EAST CAROLINA UNIVERSITY

Facility Condition Assessment

Rivers West
Asset RIVW

Inspected May 12, 2021

Revised 10/21/21

ISES CORPORATION

TABLE OF CONTENTS

FACILITY CONDITION ASSESSMENT

SECTION 1

ASSET OVERVIEW

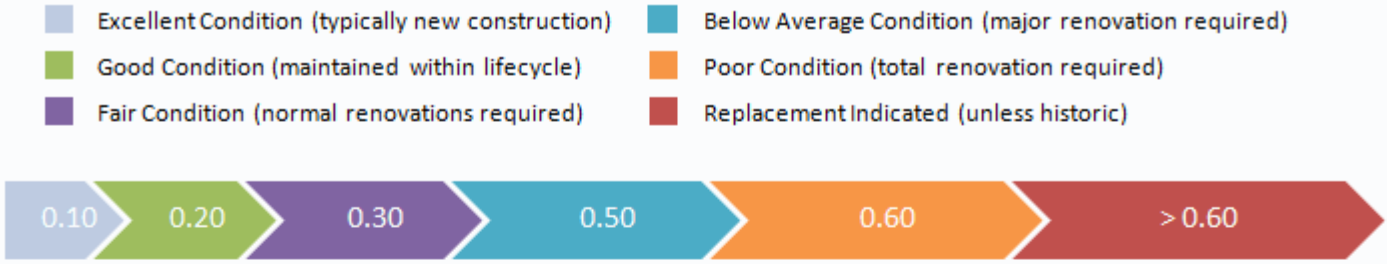
ASSET EXECUTIVE SUMMARY

All costs shown as Present Value

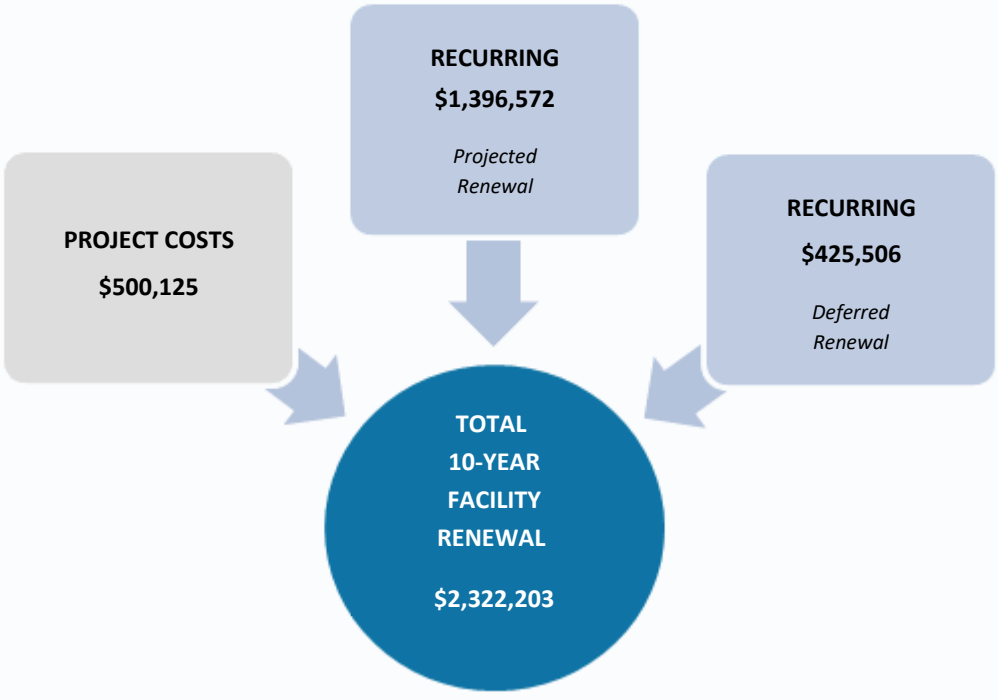
ASSET CODE	RIVW	**CURRENT REPLACEMENT VALUE**	$17,701,000
ASSET NAME	RIVERS WEST	**FACILITY CONDITION NEEDS INDEX**	0.13
ASSET USE	Office / Administrative	**FACILITY CONDITION INDEX**	0.02
YEAR BUILT	2004	**10-YEAR $/SF**	60.71
GSF	38,249		
INSPECTION DATE	05/12/2021		

FCNI Scale

The FCNI for this asset is **0.13**



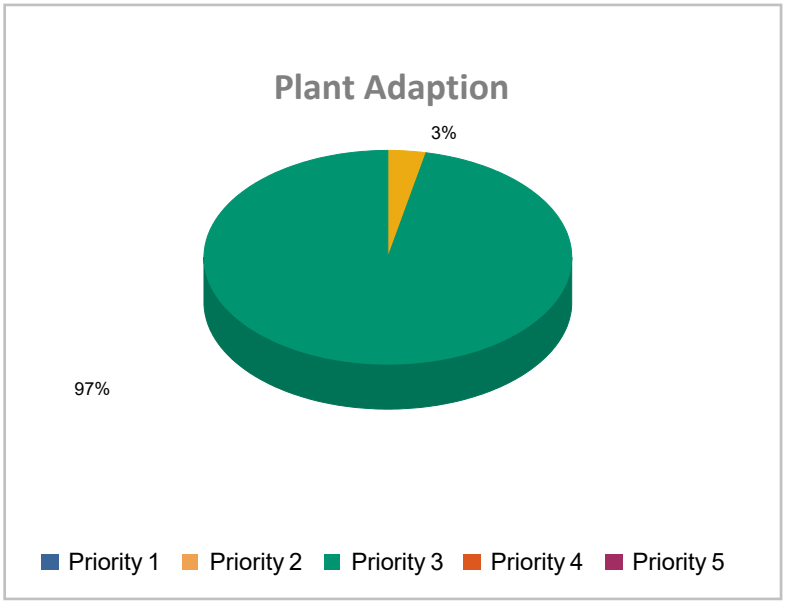
Total Facility Renewal Costs



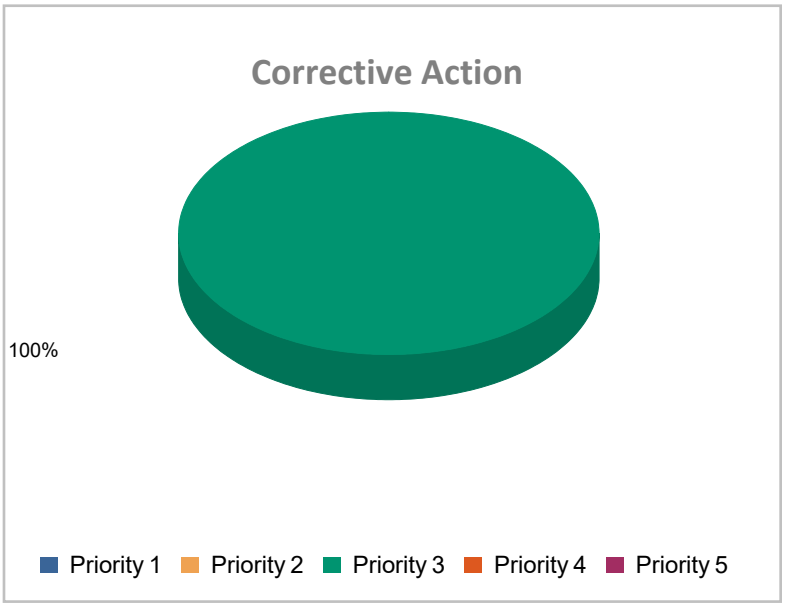
Project Costs

Project Cost by Priority

PLANT ADAPTION	
Priority 1	**$0**
Priority 2	**$16,249**
Priority 3	**$472,482**
Priority 4	**$0**
Priority 5	**$0**

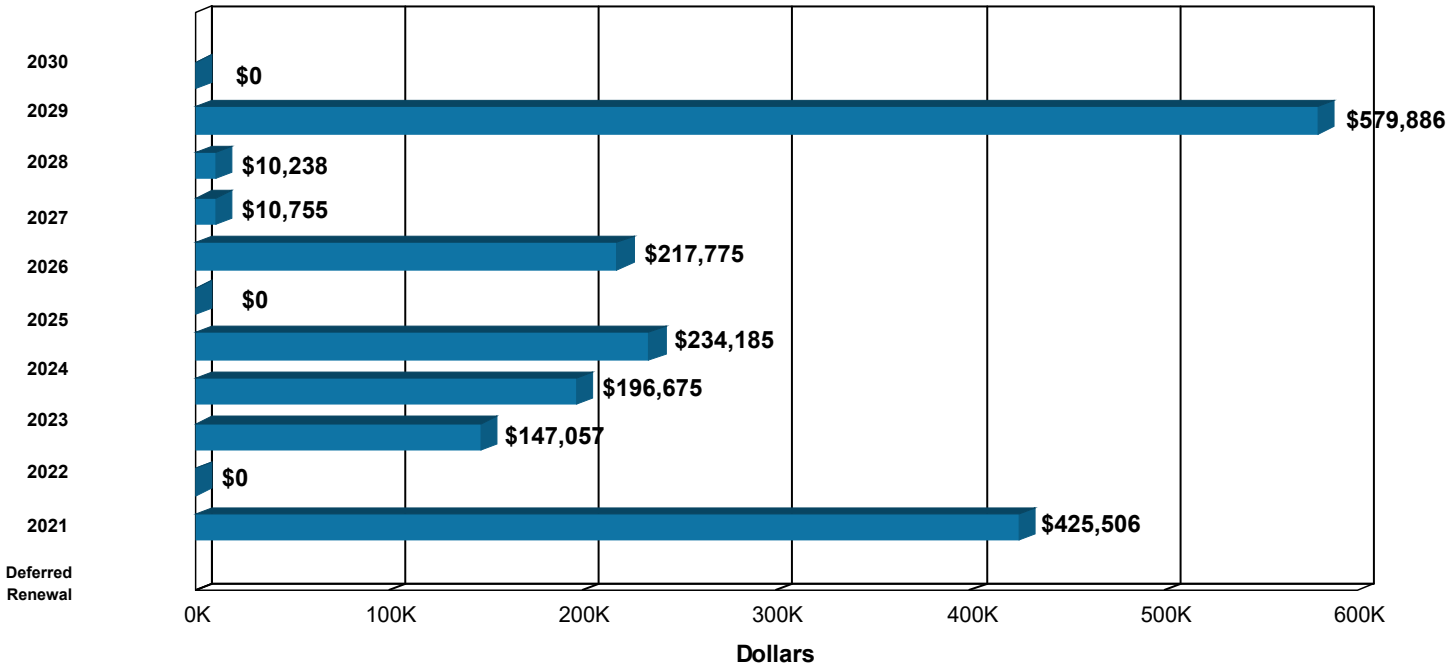


CORRECTIVE ACTION	
Priority 1	**$0**
Priority 2	**$0**
Priority 3	**$11,394**
Priority 4	**$0**
Priority 5	**$0**

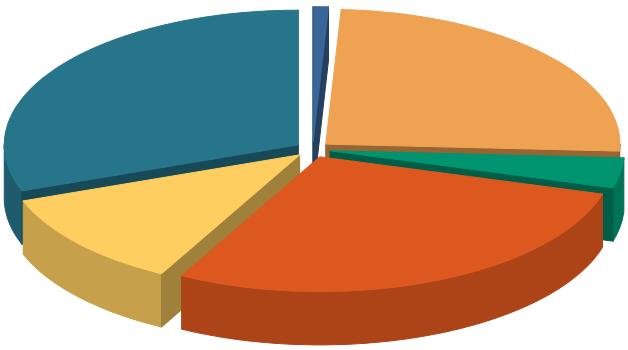


Recurring Costs

Component Replacement Cost by Year



Facilities Renewal Cost by System



Accessibility	$16,249	1%
Electrical	$582,767	25%
Exterior	$83,251	4%
Fire/Life Safety	$658,561	28%
Health	$0	0%
HVAC	$269,088	12%
Interiors	$712,286	31%
Plumbing	$0	0%
Site	$0	0.0%
Vert. Trans.	$0	0%
Security	$0	0.0%
TOTAL	**$2,322,203**	

ASSET SUMMARY

Built in 2004, Rivers West is a three-story office addition to the main Rivers Building on the East Carolina University main campus. This narrow, rectangular addition contains a mixture of offices and meeting rooms with a larger auditorium on the first floor. Exterior facades are brick veneer with cast stone accents around the windows and doors and a metal clad upper soffit. Exterior doors are mostly glass with a few hollow-metal egress and service doors. The glazing is thermal-pane, metal-framed windows. Rivers West totals approximately 38,249 gross square feet.

The information for this report was gathered during an inspection conducted on May 12, 2021.

Site

The site is relatively flat with landscaping consisting mostly of paving, with some turf grass, ornamental shrubs, and trees. Planting is adequate and no additional landscaping is warranted. Paved walkways are also in good condition. There are not parking lots directly associated with this building.

Exterior Structure

This building has a brick veneer exterior finish with cast stone trim around the windows, doors, and floor lines. There is a prominent tower at the south end that houses one of the two main egress stairs. The building has indications of localized water infiltration and some selective repointing work is needed along with recaulking of the cast stone detailing. Also, some finish spalling was noted on the plaza wall caps that should be repaired as part of this upgrade. The prefinished, metal clad trim on the upper elevations should outlast the scope of this report.

The majority of the exterior doors are glass and aluminum assemblies, including the upper tower roof access door. These doors are still in adequate condition and no upgrades should be needed. The few hollow-metal secondary egress and service doors are also in good condition and no upgrades are warranted other than hardware. The thermal-pane, metal-framed glass curtainwall on the stair tower and some of the assembly areas is in good condition as are the fixed, thermal-pane glazing on the main elevations. No glazing upgrades are needed in the near future.

The hipped, terra cotta tile main upper and south tower roofs are in good condition and no upgrades appear to be needed. The lower east flat, built-up roofs are also in adequate condition for their age but will reach the end of their normal lifecycle within the next few years and should be replaced in kind.

Interior Finishes/Systems

The interior finishes have an average appearance. The walls are painted and showing some wear and minor contact damage. They should be repainted in the near future. The wood panel wainscoting in the

auditorium still has a good appearance and no upgrades are needed. The floor finishes are mostly carpet in offices, meeting rooms, and most corridors. The first floor lobby and main corridor have terrazzo tile and there are ceramic floor and wall tile finishes in the restrooms. The carpeting is showing wear and should be replaced with carpet tile, especially in heavy trafficked areas. Ceramic floor and wall tiles in the restrooms are in good overall condition as is the terrazzo floor tile in the common areas and no upgrades are warranted. Acoustical ceiling systems appear to be sound and, except for some random stained ceiling tiles, are in good overall condition. No major ceiling upgrades are anticipated for the near future. The fixed seating in the first floor auditorium is not showing excessive wear and the casework in the various break areas still has a good general appearance. No upgrades are recommended for these finishes. Interior door assemblies on all floors are in good working order. Doors have lever hardware and accessible room signage and no reported functional issues.

Accessibility

The building has on-grade accessibility at key entry points and there is an accessible passenger elevator. The two stair towers have accessible handrail designs and the interior doors have both lever hardware and accessible wall-mounted room signage with Braille. The first floor auditorium has accessible seating. However, both side aisles lack flanking wall-mounted accessible handrails. Install these additional railings to help improve user safety and accessibility. Also, there is no indication of an assistive listening system and one should be installed to aid the hearing impaired. The restrooms on each floor have accessible fixtures and adequate circulation clearances. No additional accessibility upgrades appear to be needed at this time.

Health

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

Fire/Life Safety

The stair finishes are beginning to deteriorate and should be upgraded before they become unsafe. Install stair treads and color contrast nosings that will provide adequate traction during egress.

This facility contains a Simplex point addressable fire alarm and detection system that contains a main fire alarm panel, manual pull stations, smoke detectors, and horn and strobe alarm systems. The panel and devices are original and should be evaluated for replacement within the next ten years due to technical obsolescence.

This facility is not protected by an automatic fire suppression system. Fire suppression is handled manually via strategically placed dry-type handheld fire extinguishers and stand pipes. 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 two belt-driven air handling units. Exhaust for the restrooms is handled by a centrifugal exhaust fan, and an inline exhaust fan serves the main mechanical room. The air handling units are in good condition with routine scheduled maintenance. They are expected to remain viable for the next ten years. Due to lifecycle depletion, the inline and rooftop exhaust fans should be evaluated for replacement within the next decade.

Chilled water is supplied by the central chilled water plant. Two 30-hp inline chilled water pumps act as a backup as the chilled water plant provides adequate pressure for the building. However, the pumps should be evaluated for replacement, and/or removal, depending upon the future needs of the building. Heating hot water is generated through a shell-and-tube heat exchanger utilizing steam generated at the central steam plant. High pressure steam is reduced to low pressure steam through a pressure reducing valve. Heating hot water is circulated throughout via two 10-hp inline centrifugal pumps. Condensate from the heat exchanger is collected and transferred back to the central plant via a duplex condensate receivers. The chilled water and heating hot water systems also serve the adjacent Rivers Building. The heat exchanger and heating hot water pumps are believed to be in good condition and expected to remain viable for the next ten years. The condensate receiver and the pressure reducing valve should be evaluated for replacement within the next ten years due to lifecycle depletion.

The original HVAC distribution network is a variable air volume (VAV) design consisting of insulated metallic conduit, VAV terminal boxes with reheat, insulated mechanical piping, valves, diffusers, and similar elements. The HVAC controls are direct digital (DDC) and also original. The distribution network appears to be in good condition and is expected to remain viable for the next ten years. Due to technical obsolescence, it is recommended that the HVAC controls be upgraded as replacement and compatible components and software can become difficult to obtain.

Electrical

Main electrical service is fed to this facility from the Rivers Building at 277/480 volts. 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 distribution network is original and expected to remain viable beyond the ten-year scope.

Variable frequency drives (VFDs) are associated with the air handling units, fan coil units, and the heating hot water pumps. It is recommended that they be replaced during any future HVAC renovations.

The majority of the interior lighting is original to 2004 and consists of recessed can fixtures and various recessed lay-in fixtures. It was reported that the lighting was retrofitted to LED lamps, which has extended the service life and provided energy savings. However, it is recommended that the lighting be replaced with purpose-built self-contained LED fixtures, as they require less maintenance. Automated on/off timer lighting controls and occupancy sensing on/off lighting controls should also be added

throughout to save energy and reduce operational costs by extending lamp life. Timers should be controlled by building automation systems or be otherwise digitally programmable. The occupancy sensors should be preset for preferred inactivity periods for activation. A cost adjustment has been added to the older lighting for the installation of lighting controls.

The exterior lighting consists of recessed can CFLs, CFL sconces, and bollard fixtures. While currently functional, the exterior lighting is less efficient and requires more frequent maintenance than modern LED-based outdoor lighting. It is recommended that the exterior lighting be replaced with LED fixtures.

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, hubless connections. The supply and drain piping are original and reported to be in good condition.

Domestic hot water is generated through a tube-in-tank heat exchanger with associated fractional horsepower circulation pumps. The domestic hot water system also serves the adjacent Rivers Building. No issues were observed or reported and the system is expected to remain viable for the next ten years.

A small modular sump pump in the mechanical room was likely 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 tankless water closets, counter and wall-hung lavatories, and urinals are still in good working order. The janitor's sinks also appears to be adequate with no issues reported. The stainless-steel kitchen sinks in the break areas are adequate and should only be replaced when the casework is upgraded.

Vertical Transportation

A three-stop hydraulic-controlled passenger elevator with a capacity of 4,500 pounds serves this facility. The controls and cab appear to be in good condition. No issues were observed or reported during the inspection and the elevator is expected to remain viable for the next ten years with routine inspection and maintenance. No detailed elevator testing was conducting during this assessment.

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

INSPECTION TEAM DATA

Report Development

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Date of Inspection

May 12, 2021

Inspection Team Personnel

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

Client Contact

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

DEFINITIONS

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

Overview

Recurring and Nonrecurring Facility Renewal Costs

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

Facility Condition Needs Index (FCNI)

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

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

Facility Condition Index (FCI)

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

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

Material and Labor Cost Factors and Additional Markups

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

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

Recurring Costs

Renewable Component Inventory and Cost Projections

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

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

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

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

Recurring Cost Classifications

- Deferred Renewal
  Recurring repairs, generated by the Renewable Component Inventory, that are past due for completion and have not yet been accomplished as part of normal maintenance or capital repair efforts. Further deferral could impair the proper functioning of the facility. Deferred Renewal upgrades should include compliance with applicable codes, even if such compliance requires expenditures beyond those essential to effect the needed repairs.

- Projected Renewal
  Recurring renewal efforts, generated by the Renewable Component Inventory, that will be due within the scope of the assessment. These are regular or normal facility maintenance, repair, or renovation efforts that should be planned in the near future.

Nonrecurring Costs

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

Project Number

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

Project Classifications

- Plant Adaption
  Nonrecurring expenditures, stored in the Projects module, required to adapt the physical plant to the evolving needs of the institution and to changing codes or standards. These are expenditures beyond normal maintenance. Examples include compliance with changing codes (e.g., accessibility), facility alterations required by changing teaching or research methods, and improvements occasioned by the adoption of modern technology (e.g., the use of personal computer networks).

- Corrective Action
  Nonrecurring expenditures, stored in the Projects module, for repairs needed to correct random and unpredictable deficiencies. Such projects are not related to aligning a building with codes or standards. Deficiencies classified as Corrective Action could have an effect on building aesthetics, safety, or usability.

Priority Classes

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

- Priority 1 – High

  Items in this category include:

  a. correcting a cited safety hazard
  b. stopping accelerated deterioration
  c. returning a facility to normal operation

- Priority 2 – Medium

  Items in this category include:

  a. repairs to prevent further deterioration
  b. improvements to facility approach/entry and access to goods and services (DOJ ADA title III, priorities 1 and 2)
  c. correction of potential safety hazards

- Priority 3 – Low

  Items in this category include:

  a. improving access to restrooms and other amenities (DOJ ADA title III, priorities 3 and 4)

  b. bringing a facility into compliance with current building codes as grandfather clauses expire

  c. increasing usability following an occupancy or use change

  d. actions that are recommended but not required by code

Project Subclass

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

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

Category Codes

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

Example: **Category Code = EL5A**	
EL	System Description
5	Component Description
A	Element Description

Priority Sequence

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

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

Drawings

Floor plans for this facility are provided as a reference.

Photographs

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

Example: **Photo Number: 0001006e**	
0001	Asset Number
006	Photo Sequence
e	Engineering Photo

Sustainability/Energy Analysis

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

FACILITY CONDITION ASSESSMENT

SECTION 2

COST SUMMARIES AND TOTALS

RENEWAL NEEDS MATRIX

All dollars shown as Present Value

CATEGORY	NONRECURRING PROJECT NEEDS			RECURRING COMPONENT REPLACEMENT NEEDS											
	Immediate	Critical	Noncritical	Deferred Renewal	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
ACCESSIBILITY	0	16,249	0	0	0	0	0	0	0	0	0	0	0	0	$16,249
EXTERIOR	0	0	11,394	0	0	0	0	71,857	0	0	0	0	0	0	$83,251
INTERIOR	0	0	0	383,631	0	0	0	110,880	0	217,775	0	0	0	0	$712,286
PLUMBING	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HVAC	0	0	0	0	0	147,057	0	51,448	0	0	10,755	0	59,828	0	$269,088
FIRE/LIFE SAFETY	0	0	472,482	0	0	0	186,080	0	0	0	0	0	0	0	$658,561
ELECTRICAL	0	0	0	41,875	0	0	10,596	0	0	0	0	10,238	520,058	0	$582,767
SITE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
VERT. TRANS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
HEALTH/EQUIP.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0
SUBTOTAL	$0	$16,249	$483,876	$425,506	$0	$147,057	$196,675	$234,185	$0	$217,775	$10,755	$10,238	$579,886	$0	$2,322,203
TOTAL NONRECURRING PROJECT NEEDS			$500,125	TOTAL RECURRING COMPONENT REPLACEMENT NEEDS										$1,822,078	

CURRENT REPLACEMENT VALUE	$17,701,000
FACILITY CONDITION NEEDS INDEX	0.13
FACILITY CONDITION INDEX	0.02

GSF	TOTAL 10-YEAR FACILITY RENEWAL NEEDS	10-YEAR NEEDS/SF
38,249	$2,322,203	$60.71

RENEWAL NEEDS BY SYSTEM

All costs shown as Present Value

CATEGORY	NONRECURRING PROJECT COSTS	RECURRING COMPONENT REPLACEMENT COSTS	TOTAL 10-YEAR FACILITY RENEWAL COSTS
ACCESSIBILITY	$16,249	$0	$16,249
EXTERIOR	$11,394	$71,857	$83,251
INTERIOR	$0	$712,286	$712,286
PLUMBING	$0	$0	$0
HVAC	$0	$269,088	$269,088
FIRE/LIFE SAFETY	$472,482	$186,080	$658,561
ELECTRICAL	$0	$582,767	$582,767
SITE	$0	$0	$0
VERT. TRANS	$0	$0	$0
HEALTH	$0	$0	$0
TOTALS	**$500,125**	**$1,822,078**	**$2,322,203**

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
RIVW IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADE			C3020	Deferred Renewal	383,631
RIVW VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD AHU-001 RF		RW-222	D5010	Deferred Renewal	2,102
RIVW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-002 RF		RW-119	D5010	Deferred Renewal	5,298
RIVW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-001		RW-222	D5010	Deferred Renewal	5,298
RIVW LE01	LIGHTING - EXTERIOR, BOLLARD (SV, MH, ID, LED) COM	BOLLARD		SITE	D5020	Deferred Renewal	13,966
RIVW LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN CFL		EXT	D5020	Deferred Renewal	2,345
RIVW LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	CFL SCONCE		EXT	D5020	Deferred Renewal	12,866
RIVW BA114	HVAC CONTROLS SYSTEM - OFFICE	DDC		THROUGHOUT	D3060	2022	147,057
RIVW FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, SIMPLEX		RW-119	D4030	2023	37,851
RIVW FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	2023	148,229
RIVW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD HWP-1		RW-006	D5010	2023	5,298
RIVW VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD HWP-2		RW-006	D5010	2023	5,298
RIVW DR28	DOOR OPERATOR, POWER-ASSIST			W ENTRY	B2030	2024	8,729
RIVW DR28	DOOR OPERATOR, POWER-ASSIST			S BREEZEWAY	B2030	2024	26,187
RIVW RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	FLAT		LOWER ROOF	B3010	2024	36,941
RIVW DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DR		ROOF	C1020	2024	745
RIVW DR24	DOOR LOCK, COMMERCIAL-GRADE			B AREAWAY	C1020	2024	1,489

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
RIVW DR24	DOOR LOCK, COMMERCIAL-GRADE			ALL FLOORS	C1020	2024	91,590
RIVW DR26	DOOR PANIC HARDWARE			S EGRESS	C1020	2024	1,218
RIVW DR26	DOOR PANIC HARDWARE			W ENTRY	C1020	2024	1,218
RIVW DR26	DOOR PANIC HARDWARE			S BREEZEWAY	C1020	2024	3,655
RIVW DR26	DOOR PANIC HARDWARE			W ENTRY	C1020	2024	3,655
RIVW DR26	DOOR PANIC HARDWARE			N ENTRY	C1020	2024	7,310
RIVW HX11	PRESSURE REDUCING VALVE, STEAM SYSTEM (3")	PRV-1		RW-006	D3040	2024	6,828
RIVW PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		RW-006	D3040	2024	44,621
RIVW IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	2026	217,775
RIVW FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	D3040	2027	7,951
RIVW FN21	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY, 2.5" SP (<=30 HP)	EF-1		ROOF	D3040	2027	2,804
RIVW VF07	VARIABLE FREQUENCY DRIVE (25-30 HP)	VFD AHU-002		RW-119	D5010	2028	10,238
RIVW PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		RW-006	D3040	2029	1,645
RIVW PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-2		RW-006	D3040	2029	1,645
RIVW PH05	PUMP - ELECTRIC (25 - 30 HP)	CHWP-1		RW-006	D3040	2029	28,269
RIVW PH05	PUMP - ELECTRIC (25 - 30 HP)	CHWP-2		RW-006	D3040	2029	28,269
RIVW LI14	LIGHTING SYSTEM, INTERIOR - OFFICE	RETRO LED		THROUGHOUT	D5020	2029	520,058

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
						TOTAL	$1,822,078

FACILITIES RENEWAL PLAN

NONRECURRING PROJECT COSTS

All costs shown as Present Value

PROJECT NUMBER	PROJECT TITLE	UNI-FORMAT	PRIORITY CLASS	PROJECT CLASSIFICATION	PROJECT COST
RIVWAC01	AUDITORIUM 105A ACCESSIBILITY UPGRADES	C1010	2	Plant Adaption	16,249
RIVWES01	EXTERIOR MASONRY SELECTIVE REPOINTING	B2010	3	Corrective Action	11,394
RIVWFS02	STAIR TOWER TREAD UPGRADES	C2020	3	Plant Adaption	15,252
RIVWFS01	FIRE SPRINKLER SYSTEM INSTALLATION	D4010	3	Plant Adaption	457,229
				TOTAL	**$500,125**

FACILITY CONDITION ASSESSMENT

SECTION 3

NONRECURRING PROJECT DETAILS

All costs shown as Present Value

AUDITORIUM 105A ACCESSIBILITY UPGRADES

Project Number:	RIVWAC01	**Category Code:** AC4B	
Priority Sequence:	1		
Priority Class:	Critical	**System:**	ACCESSIBILITY
Project Class:	Plant Adaption	**Component:**	GENERAL
Date Basis:	6/8/2021	**Element:**	OTHER

Code Application:		Subclass/Savings:	Project Location:
ADAAG	605	DOJ2 - Access to Goods & Services	Room Only: Floor(s) 1

Description

Both side aisles in the first floor auditorium lack flanking wall-mounted accessible handrails. Install these additional railings to help improve user safety and accessibility. Also, there is no indication of an assistive listening system and one should be installed to aid the hearing impaired.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Wall-mounted handrail system, painted	LF	80	$68.81	$5,505	$48.23	$3,858	$9,363
Infrared transmitter and headphones	SYS	1	$2,070	$2,070	$1,815	$1,815	$3,885
Base Material/Labor Costs				**$7,575**		**$5,673**	
Indexed Material/Labor Costs				**$7,628**		**$4,045**	**$11,673**
Construction Mark Up at 20.0%							**$2,335**
Original Construction Cost							**$14,008**
Date of Original Estimate: 6/8/2021						**Inflation**	**$0**
Current Year Construction Cost							**$14,008**
Professional Fees at 16.0%							**$2,241**
TOTAL PROJECT COST							**$16,249**

All costs shown as Present Value

FIRE SPRINKLER SYSTEM INSTALLATION

Project Number:	RIVWFS01	**Category Code:** FS3A	
Priority Sequence:	2		
Priority Class:	Noncritical	**System:**	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	**Component:**	SUPPRESSION
Date Basis:	5/26/2021	**Element:**	SPRINKLERS

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

Description

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

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Install a wet-pipe sprinkler system, including valves, piping, sprinkler heads, piping supports, etc.	SF	38,249	$4.57	$174,798	$5.59	$213,812	$388,610
			Base Material/Labor Costs	**$174,798**		**$213,812**	
			Indexed Material/Labor Costs	**$176,022**		**$152,448**	**$328,469**
					Construction Mark Up at 20.0%		**$65,694**
					Original Construction Cost		**$394,163**
Date of Original Estimate: 5/26/2021					**Inflation**		**$0**
					Current Year Construction Cost		**$394,163**
					Professional Fees at 16.0%		**$63,066**
					TOTAL PROJECT COST		**$457,229**

All costs shown as Present Value

STAIR TOWER TREAD UPGRADES

Project Number:	RIVWFS02	**Category Code:** FS5E	
Priority Sequence:	3		
Priority Class:	Noncritical	**System:**	FIRE/LIFE SAFETY
Project Class:	Plant Adaption	**Component:**	EGRESS PATH
Date Basis:	6/8/2021	**Element:**	STAIRS AND RAILING

Code Application:	Subclass/Savings:	Project Location:
IBC 1003.3 Not Applicable	Not Applicable	Floor-wide: Floor(s) 1,2,3

Description

The stair finishes are beginning to deteriorate and should be upgraded before they become unsafe. Install stair treads and color contrast nosings that will provide adequate traction during egress.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Stair tread and landing finish upgrades per floor	FLR	4	$1,975	$7,900	$1,053	$4,211	$12,110
Base Material/Labor Costs				**$7,900**		**$4,211**	
Indexed Material/Labor Costs				**$7,955**		**$3,002**	**$10,957**
Construction Mark Up at 20.0%							**$2,191**
Original Construction Cost							**$13,149**
Date of Original Estimate: 6/8/2021						**Inflation**	**$0**
Current Year Construction Cost							**$13,149**
Professional Fees at 16.0%							**$2,104**
TOTAL PROJECT COST							**$15,252**

All costs shown as Present Value

EXTERIOR MASONRY SELECTIVE REPOINTING

Project Number:	RIVWES01
Priority Sequence:	4
Priority Class:	Noncritical
Project Class:	Corrective Action
Date Basis:	6/8/2021

Category Code: ES2B

System:	EXTERIOR
Component:	COLUMNS/BEAMS/WALLS
Element:	FINISH

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

Description

The building has indications of localized water infiltration and some selective repointing work is needed along with some recaulking of the cast stone detailing. Also, some finish spalling was noted on the plaza wall caps and this should be repaired as part of this upgrade.

All costs shown as Present Value

Project Cost Estimate

Task Description	Unit	Qnty	Material Unit Cost	Total Material Cost	Labor Unit Cost	Total Labor Cost	Total Cost
Selective exterior masonry repointing and plaza wall cap repairs	SF	3,000	$0.55	$1,650	$3.05	$9,150	$10,800
Base Material/Labor Costs				**$1,650**		**$9,150**	
Indexed Material/Labor Costs				**$1,662**		**$6,524**	**$8,186**
Construction Mark Up at 20.0%							**$1,637**
Original Construction Cost							**$9,823**
Date of Original Estimate: 6/8/2021						**Inflation**	**$0**
Current Year Construction Cost							**$9,823**
Professional Fees at 16.0%							**$1,572**
TOTAL PROJECT COST							**$11,394**

FACILITY CONDITION ASSESSMENT

SECTION 4

LIFECYCLE COMPONENT INVENTORY

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
EW01	WALL, EXTERIOR, MASONRY POINTING	MASONRY & CAST STONE			23,780	SF	1.12	$204,569	2004	30		2034
EW12	WALL, EXTERIOR, PANEL JOINT RESTORATION	UPPER PREFIN METAL CLAD TRIM		UPPER ELEVATIONS	1,950	SF	1.25	$46,968	2004	25	5	2034
WN01	GLASS, WINDOW, ALUMINUM OR WOOD, STANDARD			ALL ELEVS	3,000	SF	1.12	$514,314	2004	40		2044
WN03	GLASS, CURTAIN WALL, STANDARD			STAIR TOWER, ASSEMBLY AREAS	4,510	SF	1.00	$775,235	2004	60		2064
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS	SERVICE DR		ROOF	1	LEAF	1.00	$2,885	2004	25	4	2033
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			S BREEZEWAY	3	LEAF	1.00	$8,656	2004	25	4	2033
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			W ENTRY	1	LEAF	1.00	$2,885	2004	25	4	2033
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			W ENTRY	3	LEAF	1.00	$8,656	2004	25	4	2033
DR05	DOOR AND FRAME, EXTERIOR, SWINGING, ALUMINUM AND GLASS			N ENTRY	6	LEAF	1.00	$17,311	2004	25	4	2033
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			S EGRESS	1	LEAF	1.00	$2,031	2004	40		2044
DR08	DOOR AND FRAME, EXTERIOR, SWINGING, HOLLOW METAL			B AREAWAY	2	LEAF	1.00	$4,062	2004	40		2044
DR28	DOOR OPERATOR, POWER-ASSIST			S BREEZEWAY	3	EA	1.00	$26,187	2004	20		2024
DR28	DOOR OPERATOR, POWER-ASSIST			W ENTRY	1	EA	1.00	$8,729	2004	20		2024
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	FLAT		LOWER ROOF	4,370	SF	1.25	$36,941	2004	20		2024

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
RR15	ROOF - TILE, SLATE OR SIMILAR	HIPPED		MAIN ROOF	16,435	SF	1.25	$739,519	2004	70		2074
DR02	DOOR AND FRAME, INTERIOR, FIRE-RATED			ALL FLOORS	123	LEAF	1.00	$459,853	2004	40		2044
DR24	DOOR LOCK, COMMERCIAL-GRADE			ALL FLOORS	123	EA	1.00	$91,590	2004	20		2024
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DR		ROOF	1	EA	1.00	$745	2004	20		2024
DR24	DOOR LOCK, COMMERCIAL-GRADE			B AREAWAY	2	EA	1.00	$1,489	2004	20		2024
DR26	DOOR PANIC HARDWARE			S EGRESS	1	EA	1.00	$1,218	2004	20		2024
DR26	DOOR PANIC HARDWARE			S BREEZEWAY	3	EA	1.00	$3,655	2004	20		2024
DR26	DOOR PANIC HARDWARE			W ENTRY	1	EA	1.00	$1,218	2004	20		2024
DR26	DOOR PANIC HARDWARE			W ENTRY	3	EA	1.00	$3,655	2004	20		2024
DR26	DOOR PANIC HARDWARE			N ENTRY	6	EA	1.00	$7,310	2004	20		2024
CW01	CASEWORK - WOOD BASE AND WALL, TOP, STANDARD			BREAK AREAS	60	LF	1.00	$32,356	2004	20	10	2034
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			97,310	SF	1.00	$217,775	2014	12		2026
IW03	WALL FINISH - TILE, CERAMIC / STONE, STANDARD	CER WALL TILE			3,040	SF	1.00	$116,660	2004	30		2034
IW08	WALL FINISH - WOOD PANEL, STANDARD	WAINSCOT		AUDITORIUM	450	SF	1.00	$8,280	2004	40		2044
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADE			31,330	SF	1.00	$383,631	2004	12	4	DR

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
IF06	FLOORING - TILE, CERAMIC / STONE / QUARRY STANDARD	CER TILE FLOORS			1,150	SF	1.00	$36,569	2004	30		2034
IF09	FLOORING - TERRAZZO RESURFACE	TERRAZZO FLOOR TILE			2,100	SF	1.00	$21,371	2004	50		2054
IC01	CEILING FINISH - SUSPENDED ACOUSTICAL TILE, STANDARD	ACOUS LAY IN CLGS			32,700	SF	1.00	$329,994	2004	30		2034
IC07	CEILING FINISH - SUSPENDED ARCHITECTURAL	ACOUSTICAL CLOUDS			1,720	SF	1.00	$191,477	2004	60		2064
VT03	ELEVATOR MODERNIZATION - HYDRAULIC	ELEV-1		RW-103	1	EA	1.00	$302,064	2004	25	2	2031
VT04	ELEVATOR CAB RENOVATION - PASSENGER	ELEV-1		ELEV	1	EA	1.00	$53,265	2004	12	15	2031
FX01	PLUMBING FIXTURE - LAVATORY, COUNTER	PC		RRS	10	EA	1.00	$13,180	2004	35		2039
FX02	PLUMBING FIXTURE - LAVATORY, WALL HUNG	PC		FLR 2 RR	1	EA	1.00	$1,330	2004	35		2039
FX04	PLUMBING FIXTURE - SINK, KITCHEN	SST		BREAK AREAS	3	EA	1.00	$6,479	2004	35		2039
FX05	PLUMBING FIXTURE - SINK, LABORATORY-USE	FLR MOUNT		JAN CLOS	3	EA	1.00	$9,420	2004	35		2039
FX10	PLUMBING FIXTURE - URINAL	PC		RRS	5	EA	1.00	$10,589	2004	35		2039
FX12	PLUMBING FIXTURE - WATER CLOSET, TANKLESS	PC		RRS	20	EA	1.00	$38,970	2004	35		2039
PS14	SUPPLY PIPING SYSTEM - OFFICE	COPPER		THROUGHOUT	38,249	SF	0.95	$127,714	2004	35		2039
WH27	WATER HEATER - SHELL & TUBE (45-93 GPM)	DHX-1		RW-006	48	GPM	1.00	$56,593	2004	30		2034
PD14	DRAIN PIPING SYSTEM - OFFICE	CAST IRON, HUBLESS		THROUGHOUT	38,249	SF	0.95	$192,141	2004	40		2044

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
PP04	GREYWATER SUMP PUMP -SUBMERSIBLE PUMP (<0.5HP)	SUMP-1		RW-006	1	EA	1.00	$680	2015	20		2035
AH07	AIR HANDLING UNIT - INDOOR (9-12 HP)	AHU-001		RW-222	10	HP	1.00	$81,604	2004	25	3	2032
AH11	AIR HANDLING UNIT - INDOOR (27-35 HP)	AHU-002		RW-118	30	HP	1.00	$184,169	2004	25	3	2032
FN01	FAN - AXIAL, RETURN, 1.5" SP (<=3 HP) 9,200 CFM	AHU-001 RF		RW-222	3	HP	1.00	$10,796	2004	20	8	2032
FN04	FAN - AXIAL, RETURN, 1.5" SP (7.5-10 HP) 19,500 CFM	AHU-002 RF		RW-222	10	HP	1.00	$19,186	2004	20	8	2032
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	1	EA	1.00	$7,951	2004	20	3	2027
FN21	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY, 2.5" SP (<=30 HP)	EF-1		ROOF	2	HP	1.00	$2,804	2004	20	3	2027
HV14	HVAC DISTRIBUTION NETWORKS - OFFICE	VAV		THROUGHOUT	38,249	SF	0.95	$942,778	2004	40		2044
HX05	HEAT EXCHANGER - SHELL & TUBE STEAM TO WATER (>85 GPM)	HX-1		RW-006	400	GPM	1.00	$58,816	2004	35		2039
HX11	PRESSURE REDUCING VALVE, STEAM SYSTEM (3")	PRV-1		RW-006	1	EA	1.00	$6,828	2004	20		2024
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-1		RW-006	10	HP	1.00	$16,452	2004	25	3	2032
PH01	PUMP - ELECTRIC (<=10 HP)	HWP-2		RW-006	10	HP	1.00	$16,452	2004	25	3	2032
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		RW-006	1	HP	1.00	$1,645	2004	25		2029
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-2		RW-006	1	HP	1.00	$1,645	2004	25		2029
PH05	PUMP - ELECTRIC (25 - 30 HP)	CHWP-1		RW-006	30	HP	1.00	$28,269	2004	25		2029

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
PH05	PUMP - ELECTRIC (25 - 30 HP)	CHWP-2		RW-006	30	HP	1.00	$28,269	2004	25		2029
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		RW-006	6	HP	1.00	$44,621	2004	20		2024
BA114	HVAC CONTROLS SYSTEM - OFFICE	DDC		THROUGHOUT	38,249	SF	0.95	$147,057	2004	18		2022
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, SIMPLEX		RW-119	1	EA	1.00	$37,851	2004	15	4	2023
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	38,249	SF	0.95	$148,229	2004	18	1	2023
SE14	ELECTRICAL DISTRIBUTION NETWORK - OFFICE	277/480		THROUGHOUT	38,249	SF	0.95	$713,291	2004	40		2044
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD AHU-001 RF		RW-222	3	HP	1.00	$2,102	2004	12	4	DR
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-002 RF		RW-119	10	HP	1.00	$5,298	2004	12	4	DR
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD HWP-1		RW-006	10	HP	1.00	$5,298	2011	12		2023
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD HWP-2		RW-006	10	HP	1.00	$5,298	2011	12		2023
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-001		RW-222	10	HP	1.00	$5,298	2004	12	4	DR
VF07	VARIABLE FREQUENCY DRIVE (25-30 HP)	VFD AHU-002		RW-119	30	HP	1.00	$10,238	2012	16		2028
LE01	LIGHTING - EXTERIOR, BOLLARD (SV, MH, ID, LED) COM	BOLLARD		SITE	6	EA	1.00	$13,966	2004	15	1	DR
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN CFL		EXT	10	EA	1.00	$2,345	2004	15	1	DR
LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	CFL SCONCE		EXT	31	EA	1.00	$12,866	2004	15	1	DR

RENEWABLE COMPONENT INVENTORY

COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	QTY	UNITS	CPLX FACTR	TOTAL COST	INSTL DATE	USEFUL LIFE	USEFUL LIFE ADJ	REPL YEAR
LI14	LIGHTING SYSTEM, INTERIOR - OFFICE	RETRO LED		THROUGHOUT	38,249	SF	1.15	$520,058	2004	20	5	2029
SF01	SEATING, FIXED, FOLDING, STANDARD			AUDITORIUM	120	EA	1.00	$42,293	2004	40		2044
							Grand Total:	$8,243,991				

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
IF01	FLOORING - CARPET, TILE OR ROLL, STANDARD	CARPET TILE UPGRADE			C3020	31,330	SF	$383,631	DR
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-002 RF		RW-119	D5010	10	HP	$5,298	DR
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD AHU-001		RW-222	D5010	10	HP	$5,298	DR
VF01	VARIABLE FREQUENCY DRIVE (<=5 HP)	VFD AHU-001 RF		RW-222	D5010	3	HP	$2,102	DR
LE01	LIGHTING - EXTERIOR, BOLLARD (SV, MH, ID, LED) COM	BOLLARD		SITE	D5020	6	EA	$13,966	DR
LE03	LIGHTING - EXTERIOR, RECESSED (INC, CFL, LED)	REC CAN CFL		EXT	D5020	10	EA	$2,345	DR
LE08	LIGHTING - EXTERIOR, WALL LANTERN or FLOOD (INC, CFL, LED)	CFL SCONCE		EXT	D5020	31	EA	$12,866	DR
						TOTAL DEFERRED RENEWAL COST		$425,506.22	

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

RECURRING NEEDS BY YEAR

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

2022									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
BA114	HVAC CONTROLS SYSTEM - OFFICE	DDC		THROUGHOUT	D3060	38,249	SF	$151,469	2022
					2022 PROJECTED COMPONENT REPLACEMENT COST			$151,468.71	

2023									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
FA01	FIRE ALARM PANEL, DIALER, BATTERY, & CHARGER	PA, SIMPLEX		RW-119	D4030	1	EA	$40,156	2023
FA02	FIRE ALARM SYSTEM - DEVICES	HS, MP, SD		THROUGHOUT	D4030	38,249	SF	$157,256	2023
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD HWP-1		RW-006	D5010	10	HP	$5,621	2023
VF03	VARIABLE FREQUENCY DRIVE (7.5-10 HP)	VFD HWP-2		RW-006	D5010	10	HP	$5,621	2023

RECURRING NEEDS BY YEAR

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

2023 PROJECTED COMPONENT REPLACEMENT COST	$208,652.98

2024									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
DR28	DOOR OPERATOR, POWER-ASSIST			S BREEZEWAY	B2030	3	EA	$28,615	2024
DR28	DOOR OPERATOR, POWER-ASSIST			W ENTRY	B2030	1	EA	$9,538	2024
RR06	ROOF - BITUMINOUS, 2-PLY, SBS MODIFIED BITUMEN, MOP	FLAT		LOWER ROOF	B3010	4,370	SF	$40,367	2024
DR24	DOOR LOCK, COMMERCIAL-GRADE			ALL FLOORS	C1020	123	EA	$100,083	2024
DR24	DOOR LOCK, COMMERCIAL-GRADE	SERVICE DR		ROOF	C1020	1	EA	$814	2024
DR24	DOOR LOCK, COMMERCIAL-GRADE			B AREAWAY	C1020	2	EA	$1,627	2024
DR26	DOOR PANIC HARDWARE			S EGRESS	C1020	1	EA	$1,331	2024
DR26	DOOR PANIC HARDWARE			S BREEZEWAY	C1020	3	EA	$3,994	2024
DR26	DOOR PANIC HARDWARE			W ENTRY	C1020	1	EA	$1,331	2024

RECURRING NEEDS BY YEAR

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

DR26	DOOR PANIC HARDWARE			W ENTRY	C1020	3	EA	$3,994	2024
DR26	DOOR PANIC HARDWARE			N ENTRY	C1020	6	EA	$7,987	2024
HX11	PRESSURE REDUCING VALVE, STEAM SYSTEM (3")	PRV-1		RW-006	D3040	1	EA	$7,461	2024
PH14	CONDENSATE RECEIVER, ELECTRIC, 2 PUMPS	CP-1		RW-006	D3040	6	HP	$48,758	2024
						2024 PROJECTED COMPONENT REPLACEMENT COST		**$255,900.50**	

No Projected Component Replacement Cost for Asset No. RIVW for 2025

2026									
COMP CODE	**COMPONENT DESCRIPTION**	**IDENTIFIER**	**CUSTOMER ID**	**LOCATION**	**UNI-FORMAT**	**QTY**	**UNITS**	**REPLACEMENT COST**	**YEAR**
IW01	WALL FINISH - PAINT, STANDARD	PT WALLS			C3010	97,310	SF	$252,461	2026
						2026 PROJECTED COMPONENT REPLACEMENT COST		**$252,460.90**	

RECURRING NEEDS BY YEAR

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

2027									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
FN20	FAN - CENTRIFUGAL ROOF EXHAUST, 1/4" SP (25"-30" DIAMETER)	EF-2		ROOF	D3040	1	EA	$9,494	2027
FN21	FAN - INLINE CENTRIFUGAL AIRFOIL, SUPPLY, 2.5" SP (<=30 HP)	EF-1		ROOF	D3040	2	HP	$3,349	2027
						2027 PROJECTED COMPONENT REPLACEMENT COST		$12,842.26	

2028									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
VF07	VARIABLE FREQUENCY DRIVE (25-30 HP)	VFD AHU-002		RW-119	D5010	30	HP	$12,592	2028
						2028 PROJECTED COMPONENT REPLACEMENT COST		$12,591.75	

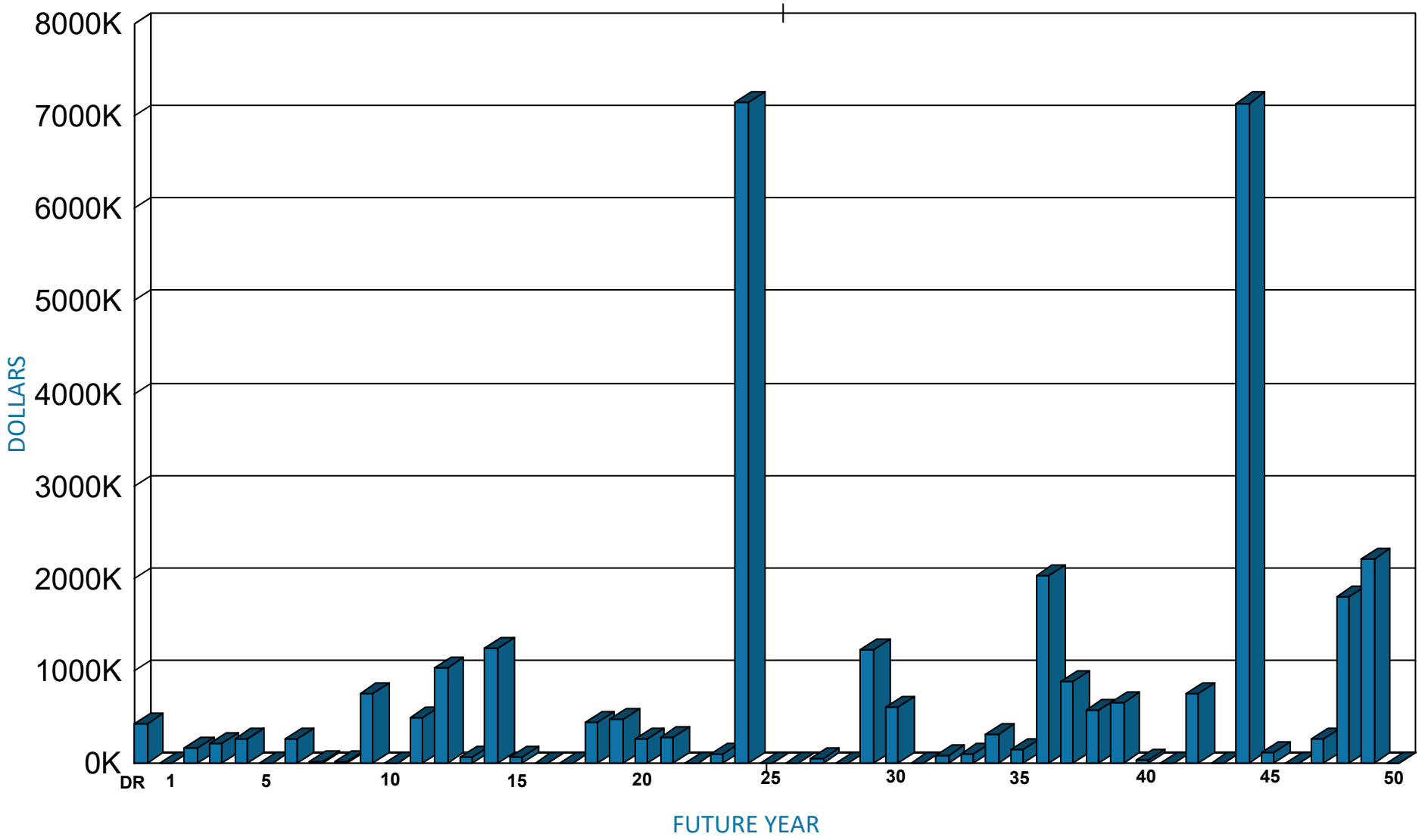
RECURRING NEEDS BY YEAR

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

2029									
COMP CODE	COMPONENT DESCRIPTION	IDENTIFIER	CUSTOMER ID	LOCATION	UNI-FORMAT	QTY	UNITS	REPLACEMENT COST	YEAR
PH05	PUMP - ELECTRIC (25 - 30 HP)	CHWP-1		RW-006	D3040	30	HP	$35,810	2029
PH05	PUMP - ELECTRIC (25 - 30 HP)	CHWP-2		RW-006	D3040	30	HP	$35,810	2029
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-1		RW-006	D3040	1	HP	$2,084	2029
PH01	PUMP - ELECTRIC (<=10 HP)	DHWP-2		RW-006	D3040	1	HP	$2,084	2029
LI14	LIGHTING SYSTEM, INTERIOR - OFFICE	RETRO LED		THROUGHOUT	D5020	38,249	SF	$658,794	2029
						2029 PROJECTED COMPONENT REPLACEMENT COST		$734,581.92	

No Projected Component Replacement Cost for Asset No. RIVW for 2030

RECURRING COMPONENT EXPENDITURE PROJECTIONS

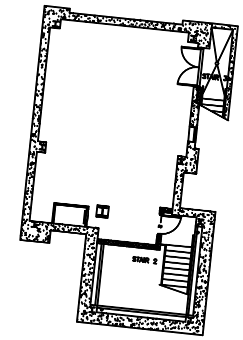


Average Annual Renewal Cost per SF $7.09

FACILITY CONDITION ASSESSMENT

SECTION 5

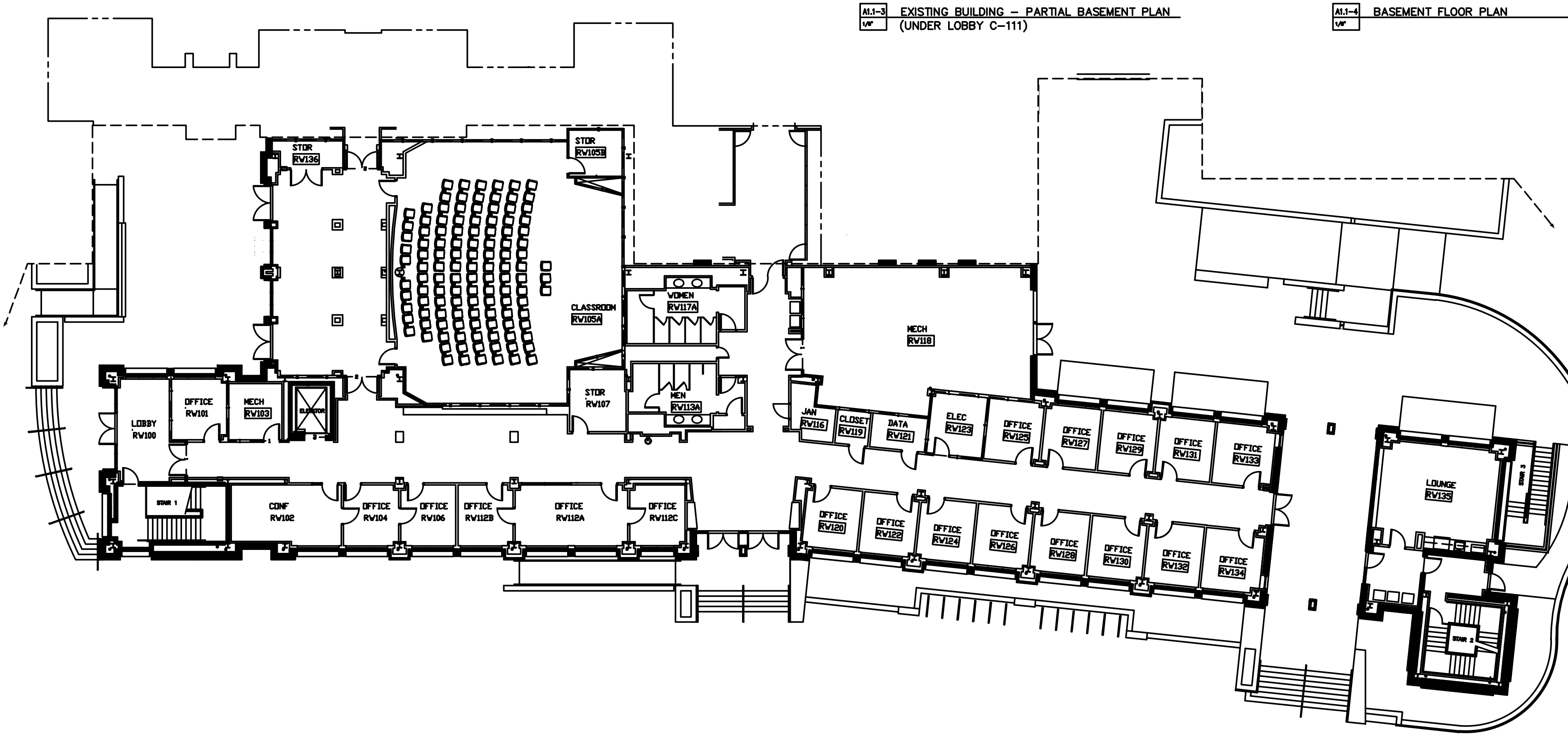
DRAWINGS



A1.1-4 BASEMENT FLOOR PLAN
1/8"

A1.1-2 FIRST FLOOR PARTIAL PLAN
1/8"

A1.1-3 EXISTING BUILDING - PARTIAL BASEMENT PLAN (UNDER LOBBY C-111)
1/8"



A1.1-1 FIRST FLOOR PLAN
1/8"

CORPORATE & ARCHITECT SEALS

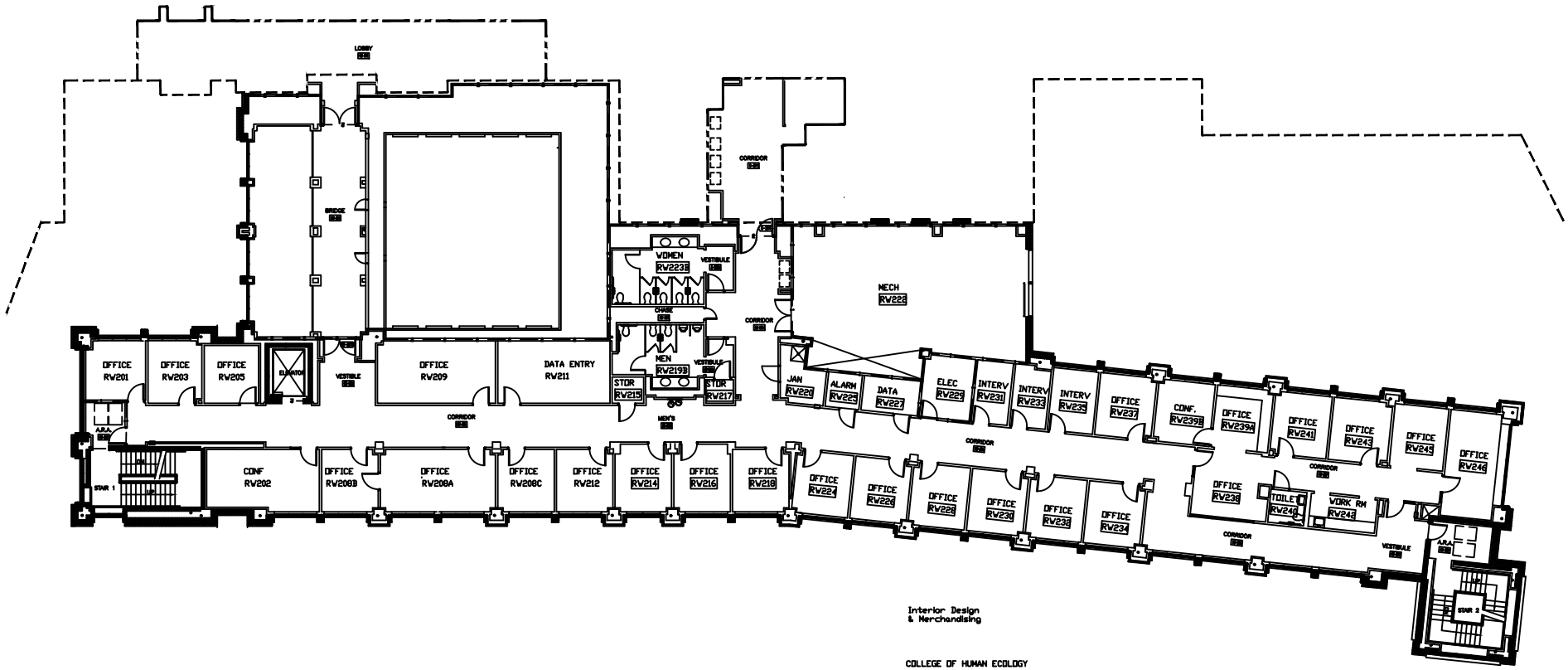
1124: RIVER'S BUILDING ADDITION
EAST CAROLINA UNIVERSITY
GREENVILLE, NORTH CAROLINA

PBC+L
PEARCE BRINKLEY CEASE + LEE P.A.
333 FAYETTEVILLE STREET MALL SUITE 200

DRAWN BY GAM
APPROVED BY HCC
PROJECT NUMBER 1124
DATE 05.15.02
REVISIONS

CONSTRUCTION DOCUMENTS SUBMITTAL
FIRST FLOOR PLAN & BASEMENT PLAN

A1.1



Interior Design
& Merchandising

COLLEGE OF HUMAN ECOLOGY

NC CTR. FOR SUSTAINABLE TOURISM

A1.2-1 SECOND FLOOR PLAN

SECOND FLOOR PLAN

A1.2

PLAN LEGEND

- UNDISTURBED EXISTING CONSTRUCTION
- METAL STUD WALL
- BRICK VENEER
- CMU WALL
- CMU WALL W/ METALSTUD FURRING
- PRECAST
- 1 HOUR RATED PARTITION
- 2 HOUR RATED PARTITION
- PROJECT LIMITS
- NEW/ EXISTING CONSTRUCTION BOUNDARY

CLASSROOM 100 — ROOM NAME AND NUMBER

DOOR NUMBER

PARTITION SYMBOL REFER TO SHEET A.1

ENLARGED PLAN DETAIL SHEET AND DETAIL NUMBER

INTERIOR ELEVATION KEY DETAIL NUMBER AND SHEET NUMBER

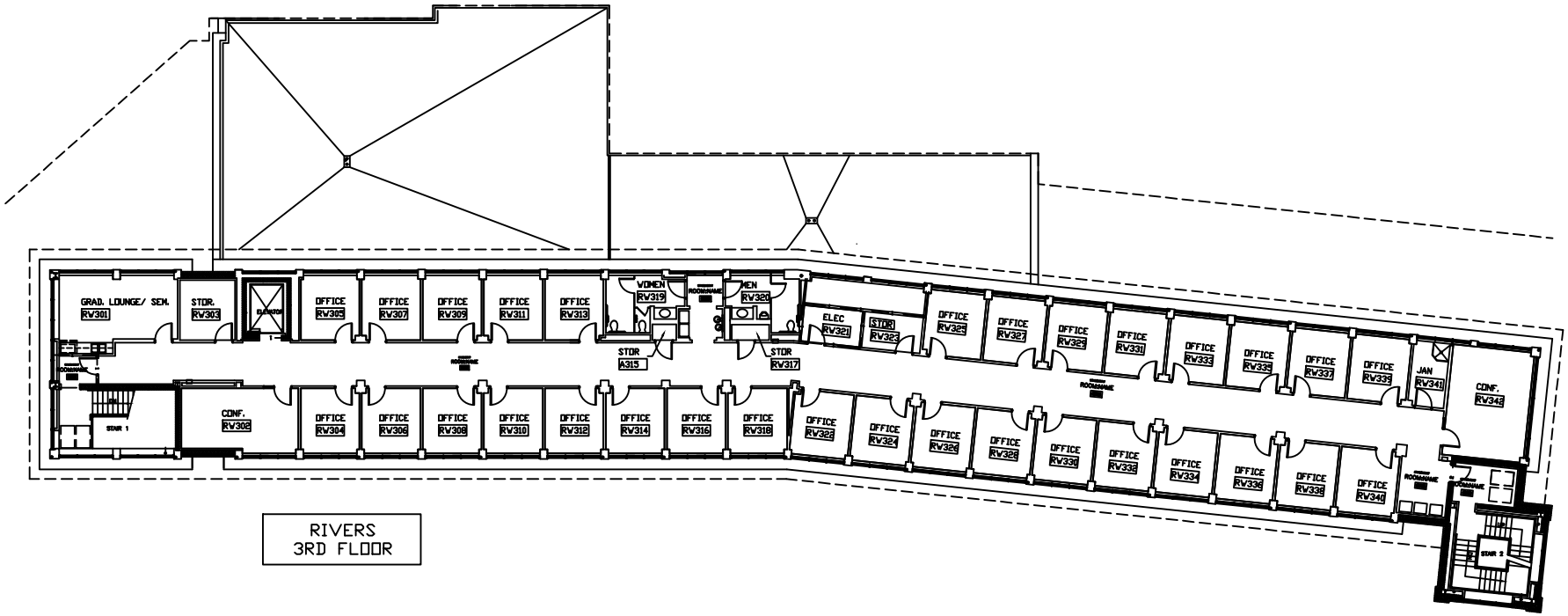
EXTERIOR ELEVATION KEY

WALL SECTION DETAIL

BUILDING SECTION

2-A1.3 PLAN-SECTION @ T.O. TOWER 1/8"

3-A1.3 FOURTH FLOOR PLAN 1/8"



RIVERS 3RD FLOOR

A1.3-1 THIRD FLOOR PLAN 1/8"

CORPORATE & ARCHITECT SEALS

1124: RIVER'S BUILDING ADDITION

EAST CAROLINA UNIVERSITY
GREENVILLE, NORTH CAROLINA

PBC+L
PEARCE, BRINKLEY, CEARLEY + LEE, P.A.
333 FAYETTEVILLE STREET MALL, SUITE 200
P.O. BOX 6161, RALEIGH, NORTH CAROLINA 27628

DRAWN BY GAM
APPROVED BY HCC
PROJECT NUMBER 24
DATE 05.15.02
REVISIONS

CONSTRUCTION DOCUMENTS SUBMITTAL
THIRD FLOOR PLAN & FOURTH FLOOR PLAN

A1.3

SECTION 6

PHOTOGRAPHS

RIVW001a 5/12/2021

Clay tile roof ridgeline

Main roof

RIVW001e 5/12/2021

Elevator control panel

Elevator

RIVW002a 5/12/2021

Clay tile roof

Main roof

RIVW002e 5/12/2021

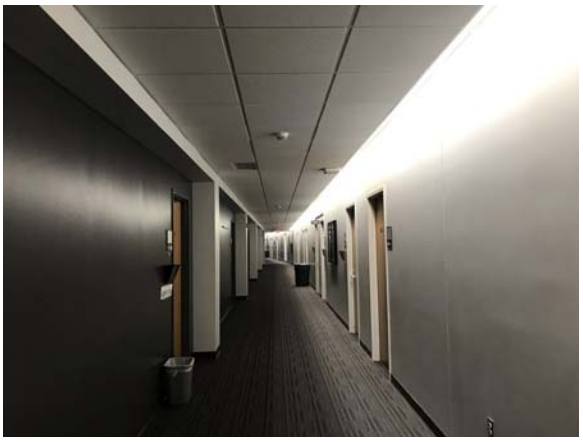
Elevator interior

Elevator

RIVW003a 5/12/2021

Lower built-up roof

Lower east roof



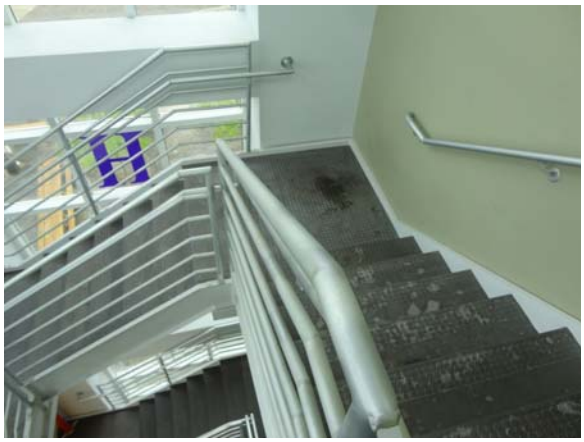
RIVW003e 5/12/2021

Upward diffusing T8 lighting fixtures

Third floor corridor

RIVW004a 5/12/2021
Lower roof counter flashing detail
Lower east roof

RIVW004e 5/12/2021
Open-cell grid recessed, lay-in T8 lighting fixtures
Room RW-338



RIVW005a 5/12/2021
Stair tread finishes and painted walls
Stair tower

RIVW005e 5/12/2021
Secondary step-down transformer
Room RW-321

RIVW006a 5/12/2021
Glass roof access door
Corner stair tower

RIVW006e 5/12/2021
Local panelboard
Room RW-321

RIVW007a 5/12/2021
Broadloom carpet and acoustical ceiling
Third floor corridor

RIVW007e 5/12/2021
Air handling unit AHU-002
Room RW-222

RIVW008a 5/12/2021
Flush wood door with lever hardware and accessible signage
Third floor corridor

RIVW008e 5/12/2021
VFD for AHU-002 supply fan
Room RW-222

RIVW009a 5/12/2021
Dual-level water fountain
Third floor corridor

RIVW009e 5/12/2021
VFD for AHU-002 return fan
Room RW-222

RIVW010a 5/12/2021

Counter lavatory

Third floor, men's restroom

RIVW010e 5/12/2021

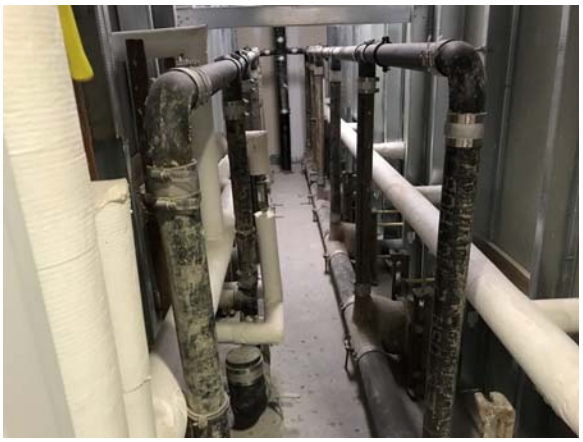
Interior coils of AHU-002

Room RW-222

RIVW011a 5/12/2021

Wall-hung urinal

Third floor, men's restroom



RIVW011e 5/12/2021

Cast-iron drain piping with hubless connections and copper supply piping

Second floor restroom pipe chase

RIVW012a 5/12/2021

Accessible toilet stall

Third floor, men's restroom

RIVW012e 5/12/2021

Chilled water pumps

Room RW-006

RIVW013a 5/12/2021

Counter lavatory

Third floor, women's restroom

RIVW013e 5/12/2021

Heating hot water pumps

Room RW-006

RIVW014a 5/12/2021

Accessible toilet stall

Third floor, women's restroom

RIVW014e 5/12/2021

VFD for heating hot water pump

Room RW-006

RIVW015a 5/12/2021

Standard toilet stall

Third floor, women's restroom

RIVW015e 5/12/2021

VFD for heating hot water pump

Room RW-006

RIVW016a 5/12/2021

Acoustical lay-in ceiling

Third floor, office

RIVW016e 5/12/2021

VFD for chilled water pump

Room RW-006

RIVW017a 5/12/2021

Broadloom carpet

Third floor, office

RIVW017e 5/12/2021

Heating hot water shell-and-tube heat exchanger

Room RW-006

RIVW018a 5/12/2021

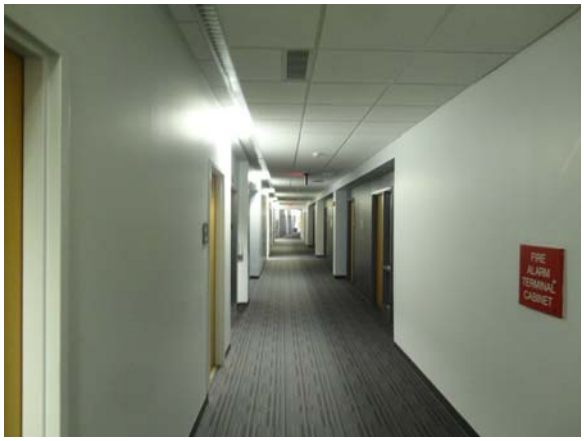
Casework

Third floor, office break room

RIVW018e 5/12/2021

Condensate receiver

Room RW-006



RIVW019a 5/12/2021
Broadloom carpeting and acoustical ceiling
Second floor corridor

RIVW019e 5/12/2021
Pressure reducing valve
Room RW-006

RIVW020a 5/12/2021
Broadloom carpeting and acoustical ceiling
Second floor, conference room

RIVW020e 5/12/2021
Domestic hot water heat exchanger
Room RW-006

RIVW021a 5/12/2021
Corridor isolation doors on magnetic hold backs
Second floor, central east corridor

RIVW021e 5/12/2021
Sump pump
Room RW-006

RIVW022a 5/12/2021

Ceiling tile stains due to possible roof leak

Second floor link to Rivers Building

RIVW022e 5/12/2021

Domestic hot water pump

Room RW-006

RIVW023a 5/12/2021

Accessible toilet stall

Second floor, men's restroom

RIVW023e 5/12/2021

Inline centrifugal exhaust fan

Room RW-006

RIVW024a 5/12/2021

Counter lavatories

Second floor, men's restroom

RIVW024e 5/12/2021

Main fire alarm panel

Room RW-119

RIVW025a 5/12/2021

Wall-hung urinals

Second floor, men's restroom

RIVW025e 5/12/2021

Air handling unit AHU-001

Room RW-118

RIVW026a 5/12/2021

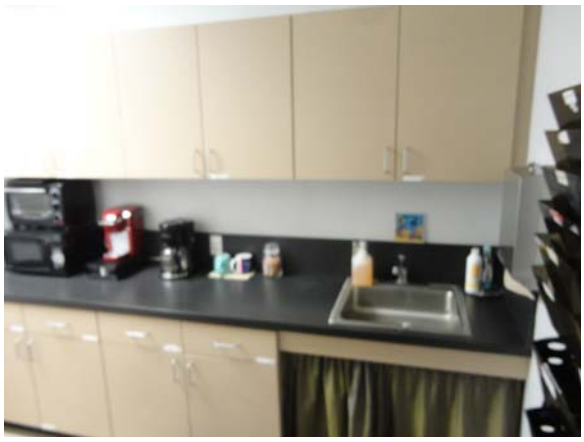
Accessible two-fixture restroom

Second floor, Dean's suite office

RIVW026e 5/12/2021

VFD for AHU-001 supply fan

Room RW-118



RIVW027a 5/12/2021

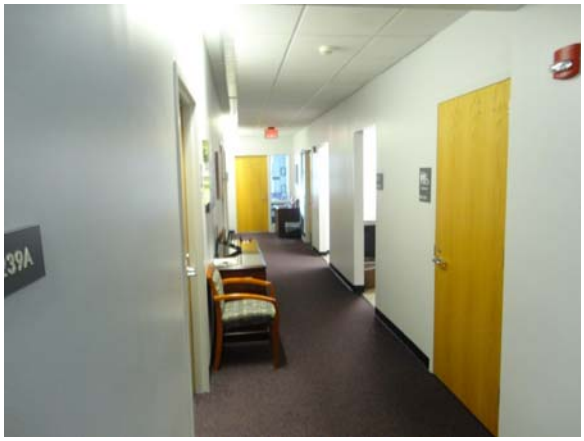
Casework

Second floor, Dean's suite office

RIVW027e 5/12/2021

VFD for AHU-001 return fan

Room RW-118



RIVW028a 5/12/2021

Carpeting and acoustical ceiling

Second floor, Dean's suite office

RIVW028e 5/12/2021

Hydraulic elevator controls

Room RW-103

RIVW029a 5/12/2021

Minor window sill damage due to condensation

Second floor window detail

RIVW029e 5/12/2021

Recessed can lighting

Auditorium RW-105A

RIVW030a 5/12/2021

Casework

First floor, student lounge

RIVW030e 5/12/2021

CFL sconce lighting fixture

Exterior

RIVW031a 5/12/2021

Terrazzo floor tile and acoustical ceiling

First floor corridor

RIVW031e 5/12/2021

CFL sconce lighting fixture

Exterior

RIVW032a 5/12/2021

No outer handrail at side aisle ramp

First floor, auditorium

RIVW032e 5/12/2021

Bollard lighting fixture

Site

RIVW033a 5/12/2021

Fixed seating with no indication of assistive listening

First floor, auditorium

RIVW033e 5/12/2021

Centrifugal rooftop exhaust fan

Roof

RIVW034a 5/12/2021

Minor wear on fixed seating

First floor, auditorium

RIVW035a 5/12/2021

Glass doors and fixed glazing

East end of north elevation

RIVW036a 5/12/2021

Ramped access to plaza

First floor north plaza

RIVW037a 5/12/2021

Brick veneer and cast stone accents

West end of north elevation

RIVW038a 5/12/2021

Brick veneer and cast stone accents

NW corner elevation

RIVW039a 5/12/2021

Ramped access to building

West elevation

RIVW040a 5/12/2021

Glass entry doors

West elevation

RIVW041a 5/12/2021

Stair tower

Southwest elevation

RIVW042a 5/12/2021

Accessible rails on breezeway passage

South end of west elevation

RIVW043a 5/12/2021

Power door assist on breezeway doors

South breezeway

RIVW044a 5/12/2021

Brick veneer, cast stone accents, and glazing

South elevation

RIVW045a 5/12/2021

Hollow-metal service door

South elevation

RIVW046a 5/12/2021

Spalling finish on plaza wall

South plaza

RIVW047a 5/12/2021

Double hollow-metal service doors

Southeast corner elevation

FACILITY CONDITION ASSESSMENT

SECTION 7

PRELIMINARY ENERGY ASSESSMENT

INTRODUCTION

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

TABLE 1. BUILDING INFORMATION	
Client	East Carolina University
Asset Number	RIVW
Asset Name	Rivers West
Year Built or Last Energy Renovation	2004

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)

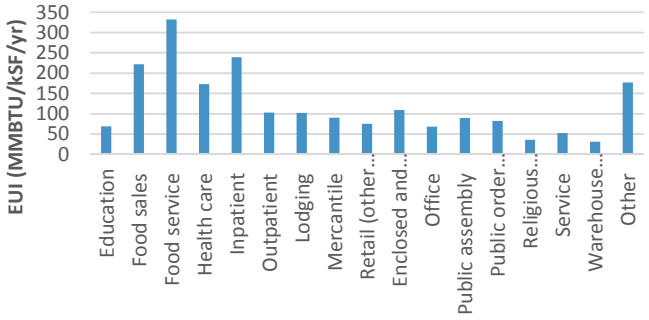
EUI is a measure of energy consumption per square foot of building space per year. The units of measurement are million British thermal units per thousand square foot per year (MMBTU/kSF/yr). The US-DOE EUI can be compared to the actual EUI of the client building to determine how efficient the building 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	1990 to present
Benchmark EUI (MMBTU/kSF/yr) =	**69**
Building EUI to be Calculated by Client (MMBTU/kSF/yr) =	

TABLE 3. EUI COMPARISON	
Very Energy Efficient (consumes more than 30% less energy)	EUI < 48.3
Energy Efficient (consumes 10% to 30% less energy)	48.3 <= EUI <= 62.1
Similar (consumes within 10% less or 10% more energy)	62.1 < EUI < 75.9
Energy Inefficient (consumes 10% to 30% more energy)	75.9 <= EUI <= 89.7
Very Energy Inefficient (consumes more than 30% more energy)	EUI > 89.7

Figure 1. EUIs for Buildings Constructed/Renovated 1990 to present

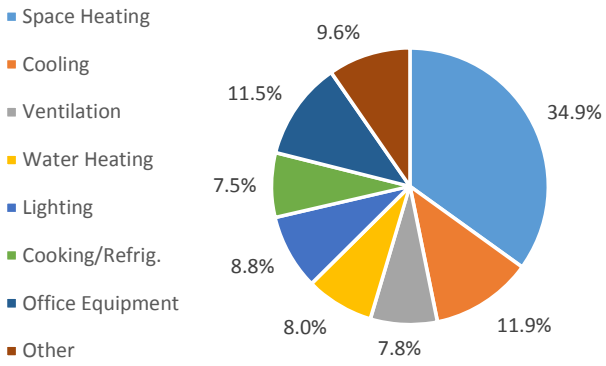


Metric #2: Energy End Use

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

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

Figure 2. Energy End Use Profile: Classroom



References:
1. U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. "Technologies and Products by Category." Efficient Technologies and Products for Federal Facilities. DOE. http://energy.gov/eere/femp/efficient-technologies-and-products-federal-facilities. Accessed: June 2016.

2. U.S. Energy Information Administration [EIA]. "2012 CBECS Survey Data." Commercial Building Energy Consumption Survey. EIA. http://www.eia.gov/consumption/commercial/data/2012/index.cfm?view=consumption#c1-c12, Accessed: June 2016.

ENERGY CONSERVATION OPPORTUNITIES

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

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

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

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

ECM CATEGORY	ECM RECOMMENDED FOR FURTHER CONSIDERATION	COST CATEGORY
Lighting - Exterior	INSTALL EFFICIENT LIGHTING FIXTURES. While incandescent lamp fixtures have a low initial cost, the lamps are energy inefficient and have a short useful life. Consider CFL and LED lighting instead. HID lamps are necessary in some applications; however, alternatives such as high intensity T5 or LED fixtures should be considered. T12 lamps are an outdated lighting technology that should be replaced with newer technologies such as high intensity fluorescent or LED lamp fixtures.	N/A, Varies
Lighting - Exterior, Controls	INSTALL LIGHTING CONTROLS. Consider using photocell sensors or timeclocks to shut off building/parking lot fixtures during daylight hours.	N/A, Varies
HVAC - EMCS	CONNECT BAS TO EMCS. Consider connecting the BAS to a central EMCS so that the system can by monitored and controlled at a central location.	CAP