

# EAST CAROLINA UNIVERSITY

Facility Condition Assessment

Austin Building (006)

Asset AUST

Inspected May 11, 2021





# TABLE OF CONTENTS

## SECTION 1 ASSET OVERVIEW

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

## SECTION 2 COST SUMMARIES AND TOTALS

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

## SECTION 3 NONRECURRING PROJECT DETAILS..... 3.1.1

## SECTION 4 LIFECYCLE COMPONENT INVENTORY

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

## SECTION 5 DRAWINGS

## SECTION 6 PHOTOGRAPHS ..... 6.1.1

## SECTION 7 PRELIMINARY ENERGY ASSESSMENT..... 7.1.1



# FACILITY CONDITION ASSESSMENT

## SECTION 1

### ASSET OVERVIEW



## ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

<b>ASSET CODE</b>	AUST	<b>CURRENT REPLACEMENT VALUE</b>	\$26,286,000
<b>ASSET NAME</b>	AUSTIN BUILDING (006)	<b>FACILITY CONDITION NEEDS INDEX</b>	0.48
<b>ASSET USE</b>	Classroom / Academic	<b>FACILITY CONDITION INDEX</b>	0.33
<b>YEAR BUILT</b>	1964	<b>10-YEAR \$/SF</b>	196.81
<b>GSF</b>	63,866		
<b>INSPECTION DATE</b>	05/11/2021		

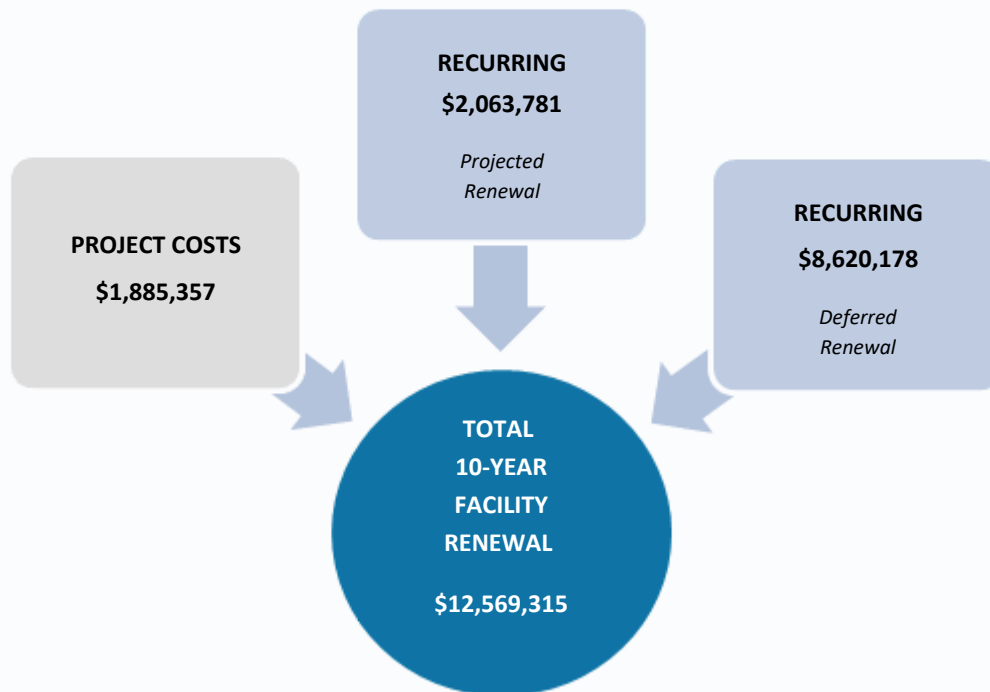
### FCNI Scale

The FCNI for this asset is **0.48**

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



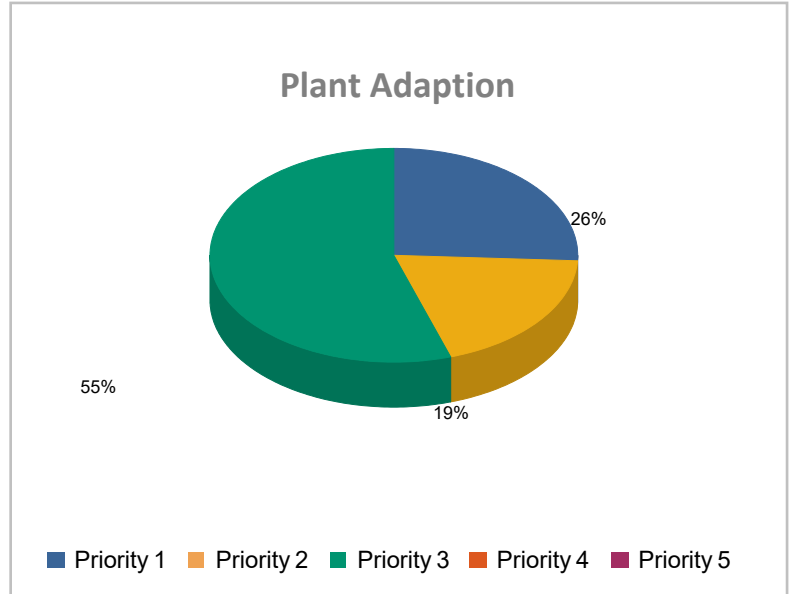
### Total Facility Renewal Costs



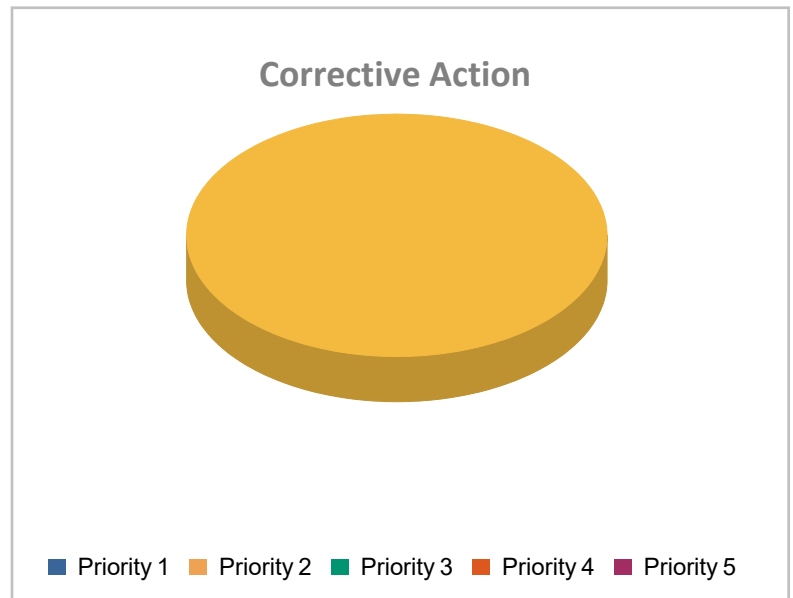
## Project Costs

### Project Cost by Priority

PLANT ADAPTION	
Priority 1	\$486,080
Priority 2	\$354,463
Priority 3	\$1,031,490
Priority 4	\$0
Priority 5	\$0



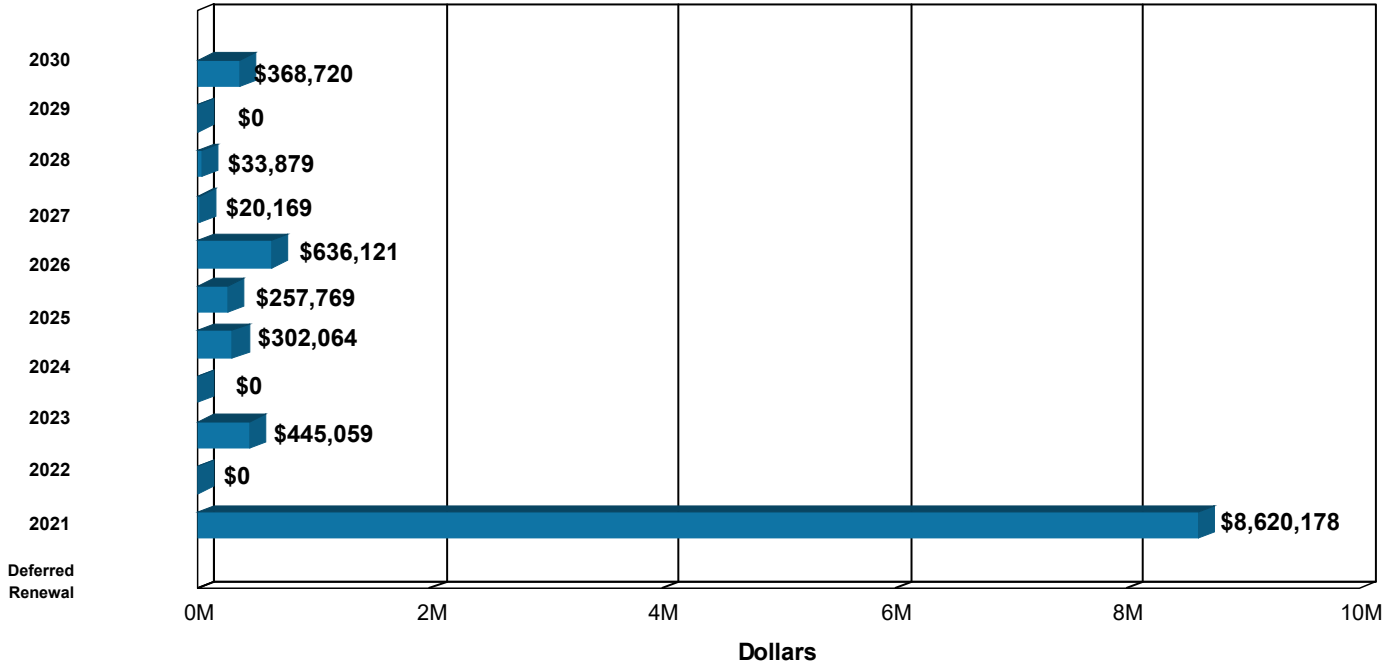
CORRECTIVE ACTION	
Priority 1	\$0
Priority 2	\$13,323
Priority 3	\$0
Priority 4	\$0
Priority 5	\$0



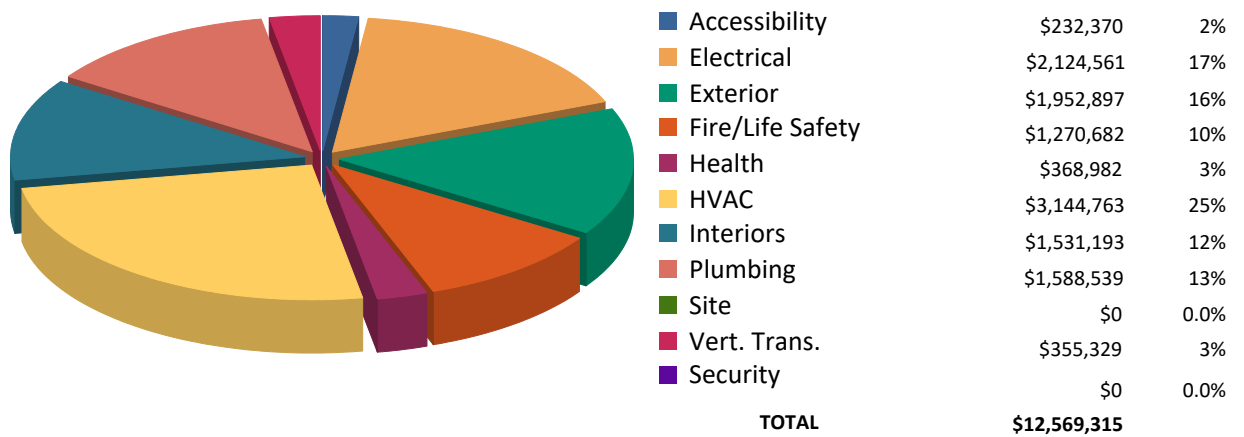


## Recurring Costs

Component Replacement Cost by Year



## Facilities Renewal Cost by System





## ASSET SUMMARY

The Austin Building is a 1964 three-story classroom and office building located on the main campus of East Carolina University. Each floor has a central double-loaded corridor with a mixture of offices and classrooms. The exterior is brick with original single-pane, metal-framed glazing with stone accents around the main entry. The main exterior entry doors are glass and secondary and service doors are hollow metal. The main roof is a built-up application, and the 1999 west wing elevator tower addition has an unballasted membrane roof. The Austin Building totals approximately 63,866 gross square feet.

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

### Site

The site is relatively flat and landscaping around the building consists of turf grass, ornamental shrubs, and some mature trees. Planting is in adequate overall condition. The concrete sidewalks around this building are in average condition and no upgrades are warranted. There are no parking lots directly associated with this facility.

### Exterior Structure

The brick facades have a good overall appearance other than some surface staining on upper elevations. The cut stone accents around the main entry are in satisfactory condition. The original single-pane glazing is in poor condition and should be considered for replacement with new thermal-pane, metal-framed glazing. The newer brick veneer and thermal-pane glazing on the west tower addition is in good condition and no upgrades are warranted.

The glass entry doors at the main front elevation are newer and in good condition as are the glass doors at the west elevator tower. The other secondary entry/egress and service doors are hollow-metal assemblies that are in serviceable condition.

The roof is a modified bitumen system that was reportedly installed in 2005 and should be due for in-kind replacement in the near future. The unballasted membrane roof on the west elevator tower should also be replaced within this same timeframe. The two roof hatches and accompanying roof access ladders are aging and inadequate given the height exposure in the stair towers. Install new roof hatch assemblies and include new permanent roof access ladders with fall guards.

### Interior Finishes/Systems

Floor finishes include carpet, vinyl tile, and ceramic tile. Walls are painted plaster or concrete in most areas and ceramic tile wainscoting in the restrooms. Ceilings are lay-in, acoustical tile and painted textured surfaces. The broadloom carpeting is older and showing signs of age. New carpet tile should be

installed on all three floors. The older vinyl composite floor tile is worn and should be replaced in the near future. Ceramic floor and wall finishes in the standard restrooms are older and should be upgraded when these restrooms are updated. The newer accessible all-gender restrooms have ceramic floor and wall tile that is in good condition. Painted wall finishes are showing signs of wear and contact damage and should be repainted in the near future on all floors. Lay-in acoustical ceilings are in average condition and should be adequate for the near future. The nine-inch vinyl flooring and textured ceilings are suspected to contain asbestos and should be properly abated. Corridor doors for classrooms are new rated doors with lever hardware, but the office areas still have older doors with knob hardware. These older doors should be replaced with properly rated assemblies.

## Accessibility

Access to the building is provided by ramp systems on the north and west. Both entrances are equipped with power-assisted door openers. The building has a fully accessible passenger elevator on the west end. However, the four stair towers lack accessible railing designs. Retrofit new accessible inner and outer railings on each stair flight and replace the stair treads once the existing tread finishes are properly removed.

Accessible all-gender restrooms have been created on each floor but some minor accessibility issues still need to be addressed with grab bar layouts and mounting heights for some of the wall-hung lavatories and mirrors. All of the accessible restrooms should also be fitted with power door assist units.

Dual-level drinking fountains have been installed in the corridors of the east and west wings on each floor. Newer interior doors for the classrooms have lever hardware and all of the floors have wall-mounted room signage with Braille. The remaining older doors, typically located in office areas, are recommended for replacement in the Fire/Life Safety section. If this door upgrade is not implemented, then new accessible lever hardware should be installed on these original doors.

## Health

The nine-inch vinyl tile and mastics and the textured ceilings are suspected to contain asbestos, and it is assumed that nine-inch vinyl tile is present under the carpeting and that textured ceilings are present above the acoustical lay-in ceilings. Asbestos insulation was also observed on mechanical piping. Prior to any future renovation efforts, it is recommended that any asbestos material be properly abated.

## Fire/Life Safety

While the building appears to have adequate egress pathways, not all of the interior doors have been upgraded with new fire-rated assemblies. Areas like classrooms have had rated corridor door upgrades, but administrative areas still have older nonrated doors with knob hardware. Replace these older doors with new similar flush wood fire rated doors with metal frames and lever hardware.

This facility contains a point addressable fire alarm and detection system with a main Notifier fire alarm panel, manual pull stations, smoke detectors, and horn and strobe alarm systems. The panel and devices were installed around 2018 and are expected to remain viable for the next ten years.

This facility is not protected by 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 three constant air volume (CAV) air handling units with a hot and cold deck and thirteen fan coil units. An outdoor air handling unit serves a former computer/server area and was installed in 2003. Exhaust for the restrooms is handled by two centrifugal exhaust fans, and a propeller exhaust fan serves the main mechanical room. The air handling units, fan coil units, and exhaust fan have exceeded their respective statistical service lives and should be considered for removal and replacement with modern systems. Variable air volume (VAV) capable air handling units are recommended.

A computer AC unit with an associated dry-cooler serve the former main server room. Both were installed in 2003 and should be evaluated for replacement and/or removal, depending upon the future needs of the area.

Chilled water is supplied by the central plant. 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 5-hp base-mounted centrifugal pump. High pressure steam is reduced to low pressure via 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, heating water pump, pressure reducing valves, and the condensate receiver should be considered for replacement as they have exceeded their respective service lives.

The original HVAC distribution network is a dual-duct CAV design and consists of insulated metallic conduit, insulated mechanical piping, valves, diffusers, and similar elements. The HVAC controls are a direct digital (DDC) and pneumatic hybrid with the pneumatic systems original and some recent upgrades to DDC. It is recommended that the distribution network and controls be removed and replaced with and a modern, energy-efficient variable air volume (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 two 500-kVA oil-filled transformers where power is reduced to 277/480 volts and routed to two main 800-amp switchboards. Power is further reduced to 120/208 volts through secondary step-down transformers. Power is distributed at 120/208 and 277/480 volts via individual conductors in metallic conduit to secondary panelboards for use in local devices. The

distribution system consists of downline electrical system components beyond the main electrical service elements including the distribution feeders, conduits, local panelboards, load centers, safety switches, fused disconnects, receptacles, switches, and similar terminal elements. The switchboards, step-down transformers, and the electrical distribution are original and should be considered for replacement as they have exceeded their statistical lifecycles. The oil-filled transformers are expected to remain viable for the next ten years.

Variable frequency drives (VFDs) are associated with the air handling units. 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 that they be replaced during any future HVAC renovations.

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

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

## Plumbing

Potable water supply, sanitary sewer, and stormwater handling systems serve this facility. 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 and recommended for replacement as aged piping can cause costly repairs due to unwanted leaks.

Domestic hot water is generated through a residential-style electric water heater with an associated fractional horsepower circulation pump. The water heater and pump were installed in 2017 and are expected to remain viable for the next ten years.

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

The standard restrooms have older wall-hung lavatories, urinals, and tankless water closets. These fixtures are showing age and should be replaced in kind in the near future. Wall-mounted service sinks in janitor closets on each floor are much older and due for replacement. The newer all-gender restrooms have newer counter and/or wall-hung lavatories, urinals, and tankless water closets that are all in good condition at this time.

## Vertical Transportation

The building has a three-stop hydraulic-controlled passenger elevator with a capacity of 2,500 pounds. The elevator was installed in 1999 and no issues were observed or reported during the inspection. However, the elevator should be evaluated for modernization within the next ten years due to lifecycle depletion. No detailed elevator testing was conducting during this assessment.

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

## INSPECTION TEAM DATA

### Report Development

ISES Corporation  
3100 Breckinridge Boulevard, Suite 400  
Duluth, GA 30096

### Project Manager

Doug Fredendall  
770.674.3112  
dougf@isescorp.com

### Date of Inspection

May 11, 2021

### Inspection Team Personnel

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

### Client Contact

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



## DEFINITIONS

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

### Overview

#### Recurring and Nonrecurring Facility Renewal Costs

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

#### Facility Condition Needs Index (FCNI)

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

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

#### Facility Condition Index (FCI)

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

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

## Material and Labor Cost Factors and Additional Markups

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

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

## Recurring Costs

### Renewable Component Inventory and Cost Projections

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

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

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

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

## Recurring Cost Classifications

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

## Nonrecurring Costs

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

### Project Number

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

## Project Classifications

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

## Priority Classes

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

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

- **Priority 3 – Low**

Items in this category include:

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

### Project Subclass

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

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

### Category Codes

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

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

## Priority Sequence

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

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

## Drawings

Floor plans for this facility are provided as a reference.

## Photographs

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

<i>Example:</i>	
Photo Number: 0001006e	
<b>0001</b>	Asset Number
<b>006</b>	Photo Sequence
<b>e</b>	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	232,370	0	0	0	0	0	0	0	0	0	0	0	0	\$232,370
EXTERIOR	0	13,323	0	1,716,172	0	0	0	0	188,486	0	0	0	0	34,916	\$1,952,897
INTERIOR	0	0	0	972,375	0	445,059	0	0	0	0	0	30,369	0	83,390	\$1,531,193
PLUMBING	0	0	0	1,532,967	0	0	0	0	51,543	0	3,349	680	0	0	\$1,588,539
HVAC	0	0	0	2,813,826	0	0	0	0	0	69,742	7,951	2,830	0	250,414	\$3,144,763
FIRE/LIFE SAFETY	486,080	0	784,602	0	0	0	0	0	0	0	0	0	0	0	\$1,270,682
ELECTRICAL	0	0	0	1,531,573	0	0	0	0	17,739	566,379	8,870	0	0	0	\$2,124,561
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	\$0
VERT. TRANS.	0	0	0	53,265	0	0	0	302,064	0	0	0	0	0	0	\$355,329
HEALTH/EQUIP.	0	122,094	246,888	0	0	0	0	0	0	0	0	0	0	0	\$368,982
<b>SUBTOTAL</b>	<b>\$486,080</b>	<b>\$367,787</b>	<b>\$1,031,490</b>	<b>\$8,620,178</b>	<b>\$0</b>	<b>\$445,059</b>	<b>\$0</b>	<b>\$302,064</b>	<b>\$257,769</b>	<b>\$636,121</b>	<b>\$20,169</b>	<b>\$33,879</b>	<b>\$0</b>	<b>\$368,720</b>	<b>\$12,569,315</b>
<b>TOTAL NONRECURRING PROJECT NEEDS</b>			<b>\$1,885,357</b>	<b>TOTAL RECURRING COMPONENT REPLACEMENT NEEDS</b>										<b>\$10,683,959</b>	

<b>CURRENT REPLACEMENT VALUE</b>	<b>\$26,286,000</b>
<b>FACILITY CONDITION NEEDS INDEX</b>	<b>0.48</b>
<b>FACILITY CONDITION INDEX</b>	<b>0.33</b>

<b>GSF</b>	<b>TOTAL 10-YEAR FACILITY RENEWAL NEEDS</b>	<b>10-YEAR NEEDS/SF</b>
<b>63,866</b>	<b>\$12,569,315</b>	<b>\$196.81</b>

## 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	\$232,370	\$0	\$232,370
EXTERIOR	\$13,323	\$1,939,574	\$1,952,897
INTERIOR	\$0	\$1,531,193	\$1,531,193
PLUMBING	\$0	\$1,588,539	\$1,588,539
HVAC	\$0	\$3,144,763	\$3,144,763
FIRE/LIFE SAFETY	\$1,270,682	\$0	\$1,270,682
ELECTRICAL	\$0	\$2,124,561	\$2,124,561
SITE	\$0	\$0	\$0
VERT. TRANS	\$0	\$355,329	\$355,329
HEALTH	\$368,982	\$0	\$368,982
<b>TOTALS</b>	<b>\$1,885,357</b>	<b>\$10,683,959</b>	<b>\$12,569,315</b>

**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
AUST EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK FACADES		ALL ELEVS	B2010	Deferred Renewal	262,379
AUST WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	SINGLE PANE			B2010	Deferred Renewal	1,453,793
AUST DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ORIGINAL		CORRIDORS	C1020	Deferred Renewal	486,024
AUST DR24	DOOR LOCK, COMMERCIAL-GRADE			ELEV MACH RM	C1020	Deferred Renewal	745
AUST DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DRS		BASEMENT	C1020	Deferred Renewal	2,979
AUST DR26	DOOR PANIC HARDWARE			ELEV TOWER ENTRY	C1020	Deferred Renewal	2,437
AUST DR26	DOOR PANIC HARDWARE	SECONDARY		ENTRIES	C1020	Deferred Renewal	12,183
AUST IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CERAMIC TILE WAINSCOT			C3010	Deferred Renewal	81,355
AUST IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL FLOOR TILE			C3020	Deferred Renewal	86,965
AUST IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	9X9 VINYL FLOOR TILE UPGRADE			C3020	Deferred Renewal	260,894
AUST IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC FLOOR TILE			C3020	Deferred Renewal	38,795
AUST VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			D1010	Deferred Renewal	53,265
AUST FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FLOOR MOUNT		JAN CLOSET	D2010	Deferred Renewal	5,378
AUST PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	D2020	Deferred Renewal	608,518
AUST PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON, BELL AND SPIGOT		THROUGHOUT	D2030	Deferred Renewal	919,071
AUST AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-1-13		OFFICES	D3040	Deferred Renewal	117,105

## 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
AUST AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-003, ASSET 10429		237	D3040	Deferred Renewal	143,555
AUST AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-002, ASSET 10427		114	D3040	Deferred Renewal	143,555
AUST AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-001, ASSET10430		149	D3040	Deferred Renewal	143,555
AUST FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-1		ROOF	D3040	Deferred Renewal	7,951
AUST FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-3		149	D3040	Deferred Renewal	2,772
AUST HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, DUAL DUCT		THROUGHOUT	D3040	Deferred Renewal	2,009,465
AUST HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		149	D3040	Deferred Renewal	41,171
AUST HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		149	D3040	Deferred Renewal	4,466
AUST HX11	PRESSURE REDUCING VALVE, STEAM SYSTEM (3")	PRV-1		149	D3040	Deferred Renewal	6,828
AUST PH01	PUMP - ELECTRIC (<=10 HP)	HWP-001		149	D3040	Deferred Renewal	8,226
AUST PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		149	D3040	Deferred Renewal	22,310
AUST AH36	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (3-10 TON)	CRAC-1		FORMER SERV ROOM	D3050	Deferred Renewal	55,546
AUST BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		SELECT SPACES	D3060	Deferred Renewal	107,322
AUST SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	277/480		THROUGHOUT	D5010	Deferred Renewal	1,377,458
AUST SG03	MAIN SWITCHBOARD W/BREAKERS (600-800 AMP)	MDP-2		149	D5010	Deferred Renewal	57,442
AUST SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MDP-1		149	D5010	Deferred Renewal	66,430

**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
AUST TX29	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (150-225 KVA)	STX		149	D5010	Deferred Renewal	25,094
AUST LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN CFL		EXT	D5020	Deferred Renewal	938
AUST LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID SCONCE		EXT	D5020	Deferred Renewal	2,965
AUST LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	CFL SCONCE		EXT	D5020	Deferred Renewal	1,245
AUST IW01	WALL FINISH - PAINT, STANDARD	PAINTED WALLS			C3010	2022	232,366
AUST IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADE			C3020	2022	212,693
AUST VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		151	D1010	2024	302,064
AUST RR03	ROOF - 1-PLY, ADHERED (EPDM, PIB, CSPE, PVC)	ELEV TOWER ADDITION			B3010	2025	8,429
AUST RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	MULTI LEVEL FLAT ROOFS			B3010	2025	180,057
AUST FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	2025	15,962
AUST FX10	PLUMBING FIXTURE - URINAL	PC		RRS	D2010	2025	6,354
AUST FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	2025	29,227
AUST VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-002		114	D5010	2025	8,870
AUST VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-001		149	D5010	2025	8,870
AUST AH17	AIR HANDLING UNIT - OUTDOOR PACKAGE (1.5-5 HP)	AHU-004, ASSET 10428		EXT	D3040	2026	60,771
AUST AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC		149	D3060	2026	8,971

**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
AUST LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	RETRO T8 LOW WATTAGE		ALL AREAS, SOME CLASSRMS	D5020	2026	566,379
AUST WH25	WATER HEATER - RESIDENTIAL, ELECTRIC (>100 GAL)	WH-1		149	D2020	2027	3,349
AUST FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	D3040	2027	7,951
AUST VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-003		237	D5010	2027	8,870
AUST IC04	CEILING FINISH - PAINTED OR STAINED, STANDARD	PAINTED CEILING UPGRADES			C3030	2028	30,369
AUST PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1		149	D2030	2028	680
AUST CH20	DRY COOLER - REFRIGERANT OR GLYCOL	DRY COOLER		EXT	D3030	2028	2,830
AUST DR28	DOOR OPERATOR, POWER-ASSIST			MAIN S ENTRY	B2030	2030	34,916
AUST DR24	DOOR LOCK, COMMERCIAL-GRADE	INTERIOR RATED DRS			C1020	2030	29,785
AUST DR26	DOOR PANIC HARDWARE	INTERIOR DRS		STAIR AND CORR ISOLATION	C1020	2030	48,731
AUST DR26	DOOR PANIC HARDWARE			MAIN S ENTRY	C1020	2030	4,873
AUST BA102	HVAC CONTROLS SYSTEM - CLASSROOM	DDC		THROUGHOUT	D3060	2030	250,414
<b>TOTAL</b>							<b>\$10,683,959</b>

**FACILITIES RENEWAL PLAN**  
**NONRECURRING PROJECT COSTS**

*All costs shown as Present Value*

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
AUSTFS02	SELECT RATED CORRIDOR DOOR UPGRADES	C1020	1	Plant Adaption	486,080
AUSTES01	ROOF HATCH REPLACEMENTS	B3010	2	Corrective Action	13,323
AUSTAC01	INTERIOR DOOR HARDWARE UPGRADES	C1010	2	Plant Adaption	96,814
AUSTAC03	STAIR TOWER RAILING UPGRADES	C2020	2	Plant Adaption	73,723
AUSTAC02	RESTROOM ACCESSIBILITY UPGRADES	D2010	2	Plant Adaption	61,833
AUSTHE01	ASBESTOS ABATEMENT - MECHANICAL SYSTEMS	F2020	2	Plant Adaption	122,094
AUSTFS01	FIRE SPRINKLER SYSTEM INSTALLATION	D4010	3	Plant Adaption	784,602
AUSTHE02	ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS	F2020	3	Plant Adaption	246,888
<b>TOTAL</b>					<b>\$1,885,357</b>





FACILITY CONDITION ASSESSMENT

**SECTION 3**

**NONRECURRING  
PROJECT DETAILS**

All costs shown as Present Value

SELECT RATED CORRIDOR DOOR UPGRADES			
<b>Project Number:</b>	AUSTFS02	<b>Category Code:</b>	
<b>Priority Sequence:</b>	1	FS5F	
<b>Priority Class:</b>	Immediate	<b>System:</b>	FIRE/LIFE SAFETY
<b>Project Class:</b>	Plant Adaption	<b>Component:</b>	EGRESS PATH
<b>Date Basis:</b>	6/10/2021	<b>Element:</b>	FIRE DOORS/HARDWARE

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

**Description**

Areas like classrooms have been updated with rated corridor door upgrades. However, administrative areas still have older nonrated doors with knob hardware. Replace these older doors with new similar flush wood fire-rated doors with metal frames and lever hardware.

All costs shown as Present Value

**Project Cost Estimate**

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Rated door and rated metal frame installation	LEAF	130	\$2,278	\$296,091	\$551	\$71,574	\$367,665
<b>Base Material/Labor Costs</b>				<b>\$296,091</b>		<b>\$71,574</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$298,163</b>		<b>\$51,032</b>	<b>\$349,196</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$69,839</b>
<b>Original Construction Cost</b>							<b>\$419,035</b>
<b>Date of Original Estimate:</b>	6/10/2021					<b>Inflation</b>	<b>\$0</b>
<b>Current Year Construction Cost</b>							<b>\$419,035</b>
<b>Professional Fees at 16.0%</b>							<b>\$67,046</b>
<b>TOTAL PROJECT COST</b>							<b>\$486,080</b>

All costs shown as Present Value

ASBESTOS ABATEMENT - MECHANICAL SYSTEMS			
<b>Project Number:</b>	AUSTHE01	<b>Category Code:</b>	
<b>Priority Sequence:</b>	2	HE6B	
<b>Priority Class:</b>	Critical	<b>System:</b>	HEALTH
<b>Project Class:</b>	Plant Adaption	<b>Component:</b>	HAZARDOUS MATERIAL
<b>Date Basis:</b>	5/25/2021	<b>Element:</b>	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	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
HVAC system - abate asbestos from utility piping	SF	63,866	\$0.25	\$15,967	\$0.61	\$38,958	\$54,925
Plumbing system - abate asbestos from supply piping network	SF	63,866	\$0.25	\$15,967	\$0.61	\$38,958	\$54,925
<b>Base Material/Labor Costs</b>				<b>\$31,933</b>		<b>\$77,917</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$32,157</b>		<b>\$55,554</b>	<b>\$87,711</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$17,542</b>
<b>Original Construction Cost</b>							<b>\$105,253</b>
<b>Date of Original Estimate:</b>	5/25/2021				<b>Inflation</b>		<b>\$0</b>
<b>Current Year Construction Cost</b>							<b>\$105,253</b>
<b>Professional Fees at 16.0%</b>							<b>\$16,841</b>
<b>TOTAL PROJECT COST</b>							<b>\$122,094</b>

All costs shown as Present Value

RESTROOM ACCESSIBILITY UPGRADES			
<b>Project Number:</b>	AUSTAC02	<b>Category Code:</b>	
<b>Priority Sequence:</b>	3	AC3E	
<b>Priority Class:</b>	Critical	<b>System:</b>	ACCESSIBILITY
<b>Project Class:</b>	Plant Adaption	<b>Component:</b>	INTERIOR PATH OF TRAVEL
<b>Date Basis:</b>	6/10/2021	<b>Element:</b>	RESTROOMS/BATHROOMS

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

**Description**

Each floor has accessible restrooms but some components of these facilities still do not meet current accessibility standards. Upgrade grab bars in each accessible restroom, replace noncompliant room signage, adjust noncompliant mirror heights, and replace noncompliant wall lavatories, Also, install power door assist units on each of the accessible restrooms.

All costs shown as Present Value

**Project Cost Estimate**

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Door operator, signage, and controls	EA	6	\$5,003	\$30,017	\$1,730	\$10,382	\$40,399
Grab bars (per stall)	SYS	6	\$193	\$1,158	\$454	\$2,724	\$3,882
Mirror height adjustments	EA	2	\$50.00	\$100	\$85.00	\$170	\$270
ADA-compliant signage	EA	3	\$72.36	\$217	\$21.28	\$64	\$281
ADA-compliant lavatory	EA	3	\$838	\$2,513	\$312	\$935	\$3,448
<b>Base Material/Labor Costs</b>				<b>\$34,004</b>		<b>\$14,275</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$34,242</b>		<b>\$10,178</b>	<b>\$44,420</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$8,884</b>
<b>Original Construction Cost</b>							<b>\$53,304</b>
<b>Date of Original Estimate:</b>	6/10/2021					<b>Inflation</b>	<b>\$0</b>
<b>Current Year Construction Cost</b>							<b>\$53,304</b>
<b>Professional Fees at 16.0%</b>							<b>\$8,529</b>
<b>TOTAL PROJECT COST</b>							<b>\$61,833</b>

All costs shown as Present Value

INTERIOR DOOR HARDWARE UPGRADES			
<b>Project Number:</b>	AUSTAC01	<b>Category Code:</b>	
<b>Priority Sequence:</b>	4	AC3C	
<b>Priority Class:</b>	Critical	<b>System:</b>	ACCESSIBILITY
<b>Project Class:</b>	Plant Adaption	<b>Component:</b>	INTERIOR PATH OF TRAVEL
<b>Date Basis:</b>	6/10/2021	<b>Element:</b>	DOORS AND HARDWARE

**Code Application:**

**Subclass/Savings:**

**Project Location:**

ADAAG

309.4

DOJ2 - Access to Goods & Services

Undefined: Floor(s) 1,2,3

**Description**

While some of the interior doors have been upgraded and have lever hardware, the older doors at the offices still have knob hardware sets. These older doors are recommended for replacement. However, if door upgrades are delayed these older doors should be fitted with lever hardware sets.



All costs shown as Present Value

**Project Cost Estimate**

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Lever actuated door hardware	EA	130	\$414	\$53,806	\$166	\$21,554	\$75,360
<b>Base Material/Labor Costs</b>				<b>\$53,806</b>		<b>\$21,554</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$54,182</b>		<b>\$15,368</b>	<b>\$69,550</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$13,910</b>
<b>Original Construction Cost</b>							<b>\$83,460</b>
<b>Date of Original Estimate:</b>	6/10/2021					<b>Inflation</b>	<b>\$0</b>
<b>Current Year Construction Cost</b>							<b>\$83,460</b>
<b>Professional Fees at 16.0%</b>							<b>\$13,354</b>
<b>TOTAL PROJECT COST</b>							<b>\$96,814</b>

All costs shown as Present Value

STAIR TOWER RAILING UPGRADES			
<b>Project Number:</b>	AUSTAC03	<b>Category Code:</b>	
<b>Priority Sequence:</b>	5	AC3B	
<b>Priority Class:</b>	Critical	<b>System:</b>	ACCESSIBILITY
<b>Project Class:</b>	Plant Adaption	<b>Component:</b>	INTERIOR PATH OF TRAVEL
<b>Date Basis:</b>	6/10/2021	<b>Element:</b>	STAIRS AND RAILINGS

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

**Description**

Inner and outer railing designs on the four interior stair towers are not full accessible and should be upgraded. Install new accessible flanking handrails on each stair run. Also, install new rubber stair treads once the existing tread finishes are properly removed.

All costs shown as Present Value

**Project Cost Estimate**

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Wall-mounted handrail system per floor	FLR	8	\$780	\$6,242	\$709	\$5,675	\$11,917
Switchback handrail/guardrail system per floor	FLR	8	\$1,768	\$14,142	\$1,135	\$9,080	\$23,222
Stair tread and landing finish upgrades per floor	FLR	8	\$1,975	\$15,799	\$1,053	\$8,422	\$24,221
<b>Base Material/Labor Costs</b>				<b>\$36,184</b>		<b>\$23,176</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$36,437</b>		<b>\$16,525</b>	<b>\$52,962</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$10,592</b>
<b>Original Construction Cost</b>							<b>\$63,554</b>
<b>Date of Original Estimate:</b>	6/10/2021					<b>Inflation</b>	<b>\$0</b>
<b>Current Year Construction Cost</b>							<b>\$63,554</b>
<b>Professional Fees at 16.0%</b>							<b>\$10,169</b>
<b>TOTAL PROJECT COST</b>							<b>\$73,723</b>

All costs shown as Present Value

ROOF HATCH REPLACEMENTS			
<b>Project Number:</b>	AUSTES01	<b>Category Code:</b>	
<b>Priority Sequence:</b>	6	ES4B	
<b>Priority Class:</b>	Critical	<b>System:</b>	EXTERIOR
<b>Project Class:</b>	Corrective Action	<b>Component:</b>	ROOF
<b>Date Basis:</b>	6/10/2021	<b>Element:</b>	REPLACEMENT

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

**Description**

The two roof hatches and accompanying roof access ladders are aging and inadequate given the height exposure in the stair towers. Install new roof hatch assemblies and include new permanent roof access ladders with fall guards.

All costs shown as Present Value

**Project Cost Estimate**

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Replace roof access hatch, aluminum with curb, flashing, lock, and cover	EA	2	\$1,948	\$3,896	\$2,025	\$4,050	\$7,946
Vertical safety ladder with fall guards	LF	28	\$54.00	\$1,512	\$62.00	\$1,736	\$3,248
<b>Base Material/Labor Costs</b>				<b>\$5,408</b>		<b>\$5,786</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$5,446</b>		<b>\$4,126</b>	<b>\$9,571</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$1,914</b>
<b>Original Construction Cost</b>							<b>\$11,486</b>
<b>Date of Original Estimate:</b>	6/10/2021					<b>Inflation</b>	<b>\$0</b>
<b>Current Year Construction Cost</b>							<b>\$11,486</b>
<b>Professional Fees at 16.0%</b>							<b>\$1,838</b>
<b>TOTAL PROJECT COST</b>							<b>\$13,323</b>

All costs shown as Present Value

FIRE SPRINKLER SYSTEM INSTALLATION			
<b>Project Number:</b>	AUSTFS01	<b>Category Code:</b>	
<b>Priority Sequence:</b>	7	FS3A	
<b>Priority Class:</b>	Noncritical	<b>System:</b>	FIRE/LIFE SAFETY
<b>Project Class:</b>	Plant Adaption	<b>Component:</b>	SUPPRESSION
<b>Date Basis:</b>	5/25/2021	<b>Element:</b>	SPRINKLERS

**Code Application:**

NFPA 1, 13, 13R, 101

**Subclass/Savings:**

Not Applicable

**Project Location:**

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

**Description**

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

All costs shown as Present Value

**Project Cost Estimate**

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Install a wet-pipe sprinkler system, including valves, piping, sprinkler heads, piping supports, etc.	SF	63,866	\$4.70	\$300,170	\$5.74	\$366,591	\$666,761
<b>Base Material/Labor Costs</b>				<b>\$300,170</b>		<b>\$366,591</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$302,271</b>		<b>\$261,379</b>	<b>\$563,651</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$112,730</b>
<b>Original Construction Cost</b>							<b>\$676,381</b>
<b>Date of Original Estimate:</b>	5/25/2021		<b>Inflation</b>			<b>\$0</b>	
<b>Current Year Construction Cost</b>							<b>\$676,381</b>
<b>Professional Fees at 16.0%</b>							<b>\$108,221</b>
<b>TOTAL PROJECT COST</b>							<b>\$784,602</b>

All costs shown as Present Value

ASBESTOS ABATEMENT - INTERIOR FINISH SYSTEMS			
<b>Project Number:</b>	AUSTHE02	<b>Category Code:</b>	
<b>Priority Sequence:</b>	8	HE6F	
<b>Priority Class:</b>	Noncritical	<b>System:</b>	HEALTH
<b>Project Class:</b>	Plant Adaption	<b>Component:</b>	HAZARDOUS MATERIAL
<b>Date Basis:</b>	6/10/2021	<b>Element:</b>	OTHER

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

**Description**

Asbestos-containing materials (ACMs) are suspected to exist in the nine-inch vinyl floor tile and mastics, and in the textured ceiling finishes. It is also assumed that the nine-inch vinyl flooring is present under the carpeting and that textured ceilings are present above the acoustical lay-in ceilings. These areas should be sampled and tested. Assuming a positive test result, these areas should be abated prior to upgrading interior finishes in these areas.



All costs shown as Present Value

**Project Cost Estimate**

Task Description	Unit	Qty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Typical asbestos abatement of floor tile and mastic	SF	40,710	\$0.31	\$12,620	\$2.18	\$88,748	\$101,368
Typical asbestos abatement of textured ceiling finishes for standard height ceilings	SF	53,700	\$0.14	\$7,518	\$2.45	\$131,565	\$139,083
<b>Base Material/Labor Costs</b>				<b>\$20,138</b>		<b>\$220,313</b>	
<b>Indexed Material/Labor Costs</b>				<b>\$20,279</b>		<b>\$157,083</b>	<b>\$177,362</b>
<b>Construction Mark Up at 20.0%</b>							<b>\$35,472</b>
<b>Original Construction Cost</b>							<b>\$212,834</b>
<b>Date of Original Estimate:</b>	6/10/2021				<b>Inflation</b>		<b>\$0</b>
<b>Current Year Construction Cost</b>							<b>\$212,835</b>
<b>Professional Fees at 16.0%</b>							<b>\$34,054</b>
<b>TOTAL PROJECT COST</b>							<b>\$246,888</b>



FACILITY CONDITION ASSESSMENT

**SECTION 4**

LIFECYCLE COMPONENT  
INVENTORY



### RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK FACADES		ALL ELEVS	30,500	SF	1.12	\$262,379	1964	30	26	DR
EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK		ELEV TOWER	2,740	SF	1.12	\$23,571	1999	30	4	2033
EW01	WALL, EXTERIOR, MASONRY POINTING	CUT STONE ACCENTS			1,030	SF	1.12	\$8,861	1999	30	4	2033
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	SINGLE PANE			8,480	SF	1.12	\$1,453,793	1964	40	16	DR
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD			ELEV TOWER	90	SF	1.12	\$15,429	1999	40		2039
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			MAIN S ENTRY	4	LEAF	1.00	\$11,541	2010	25		2035
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			ELEV TOWER ENTRY	2	LEAF	1.00	\$5,770	2000	25	7	2032
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SERVICE DRS		BASEMENT	4	LEAF	1.00	\$8,123	1990	40	3	2033
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL	SECONDARY		ENTRIES	10	LEAF	1.00	\$20,309	2000	40		2040
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			ELEV MACH RM	1	LEAF	1.00	\$2,031	1998	40		2038
DR28	DOOR OPERATOR, POWER-ASSIST			MAIN S ENTRY	4	EA	1.00	\$34,916	2010	20		2030
RR03	ROOF - 1-PLY, ADHERED (EPDM, PIB, CSPE, PVC)	ELEV TOWER ADDITION			1,000	SF	1.25	\$8,429	1999	20	6	2025
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	MULTI LEVEL FLAT ROOFS			21,300	SF	1.25	\$180,057	2005	20		2025
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ORIGINAL		CORRIDORS	130	LEAF	1.00	\$486,024	1964	40	16	DR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED			STAIR & CORR ISOLATION	40	LEAF	1.00	\$149,546	2010	40		2050

### RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	RATED		VARIOUS	40	LEAF	1.00	\$149,546	2010	40		2050
DR24	DOOR LOCK, COMMERCIAL-GRADE	INTERIOR RATED DRS			40	EA	1.00	\$29,785	2010	20		2030
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DRS		BASEMENT	4	EA	1.00	\$2,979	1990	20	10	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			ELEV MACH RM	1	EA	1.00	\$745	1998	20	2	DR
DR26	DOOR PANIC HARDWARE	INTERIOR DRS		STAIR AND CORR ISOLATION	40	EA	1.00	\$48,731	2010	20		2030
DR26	DOOR PANIC HARDWARE			MAIN S ENTRY	4	EA	1.00	\$4,873	2010	20		2030
DR26	DOOR PANIC HARDWARE	SECONDARY		ENTRIES	10	EA	1.00	\$12,183	2000	20		DR
DR26	DOOR PANIC HARDWARE			ELEV TOWER ENTRY	2	EA	1.00	\$2,437	2000	20		DR
IW01	WALL FINISH - PAINT, STANDARD	PAINTED WALLS			103,830	SF	1.00	\$232,366	2010	12		2022
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CERAMIC TILE WAINSCOT			2,120	SF	1.00	\$81,355	1964	30	26	DR
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CER TILE WAINSCOT		ALL GENDER RRS	800	SF	1.00	\$30,700	2010	30		2040
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADE			17,370	SF	1.00	\$212,693	2010	12		2022
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	9X9 VINYL FLOOR TILE UPGRADE			40,710	SF	1.00	\$260,894	1964	20	36	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL FLOOR TILE			13,570	SF	1.00	\$86,965	1990	20	10	DR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC FLOOR TILE			1,220	SF	1.00	\$38,795	1964	30	26	DR

### RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC FLOOR TILE			410	SF	1.00	\$13,038	2010	30		2040
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	LAY-IN ACOUSTICAL CEILING			40,720	SF	1.00	\$410,928	2010	30		2040
IC04	CEILING FINISH - PAINTED OR STAINED, STANDARD	PAINTED CEILING UPGRADES			13,570	SF	1.00	\$30,369	2010	24	-6	2028
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		151	1	EA	1.00	\$302,064	1999	25		2024
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			1	EA	1.00	\$53,265	1999	12	9	DR
FX01	PLUMBING FIXTURE - LAVATORY, COUNTER	PC		RRS	2	EA	1.00	\$2,636	2010	35		2045
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	12	EA	1.00	\$15,962	1990	35		2025
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	4	EA	1.00	\$5,321	2010	35		2045
FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FLOOR MOUNT		JAN CLOSET	3	EA	1.00	\$5,378	1964	35	21	DR
FX10	PLUMBING FIXTURE - URINAL	PC		RRS	3	EA	1.00	\$6,354	1990	35		2025
FX10	PLUMBING FIXTURE - URINAL	PC		RRS	2	EA	1.00	\$4,236	2010	35		2045
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	15	EA	1.00	\$29,227	1990	35		2025
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	7	EA	1.00	\$13,639	2010	35		2045
PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	63,866	SF	0.98	\$608,518	1964	35	21	DR
WH25	WATER HEATER - RESIDENTIAL, ELECTRIC (>100 GAL)	WH-1		149	119	GAL	1.00	\$3,349	2017	10		2027

### RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON, BELL AND SPIGOT		THROUGHOUT	63,866	SF	0.98	\$919,071	1964	40	16	DR
PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1		149	1	EA	1.00	\$680	2010	20	-2	2028
CH20	DRY COOLER - REFRIGERANT OR GLYCOL	DRY COOLER		EXT	5	TON	1.00	\$2,830	2003	25		2028
AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-1-13		OFFICES	13	HP	1.00	\$117,105	1964	25	31	DR
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-003, ASSET 10429		237	25	HP	1.00	\$143,555	1964	25	31	DR
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-002, ASSET 10427		114	25	HP	1.00	\$143,555	1964	25	31	DR
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-001, ASSET10430		149	25	HP	1.00	\$143,555	1964	25	31	DR
AH17	AIR HANDLING UNIT - OUTDOOR PACKAGE (1.5-5 HP)	AHU-004, ASSET 10428		EXT	3	HP	1.00	\$60,771	2003	23		2026
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-1		ROOF	1	EA	1.00	\$7,951	1980	20	20	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	1	EA	1.00	\$7,951	2007	20		2027
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-3		149	1	HP	1.00	\$2,772	1964	20	36	DR
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, DUAL DUCT		THROUGHOUT	63,866	SF	0.98	\$2,009,465	1964	40	16	DR
HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		149	280	GPM	1.00	\$41,171	1964	35	21	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		149	1	EA	1.00	\$4,466	1964	20	36	DR
HX11	PRESSURE REDUCING VALVE, STEAM SYSTEM (3")	PRV-1		149	1	EA	1.00	\$6,828	1964	20	36	DR



### RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-001		149	5	HP	1.00	\$8,226	1990	25	5	DR
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		149	1	HP	1.00	\$1,645	2017	25		2042
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		149	3	HP	1.00	\$22,310	1995	20	5	DR
AH36	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (3-10 TON)	CRAC-1		FORMER SERV ROOM	5	TON	1.00	\$55,546	2003	15	2	DR
AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC		149	5	HP	1.00	\$8,971	2006	20		2026
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		SELECT SPACES	19,160	SF	1.13	\$107,322	1964	18	38	DR
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	DDC		THROUGHOUT	44,706	SF	1.13	\$250,414	2015	18	-3	2030
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, NOTIFIER		1ST FL CORR	1	EA	1.00	\$37,851	2018	15		2033
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	63,866	SF	0.98	\$255,320	2018	18		2036
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	277/480		THROUGHOUT	63,866	SF	0.98	\$1,377,458	1964	40	16	DR
SG03	MAIN SWITCHBOARD W/BREAKERS (600-800 AMP)	MDP-2		149	800	AMP	1.00	\$57,442	2000	20		DR
SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MDP-1		149	800	AMP	1.00	\$66,430	1964	20	36	DR
TX17	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (300-500 KVA)	T-1		EXT	500	KVA	1.00	\$71,140	2002	35		2037
TX17	TRANSFORMER - OIL-FILLED, 3PH, 5-15KV PRIMARY (300-500 KVA)	T-2		EXT	500	KVA	1.00	\$71,140	1998	35		2033
TX29	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (150-225 KVA)	STX		149	225	KVA	1.00	\$25,094	1964	30	26	DR

### RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	IN STL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-003		237	25	HP	1.00	\$8,870	2011	16		2027
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-002		114	25	HP	1.00	\$8,870	2009	16		2025
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-001		149	25	HP	1.00	\$8,870	2009	16		2025
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN CFL		EXT	4	EA	1.00	\$938	1985	15	20	DR
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID SCONCE		EXT	3	EA	1.00	\$2,965	1985	15	20	DR
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	LED SCONCE		EXT	4	EA	1.00	\$3,954	2017	15		2032
LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	CFL SCONCE		EXT	3	EA	1.00	\$1,245	1985	15	20	DR
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	LED		SELECT CLASSROOMS	19,160	SF	1.25	\$242,738	2016	20		2036
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	RETRO T8 LOW WATTAGE		ALL AREAS, SOME CLASSRMS	44,706	SF	1.25	\$566,379	1985	20	21	2026
GN02	GENERATOR - DIESEL (<30-100KW)	EGEN		EXT	90	KW	1.00	\$91,538	2019	25		2044
GN11	SWITCH - AUTO TRANSFER, 208 OR 240 V (>100 AMP)	ATS-2		149	260	AMP	1.00	\$7,332	2019	25		2044
GN15	SWITCH - AUTO TRANSFER, 480 V (100-400 AMP)	ATS-1		149	104	AMP	1.00	\$4,276	2019	25		2044
<b>Grand Total:</b>								<b>\$12,346,117</b>				

## RECURRING NEEDS BY YEAR

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

DEFERRED RENEWAL									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
EW01	WALL, EXTERIOR, MASONRY POINTING	BRICK FACADES		ALL ELEVS	B2010	30,500	SF	\$262,379	DR
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD	SINGLE PANE			B2010	8,480	SF	\$1,453,793	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DRS		BASEMENT	C1020	4	EA	\$2,979	DR
DR24	DOOR LOCK, COMMERCIAL-GRADE			ELEV MACH RM	C1020	1	EA	\$745	DR
DR26	DOOR PANIC HARDWARE	SECONDARY		ENTRIES	C1020	10	EA	\$12,183	DR
DR26	DOOR PANIC HARDWARE			ELEV TOWER ENTRY	C1020	2	EA	\$2,437	DR
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED	ORIGINAL		CORRIDORS	C1020	130	LEAF	\$486,024	DR
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CERAMIC TILE WAINSCOT			C3010	2,120	SF	\$81,355	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	9X9 VINYL FLOOR TILE UPGRADE			C3020	40,710	SF	\$260,894	DR
IF03	FLOORING - VINYL COMPOSITION TILE, STANDARD	VINYL FLOOR TILE			C3020	13,570	SF	\$86,965	DR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CERAMIC FLOOR TILE			C3020	1,220	SF	\$38,795	DR
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1			D1010	1	EA	\$53,265	DR

## RECURRING NEEDS BY YEAR

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

FX06	PLUMBING FIXTURE - SINK, SERVICE/LAUNDRY/UTILITY	FLOOR MOUNT		JAN CLOSET	D2010	3	EA	\$5,378	DR
PS02	SUPPLY PIPING SYSTEM - CLASSROOM	COPPER		THROUGHOUT	D2020	63,866	SF	\$608,518	DR
PD02	DRAIN PIPING SYSTEM - CLASSROOM	CAST IRON, BELL AND SPIGOT		THROUGHOUT	D2030	63,866	SF	\$919,071	DR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-1		ROOF	D3040	1	EA	\$7,951	DR
FN26	FAN - PROPELLER WITH LOUVER, 1/4" SP (.5-1 HP)	EF-3		149	D3040	1	HP	\$2,772	DR
HV02	HVAC DISTRIBUTION NETWORKS - CLASSROOM	CAV, DUAL DUCT		THROUGHOUT	D3040	63,866	SF	\$2,009,465	DR
HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		149	D3040	280	GPM	\$41,171	DR
HX11	PRESSURE REDUCING VALVE, STEAM SYSTEM (3")	PRV-1		149	D3040	1	EA	\$6,828	DR
HX09	PRESSURE REDUCING VALVE, STEAM SYSTEM (2")	PRV-2		149	D3040	1	EA	\$4,466	DR
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-001		149	D3040	5	HP	\$8,226	DR
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		149	D3040	3	HP	\$22,310	DR
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-003, ASSET 10429		237	D3040	25	HP	\$143,555	DR
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-002, ASSET 10427		114	D3040	25	HP	\$143,555	DR
AH10	AIR HANDLING UNIT - INDOOR (23-27 HP)	AHU-001, ASSET10430		149	D3040	25	HP	\$143,555	DR

### RECURRING NEEDS BY YEAR

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

AH01	AIR HANDLING UNIT - INDOOR (.5-1.25 HP)	FCU-1-13		OFFICES	D3040	13	HP	\$117,105	DR
AH36	COMPUTER ROOM AC UNIT - REFRIGERANT, EXCL. HEAT REJECTION (3-10 TON)	CRAC-1		FORMER SERV ROOM	D3050	5	TON	\$55,546	DR
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	HYBRID-DDC, PNEUM		SELECT SPACES	D3060	19,160	SF	\$107,322	DR
SE02	ELECTRICAL DISTRIBUTION NETWORK - CLASSROOM	277/480		THROUGHOUT	D5010	63,866	SF	\$1,377,458	DR
TX29	TRANSFORMER - DRY-TYPE, 3PH, 480V SECONDARY (150-225 KVA)	STX		149	D5010	225	KVA	\$25,094	DR
SG06	MAIN SWITCHBOARD W/BREAKERS (1600-2500 AMP)	MDP-1		149	D5010	800	AMP	\$66,430	DR
SG03	MAIN SWITCHBOARD W/BREAKERS (600-800 AMP)	MDP-2		149	D5010	800	AMP	\$57,442	DR
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN CFL		EXT	D5020	4	EA	\$938	DR
LE07	LIGHTING - EXTERIOR, WALL FLOOD (SV, MH, ID, LED)	HID SCONCE		EXT	D5020	3	EA	\$2,965	DR
LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	CFL SCONCE		EXT	D5020	3	EA	\$1,245	DR
<b>TOTAL DEFERRED RENEWAL COST</b>								<b>\$8,620,177.92</b>	

## RECURRING NEEDS BY YEAR

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

***No Projected Component Replacement Cost for Asset No. AUST for 2021***

2022									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
IW01	WALL FINISH - PAINT, STANDARD	PAINTED WALLS			C3010	103,830	SF	\$239,337	2022
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADE			C3020	17,370	SF	\$219,074	2022
<b>2022 PROJECTED COMPONENT REPLACEMENT COST</b>								<b>\$458,411.26</b>	

***No Projected Component Replacement Cost for Asset No. AUST for 2023***

### RECURRING NEEDS BY YEAR

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

2024									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		151	D1010	1	EA	\$330,074	2024
<b>2024 PROJECTED COMPONENT REPLACEMENT COST</b>								<b>\$330,073.54</b>	

2025									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	MULTI LEVEL FLAT ROOFS			B3010	21,300	SF	\$202,655	2025
RR03	ROOF - 1-PLY, ADHERED (EPDM, PIB, CSPE, PVC)	ELEV TOWER ADDITION			B3010	1,000	SF	\$9,487	2025
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		RRS	D2010	12	EA	\$17,966	2025
FX10	PLUMBING FIXTURE - URINAL	PC		RRS	D2010	3	EA	\$7,151	2025
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	D2010	15	EA	\$32,896	2025
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-002		114	D5010	25	HP	\$9,983	2025

### RECURRING NEEDS BY YEAR

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

VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-001		149	D5010	25	HP	\$9,983	2025
<b>2025 PROJECTED COMPONENT REPLACEMENT COST</b>								<b>\$290,120.97</b>	

2026									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
AH17	AIR HANDLING UNIT - OUTDOOR PACKAGE (1.5-5 HP)	AHU-004, ASSET 10428		EXT	D3040	3	HP	\$70,450	2026
AC01	AIR COMPRESSOR SYSTEM - HVAC CONTROLS (<=6 TOTAL HP)	CAC		149	D3060	5	HP	\$10,400	2026
LI02	LIGHTING SYSTEM, INTERIOR - CLASSROOM	RETRO T8 LOW WATTAGE		ALL AREAS, SOME CLASSRMS	D5020	44,706	SF	\$656,589	2026
<b>2026 PROJECTED COMPONENT REPLACEMENT COST</b>								<b>\$737,438.30</b>	

2027									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR



### RECURRING NEEDS BY YEAR

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

WH25	WATER HEATER - RESIDENTIAL, ELECTRIC (>100 GAL)	WH-1		149	D2020	119	GAL	\$3,999	2027
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	D3040	1	EA	\$9,494	2027
VF06	VARIABLE FREQUENCY DRIVE (20-25 HP)	VFD AHU-003		237	D5010	25	HP	\$10,591	2027
<b>2027 PROJECTED COMPONENT REPLACEMENT COST</b>								<b>\$24,082.95</b>	

2028									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
IC04	CEILING FINISH - PAINTED OR STAINED, STANDARD	PAINTED CEILING UPGRADES			C3030	13,570	SF	\$37,350	2028
PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1		149	D2030	1	EA	\$836	2028
CH20	DRY COOLER - REFRIGERANT OR GLYCOL	DRY COOLER		EXT	D3030	5	TON	\$3,481	2028
<b>2028 PROJECTED COMPONENT REPLACEMENT COST</b>								<b>\$41,666.97</b>	

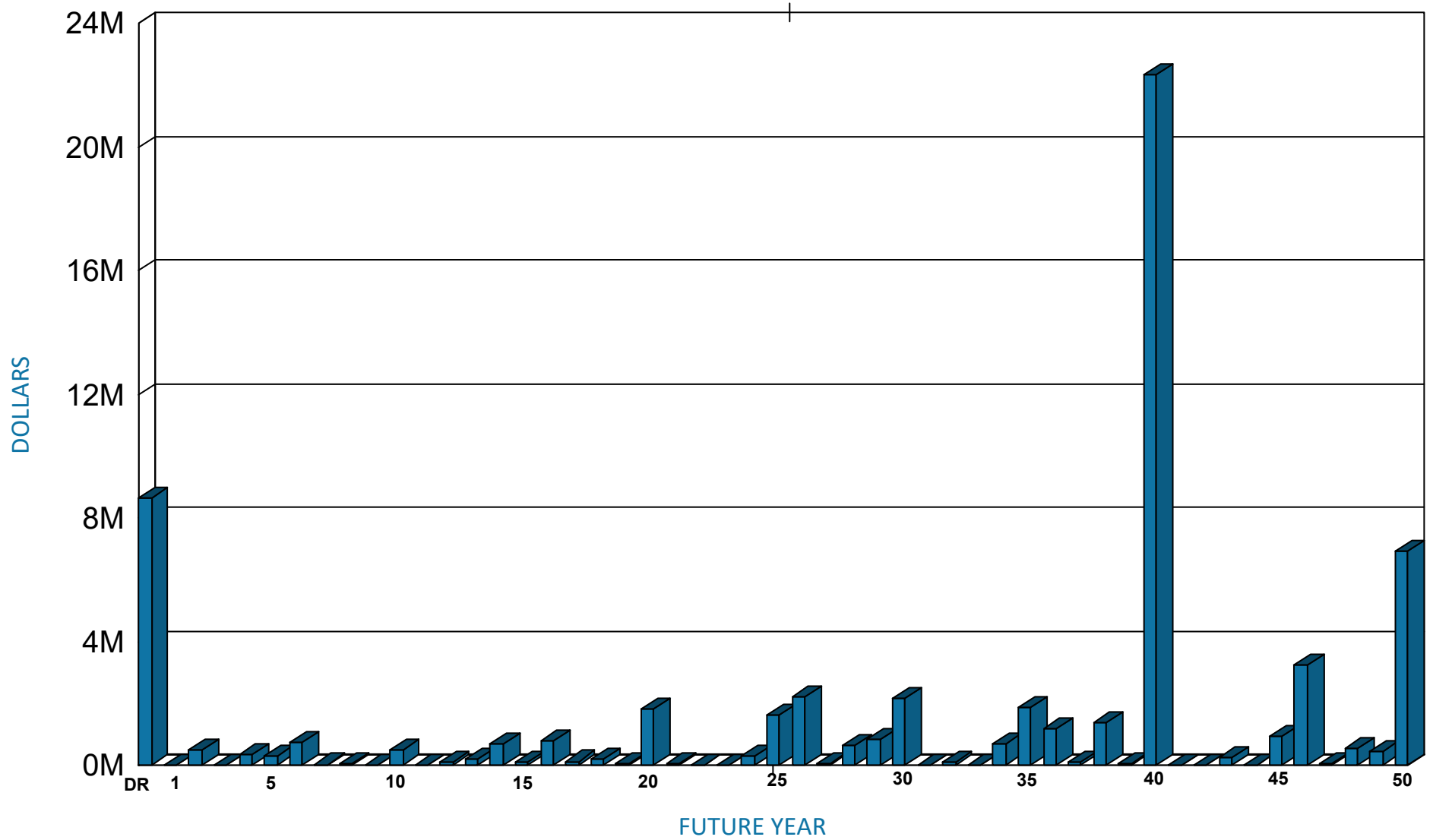
## RECURRING NEEDS BY YEAR

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

***No Projected Component Replacement Cost for Asset No. AUST for 2029***

2030									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
DR28	DOOR OPERATOR, POWER-ASSIST			MAIN S ENTRY	B2030	4	EA	\$45,557	2030
DR26	DOOR PANIC HARDWARE			MAIN S ENTRY	C1020	4	EA	\$6,358	2030
DR24	DOOR LOCK, COMMERCIAL-GRADE	INTERIOR RATED DRS			C1020	40	EA	\$38,863	2030
DR26	DOOR PANIC HARDWARE	INTERIOR DRS		STAIR AND CORR ISOLATION	C1020	40	EA	\$63,583	2030
BA102	HVAC CONTROLS SYSTEM - CLASSROOM	DDC		THROUGHOUT	D3060	44,706	SF	\$326,734	2030
<b>2030 PROJECTED COMPONENT REPLACEMENT COST</b>								<b>\$481,095.34</b>	

### RECURRING COMPONENT EXPENDITURE PROJECTIONS



Average Annual Renewal Cost per SF \$8.68

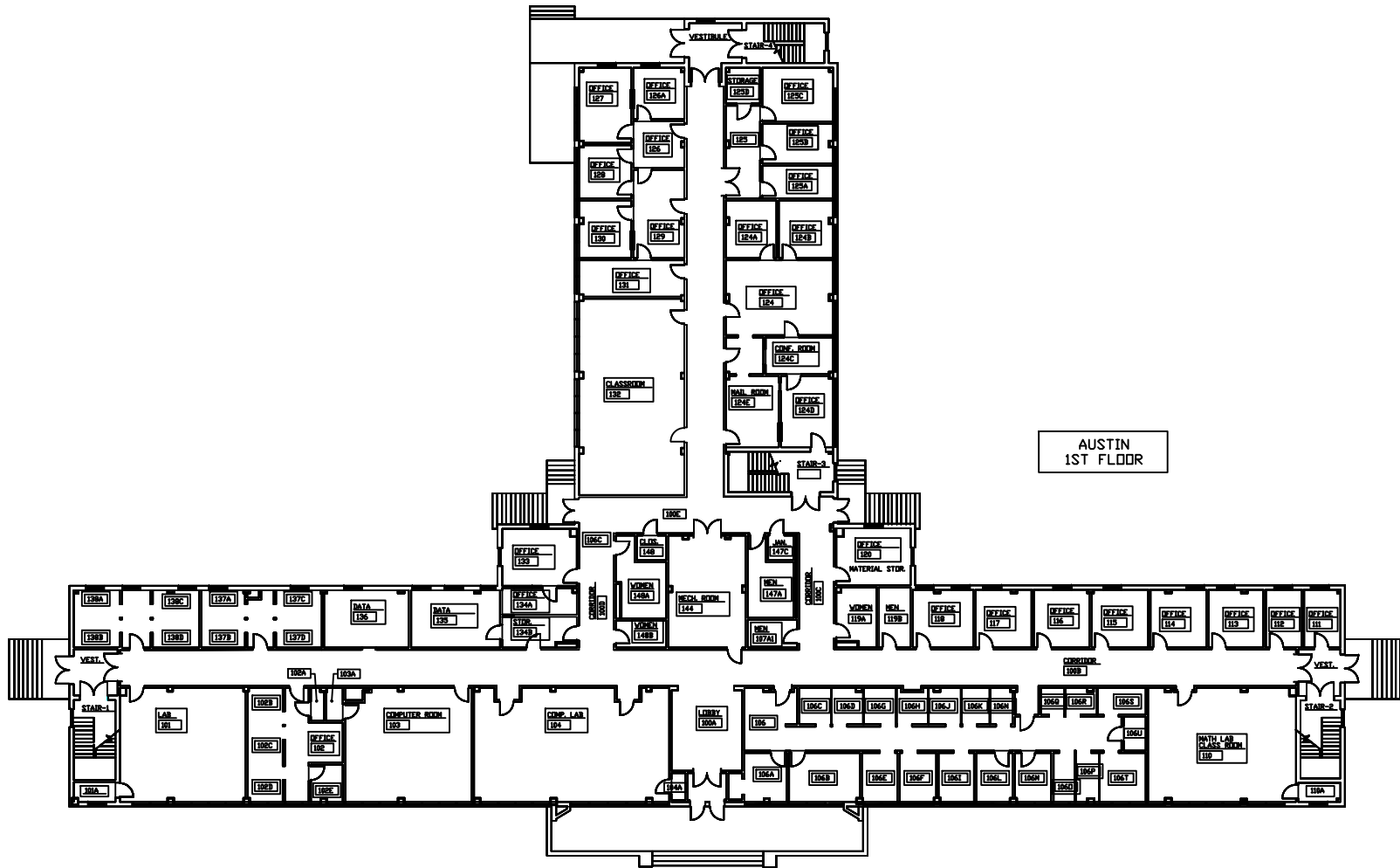


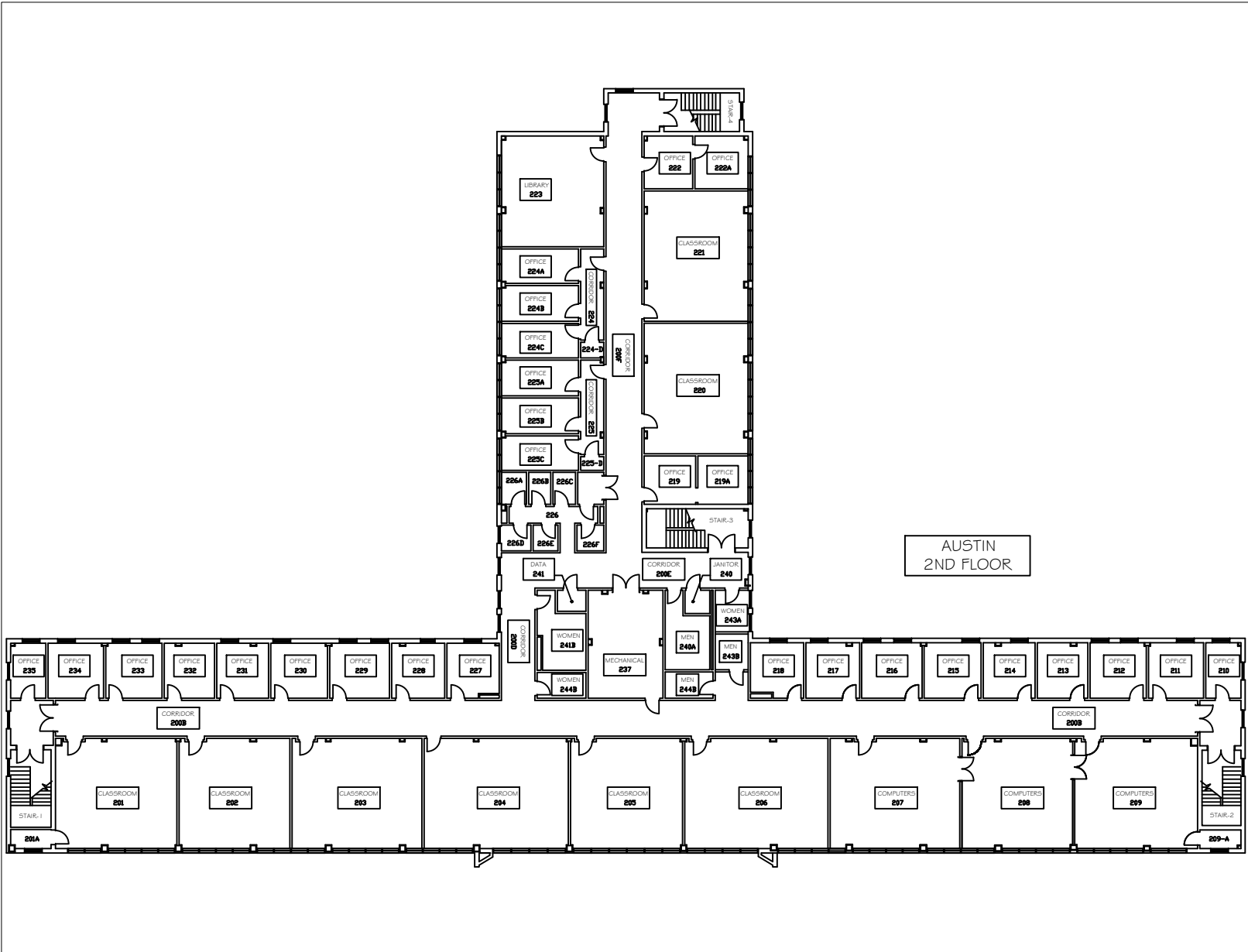
FACILITY CONDITION ASSESSMENT

**SECTION 5**

DRAWINGS











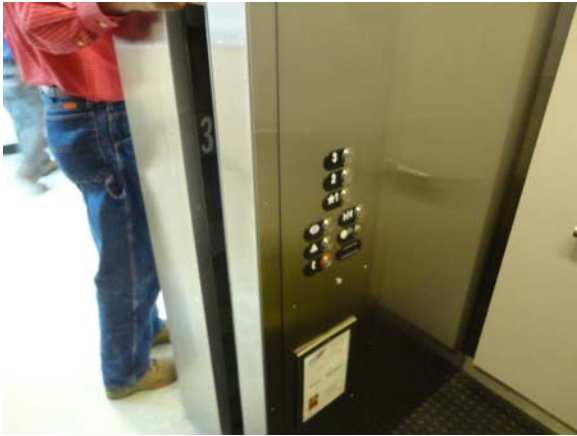


# FACILITY CONDITION ASSESSMENT

## **SECTION 6**

### PHOTOGRAPHS





AUST001a 5/11/2021  
Accessible elevator control panel  
Passenger elevator cab



AUST001e 5/11/2021  
Manual pull fire alarm device  
Third floor corridor



AUST002a 5/11/2021  
Deteriorated roof access hatch and ladder  
Third floor, stair tower



AUST002e 5/11/2021  
Local panelboard  
Third floor corridor



AUST003a 5/11/2021  
A second deteriorated roof access hatch and ladder  
Third floor, stair tower



AUST003e 5/11/2021  
Recessed LED lighting fixtures  
Room 321



AUST004a 5/11/2021  
Nonaccessible railing design  
Third floor, stair tower



AUST004e 5/11/2021  
Recessed LED lighting fixtures  
Third floor, restroom



AUST005a 5/11/2021  
Aging vinyl stair treads need upgrade  
Third floor, stair tower



AUST005e 5/11/2021  
Horn with strobe fire alarm device  
Third floor, restroom



AUST006a 5/11/2021  
Newer single-level water fountain  
Third floor corridor



AUST006e 5/11/2021  
HVAC diffusers  
Third floor corridor



AUST007a 5/11/2021  
Nine-inch vinyl floor tile, textured ceiling, and painted  
CMU walls  
Third floor corridor



AUST007e 5/11/2021  
Suspended T8 lighting fixtures  
Room 325B



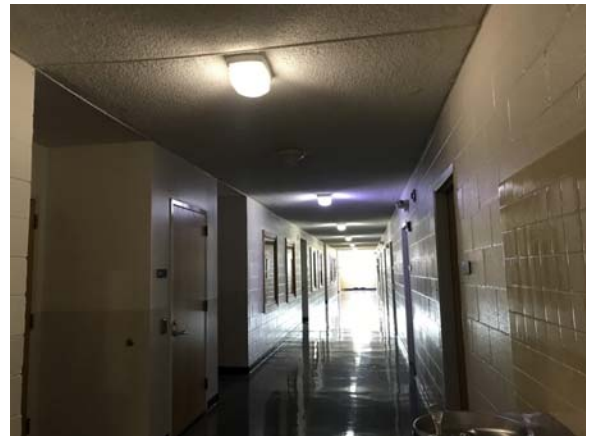
AUST008a 5/11/2021  
Partially accessible wall-hung lavatories  
Third floor, men's restroom



AUST008e 5/11/2021  
Fire extinguisher  
Third floor corridor



AUST009a 5/11/2021  
Two wall-hung urinals  
Third floor, men's restroom



AUST009e 5/11/2021  
Ceiling mounted lighting fixtures  
Second floor corridor



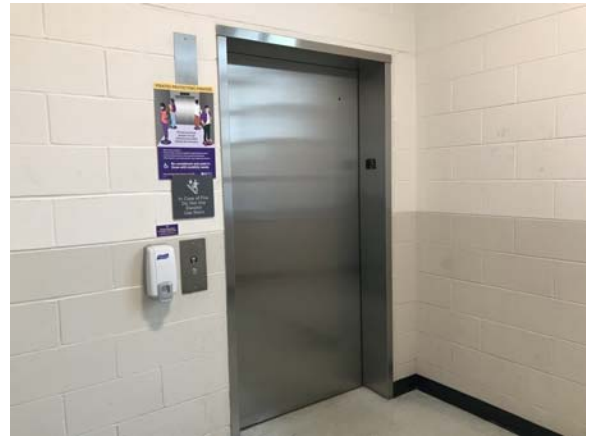
AUST010a 5/11/2021  
Standard tankless water closet  
Third floor, men's restroom



AUST010e 5/11/2021  
Potential asbestos insulation on mechanical piping  
Room 336



AUST011a 5/11/2021  
Ceramic tile wainscot and acoustical ceiling  
Third floor, men's restroom



AUST011e 5/11/2021  
Elevator exterior  
Elevator



AUST012a 5/11/2021  
Accessible two-fixture restroom  
Third floor, all-gender restroom



AUST012e 5/11/2021  
Elevator control panel  
Elevator





AUST013a 5/11/2021  
Aging original single-pane, metal-framed windows  
Third floor corridor



AUST013e 5/11/2021  
Air handling unit AHU-003  
Room 237



AUST014a 5/11/2021  
Standard wall-hung lavatories  
Third floor, women's restroom



AUST014e 5/11/2021  
DDC valve positioners  
Room 237



AUST015a 5/11/2021  
Standard tankless water closet  
Third floor, women's restroom



AUST015e 5/11/2021  
VFD for AHU-003  
Room 237



AUST016a 5/11/2021  
Older vinyl composite floor tile and lay-in acoustical ceiling  
Third floor, classroom



AUST016e 5/11/2021  
Main fire alarm panel  
Room 144



AUST017a 5/11/2021  
Older doors with nonaccessible knob hardware  
Third floor, office suite



AUST017e 5/11/2021  
Air handling unit AHU-002  
Room 144



AUST018a 5/11/2021  
Dual-level water fountain  
Third floor, south corridor



AUST018e 5/11/2021  
VFD for AHU-002  
Room 144



AUST019a 5/11/2021  
Accessible two-fixture restroom  
Third floor, men's restroom



AUST019e 5/11/2021  
Cast-iron piping with bell-and-spigot connections  
Room 144



AUST020a 5/11/2021  
Standard fixtures  
Third floor, men's restroom



AUST020e 5/11/2021  
Ceiling-mounted HID lighting fixture  
Entrance



AUST021a 5/11/2021  
Standard corner wall-hung lavatory  
Third floor, men's restroom



AUST021e 5/11/2021  
Air handling unit AHU-004  
Site



AUST022a 5/11/2021  
Broadloom carpeting and lay-in acoustical ceiling  
Third floor, classroom



AUST022e 5/11/2021  
Dry-cooler for computer AC unit  
Site



AUST023a 5/11/2021  
Newer corridor doors and lever hardware  
Third floor



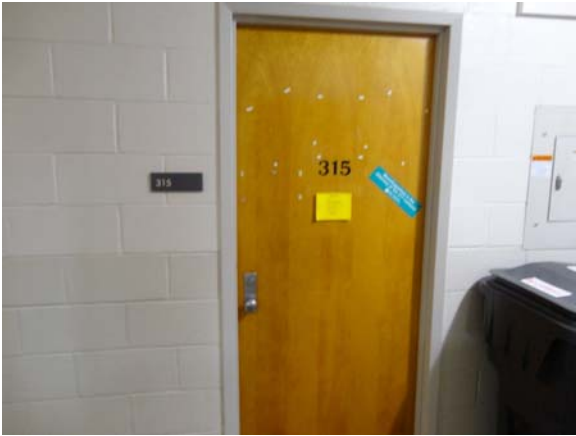
AUST023e 5/11/2021  
Diesel-fired emergency generator  
Courtyard



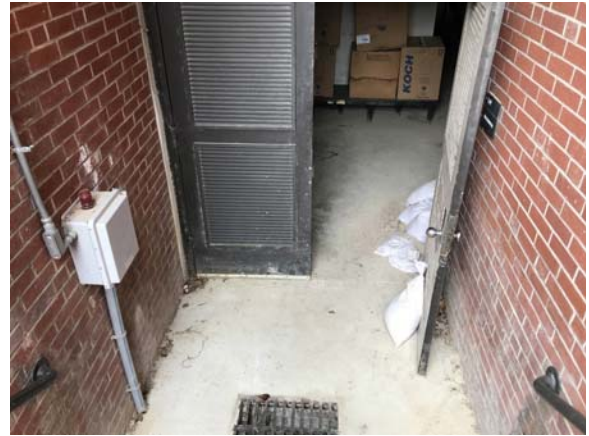
AUST024a 5/11/2021  
Vinyl composite floor tile and lay-in acoustical ceiling  
Third floor, classroom



AUST024e 5/11/2021  
Wall-mounted T8 lighting fixture  
Courtyard



AUST025a 5/11/2021  
Typical older nonrated office corridor door  
Third floor corridor



AUST025e 5/11/2021  
Sump pump  
Stairwell to basement mechanical room



AUST026a 5/11/2021  
Newer thermal-pane fixed glazing  
Third floor, west elevator tower addition



AUST026e 5/11/2021  
Controls air compressor  
Room 149



AUST027a 5/11/2021  
Unballasted membrane roof  
Third floor, west elevator tower addition



AUST027e 5/11/2021  
Air handling unit AHU-001  
Room 149



AUST028a 5/11/2021  
Some dissimilar vinyl flooring repairs  
Second floor corridor



AUST028e 5/11/2021  
VFD for AHU-001  
Room 149



AUST029a 5/11/2021  
Nine-inch vinyl floor tile, textured ceiling, and painted  
CMU walls  
Second floor corridor



AUST029e 5/11/2021  
Main switchboard  
Room 149



AUST030a 5/11/2021  
Older wall-mounted service sink  
Second floor, janitor's closet



AUST030e 5/11/2021  
Heating hot water pump  
Room 149



AUST031a 5/11/2021  
Lower built-up roof  
South center of building



AUST031e 5/11/2021  
Condensate receiver  
Room 149



AUST032a 5/11/2021  
Nine-inch vinyl floor tile, textured ceiling, and painted  
CMU walls  
First floor corridor



AUST032e 5/11/2021  
HVAC field panel  
Room 149



AUST033a 5/11/2021  
Accessible counter lavatory  
First floor, men's restroom



AUST033e 5/11/2021  
Residential electric water heater  
Room 149



AUST034a 5/11/2021  
Accessible toilet stall  
First floor, men's restroom



AUST034e 5/11/2021  
Fractional horsepower domestic hot water pump  
Room 149



AUST035a 5/11/2021  
Urinal area  
First floor, men's restroom



AUST035e 5/11/2021  
Step-down transformer  
Room 149



AUST036a 5/11/2021  
Accessible water fountains  
First floor corridor



AUST036e 5/11/2021  
Heating hot water shell-and-tube heat exchanger  
Room 149





AUST037a 5/11/2021  
Accessible counter sink  
First floor, women's restroom



AUST037e 5/11/2021  
Pressure reducing valves  
Room 149



AUST038a 5/11/2021  
Accessible toilet stall  
First floor, women's restroom



AUST038e 5/11/2021  
Automatic transfer switch  
Room 149



AUST039a 5/11/2021  
Older vinyl composite floor tile and lay-in acoustical  
ceiling  
First floor, classroom



AUST039e 5/11/2021  
Automatic transfer switch  
Room 149



AUST040a 5/11/2021  
Localized settlement crack in floor slab  
First floor, classroom



AUST040e 5/11/2021  
Ceiling-mounted HID lighting fixture  
Entrance



AUST041a 5/11/2021  
Newer vinyl flooring and acoustical ceiling  
First floor, computer lab



AUST041e 5/11/2021  
Oil-filled transformer  
Site



AUST042a 5/11/2021  
Hollow-metal doors at end elevation  
East end elevation



AUST042e 5/11/2021  
Oil-filled transformer  
Site



AUST043a 5/11/2021  
Original single-pane, metal-framed glazing  
East end elevation



AUST043e 5/11/2021  
Elevator controls  
Room 151



AUST044a 5/11/2021  
Brick and glazing  
Northeast corner elevation



AUST044e 5/11/2021  
Recessed can exterior lighting fixtures  
Soffit



AUST045a 5/11/2021  
Newer entry doors and stone accents  
North elevation



AUST046a 5/11/2021  
Bands of original single-pane glazing  
North elevation



AUST047a 5/11/2021  
Signs of upper masonry staining  
North elevation



AUST048a 5/11/2021  
Elevator tower addition  
West elevation



AUST049a 5/11/2021  
Newer glass entry doors and newer tower windows  
West elevation



AUST050a 5/11/2021  
Newer hollow-metal service door  
West elevation



AUST051a 5/11/2021  
Brick finishes and glazing  
Southwest elevation



AUST052a 5/11/2021  
Hollow-metal service doors at areaway  
Southwest elevation



AUST053a 5/11/2021  
Ramped access to first floor  
South end elevation



AUST054a 5/11/2021  
Hollow-metal service doors at areaway  
Southeast elevation



FACILITY CONDITION ASSESSMENT

**SECTION 7**

PRELIMINARY ENERGY  
ASSESSMENT





## INTRODUCTION

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

TABLE 1. BUILDING INFORMATION	
Client	East Carolina University
Asset Number	AUST
Asset Name	Austin Building
Year Built or Last Energy Renovation	1964

## 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.

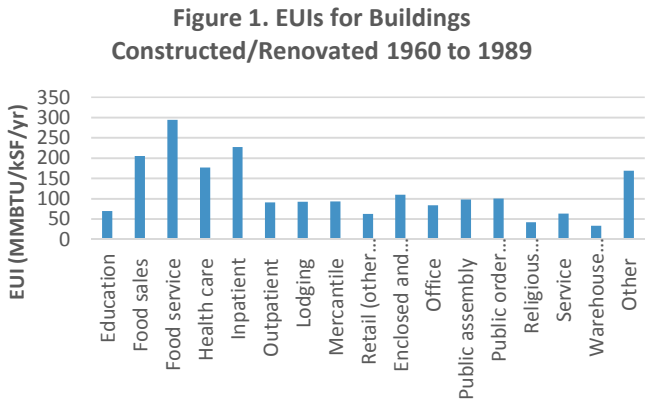
### Metric #1: Energy Use Intensity (EUI)

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
<b>Benchmark EUI (MMBTU/kSF/yr) =</b>	<b>70.1</b>
<b>Building EUI to be Calculated by Client (MMBTU/kSF/yr) =</b>	

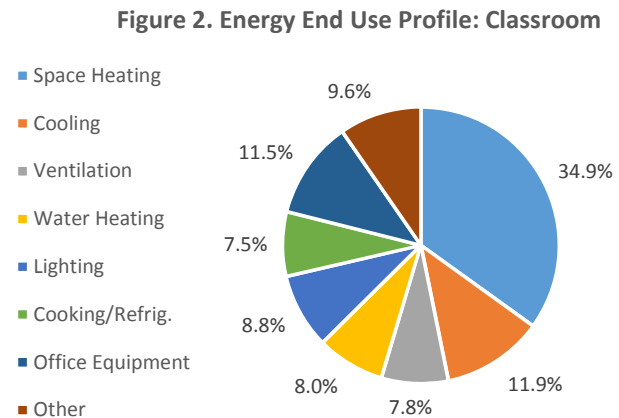
TABLE 3. EUI COMPARISON	
<b>Very Energy Efficient</b> (consumes more than 30% less energy)	EUI < 49.1
<b>Energy Efficient</b> (consumes 10% to 30% less energy)	49.1 <= EUI <= 63.1
<b>Similar</b> (consumes within 10% less or 10% more energy)	63.1 < EUI < 77.1
<b>Energy Inefficient</b> (consumes 10% to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



### Metric #2: Energy End Use

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

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



References:

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

## ENERGY CONSERVATION OPPORTUNITIES

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

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

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

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

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
Building Envelope - Window/Door Heat Gain/Loss	INCREASE THE R-VALUE OF THE WINDOWS/DOORS. ENERGY STAR qualified fenestration products such as windows and doors can minimize HVAC energy consumption by reducing solar heat gain/loss.	CAP
Building Envelope - Window/Door Air Infiltration	WEATHERSTRIP/CAULK WINDOWS/DOORS. When there is air leakage, weatherstrip around movable components and caulk around rigid components to reduce infiltration and save on heating/cooling costs.	O&M; LC/NC
Lighting - Interior	INSTALL EFFICIENT LIGHTING FIXTURES. While incandescent lamp fixtures have a low initial cost, the lamps are energy inefficient and have a short useful life. Consider CFL and LED lighting instead. HID lamps are necessary in some applications; however, alternatives such as high bay, T5 lighting fixtures or LED fixtures should be considered as an alternate. T12 lamps are an outdated lighting technology that should be replaced with newer technologies such as T8, T5, or LED lamp fixtures.	N/A, Varies
Lighting - Interior, Controls	INSTALL LIGHTING CONTROLS. Oftentimes, lighting fixtures on switches do not get turned off when a space is unoccupied. Occupancy sensors, photocell sensors, and lighting control systems can help reduce lighting energy consumption. For example, consider installing occupancy sensors in offices, common areas, and other areas that have variable occupancy. In areas where there is natural lighting, consider using photocell sensors to dim or shut off fixtures that aren't needed. Alternatively, install a comprehensive light control system that uses time clock schedules, occupancy sensors, photocell sensors, etc., to monitor and control lighting throughout an entire building.	N/A, Varies
Lighting - Exterior	INSTALL EFFICIENT LIGHTING FIXTURES. While incandescent lamp fixtures have a low initial cost, the lamps are energy inefficient and have a short useful life. Consider CFL and LED lighting instead. HID lamps are necessary in some applications; however, alternatives such as high intensity T5 or LED fixtures should be considered. T12 lamps are an outdated lighting technology that should be replaced with newer technologies such as high intensity fluorescent or LED lamp fixtures.	N/A, Varies

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
Lighting - Exterior, Controls	INSTALL LIGHTING CONTROLS. Consider using photocell sensors or timeclocks to shut off building/parking lot fixtures during daylight hours.	N/A, Varies
HVAC - Central Heating	INSTALL AN ENERGY-EFFICIENT BOILER. Energy-efficient boilers and condensing boilers achieve higher efficiencies than conventional boilers. Research FEMP designated commercial boilers to find the most energy-efficient options.	CAP
HVAC - Hydronic Dist. Network Insulation	INSULATE THE HVAC PIPING. Insulating HVAC piping reduces heat loss and decreases energy consumption.	CAP
HVAC - Air Dist. Network Insulation	INSULATE DUCTWORK. Insulating HVAC ductwork reduces heat loss and decreases energy consumption.	CAP
HVAC - Air Dist. Network, VAV	INSTALL VARIABLE AIR VOLUME (VAV) SYSTEM. In constant air volume (CAV) systems, more energy is required to heat, cool, and distribute air than in VAV systems. Consider a VAV system to reduce energy consumption, mainly fan energy consumption.	CAP
HVAC - BAS	INSTALL A BAS. Consider installing a BAS so that there is autonomous control of the building HVAC systems.	CAP
HVAC - EMCS	CONNECT BAS TO EMCS. Consider connecting the BAS to a central EMCS so that the system can be monitored and controlled at a central location.	CAP
HVAC - Exhaust Ventilation	INSTALL ENERGY RECOVERY SYSTEM. Energy Recovery Ventilation (ERV) systems exchange heat between outgoing exhaust air and the incoming outdoor air. Investigate the feasibility of installing an ERV system to pre-heat/cool ventilation air.	LC/NC; CAP
HVAC - Unitary Equipment	INSTALL EFFICIENT UNITARY EQUIPMENT. Consider replacing the existing equipment with FEMP recommended/ENERGY STAR qualified unitary equipment.	LC/NC; CAP
HVAC - Unitary Equipment Controls	UPGRADE CONTROLS. Install controls that allow the unitary equipment to be programmed for on/off and/or thermostat setpoints so that the systems operate at appropriate temperatures and do not run when the building/space is unoccupied.	LC/NC; CAP
HVAC - Building Comfort/Tuning	CONDUCT RETROCOMMISSIONING (RCX). RCx the building to identify and address operating deficiencies, optimize HVAC operations, reduce energy bills, and improve occupant comfort.	CAP
Electrical - VFDs	INSTALL VARIABLE FREQUENCY DRIVES. Install VFDs on motors greater than 5 hp to reduce energy consumption by varying motor speed based on system demand.	O&M; LC/NC; CAP
Plumbing - DHW Piping Insulation	INSULATE THE DOMESTIC HOT WATER PIPES. Insulating piping reduces heat loss, thereby reducing the amount of energy consumption.	LC/NC; CAP
Plumbing - DHW Heater Efficiency	INSTALL A HIGH-EFFICIENCY WATER HEATER. High efficiency/ENERGY STAR water heaters consume less energy. Consider condensing water heaters that capture the latent heat from water vapor contained in the flue gases.	LC/NC; CAP

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
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
Plumbing - Urinals	INSTALL LOW-FLOW URINALS. WaterSense labeled urinals save water and reduce the energy required to pump water.	LC/NC; CAP

