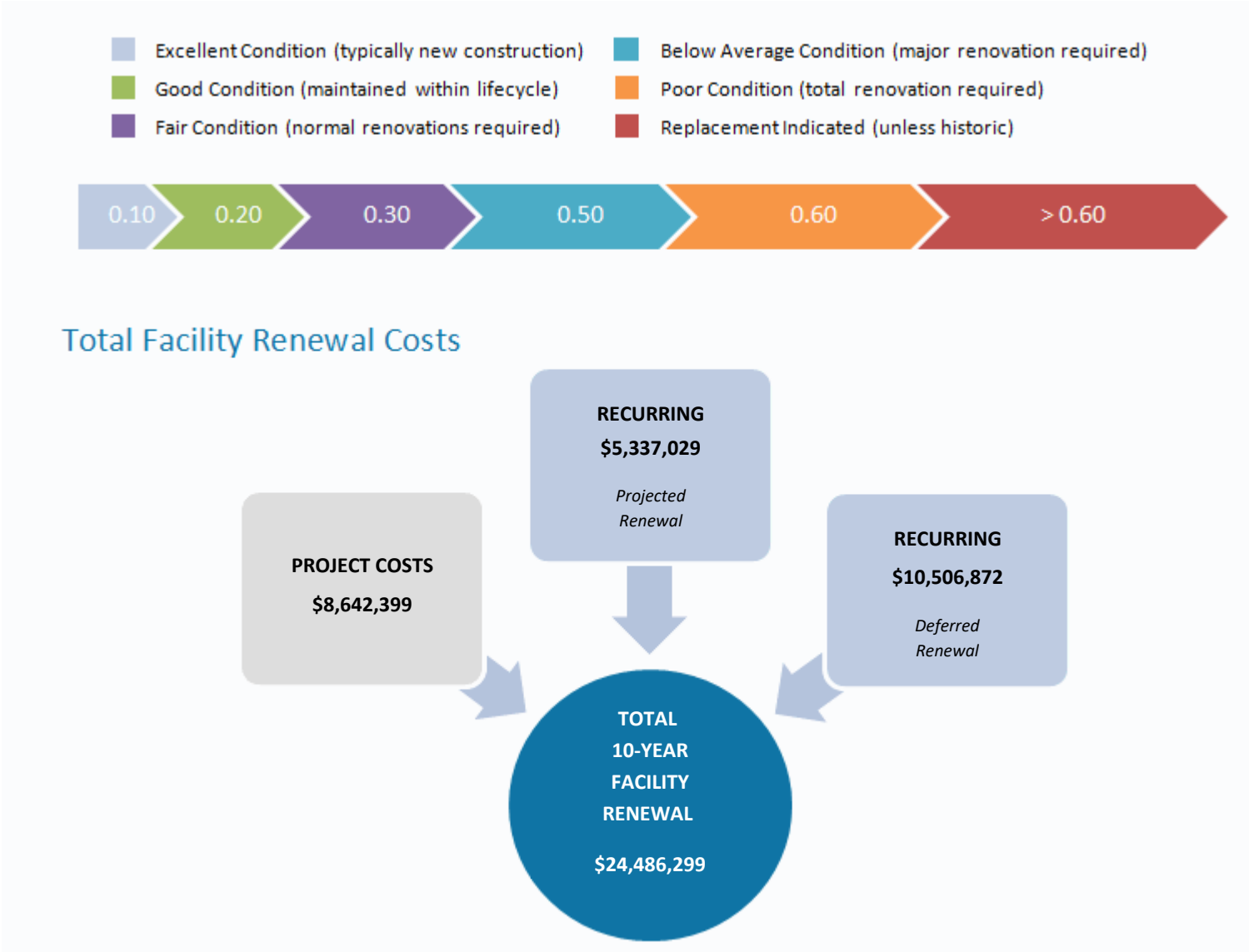
ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

ASSET CODE	BREW	**CURRENT REPLACEMENT VALUE**	$46,845,000
ASSET NAME	BREWSTER BUILDING (008)	**FACILITY CONDITION NEEDS INDEX**	0.52
ASSET USE	Classroom / Academic	**FACILITY CONDITION INDEX**	0.22
YEAR BUILT	1970	**10-YEAR $/SF**	206.71
GSF	118,456		
INSPECTION DATE	05/12/2021		

FCNI Scale

The FCNI for this asset is **0.52**

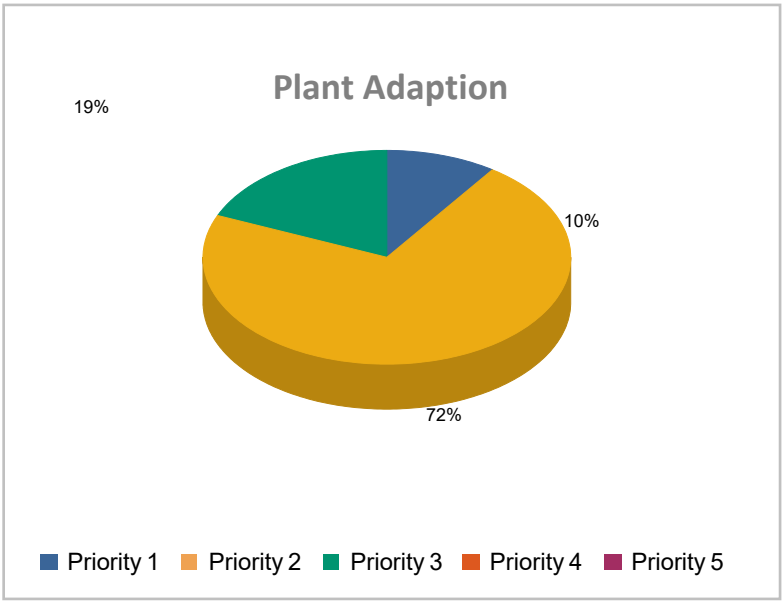


Total Facility Renewal Costs

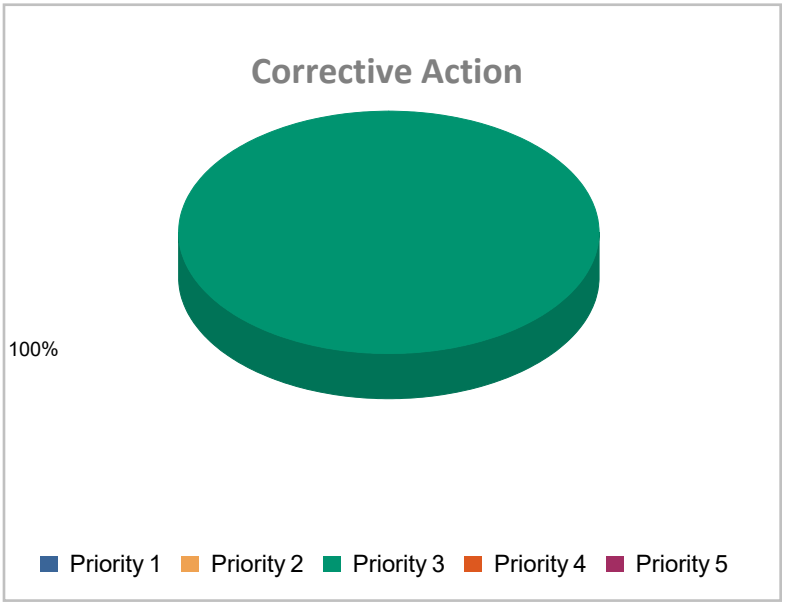
Project Costs

Project Cost by Priority

PLANT ADAPTION	
Priority 1	**$841,293**
Priority 2	**$6,174,307**
Priority 3	**$1,597,833**
Priority 4	**$0**
Priority 5	**$0**

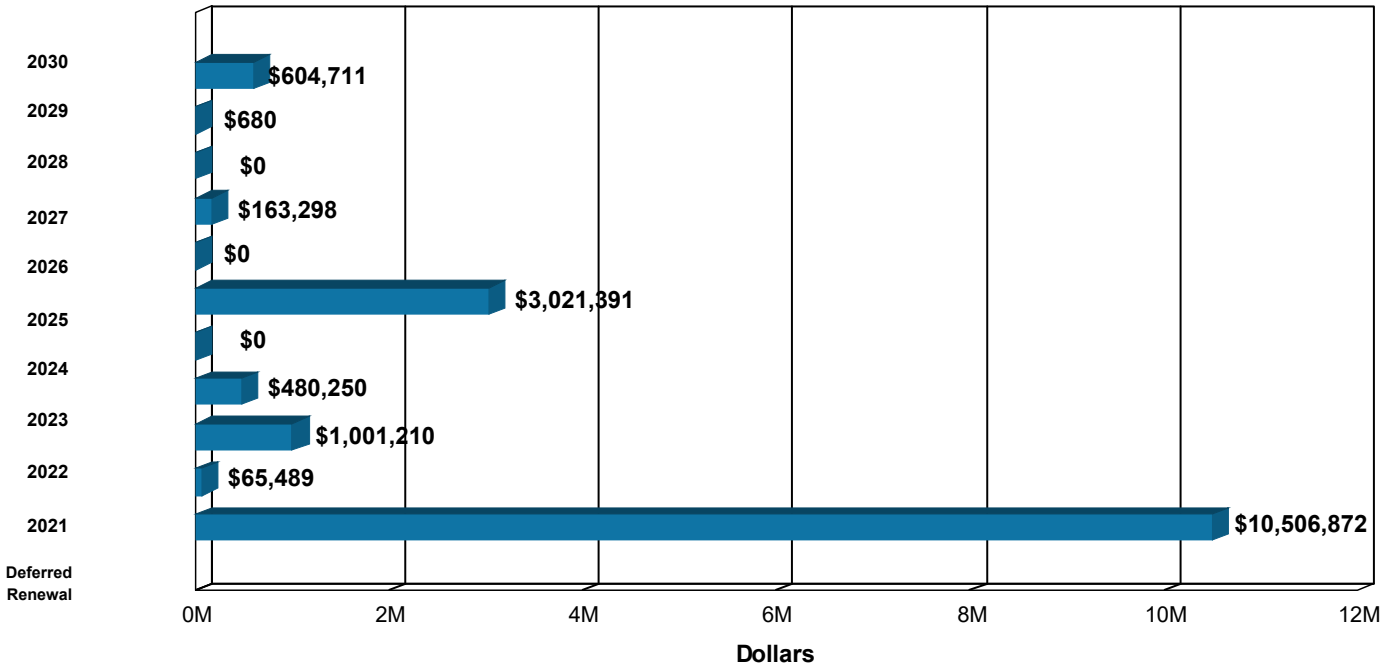


CORRECTIVE ACTION	
Priority 1	**$0**
Priority 2	**$0**
Priority 3	**$28,966**
Priority 4	**$0**
Priority 5	**$0**

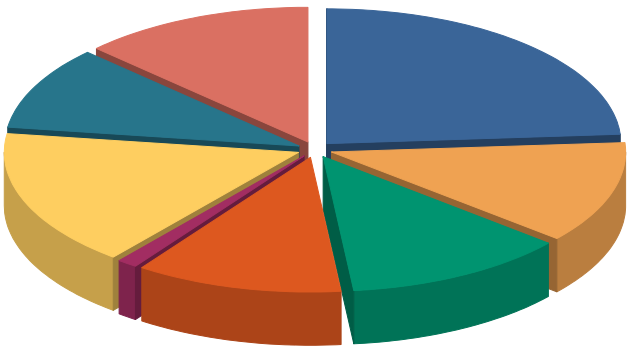


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



Accessibility	$5,866,700	24%
Electrical	$2,965,012	12%
Exterior	$2,986,668	12%
Fire/Life Safety	$2,820,382	12%
Health	$288,920	1%
HVAC	$4,014,844	16%
Interiors	$2,415,796	10%
Plumbing	$3,127,978	13%
Site	$0	0.0%
Vert. Trans.	$0	0%
Security	$0	0.0%
TOTAL	**$24,486,299**	

ASSET SUMMARY

The Brewster Building is a three-to-four-story 1970 office and classroom building on the main campus of East Carolina University. The building is organized into four separate wings (A, B, C, and D) interconnected by breezeways. The B, C, and D Wings have three floors and A Wing has four floors. These four rectangular wings are organized around a large central courtyard. Exterior facades are brick with cut stone accents and each narrow window unit is flanked by cut stone passive solar screening. The main south entry doors are glass and the entry doors for each individual floor are older hollow-metal assemblies. The facility has an older, built-up roofing system. The Brewster Building totals approximately 118,456 gross square feet.

The information for this report was gathered during an inspection conducted on May 11, 2021.

Site

The site has a gentle slope and planting consists of turf grass, shrubs, and ornamental trees. The landscaping is in overall good condition and no additional planting is recommended. The walkways are also in good condition and no upgrades are recommended at this time. There are no parking lots directly associated with this facility.

Exterior Structure

The brick veneer and cut stone accents are showing signs of staining and some grouting issues. Soft clean the stone and stained brick and selectively repoint all elevations. A number of the cut stone panels are heavily weathered and several of the cut stone passive solar screens on the exterior windows are damaged or broken. Repair or replace the damaged cut stone panels around the building to help improve general appearances. The narrow, single-pane, metal-framed glazing in all four wings is original and due for replacement. Install new operable and fixed thermal-pane glazing building wide. The built-up roofing system is aging and should be replaced in the near future.

The main south glass entry doors receive heavily use and should be replaced in the near future. The hollow-metal entry and egress doors off of the breezeways are older and should be considered for replacement to 1-1/2 doors similar those on the A Wing fourth floor which are still relatively new and in good condition at this time. Hollow-metal service doors are older and should be considered for replacement within the next ten years. The courtyard gates are serviceable, but emergency time delay egress hardware should be installed on these gates to help improve safety. Upgrade door hardware as part of routine maintenance.

Interior Finishes/Systems

The interior finishes in all four wings are in average to fair condition. Painted walls throughout the building are showing wear and have some contact damage. Repaint all of the interior walls to help maintain a good even interior aesthetic. Ceilings in most spaces are lay-in, acoustical tile, with some painted ceilings in areas like restrooms. Acoustical ceiling systems vary in age and condition throughout the building and a large percentage should be upgraded. The painted ceilings are adequate at this time pending recommended restroom renovation and expansion work.

Floor finishes include terrazzo flooring in the B, C, and D Wing corridors with older vinyl tile flooring in the classroom areas. A Wing has mostly vinyl floor tile throughout with some offices and classrooms that are carpeted. The terrazzo flooring needs to be ground and polished and most of the vinyl flooring is due for in-kind replacement. Broadloom carpeting is older and showing wear and staining. Replace this older carpeting with carpet tile. The newer carpet tile is in average condition but should also be replaced in kind within the next ten years. Ceramic floor and wall tile in the restrooms is older and should be upgraded as part of the recommended restroom renovations.

The fixed seating in the tiered classrooms is worn and should be upgraded. Replace this seating with fixed seats in a similar row configuration. Ensure that ADA requirements are followed with the new seating layout. The interior doors are in overall fair condition and the older standard interior doors are recommended for in-kind replacement. The older nonrated corridor doors are addressed in the Fire/Life Safety section.

Accessibility

The central courtyard has a series of steps with no handrails and these site steps will require accessible handrails and at least three wheelchair lifts to improve general accessibility. The main entry doors and the breezeway entry doors on each floor have older, power door assist units that need to be upgraded. Also, these site steps cannot easily be ramped and wheelchair lifts should be installed to make the courtyard more accessible. Additionally, the fourth floor A Wing ramps lack a second handrail and accessible flanking railings should be added.

There are two accessible passenger elevators but one was offline on the day of inspection. It is recommended that additional accessible passenger elevators be installed in the other two wings to provide more uniform accessibility in this this elongated building. Both the inner and outer railings on all of the breezeway stair towers lack accessibility and should be upgraded with new railing designs. Install new railings that have proper graspability and picket spacing on both sides of each stair run.

The older interior corridor and standard doors have accessible room signage but are timeworn and lack accessible hardware. These doors are recommended for replacement in the Fire/Life Safety and Interior sections. However, if they are not upgraded in the near future, then the current doors should be fitted with new lever hardware sets.

The first floor lecture rooms lack assistive listening capability and the rear tiered seating and front stage areas lack accessibility. Install an assistive listening system. Also, install accessible side aisle handrails at the tiered seating and a wheelchair lift for the raised stage area of the east lecture room.

With the exception of the first floor restrooms in A Wing, all of the restrooms have aging nonaccessible fixtures and older restroom accessories and finishes. Upgrade these restrooms with new accessible fixtures, accessories, and finishes. The new accessible layouts will require restroom expansion to avoid the reduction of total building fixture counts. Also, the two accessible first floor restrooms have older finishes and should also be renovated as part of this project. Water fountains throughout the building are a mixture of older nonaccessible units and some newer partially accessible units. Replace these fountains with new accessible dual-level fountain units set in the same corridor alcoves.

Health

Asbestos insulation was observed on mechanical piping during the inspection. Prior to any future renovation efforts, it is recommended that it be properly removed and disposed according to local, state, and federal regulations.

Fire/Life Safety

The building appears to have adequate egress pathways and no exiting obstructions were noted or reported. Most of the egress corridor doors do not appear to be fire rated. Only a few corridor doors in areas like the High School/College prep areas are newer fire-rated assemblies with lever hardware. Replace the remainder of these doors with new fire-rated flush wood doors with rated metal frames and lever hardware.

The elevator lobbies for the two existing passenger elevators open into the egress corridors in A and B Wings. The lobby layout should separate the elevators from the corridor with rated partitions. Elevator lobbies also need to contain smoke detectors. The construction of fire resistant barriers with automatically closing fire doors is needed between the elevator lobbies and corridors to provide the required separation and protection on all floors.

Install rooftop hard looped tie-off points for fall protection especially at rooftop equipment near roof perimeters.

This facility has a Notifier point addressable fire alarm and detection system. This system contains fire alarm extension panels for each wing with the main monitoring panel in the B Wing mechanical room. Additionally, there are manual pull stations, smoke detectors, and horn and strobe alarm systems. The panels and devices appear to have been installed in the early to mid-2000s and should be considered for replacement due to technical obsolescence.

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 thirteen constant air volume (CAV) air handling units utilizing heating hot water and chilled water. The air handling units in A Wing are multizone while the air handling units in B, C, and D Wings are dual duct. Building exhaust is handled by four centrifugal exhaust fan and one utility exhaust fan that serves a small dry laboratory. Three propeller exhaust fans serve the main mechanical room in B Wing. The coils and the motors for the air handling units were reported to have been replaced around 2010 which has extended their respective service lives. However, it is recommended that they be replaced with modern and energy-efficient variable air volume (VAV) capable air handling units during any future renovations. The majority of the exhaust fans appear to be timeworn as vibration and rattles were observed. It is recommended that they be replaced. Supplemental cooling for the elevator machine room is handled by a one-ton ductless split system. No issues were observed or reported, and it should remain viable for the next ten years.

Chilled water is supplied by the central plant with a 40-hp inline pump for support. Heating hot water is generated through a shell-and-tube heat exchanger utilizing steam generated at the central steam plant and circulated throughout via a 50-hp base-mounted centrifugal pump. High pressure steam is reduced to low pressure steam through pressure reducing valves. Condensate from the heat exchanger is collected and transferred back to the central plant via a duplex condensate receiver. The heat exchanger, chilled water pump, heating hot water pump, pressure reducing valves, and the condensate receiver should be considered for replacement as they have exceeded their respective service lives.

A fume hood in a laboratory space was likely installed in the mid-1990s. It is recommended that it be evaluated for replacement and/or removal, depending upon the future uses for the space.

The original HVAC distribution network is a CAV design utilizing multizone in A Wing and dual duct in B, C, and D Wings. The network is considered inefficient compared to current standards. Humidity issues were noted during the inspection as sagging ceiling tiles were observed throughout the majority of the spaces. Recent upgrades were observed with the conversion of some dual duct boxes to VAV terminal boxes with direct digital controls (DDC) Original dual-duct boxes were observed and were in select spaces with the plan for future upgrade with VAV capability. The HVAC controls are a DDC and pneumatic hybrid with the pneumatic systems original and some recent upgrades to DDC for valve control associated with the air handling units in B, C, and D Wings. It is recommended that the HVAC distribution network and controls be removed and replaced with and a modern, energy-efficient VAV system with full DDC. The controls air compressor should be evaluated for replacement and/or removal, depending upon the future needs with an upgrade to full DDC.

Electrical

Main electrical service is fed to this facility from a 1,000-kVA transformer, where power is reduced to 277/480 volts and routed to a 2,000-amp main 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 downline electrical system components include distribution feeders, conduits, local panelboards, load centers, safety switches, fused disconnects, receptacles, switches, and similar terminal elements. The

switchboards, step-down transformers, and electrical distribution system are original and should be considered for replacement. The oil-filled transformer should remain viable for the next ten years.

The emergency power network consists of a 50-kW diesel-fired generator with an associated 150-amp automatic transfer switch. The generator and transfer switch were installed in 2005 and are expected to remain viable for the next ten years.

Variable frequency drives (VFDs) are associated with the air handling units and the heating hot water pump. The drives are currently used as soft starts for the motors and not able to provide throttling due to the current HVAC controls. It is recommended they be replaced during any future HVAC renovations.

The majority of the interior lighting was replaced in 2016 and consists of recessed, lay-in LED fixtures. Some original fixtures were observed with LED retrofits. Although the retrofitted fixtures are in usable condition, replacement acrylic diffusers and components may be difficult to obtain. Therefore, it is recommended the original fixtures be replaced. The 2016 fixtures are expected to remain viable for the next ten years.

The majority of the exterior lighting consists of LED sconces and pole-mounted LED fixtures. Some HID wallpacks were observed in select locations. While currently functional, the HID fixtures are less efficient and require more frequent maintenance than modern LED-based outdoor lighting. It is recommended that the HID lighting be replaced with LED fixtures. The LED fixtures were installed within the last three years and are expected to remain viable for the next decade.

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 bell-and-spigot connections. The majority of the supply and drain piping is original. It is recommended that they be replaced as aged piping can cause costly repairs due to unwanted leaks. Three backflow preventers serve the makeup water for the heating hot water system and the water main. The backflow preventers were installed within the last ten years and should be evaluated for replacement within the next five prior to failure.

Domestic hot water is generated through a residential style electric water heater with an associated fractional horsepower circulation pump. At the request of the client, a project was created to convert to gas-fired instantaneous equipment. The cost estimate was provided by the client.

A small modular sump pump in the basement stairwell near B Wing was installed within the last five years. Due to service life depletion and use, it should be expected that it will need to be replaced within the next ten years.

With the exception of the wall-hung urinals most of the fixtures are aging and due for replacement. Wall-hung lavatories and tankless water closets are showing age and should be upgraded as part of the recommended restroom renovation. Mop sinks in the janitor’s closets are original and also due for

upgrade. Older water closets in the partial staff restrooms are also aging and should be updated. The service sink in the D Wing warming kitchen is adequate at this time.

Vertical Transportation

This building has one three-stop and one four-stop hydraulic-controlled passenger elevators with capacities of 3,000 pounds each. The elevators were modernized in 2013 and no issues were observed or reported during the inspection. 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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Date of Inspection

May 12, 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.

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

Facility Condition Index (FCI)

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

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

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

Example: **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.

Example			
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).

Example: **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	5,866,700	0	0	0	0	0	0	0	0	0	0	0	0	$5,866,700
EXTERIOR	0	0	28,966	2,953,640	0	0	0	0	0	0	0	0	0	4,062	$2,986,668
INTERIOR	0	0	0	1,489,399	0	282,407	0	0	150,346	0	149,926	0	0	343,718	$2,415,796
PLUMBING	0	0	200,000	2,754,495	0	0	15,426	0	157,377	0	0	0	680	0	$3,127,978
HVAC	0	0	0	652,861	0	718,803	0	0	2,643,179	0	0	0	0	0	$4,014,844
FIRE/LIFE SAFETY	841,293	89,176	1,397,833	37,851	0	0	454,229	0	0	0	0	0	0	0	$2,820,382
ELECTRICAL	0	0	0	2,618,625	65,489	0	10,596	0	0	0	13,371	0	0	256,931	$2,965,012
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	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	218,431	0	0	0	0	0	0	70,489	0	0	0	0	0	$288,920
SUBTOTAL	$841,293	$6,174,307	$1,626,799	$10,506,872	$65,489	$1,001,210	$480,250	$0	$3,021,391	$0	$163,298	$0	$680	$604,711	$24,486,299
TOTAL NONRECURRING PROJECT NEEDS			$8,642,399	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$15,843,900	

CURRENT REPLACEMENT VALUE	$46,845,000
FACILITY CONDITION NEEDS INDEX	0.52
FACILITY CONDITION INDEX	0.22

GSF	TOTAL 10-YEAR FACILITY RENEWAL NEEDS	10-YEAR NEEDS/SF
118,456	$24,486,299	$206.71

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	$5,866,700	$0	$5,866,700
EXTERIOR	$28,966	$2,957,702	$2,986,668
INTERIOR	$0	$2,415,796	$2,415,796
PLUMBING	$200,000	$2,927,978	$3,127,978
HVAC	$0	$4,014,844	$4,014,844
FIRE/LIFE SAFETY	$2,328,302	$492,079	$2,820,382
ELECTRICAL	$0	$2,965,012	$2,965,012
SITE	$0	$0	$0
VERT. TRANS	$0	$0	$0
HEALTH	$218,431	$70,489	$288,920
TOTALS	**$8,642,399**	**$15,843,900**	**$24,486,299**

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
BREW EW01	WALL, EXTERIOR, MASONRY POINTING	CUT STONE ACCENTS			B2010	Deferred Renewal	125,467
BREW EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK FACADE			B2010	Deferred Renewal	592,675
BREW WN02	GLASS, WINDOW, ALUMINUM OR WOOD, CUSTOM	SINGLE PANE MTL FRAME			B2010	Deferred Renewal	1,889,245
BREW DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			A WING S ENTRY	B2030	Deferred Renewal	5,770
BREW DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			D WING ENTRIES	B2030	Deferred Renewal	8,123
BREW DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			A WING N ENTRIES	B2030	Deferred Renewal	24,370
BREW DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			B WING ENTRIES	B2030	Deferred Renewal	24,370
BREW DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			C WING ENTRIES	B2030	Deferred Renewal	24,370
BREW RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP				B3010	Deferred Renewal	259,248
BREW DR01	DOOR AND FRAME, INTERIOR, NON-RATED	KNOB HDW			C1020	Deferred Renewal	51,951
BREW DR24	DOOR LOCK, COMMERCIAL-GRADE	SERV DRS		B WING	C1020	Deferred Renewal	1,489
BREW DR26	DOOR PANIC HARDWARE			A WING N ENTRIES	C1020	Deferred Renewal	14,619
BREW DR26	DOOR PANIC HARDWARE			B WING ENTRIES	C1020	Deferred Renewal	14,619
BREW DR26	DOOR PANIC HARDWARE			C WING ENTRIES	C1020	Deferred Renewal	14,619
BREW DR26	DOOR PANIC HARDWARE			A WING S ENTRY	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
BREW DR26	DOOR PANIC HARDWARE			D WING ENTRIES	C1020	Deferred Renewal	4,873
BREW DR26	DOOR PANIC HARDWARE	GATES		COURTYARD	C1020	Deferred Renewal	4,873
BREW IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CER WALL TILE			C3010	Deferred Renewal	364,180
BREW IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADES			C3020	Deferred Renewal	115,346
BREW IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE FLOORING			C3020	Deferred Renewal	100,230
BREW IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CER FLR TILE			C3020	Deferred Renewal	481,443
BREW IF09	FLOORING - TERRAZZO RESURFACE	CORR TERRAZZO FLOORING			C3020	Deferred Renewal	51,393
BREW IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		A WING	C3030	Deferred Renewal	267,325
BREW FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FLR MOUNT		JAN CLOS	D2010	Deferred Renewal	23,303
BREW FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		JAN CLOS	D2010	Deferred Renewal	7,794
BREW FX15	PLUMBING FIXTURE - EMERGENCY EYEWASH	EM EYEWASH		D211	D2010	Deferred Renewal	4,685
BREW BF01	BACKFLOW PREVENTER (<=1 INCH)	BFP-MU-1		B109	D2020	Deferred Renewal	1,049
BREW PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	D2020	Deferred Renewal	1,082,587
BREW PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON, BELL AND SPIGOT		THROUGHOUT	D2030	Deferred Renewal	1,635,077
BREW FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-002		ROOF	D3040	Deferred Renewal	7,951

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
BREW FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-003		ROOF	D3040	Deferred Renewal	7,951
BREW FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-004		ROOF	D3040	Deferred Renewal	7,951
BREW FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-6		B109	D3040	Deferred Renewal	2,772
BREW FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-7		B109	D3040	Deferred Renewal	2,772
BREW FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-8			D3040	Deferred Renewal	2,772
BREW FN32	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	EAF-005		ROOF	D3040	Deferred Renewal	5,595
BREW HD01	HOOD, FUME	FH-211		D211	D3040	Deferred Renewal	9,485
BREW HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		B109	D3040	Deferred Renewal	117,632
BREW HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-1		B109	D3040	Deferred Renewal	4,466
BREW HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		B109	D3040	Deferred Renewal	4,466
BREW PH06	PUMP - ELECTRIC (30 - 40 HP)	HWP-1		B109	D3040	Deferred Renewal	49,353
BREW PH07	PUMP - ELECTRIC (40 - 50 HP)	CHWP-1		B109	D3040	Deferred Renewal	32,165
BREW PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		B109	D3040	Deferred Renewal	22,310
BREW AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC-1		B109	D3060	Deferred Renewal	8,971
BREW BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-PNUEM, DDC		THROUGHOUT	D3060	Deferred Renewal	366,251
BREW FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, SIEMENS		B109	D4030	Deferred Renewal	37,851

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
BREW SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	ORIG, 277/480		THROUGHOUT	D5010	Deferred Renewal	2,450,572
BREW SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MSB		B109	D5010	Deferred Renewal	166,076
BREW LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID WP		EXT	D5020	Deferred Renewal	1,977
BREW VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD AHU-B2		B209	D5010	2021	4,764
BREW VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD AHU-B1		B108	D5010	2021	4,764
BREW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-B3		B309	D5010	2021	5,298
BREW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C3, AHU-013		C309	D5010	2021	5,298
BREW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C2, AHU-011		C208	D5010	2021	5,298
BREW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C1, AHU-012		C108	D5010	2021	5,298
BREW VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	VFD AHU-A4		A445	D5010	2021	6,133
BREW VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	VFD AHU-A3		A345	D5010	2021	6,133
BREW VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D1		D116	D5010	2021	7,501
BREW VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D2		D219	D5010	2021	7,501
BREW VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D3		D316	D5010	2021	7,501
BREW IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	2022	282,407
BREW HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, DUCTWORK, ORIG		B, C, D WINGS	D3040	2022	718,803

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
BREW BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-1		B109	D2020	2023	7,713
BREW BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-2		B109	D2020	2023	7,713
BREW FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	2023	454,229
BREW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-A2		A245	D5010	2023	5,298
BREW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-A1, AHU-002		A139	D5010	2023	5,298
BREW IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE FLOORING			C3020	2025	150,346
BREW FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	2025	63,850
BREW FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	2025	93,527
BREW HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, HYDR, ORIG		B, C, D WINGS	D3040	2025	1,654,364
BREW HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, MULTIZONE		A WING	D3040	2025	988,815
BREW SF01	SEATING, FIXED, FOLDING, STANDARD	MOULDED PLASTIC SEATS			E2010	2025	35,245
BREW SF01	SEATING, FIXED, FOLDING, STANDARD	MOULDED PLASTIC SEATS			E2010	2025	35,245
BREW IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	2027	121,028
BREW IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE			C3020	2027	28,898
BREW VF09	VARIABLE FREQUENCY DRIVE (40-50 HP)	VFD HWP-1		B109	D5010	2027	13,371
BREW PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1, B ELEV RM EXT		ELEV PIT	D2030	2029	680

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
BREW DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERV DRS		B WING	B2030	2030	4,062
BREW IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		A, B, C, D WINGS	C3030	2030	343,718
BREW LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LED		SELECT SPACES	D5020	2030	256,931
						TOTAL	**$15,843,900**

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COSTS

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
BREWFS03	RATED CORRIDOR DOOR UPGRADES	C1020	1	Plant Adaption	841,293
BREWAC01	COURTYARD ENTRY ACCESSIBILITY UPGRADES	B2030	2	Plant Adaption	3,929,626
BREWFS04	MAIN ROOF FALL GUARD UPGRADE ALLOWANCE	B3010	2	Plant Adaption	23,368
BREWAC02	A AND B WING LECTURE ROOM ACCESSIBILITY UPGRADES	C1010	2	Plant Adaption	62,951
BREWAC03	INTERIOR DOOR ACCESSIBILITY UPGRADES	C1010	2	Plant Adaption	185,436
BREWFS02	ELEVATOR LOBBY ISOLATION UPGRADES	C1010	2	Plant Adaption	65,809
BREWAC06	STAIR TOWER RAILING UPGRADES	C2020	2	Plant Adaption	54,022
BREWAC05	C AND D WING ELEVATOR INSTALLATIONS	D1010	2	Plant Adaption	664,371
BREWAC04	RESTROOM ACCESSIBILITY UPGRADES	D2010	2	Plant Adaption	970,293
BREWHE01	ASBESTOS ABATEMENT - MECHANICAL SYSTEMS	F2020	2	Plant Adaption	218,431
BREWES01	EXTERIOR CUT STONE REPAIR ALLOWANCE	B2010	3	Corrective Action	28,966
BREWPL01	DOMESTIC HOT WATER CONVERSTION TO GAS-FIRED	D2020	3	Plant Adaption	200,000
BREWFS01	FIRE SPRINKLER SYSTEM INSTALLATION	D4010	3	Plant Adaption	1,397,833
				TOTAL	**$8,642,399**

FACILITY CONDITION ASSESSMENT

SECTION 3

NONRECURRING PROJECT DETAILS

All costs shown as Present Value

RATED CORRIDOR DOOR UPGRADES

Project Number:	BREWFS03	**Category Code:** FS5F	
Priority Sequence:	1		
Priority Class:	Immediate	**System:**	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	**Component:**	EGRESS PATH
Date Basis:	6/21/2021	**Element:**	FIRE DOORS/HARDWARE

Code Application:		Subclass/Savings:	Project Location:
IBC	713	Not Applicable	Floor-wide: Floor(s) 1,2,3,4

Description

Only a few existing corridor doors in areas like the High School/College prep areas have newer fire-rated doors with lever hardware. Replace the remainder of the older doors with new fire-rated flush wood doors with rated metal frames and lever hardware.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Rated door and rated metal frame installation	LEAF	225	$2,278	$512,465	$551	$123,878	$636,343
Base Material/Labor Costs				**$512,465**		**$123,878**	
Indexed Material/Labor Costs				**$516,052**		**$88,325**	**$604,377**
Construction Mark Up at 20.0%							**$120,875**
Original Construction Cost							**$725,252**
Date of Original Estimate: 6/21/2021						**Inflation**	**$0**
Current Year Construction Cost							**$725,252**
Professional Fees at 16.0%							**$116,040**
TOTAL PROJECT COST							**$841,293**

All costs shown as Present Value

ELEVATOR LOBBY ISOLATION UPGRADES

Project Number:	BREWFS02	**Category Code:** FS5C	
Priority Sequence:	2		
Priority Class:	Critical	**System:**	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	**Component:**	EGRESS PATH
Date Basis:	6/21/2021	**Element:**	SEPARATION RATING

Code Application:		Subclass/Savings:	Project Location:
IBC	713	Not Applicable	Undefined: Floor(s) 1,2,3,4

Description

The elevator lobbies for the two existing passenger elevators open into the egress corridors in A and B wings. The lobby should completely separate the elevators from the corridor with rated partitions. Elevator lobbies also need to contain smoke detectors. The construction of fire resistant barriers with automatically closing fire doors is needed between the elevator lobbies and corridors to provide the required separation and protection on all floors.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Rated partition, door assembly, panic hardware, holdbacks, closers, and smoke detector (assumes 208 square feet of rated partition per assembly)	SYS	6	$4,453	$26,721	$4,761	$28,568	$55,288
Base Material/Labor Costs				**$26,721**		**$28,568**	
Indexed Material/Labor Costs				**$26,908**		**$20,369**	**$47,276**
Construction Mark Up at 20.0%							**$9,455**
Original Construction Cost							**$56,732**
Date of Original Estimate: 6/21/2021						**Inflation**	**$0**
Current Year Construction Cost							**$56,732**
Professional Fees at 16.0%							**$9,077**
TOTAL PROJECT COST							**$65,809**

All costs shown as Present Value

MAIN ROOF FALL GUARD UPGRADE ALLOWANCE

Project Number:	BREWFS04	**Category Code:** FS6A	
Priority Sequence:	3		
Priority Class:	Critical	**System:**	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	**Component:**	GENERAL
Date Basis:	6/21/2021	**Element:**	OTHER

Code Application:		Subclass/Savings:	Project Location:
OSHA	29 CFR 1926.500	Not Applicable	Floor-wide: Floor(s) R

Description

Install rooftop hard looped tie-off points for fall protection especially at rooftop equipment near roof perimeters

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Rooftop tie-off point installations for PPE equipment on roofs	EA	24	$325	$7,800	$522	$12,528	$20,328
			Base Material/Labor Costs	**$7,800**		**$12,528**	
			Indexed Material/Labor Costs	**$7,855**		**$8,932**	**$16,787**
					Construction Mark Up at 20.0%		**$3,357**
					Original Construction Cost		**$20,144**
Date of Original Estimate:	6/21/2021				**Inflation**		**$0**
					Current Year Construction Cost		**$20,144**
					Professional Fees at 16.0%		**$3,223**
					TOTAL PROJECT COST		**$23,368**

All costs shown as Present Value

ASBESTOS ABATEMENT - MECHANICAL SYSTEMS

Project Number:	BREWHE01	**Category Code:** HE6B	
Priority Sequence:	4		
Priority Class:	Critical	**System:**	HEALTH
Project Class:	Plant Adaption	**Component:**	HAZARDOUS MATERIAL
Date Basis:	6/4/2021	**Element:**	MECHANICAL ASBESTOS

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

Description

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

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
HVAC system - abate asbestos from utility piping	SF	118,456	$0.24	$28,429	$0.59	$69,889	$98,318
Plumbing system - abate asbestos from supply piping network	SF	118,456	$0.24	$28,429	$0.59	$69,889	$98,318
			Base Material/Labor Costs	**$56,859**		**$139,778**	
			Indexed Material/Labor Costs	**$57,257**		**$99,662**	**$156,919**
					Construction Mark Up at 20.0%		**$31,384**
					Original Construction Cost		**$188,302**
Date of Original Estimate: 6/4/2021					**Inflation**		**$0**
					Current Year Construction Cost		**$188,302**
					Professional Fees at 16.0%		**$30,128**
					TOTAL PROJECT COST		**$218,431**

All costs shown as Present Value

COURTYARD ENTRY ACCESSIBILITY UPGRADES

Project Number:	BREWAC01	**Category Code:** AC2A	
Priority Sequence:	5		
Priority Class:	Critical	**System:**	ACCESSIBILITY
Project Class:	Plant Adaption	**Component:**	BUILDING ENTRY
Date Basis:	6/21/2021	**Element:**	GENERAL

Code Application:		Subclass/Savings:	Project Location:
ADAAG	703.1, 309, 403.6, 505, 410	DOJ1 - Approach & Entrance	Undefined: Floor(s) 1

Description

The central courtyard has a series of steps with no handrails and these site steps will require accessible handrails and at least three wheelchair lifts to improve general accessibility. The main entry doors and the breezeway entry doors on each floor have older, power door assist units that need to be upgraded. Also, these site steps cannot easily be ramped and wheelchair lifts should be installed to make the courtyard more accessible. Additionally, the existing fourth floor A Wing ramps lack a second handrail and accessible flanking railings should be added.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Door operator, signage, and controls	EA	42	$5,003	$210,117	$1,730	$72,674	$282,791
Freestanding handrail system, painted	LF	160	$124	$19,862	$204	$32,688	$52,550
Wall-mounted accessible ramp handrail allowance	LOT	2,000	$1,200	$2,400,000	$48.23	$96,460	$2,496,460
Wheelchair lift/stair climber, conduit, wiring, tools, and supplies	EA	3	$8,883	$26,648	$1.816	$5,448	$32,096
Base Material/Labor Costs				**$2,656,627**		**$207,270**	
Indexed Material/Labor Costs				**$2,675,224**		**$147,784**	**$2,823,007**
Construction Mark Up at 20.0%							**$564,601**
Original Construction Cost							**$3,387,609**
Date of Original Estimate: 6/21/2021						**Inflation**	**$0**
Current Year Construction Cost							**$3,387,609**
Professional Fees at 16.0%							**$542,017**
TOTAL PROJECT COST							**$3,929,626**

All costs shown as Present Value

RESTROOM ACCESSIBILITY UPGRADES

Project Number:	BREWAC04	**Category Code:** AC3E	
Priority Sequence:	6		
Priority Class:	Critical	**System:**	ACCESSIBILITY
Project Class:	Plant Adaption	**Component:**	INTERIOR PATH OF TRAVEL
Date Basis:	6/21/2021	**Element:**	RESTROOMS/BATHROOMS

Code Application:		Subclass/Savings:	Project Location:
ADAAG	211, 602, 309, 603, 604, 605, 606, 607, 608	DOJ3 - Restrooms	Floor-wide: Floor(s) 1,2,3,4

Description

With the exception of the first floor restrooms in A wing, all of the restrooms have aging nonaccessible fixtures and older restroom accessories and finishes. Upgrade these restrooms with new accessible fixtures and accessories and finishes. The new accessible layouts will require restroom expansion to avoid the reduction of total building fixture counts. Also, the two accessible first floor restrooms have older finishes and should also be renovated as part of this project. Additionally, the water fountains throughout the building are a mixture of older nonaccessible units and some newer partially accessible units. Replace all of these fountains with new accessible dual-level fountain units set in the same corridor alcoves.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Door operator, signage, and controls	EA	26	$5,003	$130,072	$1,730	$44,989	$175,061
Grab bars (per stall)	SYS	26	$193	$5,016	$454	$11,804	$16,820
Mirror	EA	26	$397	$10,328	$305	$7,931	$18,259
ADA-compliant signage	EA	26	$72.36	$1,881	$21.28	$553	$2,435
ADA-compliant lavatory	EA	26	$838	$21,776	$312	$8,107	$29,883
ADA-compliant toilet	EA	26	$1,316	$34,207	$348	$9,039	$43,246
High density polymer toilet partition modification	EA	26	$2,199	$57,175	$1,362	$35,412	$92,587
Interior non-load bearing wall expansion allowance	EA	26	$4,500	$117,000	$11,250	$292,500	$409,500
Dual-level drinking fountain	EA	12	$1,657	$19,885	$509	$6,112	$25,997
			Base Material/Labor Costs	**$397,341**		**$416,447**	
			Indexed Material/Labor Costs	**$400,123**		**$296,927**	**$697,050**
					Construction Mark Up at 20.0%		**$139,410**
					Original Construction Cost		**$836,460**
Date of Original Estimate:	6/21/2021				**Inflation**		**$0**
					Current Year Construction Cost		**$836,460**
					Professional Fees at 16.0%		**$133,834**
					TOTAL PROJECT COST		**$970,293**

All costs shown as Present Value

A AND B WING LECTURE ROOM ACCESSIBILITY UPGRADES

Project Number:	BREWAC02	**Category Code:** AC3B	
Priority Sequence:	7		
Priority Class:	Critical	**System:**	ACCESSIBILITY
Project Class:	Plant Adaption	**Component:**	INTERIOR PATH OF TRAVEL
Date Basis:	6/21/2021	**Element:**	STAIRS AND RAILINGS

Code Application:		Subclass/Savings:	Project Location:
ADAAG	219.3, 706.1, 806, 505	DOJ2 - Access to Goods & Services	Undefined: Floor(s) 1

Description

The two first floor lecture rooms lack assistive listening capability and the rear tiered seating and front stage areas lack accessibility. Install an assistive listening system. Also, install accessible side aisle handrails at the tiered seating and a wheelchair lift for the raised stage area of the east lecture room.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Infrared transmitter and headphone receiver sets	SYS	2	$2,071	$4,143	$1,816	$3,632	$7,775
Stage wheelchair lift	SYS	2	$9,931	$19,862	$5,675	$11,350	$31,212
Wall-mounted handrail system, painted	LF	100	$68.81	$6,881	$48.23	$4,823	$11,704
			Base Material/Labor Costs	**$30,886**		**$19,805**	
			Indexed Material/Labor Costs	**$31,102**		**$14,121**	**$45,223**
						Construction Mark Up at 20.0%	**$9,045**
						Original Construction Cost	**$54,268**
Date of Original Estimate: 6/21/2021						**Inflation**	**$0**
						Current Year Construction Cost	**$54,268**
						Professional Fees at 16.0%	**$8,683**
						TOTAL PROJECT COST	**$62,951**

All costs shown as Present Value

C AND D WING ELEVATOR INSTALLATIONS

Project Number:	BREWAC05	**Category Code:** AC3A	
Priority Sequence:	8		
Priority Class:	Critical	**System:**	ACCESSIBILITY
Project Class:	Plant Adaption	**Component:**	INTERIOR PATH OF TRAVEL
Date Basis:	6/21/2021	**Element:**	LIFTS/RAMPS/ELEVATORS

Code Application:		Subclass/Savings:	Project Location:
ASME	A17.1	DOJ2 - Access to Goods & Services	Undefined: Floor(s) 1
ADAAG	407		

Description

Due to the configuration of each wing, it is recommended that two additional accessible passenger elevators be installed to directly serve C and D wings.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Elevator installation, hydraulic	SYS	2	$98,461	$196,921	$54,905	$109,811	$306,732
Each additional stop	FLR	4	$22,700	$90,799	$38,306	$153,224	$244,023
Base Material/Labor Costs				**$287,721**		**$263,034**	
Indexed Material/Labor Costs				**$289,735**		**$187,544**	**$477,278**
Construction Mark Up at 20.0%							**$95,456**
Original Construction Cost							**$572,734**
Date of Original Estimate: 6/21/2021						**Inflation**	**$0**
Current Year Construction Cost							**$572,734**
Professional Fees at 16.0%							**$91,637**
TOTAL PROJECT COST							**$664,371**

All costs shown as Present Value

INTERIOR DOOR ACCESSIBILITY UPGRADES

Project Number:	BREWAC03	**Category Code:** AC3C	
Priority Sequence:	9		
Priority Class:	Critical	**System:**	ACCESSIBILITY
Project Class:	Plant Adaption	**Component:**	INTERIOR PATH OF TRAVEL
Date Basis:	6/21/2021	**Element:**	DOORS AND HARDWARE

Code Application:		Subclass/Savings:	Project Location:
ADAAG	309.4	DOJ2 - Access to Goods & Services	Floor-wide: Floor(s) 1,2,3,4

Description

The older interior corridor and standard doors lack accessibility and are recommended for replacement. If these doors are not replaced in the near future, then they should be fitted with new lever hardware sets.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Lever actuated door hardware	EA	249	$414	$103,059	$166	$41,284	$144,343
Base Material/Labor Costs				**$103,059**		**$41,284**	
Indexed Material/Labor Costs				**$103,780**		**$29,436**	**$133,216**
Construction Mark Up at 20.0%							**$26,643**
Original Construction Cost							**$159,859**
Date of Original Estimate: 6/21/2021						**Inflation**	**$0**
Current Year Construction Cost							**$159,859**
Professional Fees at 16.0%							**$25,577**
TOTAL PROJECT COST							**$185,436**

All costs shown as Present Value

STAIR TOWER RAILING UPGRADES

Project Number:	BREWAC06	**Category Code:** AC3B	
Priority Sequence:	10		
Priority Class:	Critical	**System:**	ACCESSIBILITY
Project Class:	Plant Adaption	**Component:**	INTERIOR PATH OF TRAVEL
Date Basis:	6/21/2021	**Element:**	STAIRS AND RAILINGS

Code Application:		Subclass/Savings:	Project Location:
IBC	1003.3	DOJ2 - Access to Goods & Services	Floor-wide: Floor(s) 1,2,3,4
ADAAG	505		

Description

Both the inner and outer railing on all breezeway stair towers lack accessibility and should be upgraded with new railing designs.
Install new railings that have proper graspability and picket spacing on both sides of each stair run.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Wall-mounted handrail system per floor	FLR	10	$780	$7,803	$709	$7,094	$14,897
Switchback handrail/guardrail system per floor	FLR	10	$1,768	$17,678	$1,135	$11,350	$29,027
			Base Material/Labor Costs	**$25,481**		**$18,444**	
			Indexed Material/Labor Costs	**$25,659**		**$13,150**	**$38,809**
					Construction Mark Up at 20.0%		**$7,762**
					Original Construction Cost		**$46,571**
Date of Original Estimate: 6/21/2021					**Inflation**		**$0**
					Current Year Construction Cost		**$46,571**
					Professional Fees at 16.0%		**$7,451**
					TOTAL PROJECT COST		**$54,022**

All costs shown as Present Value

FIRE SPRINKLER SYSTEM INSTALLATION

Project Number:	BREWFS01	**Category Code:** FS3A	
Priority Sequence:	11		
Priority Class:	Noncritical	**System:**	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	**Component:**	SUPPRESSION
Date Basis:	6/4/2021	**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	Qnty	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	118,456	$4.51	$534,237	$5.52	$653,877	$1,188,114
			Base Material/Labor Costs	**$534,237**		**$653,877**	
			Indexed Material/Labor Costs	**$537,976**		**$466,214**	**$1,004,191**
					Construction Mark Up at 20.0%		**$200,838**
					Original Construction Cost		**$1,205,029**
Date of Original Estimate: 6/4/2021					**Inflation**		**$0**
					Current Year Construction Cost		**$1,205,029**
					Professional Fees at 16.0%		**$192,805**
					TOTAL PROJECT COST		**$1,397,833**

All costs shown as Present Value

EXTERIOR CUT STONE REPAIR ALLOWANCE

Project Number:	BREWES01	**Category Code:** ES2B	
Priority Sequence:	12		
Priority Class:	Noncritical	**System:**	EXTERIOR
Project Class:	Corrective Action	**Component:**	COLUMNS/BEAMS/WALLS
Date Basis:	6/21/2021	**Element:**	FINISH

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Building-wide: Floor(s) 1

Description

A number of cut stone panels are heavily weathered and several cut stone passive solar screens on the exterior windows are damaged or broken. Repair or replace damaged cut stone panels around the building to help improve general appearances.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Repair premium face stone wall (marble, granite, select quarry stones)	SF	200	$78.56	$15,712	$34.97	$6,994	$22,706
			Base Material/Labor Costs	**$15,712**		**$6,994**	
			Indexed Material/Labor Costs	**$15,822**		**$4,987**	**$20,809**
						Construction Mark Up at 20.0%	**$4,162**
						Original Construction Cost	**$24,970**
Date of Original Estimate:	6/21/2021					**Inflation**	**$0**
						Current Year Construction Cost	**$24,970**
						Professional Fees at 16.0%	**$3,995**
						TOTAL PROJECT COST	**$28,966**

All costs shown as Present Value

DOMESTIC HOT WATER CONVERSTION TO GAS-FIRED

Project Number:	BREWPL01	**Category Code:** PL1E	
Priority Sequence:	13		
Priority Class:	Noncritical	**System:**	PLUMBING
Project Class:	Plant Adaption	**Component:**	DOMESTIC WATER
Date Basis:	5/12/2021	**Element:**	HEATING

Code Application:	Subclass/Savings:	Project Location:
Not Applicable	Not Applicable	Undefined: Floor(s) 1

Description

The building currently utilizes an electric water heater. At the request of the client, a project has been created to convert to gas-fired equipment. The client provided an estimate of $200,000.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Convert electric water heater to gas-fired	EA	1	$45,000	$45,000	$155,000	$155,000	$200,000
Base Material/Labor Costs				**$45,000**		**$155,000**	
Indexed Material/Labor Costs				**$45,000**		**$155,000**	**$200,000**
No GCM Required							**$0**
Original Construction Cost							**$200,000**
Date of Original Estimate: 5/12/2021						**Inflation**	**$0**
Current Year Construction Cost							**$200,000**
No Professional Fees Required							**$0**
TOTAL PROJECT COST							**$200,000**

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 FACADE			61,730	SF	1.25	$592,675	1990	30		DR
EW01	WALL, EXTERIOR, MASONRY POINTING	CUT STONE ACCENTS			10,890	SF	1.50	$125,467	1990	30		DR
WN02	GLASS, WINDOW, ALUMINUM OR WOOD, CUSTOM	SINGLE PANE MTL FRAME			7,180	SF	1.25	$1,889,245	1970	40	10	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			A WING S ENTRY	2	LEAF	1.00	$5,770	1990	25	5	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	GATES		COURTYARD	4	LEAF	1.00	$8,123	2000	40		2040
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			A WING N ENTRIES	12	LEAF	1.00	$24,370	1970	40	10	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			B WING ENTRIES	12	LEAF	1.00	$24,370	1970	40	10	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERV DRS		B WING	2	LEAF	1.00	$4,062	1990	40		2030
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			C WING ENTRIES	12	LEAF	1.00	$24,370	1970	40	10	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			D WING ENTRIES	4	LEAF	1.00	$8,123	1970	40	10	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			A WING 4TH FLR	4	LEAF	1.00	$8,123	2015	40		2055
DR28	DOOR OPERATOR, POWER-ASSIST			A WING 4TH FLR	4	EA	1.00	$34,916	2015	20		2035
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP				38,335	SF	1.00	$259,248	1993	20	7	DR
DR01	DOOR AND FRAME, INTERIOR, NON-RATED	KNOB HDW			24	LEAF	1.00	$51,951	1970	40	10	DR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED			CORRIDORS	30	LEAF	1.00	$112,159	2015	40		2055

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
DR24	DOOR LOCK, COMMERCIAL-GRADE			CORRIDORS	30	EA	1.00	$22,339	2015	20		2035
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERV DRS		B WING	2	EA	1.00	$1,489	1990	20	10	DR
DR26	DOOR PANIC HARDWARE	GATES		COURTYARD	4	EA	1.00	$4,873	2000	20		DR
DR26	DOOR PANIC HARDWARE			A WING S ENTRY	2	EA	1.00	$2,437	1990	20	10	DR
DR26	DOOR PANIC HARDWARE			A WING N ENTRIES	12	EA	1.00	$14,619	1970	20	30	DR
DR26	DOOR PANIC HARDWARE			B WING ENTRIES	12	EA	1.00	$14,619	1970	20	30	DR
DR26	DOOR PANIC HARDWARE			C WING ENTRIES	12	EA	1.00	$14,619	1970	20	30	DR
DR26	DOOR PANIC HARDWARE			D WING ENTRIES	4	EA	1.00	$4,873	1970	20	30	DR
DR26	DOOR PANIC HARDWARE			A WING 4TH FLR	4	EA	1.00	$4,873	2015	20		2035
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			126,190	SF	1.00	$282,407	2010	12		2022
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			54,080	SF	1.00	$121,028	2015	12		2027
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CER WALL TILE			9,490	SF	1.00	$364,180	1990	30		DR
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADES			9,420	SF	1.00	$115,346	2000	12	8	DR
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE			2,360	SF	1.00	$28,898	2015	12		2027
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE FLOORING			23,460	SF	1.00	$150,346	2005	20		2025

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
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE FLOORING			13,040	SF	1.00	$83,568	2015	20		2035
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE FLOORING			15,640	SF	1.00	$100,230	1990	20	10	DR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CER FLR TILE			15,140	SF	1.00	$481,443	1990	30		DR
IF09	FLOORING - TERRAZZO RESURFACE	CORR TERRAZZO FLOORING			5,050	SF	1.00	$51,393	1970	50		DR
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		A & B WING	7,570	SF	1.00	$76,393	2015	30		2045
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		D WING	7,570	SF	1.00	$76,393	2021	30		2051
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		A WING	26,490	SF	1.00	$267,325	1990	30		DR
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		A, B, C, D WINGS	34,060	SF	1.00	$343,718	2005	30	-5	2030
IC04	CEILING FINISH - PAINTED OR STAINED, STANDARD	PT CLGS			8,410	SF	1.00	$18,821	2010	24		2034
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV B		B117	1	EA	1.00	$302,064	2013	25		2038
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV A		B117	1	EA	1.00	$302,064	2013	25		2038
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV A			1	EA	1.00	$53,265	2013	12	7	2032
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV B			1	EA	1.00	$53,265	2013	12	7	2032
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	48	EA	1.00	$63,850	1990	35		2025
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FLR MOUNT		JAN CLOS	13	EA	1.00	$23,303	1970	35		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
FX10	PLUMBING FIXTURE - URINAL	PC		RRS	23	EA	1.00	$48,712	2010	35		2045
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		JAN CLOS	4	EA	1.00	$7,794	1970	35		DR
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	48	EA	1.00	$93,527	1990	35		2025
FX15	PLUMBING FIXTURE - EMERGENCY EYEWASH	EM EYEWASH		D211	1	EA	1.00	$4,685	1970	35	15	DR
BF01	BACKFLOW PREVENTER (<=1 INCH)	BFP-MU-1		B109	1	EA	1.00	$1,049	2010	10		DR
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-1		B109	1	EA	1.00	$7,713	2013	10		2023
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-2		B109	1	EA	1.00	$7,713	2013	10		2023
PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	118,456	SF	0.94	$1,082,587	1970	35	15	DR
PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON, BELL AND SPIGOT		THROUGHOUT	118,456	SF	0.94	$1,635,077	1970	40	10	DR
PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1, B ELEV RM EXT		ELEV PIT	1	EA	1.00	$680	2018	20	-9	2029
HU17	DUCTLESS DX SPLIT SYSTEM (<=1 TON)	CU-1		EXT	1	TON	1.00	$2,769	2013	23		2036
AH06	AIR HANDLING UNIT - INDOOR (6-9 HP)	AHU-B2, AHU-005, 2010 COIL & MTR REPL		B209	7.50	HP	1.00	$55,834	1970	25	37	2032
AH06	AIR HANDLING UNIT - INDOOR (6-9 HP)	AHU-B1, 2010 COIL & MTR REPL		B108	7.50	HP	1.00	$55,834	1970	25	37	2032
AH06	AIR HANDLING UNIT - INDOOR (6-9 HP)	AHU-D1, 2010 COIL & MTR REPL		D116	7.50	HP	1.00	$55,834	1970	25	37	2032

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
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	AHU-C3, AHU-013, 2010 COIL & MTR REPL		C309	10	HP	1.00	$81,604	1970	25	37	2032
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	AHU-C2, AHU-011, 2010 COIL & MTR REPL		C208	10	HP	1.00	$81,604	1970	25	37	2032
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	AHU-C1, AHU-012, 2010 COIL & MTR REPL		C108	10	HP	1.00	$81,604	1970	25	37	2032
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	AHU-A2, 2010 COIL & MTR REPL		A245	10	HP	1.00	$81,604	1970	25	37	2032
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	AHU-A1, AHU-002, 2010 COIL & MTR REPL		A139	10	HP	1.00	$81,604	1970	25	37	2032
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	AHU-B3, 2010 COILS & MTR REPL		B309	10	HP	1.00	$81,604	1970	25	37	2032
AH08	AIR HANDLING UNIT - INDOOR (12-17 HP)	AHU-A4, 2010 COIL & MTR REPL		A445	15	HP	1.00	$103,428	1970	25	37	2032
AH08	AIR HANDLING UNIT - INDOOR (12-17 HP)	AHU-A3, 2010 COIL & MTR REPL		A345	15	HP	1.00	$103,428	1970	25	37	2032
AH09	AIR HANDLING UNIT - INDOOR (17-23 HP)	AHU-D2, 2010 COIL & MTR REPL		D219	20	HP	1.00	$130,263	1970	25	37	2032
AH09	AIR HANDLING UNIT - INDOOR (17-23 HP)	AHU-D3, 2010 COIL & MTR REPL		D316	20	HP	1.00	$130,263	1970	25	37	2032
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-001		ROOF	1	EA	1.00	$7,951	2013	20		2033
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-002		ROOF	1	EA	1.00	$7,951	1970	20	30	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-003		ROOF	1	EA	1.00	$7,951	1970	20	30	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
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-004		ROOF	1	EA	1.00	$7,951	1970	20	30	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-6		B109	1	HP	1.00	$2,772	1970	20	30	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-7		B109	1	HP	1.00	$2,772	1970	20	30	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-8			1	HP	1.00	$2,772	1970	20	30	DR
FN32	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	EAF-005		ROOF	1	HP	1.00	$5,595	1995	20	5	DR
HD01	HOOD, FUME	FH-211		D211	4	LF	1.00	$9,485	1995	20	5	DR
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	DUAL DUCT CONV TO VAV		B, C, D WINGS	35,536	SF	0.42	$479,184	1970	40	25	2035
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, DUCTWORK, ORIG		B, C, D WINGS	53,306	SF	0.42	$718,803	1970	40	12	2022
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, MULTIZONE		A WING	29,614	SF	1.04	$988,815	1970	40	15	2025
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, HYDR, ORIG		B, C, D WINGS	88,842	SF	0.58	$1,654,364	1970	40	15	2025
HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		B109	800	GPM	1.00	$117,632	1970	35	15	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-1		B109	1	EA	1.00	$4,466	1995	20	5	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		B109	1	EA	1.00	$4,466	1995	20	5	DR
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		B109	1	HP	1.00	$1,645	2018	25		2043
PH06	PUMP - ELECTRIC (30 - 40 HP)	HWP-1		B109	50	HP	1.00	$49,353	1995	25		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
PH07	PUMP - ELECTRIC (40 - 50 HP)	CHWP-1		B109	40	HP	1.00	$32,165	1995	25		DR
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		B109	3	HP	1.00	$22,310	1970	20	30	DR
AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC-1		B109	5	HP	1.00	$8,971	1995	20	5	DR
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	DDC, 2018-CONV DUAL TO VAV		THROUGHOUT	41,491	SF	1.02	$209,782	2018	18	-5	2031
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-PNUEM, DDC		THROUGHOUT	76,965	SF	0.96	$366,251	1970	18	32	DR
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, SIEMENS		B109	1	EA	1.00	$37,851	2005	15		DR
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	118,456	SF	0.94	$454,229	2005	18		2023
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	ORIG, 277/480		THROUGHOUT	118,456	SF	0.94	$2,450,572	1970	40	10	DR
SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MSB		B109	2,000	AMP	1.00	$166,076	1970	20	30	DR
TX19	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (750-1000 KVA)	TX BREWSTER		EXT	1,000	KVA	1.00	$102,993	2006	35		2041
VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD AHU-B2		B209	7.50	HP	1.00	$4,764	2009	12		2021
VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD AHU-B1		B108	7.50	HP	1.00	$4,764	2009	12		2021
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C3, AHU-013		C309	10	HP	1.00	$5,298	2009	12		2021
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C2, AHU-011		C208	10	HP	1.00	$5,298	2009	12		2021
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C1, AHU-012		C108	10	HP	1.00	$5,298	2009	12		2021

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
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-B3		B309	10	HP	1.00	$5,298	2009	12		2021
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-A2		A245	10	HP	1.00	$5,298	2011	12		2023
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-A1, AHU-002		A139	10	HP	1.00	$5,298	2011	12		2023
VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	VFD AHU-A4		A445	15	HP	1.00	$6,133	2009	12		2021
VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	VFD AHU-A3		A345	15	HP	1.00	$6,133	2009	12		2021
VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D1		D116	20	HP	1.00	$7,501	2009	12		2021
VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D2		D219	20	HP	1.00	$7,501	2009	12		2021
VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D3		D316	20	HP	1.00	$7,501	2009	12		2021
VF09	VARIABLE FREQUENCY DRIVE (40-50 HP)	VFD HWP-1		B109	50	HP	1.00	$13,371	2011	16		2027
LE04	LIGHTING - EXTERIOR, STANCHION LUMINAIRE, 12-FOOT	PM LED FIX		EXT	2	EA	1.00	$4,365	2016	15		2031
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	LED SCONCE		EXT	32	EA	1.00	$31,629	2016	15		2031
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID WP		EXT	2	EA	1.00	$1,977	2005	15		DR
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	ENERGY RETRO T8		MAJ OF SPACES	94,764	SF	1.07	$1,027,681	2016	20		2036
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LED		SELECT SPACES	23,692	SF	1.07	$256,931	2016	20	-6	2030
GN02	GENERATOR - DIESEL (<30-100KW)	EGEN		EXT	50	KW	1.00	$50,855	2005	25	2	2032

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
GN15	SWITCH - AUTO TRANSFER, 480 V (100-400 AMP)	ATS-1		B109	150	AMP	1.00	$6,167	2005	25	2	2032
SF01	SEATING, FIXED, FOLDING, STANDARD	MOULDED PLASTIC SEATS			100	EA	1.00	$35,245	1990	40	-5	2025
SF01	SEATING, FIXED, FOLDING, STANDARD	MOULDED PLASTIC SEATS			100	EA	1.00	$35,245	1990	40	-5	2025
								Grand Total:	**$20,098,506**			

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 FACADE			B2010	61,730	SF	$592,675	DR
EW01	WALL, EXTERIOR, MASONRY POINTING	CUT STONE ACCENTS			B2010	10,890	SF	$125,467	DR
WN02	GLASS, WINDOW, ALUMINUM OR WOOD, CUSTOM	SINGLE PANE MTL FRAME			B2010	7,180	SF	$1,889,245	DR
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			A WING S ENTRY	B2030	2	LEAF	$5,770	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			A WING N ENTRIES	B2030	12	LEAF	$24,370	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			B WING ENTRIES	B2030	12	LEAF	$24,370	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			C WING ENTRIES	B2030	12	LEAF	$24,370	DR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			D WING ENTRIES	B2030	4	LEAF	$8,123	DR
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP				B3010	38,335	SF	$259,248	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERV DRS		B WING	C1020	2	EA	$1,489	DR
DR26	DOOR PANIC HARDWARE	GATES		COURTYARD	C1020	4	EA	$4,873	DR
DR26	DOOR PANIC HARDWARE			A WING S ENTRY	C1020	2	EA	$2,437	DR

RECURRING NEEDS BY YEAR

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

DR26	DOOR PANIC HARDWARE			A WING N ENTRIES	C1020	12	EA	$14,619	DR
DR26	DOOR PANIC HARDWARE			B WING ENTRIES	C1020	12	EA	$14,619	DR
DR26	DOOR PANIC HARDWARE			C WING ENTRIES	C1020	12	EA	$14,619	DR
DR26	DOOR PANIC HARDWARE			D WING ENTRIES	C1020	4	EA	$4,873	DR
DR01	DOOR AND FRAME, INTERIOR, NON-RATED	KNOB HDW			C1020	24	LEAF	$51,951	DR
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CER WALL TILE			C3010	9,490	SF	$364,180	DR
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADES			C3020	9,420	SF	$115,346	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE FLOORING			C3020	15,640	SF	$100,230	DR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CER FLR TILE			C3020	15,140	SF	$481,443	DR
IF09	FLOORING - TERRAZZO RESURFACE	CORR TERRAZZO FLOORING			C3020	5,050	SF	$51,393	DR
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		A WING	C3030	26,490	SF	$267,325	DR
FX15	PLUMBING FIXTURE - EMERGENCY EYEWASH	EM EYEWASH		D211	D2010	1	EA	$4,685	DR
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FLR MOUNT		JAN CLOS	D2010	13	EA	$23,303	DR
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		JAN CLOS	D2010	4	EA	$7,794	DR

RECURRING NEEDS BY YEAR

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

PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	D2020	118,456	SF	$1,082,587	DR
BF01	BACKFLOW PREVENTER (<=1 INCH)	BFP-MU-1		B109	D2020	1	EA	$1,049	DR
PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON, BELL AND SPIGOT		THROUGHOUT	D2030	118,456	SF	$1,635,077	DR
HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		B109	D3040	800	GPM	$117,632	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-1		B109	D3040	1	EA	$4,466	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		B109	D3040	1	EA	$4,466	DR
PH06	PUMP - ELECTRIC (30 - 40 HP)	HWP-1		B109	D3040	50	HP	$49,353	DR
PH07	PUMP - ELECTRIC (40 - 50 HP)	CHWP-1		B109	D3040	40	HP	$32,165	DR
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		B109	D3040	3	HP	$22,310	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-002		ROOF	D3040	1	EA	$7,951	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-003		ROOF	D3040	1	EA	$7,951	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EAF-004		ROOF	D3040	1	EA	$7,951	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-6		B109	D3040	1	HP	$2,772	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-7		B109	D3040	1	HP	$2,772	DR

RECURRING NEEDS BY YEAR

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

FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-8			D3040	1	HP	$2,772	DR
FN32	FAN - UTILITY SET, 1/4" SP (.4-1.25 HP)	EAF-005		ROOF	D3040	1	HP	$5,595	DR
HD01	HOOD, FUME	FH-211		D211	D3040	4	LF	$9,485	DR
AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC-1		B109	D3060	5	HP	$8,971	DR
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-PNUEM, DDC		THROUGHOUT	D3060	76,965	SF	$366,251	DR
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, SIEMENS		B109	D4030	1	EA	$37,851	DR
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	ORIG, 277/480		THROUGHOUT	D5010	118,456	SF	$2,450,572	DR
SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MSB		B109	D5010	2,000	AMP	$166,076	DR
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID WP		EXT	D5020	2	EA	$1,977	DR
					TOTAL DEFERRED RENEWAL COST			**$10,506,871.80**	

RECURRING NEEDS BY YEAR

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

2021									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-B3		B309	D5010	10	HP	$5,298	2021
VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD AHU-B2		B209	D5010	7.50	HP	$4,764	2021
VF02	VARIABLE FREQUENCY DRIVE (5-7.5 HP)	VFD AHU-B1		B108	D5010	7.50	HP	$4,764	2021
VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D1		D116	D5010	20	HP	$7,501	2021
VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D2		D219	D5010	20	HP	$7,501	2021
VF05	VARIABLE FREQUENCY DRIVE (15-20 HP)	VFD AHU-D3		D316	D5010	20	HP	$7,501	2021
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C3, AHU-013		C309	D5010	10	HP	$5,298	2021
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C2, AHU-011		C208	D5010	10	HP	$5,298	2021
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-C1, AHU-012		C108	D5010	10	HP	$5,298	2021
VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	VFD AHU-A4		A445	D5010	15	HP	$6,133	2021
VF04	VARIABLE FREQUENCY DRIVE (10-15 HP)	VFD AHU-A3		A345	D5010	15	HP	$6,133	2021
					2021 PROJECTED COMPONENT REPLACEMENT COST			$65,488.91	

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	126,190	SF	$290,879	2022
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, DUCTWORK, ORIG		B, C, D WINGS	D3040	53,306	SF	$740,367	2022
						2022 PROJECTED COMPONENT REPLACEMENT COST		$1,031,246.65	

2023									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-1		B109	D2020	1	EA	$8,182	2023
BF03	BACKFLOW PREVENTER (2-3 INCHES)	BFP-WM-2		B109	D2020	1	EA	$8,182	2023
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	118,456	SF	$481,891	2023
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-A2		A245	D5010	10	HP	$5,621	2023

RECURRING NEEDS BY YEAR

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

VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-A1, AHU-002		A139	D5010	10	HP	$5,621	2023
2023 PROJECTED COMPONENT REPLACEMENT COST								**$509,497.23**	

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

2025									
COMP CODE	**COMPONENT DESCRIPTION**	**IDENTIFIER**	**CUSTOMER ID**	**LOCATION**	**UNI-FORMAT**	**QTY**	**UNITS**	**REPLACEMENT COST**	**YEAR**
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL TILE FLOORING			C3020	23,460	SF	$169,215	2025
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	48	EA	$71,864	2025
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	48	EA	$105,266	2025
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, MULTIZONE		A WING	D3040	29,614	SF	$1,112,920	2025
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, HYDR, ORIG		B, C, D WINGS	D3040	88,842	SF	$1,862,001	2025

RECURRING NEEDS BY YEAR

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

SF01	SEATING, FIXED, FOLDING, STANDARD	MOULDED PLASTIC SEATS			E2010	100	EA	$39,668	2025
SF01	SEATING, FIXED, FOLDING, STANDARD	MOULDED PLASTIC SEATS			E2010	100	EA	$39,668	2025
						2025 PROJECTED COMPONENT REPLACEMENT COST		**$3,400,601.98**	

No Projected Component Replacement Cost for Asset No. BREW for 2026

2027									
COMP CODE	**COMPONENT DESCRIPTION**	**IDENTIFIER**	**CUSTOMER ID**	**LOCATION**	**UNI-FORMAT**	**QTY**	**UNITS**	**REPLACEMENT COST**	**YEAR**
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	54,080	SF	$144,514	2027
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE			C3020	2,360	SF	$34,506	2027
VF09	VARIABLE FREQUENCY DRIVE (40-50 HP)	VFD HWP-1		B109	D5010	50	HP	$15,966	2027
						2027 PROJECTED COMPONENT REPLACEMENT COST		**$194,985.92**	

RECURRING NEEDS BY YEAR

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

No Projected Component Replacement Cost for Asset No. BREW for 2028

2029									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1, B ELEV RM EXT		ELEV PIT	D2030	1	EA	$861	2029
						2029 PROJECTED COMPONENT REPLACEMENT COST		$860.90	

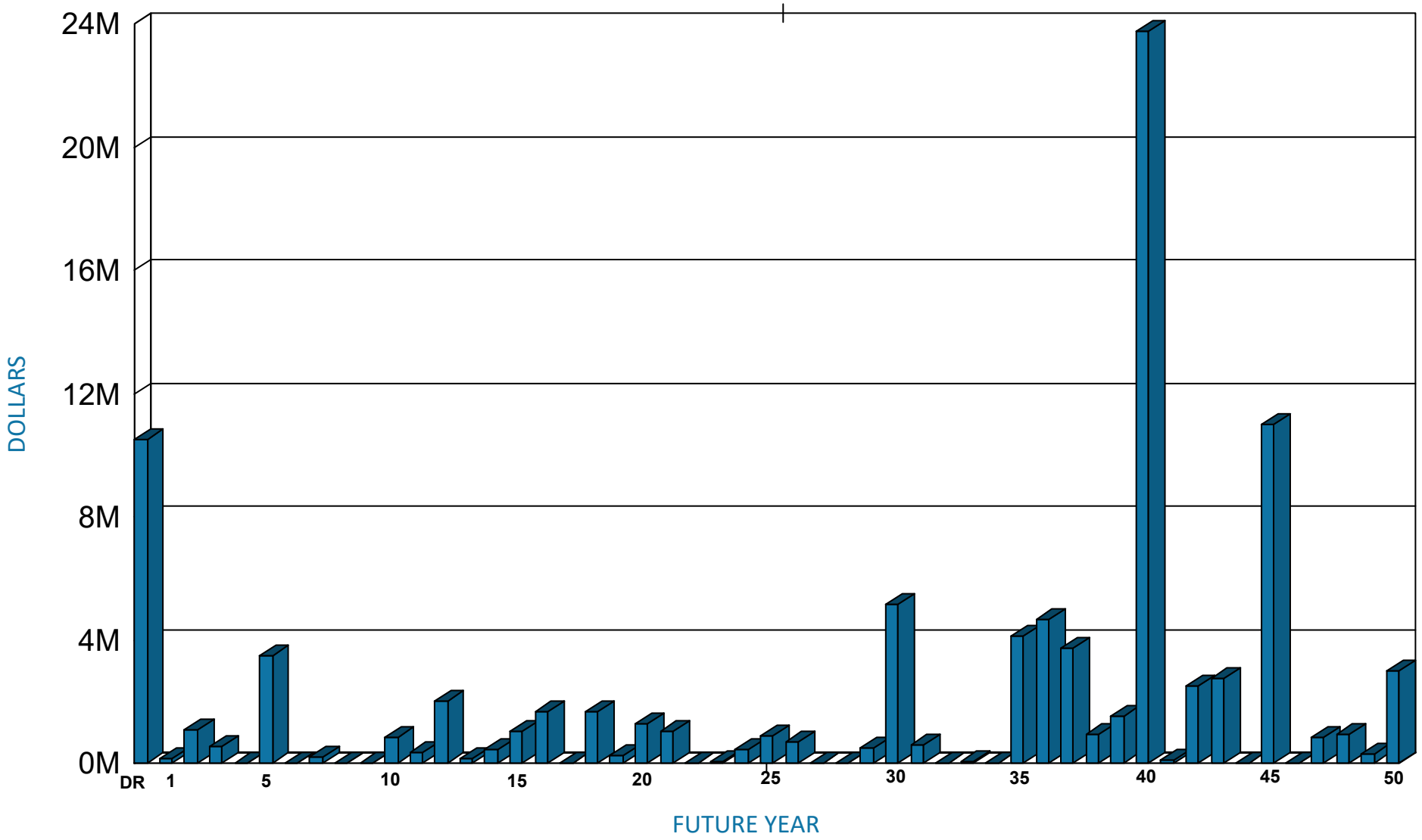
2030									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERV DRS		B WING	B2030	2	LEAF	$5,300	2030

RECURRING NEEDS BY YEAR

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

IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS CLG		A, B, C, D WINGS	C3030	34,060	SF	$448,475	2030
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LED		SELECT SPACES	D5020	23,692	SF	$335,237	2030
					2030 PROJECTED COMPONENT REPLACEMENT COST			**$789,011.16**	

RECURRING COMPONENT EXPENDITURE PROJECTIONS

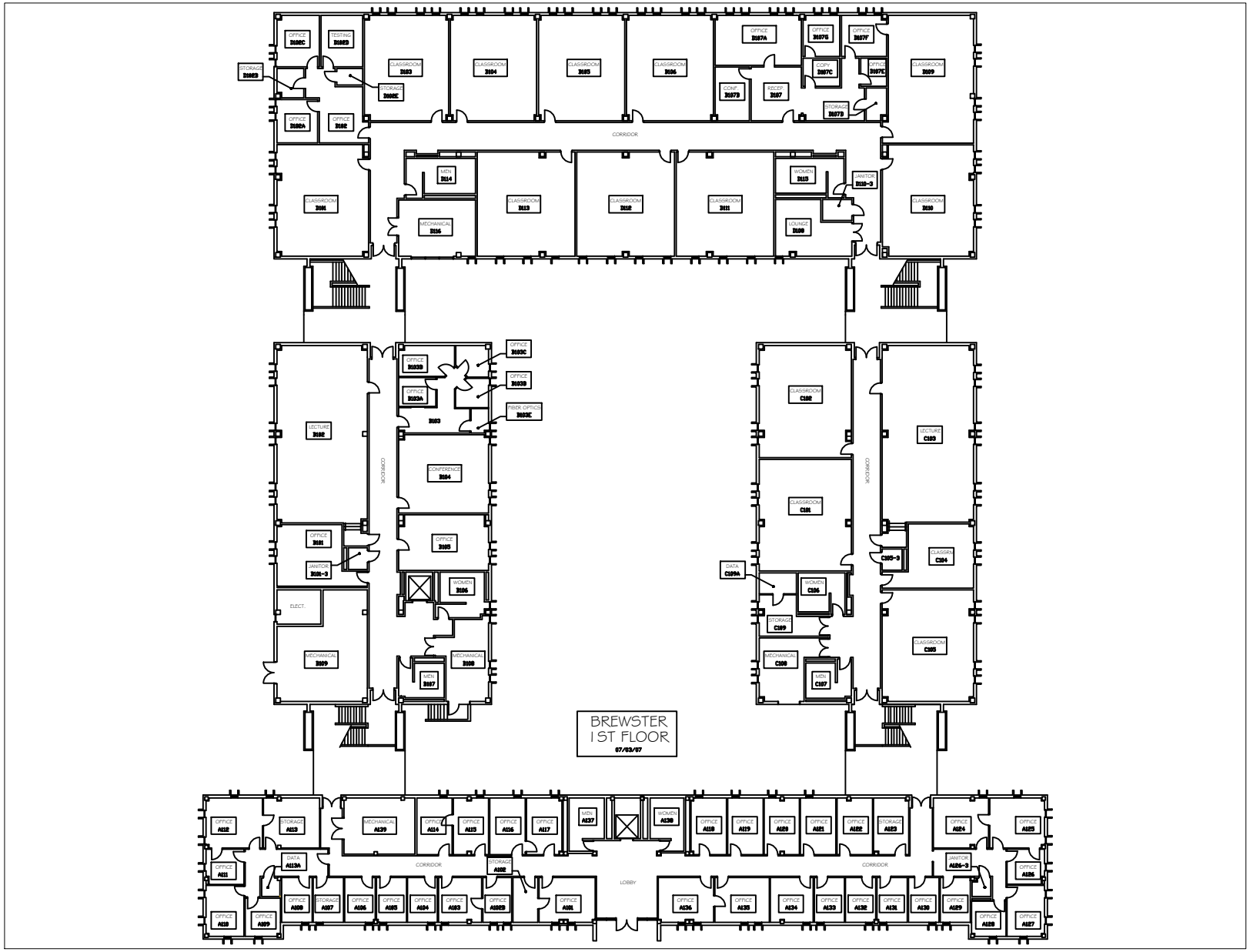


Average Annual Renewal Cost per SF $7.23

FACILITY CONDITION ASSESSMENT

SECTION 5

DRAWINGS


BREWSTER
1ST FLOOR
07/03/07
CORRIDOR
LOBBY
OFFICE
STORAGE
CLASSROOM
MECHANICAL
MEN
WOMEN
JANITOR
LOUNGE
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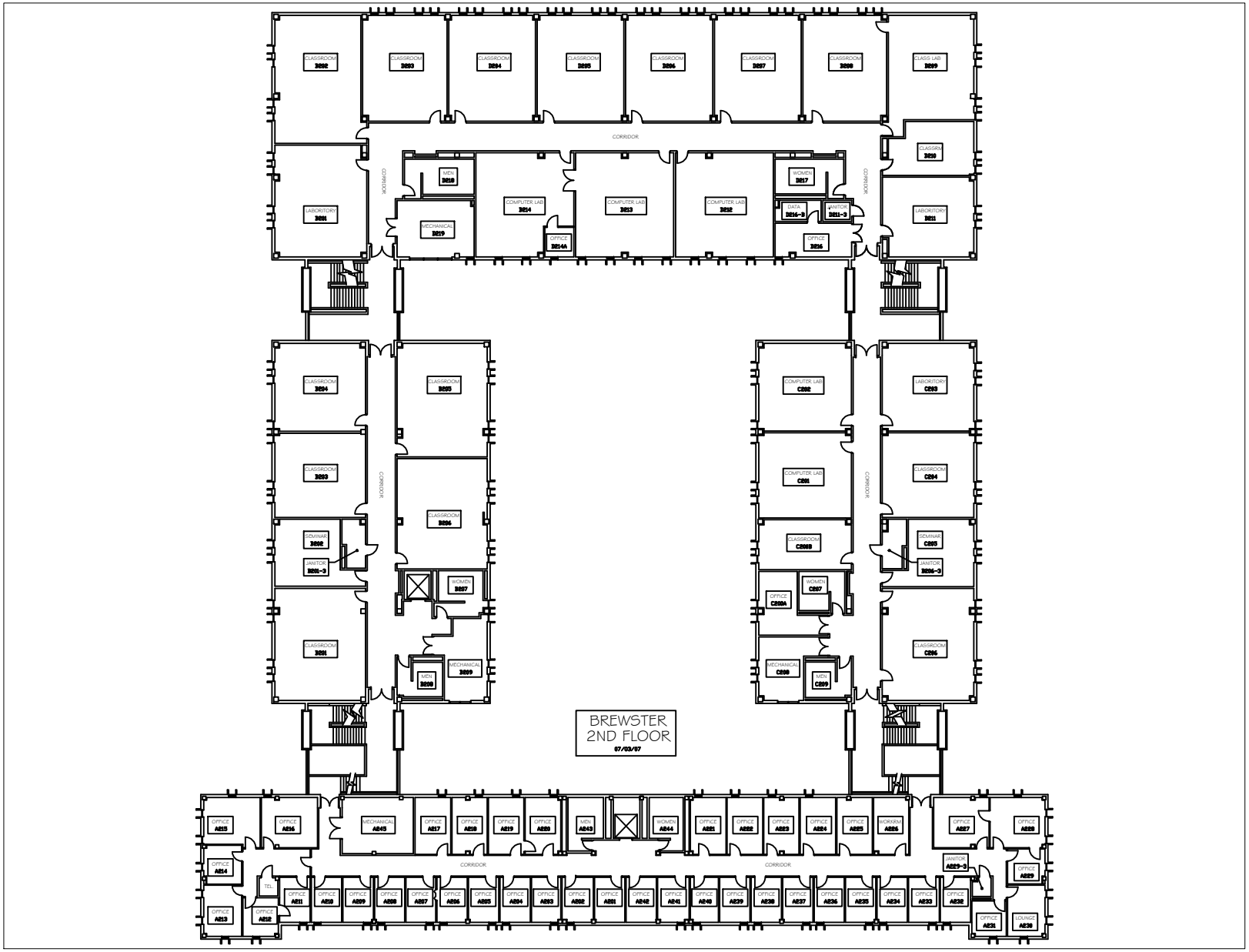
FIBER OPTICS
DATA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CLASS LAB B899
CORRIDOR
CLASSRM B830
LABORATORY B891
MEN B810
MECHANICAL B819
COMPUTER LAB B814
COMPUTER LAB B813
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WOMEN B817
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MECHANICAL C888
MEN C809
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2ND FLOOR
07/03/97
OFFICE A815
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MEN A843
WOMEN A844
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CORRIDOR
CORRIDOR
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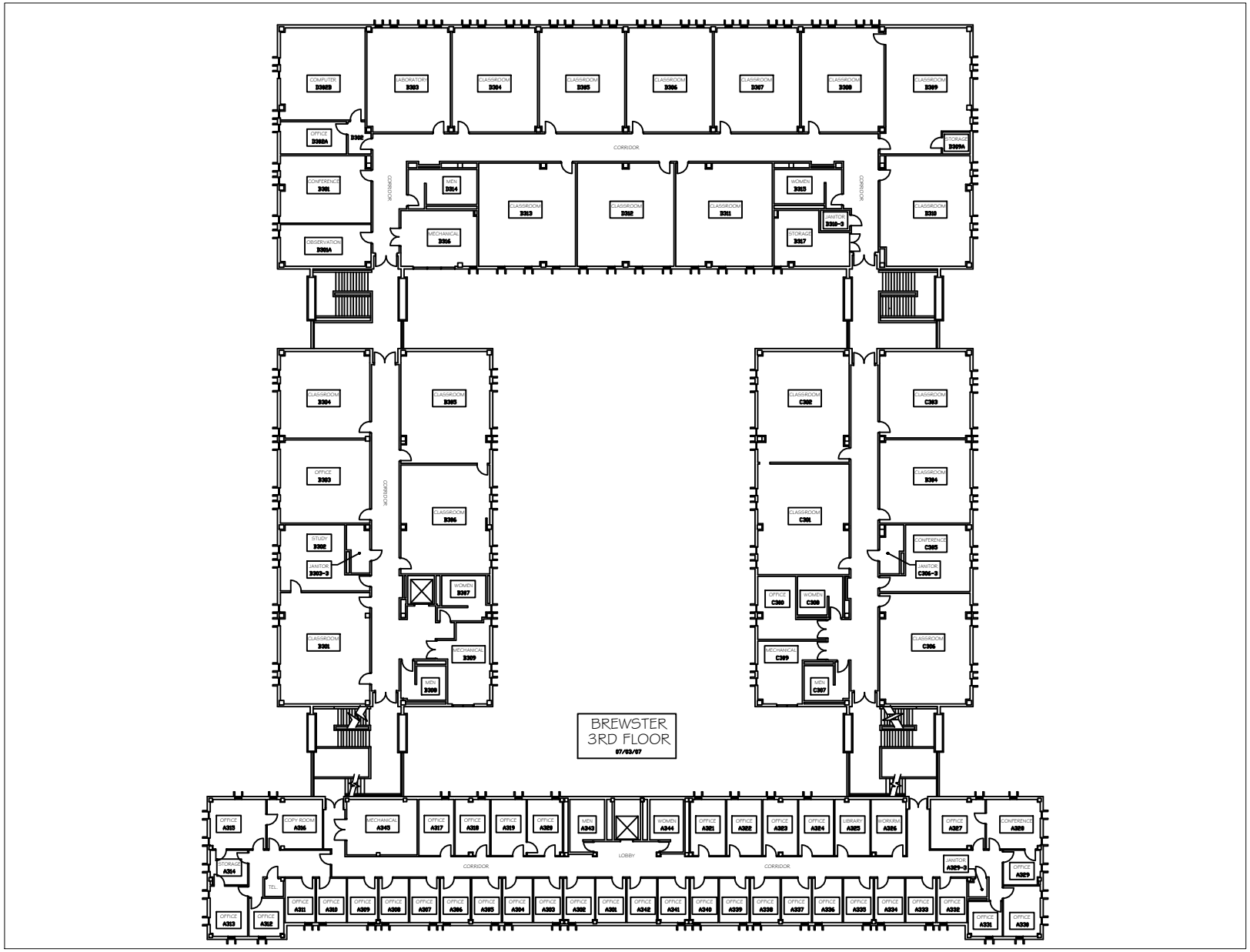
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07/03/07
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MEN B314
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STORAGE B317
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WOMEN B307
MECHANICAL B309
MEN B308
CLASSROOM C302
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CONFERENCE C305
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MEN C307
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TEL
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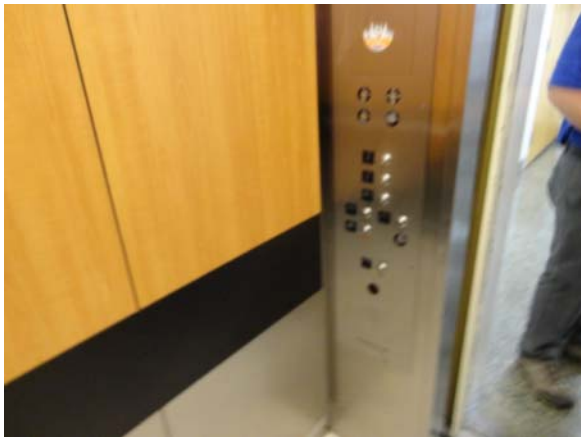
OFFICE A330

SECTION 6

PHOTOGRAPHS



BREW001a 5/12/2021

Accessible elevator control panel

B Wing, passenger elevator

BREW001e 5/12/2021

Elevator B interior

Elevator B

BREW002a 5/12/2021

Original ceramic tile floor service sink

B Wing, janitor's closet

BREW002e 5/12/2021

Elevator B interior

Elevator B

BREW003a 5/12/2021

Weathered built-up roof with cap sheet

B Wing roof

BREW003e 5/12/2021

Centrifugal rooftop exhaust fan

Roof

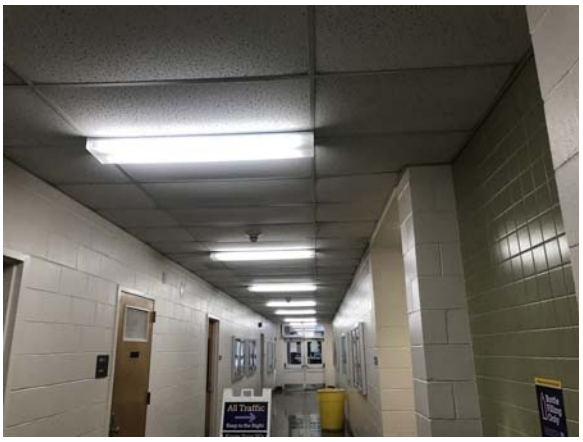
BREW004a 5/12/2021
Weathered built-up roof with cap sheet
A Wing roof

BREW004e 5/12/2021
Utility-style exhaust fan
Roof

BREW005a 5/12/2021
Roof expansion joint
A Wing roof

BREW005e 5/12/2021
Centrifugal rooftop exhaust fan
Roof

BREW006a 5/12/2021
Weathered built-up roof with cap sheet
C Wing roof



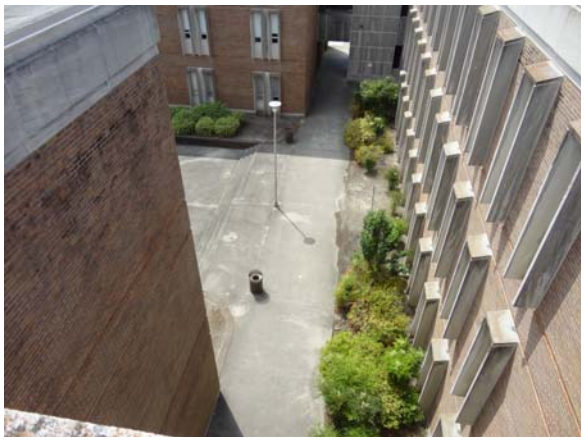
BREW006e 5/12/2021
Retrofitted LED lighting fixtures
B Wing, third floor corridor

BREW007a 5/12/2021
Weathered built-up roof with cap sheet
Breezeway roof

BREW007e 5/12/2021
Local panelboard
Room B309

BREW008a 5/12/2021
Weathered built-up roof with cap sheet
D Wing roof

BREW008e 5/12/2021
Dual duct air handling unit
Room B309



BREW009a 5/12/2021
Stained brick facades
Central courtyard

BREW009e 5/12/2021
VFD for air handling unit
Room B309

BREW010a 5/12/2021

Cut stone parapet cap

Breezeway roof

BREW010e 5/12/2021

Occupancy sensor and timing control

Room B301

BREW011a 5/12/2021

Localized cut stone weathering

Breezeway roof

BREW011e 5/12/2021

Horn with strobe fire alarm device

B Wing, third floor corridor

BREW012a 5/12/2021

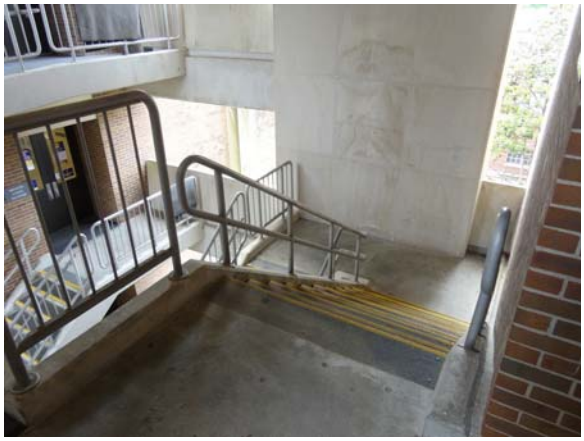
No fall protection for the various rooftop speakers

Main roof

BREW012e 5/12/2021

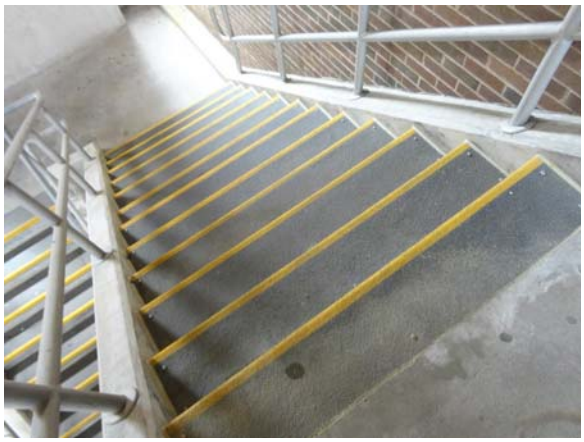
Smoke detector and sagging ceiling tiles

B Wing, third floor corridor



BREW013a 5/12/2021
Nonaccessible freestanding handrails in stair tower
B Wing, third floor stair tower

BREW013e 5/12/2021
Manual pull fire alarm device
B Wing, third floor corridor



BREW014a 5/12/2021
Newer stair treads with color contrast nosing's
B Wing, third floor stair tower

BREW014e 5/12/2021
LED sconce lighting fixture
Exterior stairwell

BREW015a 5/12/2021
Hollow-metal entry doors with power assist
B Wing, third floor entry

BREW015e 5/12/2021
Recessed LED lighting fixture
B Wing, second floor corridor

BREW016a 5/12/2021

Worn terrazzo, sagging acoustical ceiling, and painted CMU

B Wing, third floor corridor

BREW016e 5/12/2021

Dual duct air handling unit

Room B209

BREW017a 5/12/2021

Older wall-hung lavatories

B Wing, third floor men's restroom

BREW017e 5/12/2021

VFD for air handling unit

Room B209

BREW018a 5/12/2021

Wall-hung urinals

B Wing, third floor men's restroom

BREW018e 5/12/2021

HVAC field panel

Room B209

BREW019a 5/12/2021

Standard tankless water closet

B Wing, third floor men's restroom

BREW019e 5/12/2021

Dual duct air handling unit

Room B108

BREW020a 5/12/2021

Ceramic floor and wall tile and painted ceiling

B Wing, third floor men's restroom

BREW020e 5/12/2021

Oil-filled transformer

B Wing site

BREW021a 5/12/2021

Older wall-hung lavatories

B Wing, third floor women's restroom

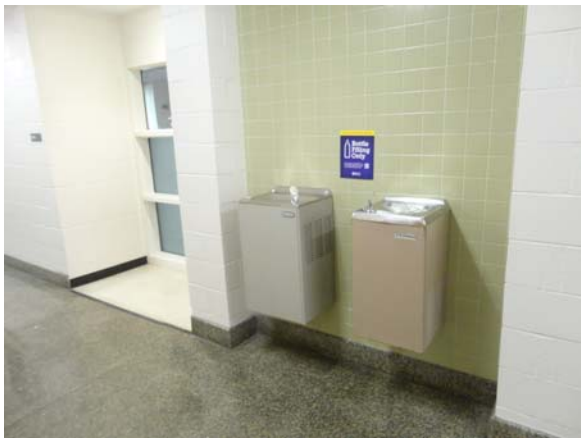
BREW021e 5/12/2021

Diesel-fired emergency generator

B Wing site

BREW022a 5/12/2021
Standard tankless water closet
B Wing, third floor women's restroom

BREW022e 5/12/2021
Backflow preventer
Room B109



BREW023a 5/12/2021
Two older partially accessible water fountains
B Wing, third floor corridor

BREW023e 5/12/2021
Propeller exhaust fans
Room B109

BREW024a 5/12/2021
Older vinyl floor tile and older acoustical ceiling
B Wing, third floor classroom

BREW024e 5/12/2021
Heating hot water pump
Room B109

BREW025a 5/12/2021

Older, power-assisted door operator

B Wing, third floor entry

BREW025e 5/12/2021

HVAC field panel

Room B109

BREW026a 5/12/2021

Accessible room signage with Braille

B Wing, second floor corridor

BREW026e 5/12/2021

Chilled water pump

Room B109

BREW027a 5/12/2021

Worn terrazzo, sagging acoustical ceiling, and painted CMU

B Wing, second floor corridor

BREW027e 5/12/2021

Controls air compressor

Room B109

BREW028a 5/12/2021

Older standard water closet and floor mop sink

B Wing, second floor janitor's closet

BREW028e 5/12/2021

Electric water heater

Room B109

BREW029a 5/12/2021

Older two-level water fountain

B Wing, second floor corridor

BREW029e 5/12/2021

Domestic hot water pump

Room B109

BREW030a 5/12/2021

Worn terrazzo, sagging acoustical ceilings and painted CMU

B Wing, first floor corridor

BREW030e 5/12/2021

Condensate receiver

Room B109

BREW031a 5/12/2021

Partially accessible toilet stall

B Wing, first floor men's restroom

BREW031e 5/12/2021

Heating hot water shell-and-tube heat exchanger

Room B109

BREW032a 5/12/2021

Accessible wall-hung urinals

B Wing, first floor men's restroom

BREW032e 5/12/2021

Pressure reducing valve

Room B109

BREW033a 5/12/2021

Older wall-hung lavatories

B Wing, first floor men's restroom

BREW033e 5/12/2021

Propeller exhaust fan

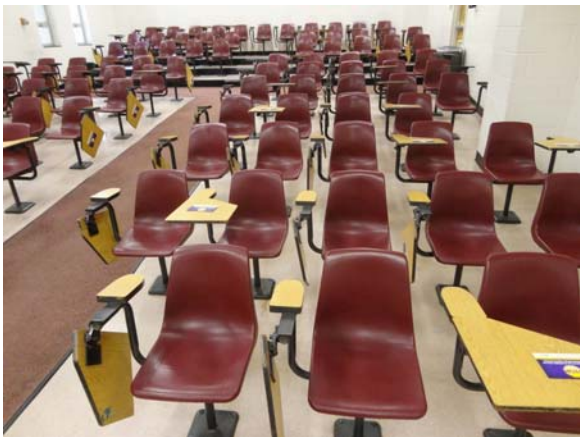
Room B109

BREW034a 5/12/2021
New and old single-level water fountains
B Wing, first floor corridor

BREW034e 5/12/2021
Retrofitted LED lighting fixtures
Room B109

BREW035a 5/12/2021
No sign of assistive listening
B Wing, first floor lecture room

BREW035e 5/12/2021
Main switchboard
Room B109



BREW036a 5/12/2021
Aging original plastic fixed seating
B Wing, first floor lecture room

BREW036e 5/12/2021
Automatic transfer switch
Room B109

BREW037a 5/12/2021
Older exterior doors with panic hardware
B Wing, first floor corridor

BREW037e 5/12/2021
Main fire alarm panel
Room B109

BREW038a 5/12/2021
Aging original hollow-metal service doors
B Wing, first floor mechanical area

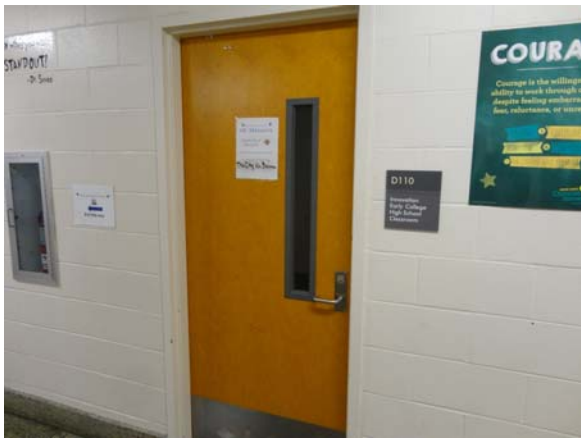
BREW038e 5/12/2021
VFD for heating hot water pump
Room B109

BREW039a 5/12/2021
Aging, original janitor's sink
D Wing, first floor janitor's closet

BREW039e 5/12/2021
Sump pump
Exterior of elevator mechanical room

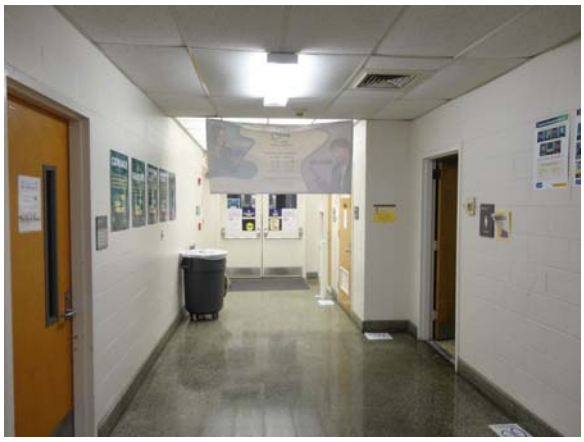
BREW040a 5/12/2021
Standard wall-hung lavatories and toilet stalls
D Wing, first floor women's restroom

BREW040e 5/12/2021
Elevator controls
Room B117

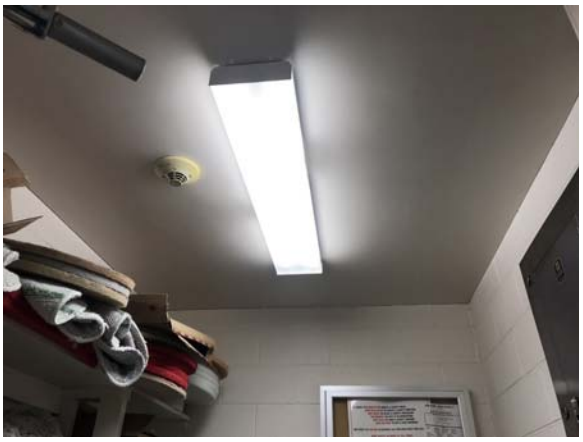


BREW041a 5/12/2021
Select newer corridor doors with lever hardware
D Wing, first floor classroom

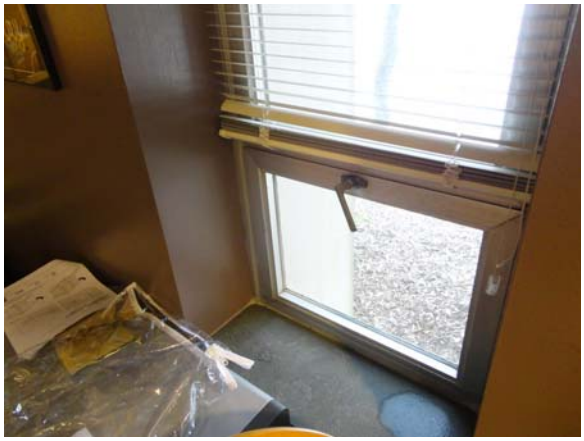
BREW041e 5/12/2021
Elevator controls
Room B117



BREW042a 5/12/2021
Worn terrazzo, sagging acoustical ceiling, and painted CMU
D Wing, first floor corridor



BREW042e 5/12/2021
Retrofitted LED lighting fixtures
Room D110-3



BREW043a 5/12/2021
Single-pane, original, metal-framed glazing
D Wing

BREW043e 5/12/2021
Fire extinguisher
D Wing, first floor corridor

BREW044a 5/12/2021
Older vinyl flooring and acoustical ceiling
D Wing, first floor classroom

BREW044e 5/12/2021
Recessed LED lighting fixture
Room D107

BREW045a 5/12/2021
Small food service area with service sink
D Wing, first floor lounge

BREW045e 5/12/2021
Dual duct air handling unit
Room D116

BREW046a 5/12/2021

Accessible newer urinals

D Wing, first floor men's restroom

BREW046e 5/12/2021

VFD for air handling unit

Room D116

BREW047a 5/12/2021

Older, partially accessible toilet stall

D Wing, first floor men's restroom

BREW047e 5/12/2021

Dual duct air handling unit

Room D219

BREW048a 5/12/2021

Older vinyl floor tile and acoustical ceiling

D Wing, second floor classroom

BREW048e 5/12/2021

VFD for air handling unit

Room D219

BREW049a 5/12/2021
Worn terrazzo, sagging acoustical ceiling, and painted CMU
D Wing, second floor corridor

BREW049e 5/12/2021
Dual duct air handling unit
Room D316

BREW050a 5/12/2021
Newer carpet and acoustical ceiling
D Wing, second floor office

BREW050e 5/12/2021
Potential asbestos insulation on mechanical piping
Room D316

BREW051a 5/12/2021
Older acoustical ceiling with newer ceiling tiles
D Wing, second floor classroom

BREW051e 5/12/2021
VFD for air handling unit
Room D316

BREW052a 5/12/2021

Worn terrazzo flooring

D Wing, third floor corridor

BREW052e 5/12/2021

Fume hood

Room D211

BREW053a 5/12/2021

Older vinyl flooring and acoustical ceiling

D Wing, third floor classroom

BREW053e 5/12/2021

Emergency eyewash

Room D211

BREW054a 5/12/2021

Newer carpet tile and acoustical ceiling

D Wing, third floor conference room

BREW054e 5/12/2021

Recessed LED lighting fixture

Room C302

BREW055a 5/12/2021

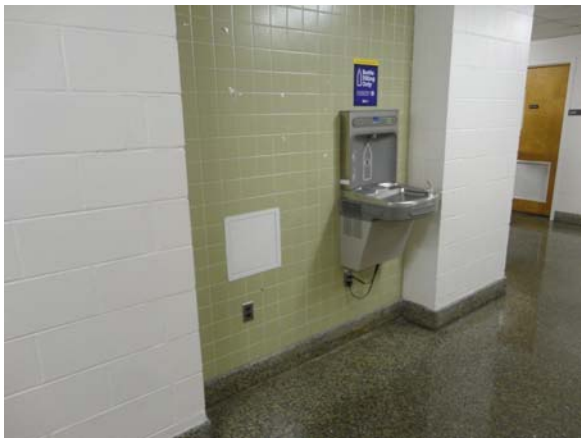
Older carpeting and acoustical ceiling

D Wing third floor classroom

BREW055e 5/12/2021

DDC valve positioners

Room C309



BREW056a 5/12/2021

Partially accessible single-level water fountain with bottle filler

D Wing, third floor corridor

BREW056e 5/12/2021

Dual duct air handling unit

Room C309

BREW057a 5/12/2021

Older interior doors with knob hardware

D Wing, third floor office area

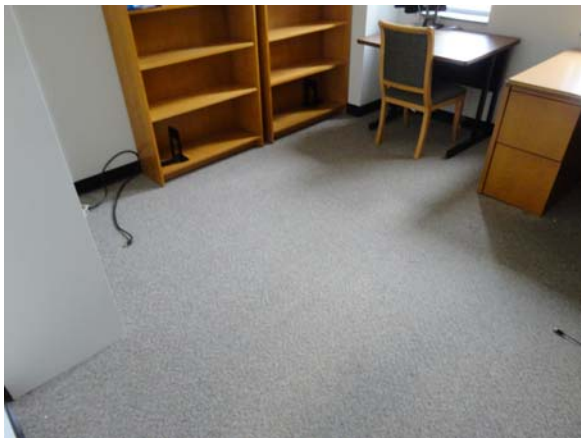
BREW057e 5/12/2021

Dual duct air handling unit

Room C309

BREW058a 5/12/2021
Older nonrated doors with transfer louvers
D Wing, third floor corridor

BREW058e 5/12/2021
VFD for air handling unit
Room C309



BREW059a 5/12/2021
Newer broadloom carpet
D Wing, third floor office

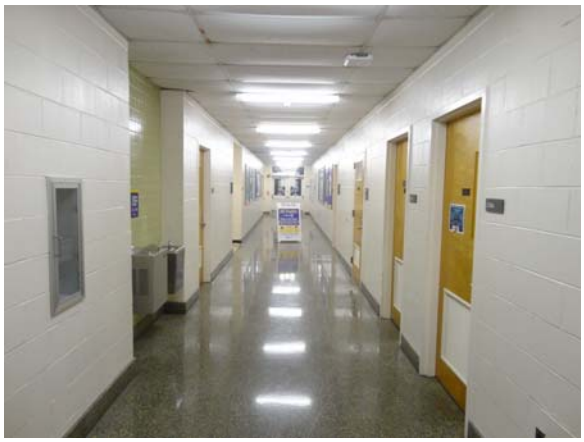
BREW059e 5/12/2021
DDC valve positioners
Room C208

BREW060a 5/12/2021
Newer acoustical ceiling
D Wing, third floor office

BREW060e 5/12/2021
Dual duct air handling unit
Room C208

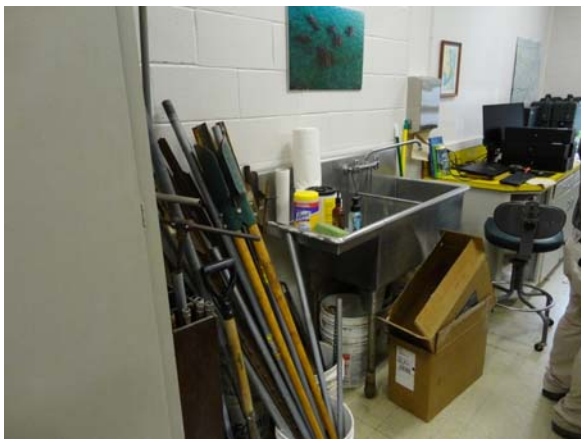
BREW061a 5/12/2021
Older VCT, older acoustical ceiling, and wood lab cabinet
D Wing, second floor lab

BREW061e 5/12/2021
VFD for air handling unit
Room C208



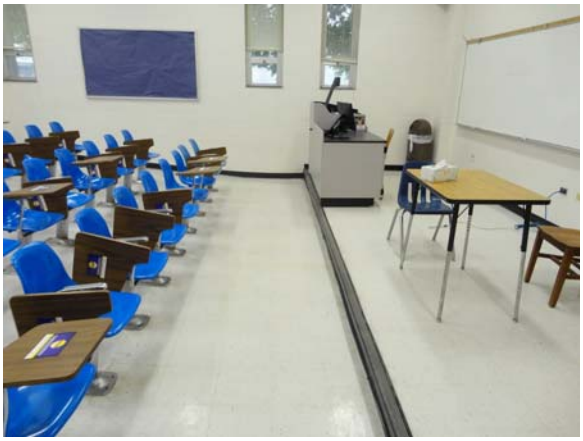
BREW062a 5/12/2021
Worn terrazzo, sagging acoustical ceiling, and painted CMU
C Wing, second floor corridor

BREW062e 5/12/2021
Fire alarm extension panel
Room C108



BREW063a 5/12/2021
Original service sink
C Wing, second floor lab

BREW063e 5/12/2021
Multizone air handling unit
Room A445



BREW064a 5/12/2021

No wheelchair access to stage

C Wing, first floor lecture room

BREW064e 5/12/2021

VFD for air handling unit

Room A445

BREW065a 5/12/2021

Aging original fixed seating

C Wing, first floor lecture room

BREW065e 5/12/2021

Multizone air handling unit

Room A345

BREW066a 5/12/2021

Stained ceiling tile at window heads

C Wing, first floor lecture room

BREW066e 5/12/2021

Multizone deck

Room A345

BREW067a 5/12/2021

Newer carpeting and acoustical ceiling

C Wing, first floor classroom

BREW067e 5/12/2021

Multizone air handling unit

Room A245

BREW068a 5/12/2021

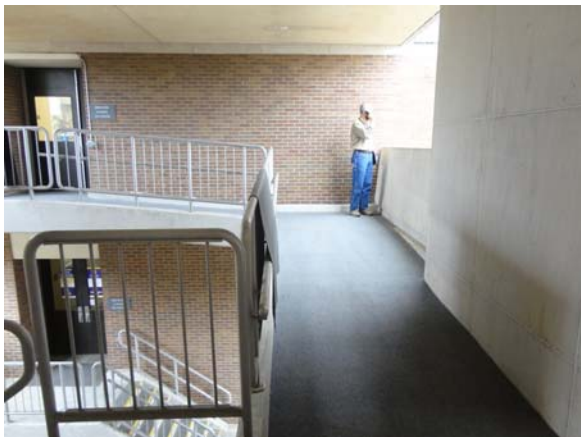
Newer carpet tile and acoustical ceiling

C Wing, first floor conference room

BREW068e 5/12/2021

VFD for air handling unit

Room A245



BREW069a 5/12/2021

No outer handrail on entry ramp

A Wing, fourth floor access ramp

BREW069e 5/12/2021

Multizone air handling unit

Room A139

BREW070a 5/12/2021
Newer 1-1/2 exterior entry door
A Wing, fourth floor

BREW070e 5/12/2021
VFD for air handling unit
Room A139

BREW071a 5/12/2021
Older vinyl flooring and acoustical ceiling
A Wing, fourth floor corridor

BREW071e 5/12/2021
Fire alarm annunciator panel
A Wing, lobby

BREW072a 5/12/2021
Non-rated corridor doors with knob hardware
A Wing, fourth floor corridor

BREW072e 5/12/2021
Pole-mounted LED lighting fixture
Courtyard

BREW073a 5/12/2021
Older vinyl flooring and acoustical ceiling
A Wing, third floor office

BREW074a 5/12/2021
Worn concrete sealer in typical mechanical room
A Wing, third floor mechanical room

BREW075a 5/12/2021
Older vinyl flooring and acoustical ceiling
A Wing, third floor corridor

BREW076a 5/12/2021
Older narrow double two-foot, six-inch entry doors
A Wing, first floor entry

BREW077a 5/12/2021
Accessible toilet stall
A Wing, first floor women's restroom

BREW078a 5/12/2021
Older standard toilet stall
A Wing, first floor women's restroom

BREW079a 5/12/2021
Partially accessible wall-hung lavatories
A Wing, first floor women's restroom

BREW080a 5/12/2021
Brick facade and stained cut stone facades
Central courtyard

BREW081a 5/12/2021
No handrails on courtyard steps
Central courtyard

BREW082a 5/12/2021
No handrails on elonged steps
Central courtyard

BREW083a 5/12/2021
Brick facade and stained cut stone facades
East end of D Wing

BREW084a 5/12/2021
Brick facade and stained cut stone facades
Northwest corner elevation of D Wing

BREW085a 5/12/2021

Metal gate at each courtyard entry

West courtyard entry

BREW086a 5/12/2021

Brick facade and stained cut stone facades

East elevation of C Wing

BREW087a 5/12/2021

Some upper staining and lower broken stone solar fin

East end of A Wing

BREW088a 5/12/2021

Brick facade and stained cut stone facades

South elevation of A Wing

BREW089a 5/12/2021

Example of repaired stone solar fin

South elevation of A Wing

BREW090a 5/12/2021

Glass entry doors

A Wing, main south entry

BREW091a 5/12/2021

Two louvered hollow-metal service doors

Wing B, west mechanical area

BREW092a 5/12/2021

Courtyard gates have padlocks without emergency egress

Typical courtyard gate

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	BREW
Asset Name	Brewster Building (008)
Year Built or Last Energy Renovation	1970

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)

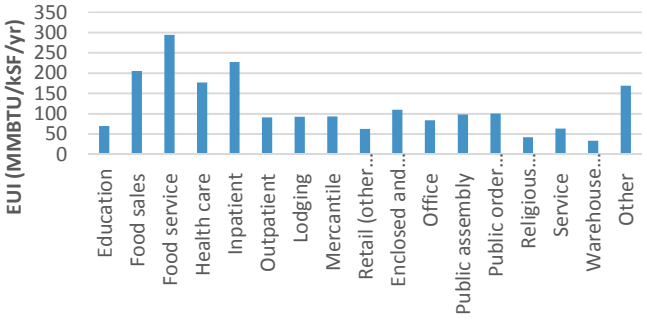
EUI is a measure of energy consumption per square foot of building space per year. The units of measurement are million British thermal units per thousand square foot per year (MMBTU/kSF/yr). The US-DOE EUI can be compared to the actual EUI of the client building to determine how efficient the building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

Figure 1. EUIs for Buildings Constructed/Renovated 1960 to 1989

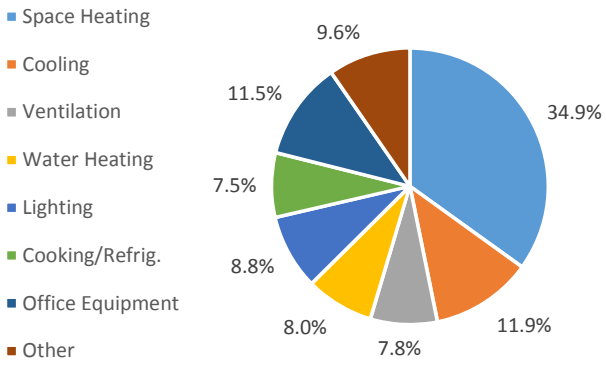


Metric #2: Energy End Use

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%

Figure 2. Energy End Use Profile: Classroom



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 - 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 by 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
Plumbing - Water Closets	INSTALL LOW-FLOW FLUSH VALVES/NEW WATER CLOSETS. WaterSense labeled water closets save water and reduce the energy required to pump water.	LC/NC; CAP