

FACILITY AUDIT REPORT

ARPS HALL
1945 N. High Street

#011



ARPS HALL

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	5
PROJECTS.....	6
GENERAL BUILDING INFORMATION.....	8
BUILDING SYSTEMS INFORMATION.....	9
NARRATIVE	11
History	11
Foundation.....	12
Columns & Beams.....	12
Exterior Walls.....	12
Exterior Windows & Doors.....	12
Roofing & Flashing	13
Partitions & Wall Finishes.....	13
Doors	14
Floor Finishes	14
Ceilings & Finishes	14
Conveying	15
Plumbing	15
Heating	16
Cooling & Ventilation	17
Electrical Service & Distribution	19
Lighting & Power	19
Safety Standards	20
Asbestos	20
Perimeter	20
BUILDING EVALUATION SUMMARY	23
Component Rating.....	23
Foundation.....	24
Columns & Beams.....	25
Exterior Walls.....	26
Exterior Windows & Doors.....	27
Roofing & Flashing	28
Partitions & Doors.....	29
Wall Finishes	30
Floor Finishes	31
Ceilings & Finishes	32
Conveying	33
Plumbing	34
Heating	35
Cooling & Ventilation	36
Electrical Service & Distribution	37
Lighting & Power	38
Safety Standards	39
Perimeter	40
BUILDING AUDIT METHODOLOGY	41
ABBREVIATIONS	43
APPENDIX.....	45

EXECUTIVE SUMMARY

The original building of Arps Hall is functioning as originally designed and has held up well over the past 76 years.

The building components that need attention within the next five years are:

- a. 1959 elevator
- b. several restroom fixtures
- c. 1926 copper roof
- d. windows in the 1959 addition
- e. restroom exhaust ventilation

General maintenance projects need to be completed within the next five to ten years to repair or replace normal-wear items. The rest of the 1959 building is in need of a total renovation. These items, when completed, will protect and enhance the building performance and create a satisfying visual environment for students, faculty, staff and visitors.

A review of the work orders indicates problems with window A/C repairs, temperature controls, doors and door hardware, clogged toilets and leaking faucets.

The building coordinator indicated that the occupants are satisfied with the overall condition and performance of the building systems but requested that attention be given to the items herein identified.

There are currently six projects in process with a budget of \$773,000. In addition, Physical Facilities has assigned project numbers to projects totaling \$2,332,000 that is proposed over the next ten years.

The engineer completed the building inspection in August 2002.

According to an assessment by the Office of Facilities Planning and Development in the University Space Inventory Department, the overall building condition is Satisfactory.

PROJECTS

Proposed Maintenance Projects		
Corrective Maintenance Projects		
1. Paint exterior doors and window trim	\$5,000	0096
2. Replace one exterior wood double door on 1925 building	<u>\$12,000</u>	6586
Subtotal	\$17,000	
Building Improvements/Addition Projects		
1. Replace windows in 1959 building with double-pane insulated type (130 windows)	\$515,000	2051
2. Upgrade original fire alarm system	\$128,000	07582
3. Upgrade original plumbing system	\$135,000	07599
4. Upgrade original hot water heating system	<u>\$190,000</u>	07600
Subtotal	\$968,000	
Building Component Replacements expected within next 5-10 years		
1. Replace 1985 R-11 chiller and cooling tower	\$269,000	07601
2. Replace copper roof and gutters on original 1926 building (15,700 s/f)	\$400,000	2052
3. Replace three multi-zone air-handling units (rooms 280M, 380M and 320M)	\$195,000	07614
4. Replace one multi-zone air-handling unit (room 027M)	\$125,000	07614
5. Replace one VAV air-handling unit (room 055M)	\$198,000	07615
6. Replace elevator	<u>\$160,000</u>	07603
Subtotal	<u>\$1,346,995</u>	
Total cost for all projects	<u>\$2,332,000</u>	

Renovation Projects Completed since September 1992 audit		
Project	Cost	Project #
Replace cooling tower hot water pan	\$13,689	9986-5085
Replace cooling coils with CW cooling coil room 346	\$16,000	9986-6011
Cross-connect the two chillers	\$16,237	5061-001716
Convert library to swing space	\$1,021,632	5061-PF980907
Renovate rooms 110 and 110A	\$218,719	5061-PF960809
Modify and install new accessible ramps	\$502,448	315-1996-983
Replace ceiling tiles and paint rooms 127 & 133	\$198,806	5070-R931415
Repair masonry brick and stone and caulk building	\$286,229	315-1991-042
Renovate several electrical feeds to meet code	\$6,511	9986-6277
Replace chiller and cooling tower	\$313,089	315-1996-919
Replace cooling coils with CW cooling coil room 380	<u>\$12,500</u>	9986-07210
Total Renovation Projects Completed	<u>\$2,605,860</u>	

PROJECTS

Renovation Projects in Process as of 8/31/2003

Project	Budget	Spent as of 8/31/03	Project #
Replace CW cooling coils—room 280M	\$19,500	\$17,066	9986-6349
Replace cooling tower in parking lot	\$30,000	\$23,446	9986-6749
Renovate basement rooms	\$420,860	\$417,930	315-1994-938
Replace windows in 1956 building	\$200,000	0	315-1994-904
Repair front entry steps and porch	\$19,500	\$15,970	9986-5712
Renovate mailroom and offices	\$83,140	\$80,544	5061-PF07201
Total	\$773,000	\$554,956	

Minor Maintenance Projects (<\$5,000) entered into Physical Facilities Work Order system in August 2003

Exterior Maintenance Projects	Work Request
1. Remove dead and new ivy growth on the east of the building (High Street side).	#278697
2. Seed bare spots around the building.	#278698
3. Remove loose caulking and re-caulk on the limestone step at the front door on the east of the building (High Street side).	#278704
4. Repair the canopy roof and soffit over the wood door on the north end of the east building.	#278705
5. Clean the window wells around the building.	#278634
6. Repair rusted steel treads and paint the north fire escape.	#278707
7. Patch potholes, fill cracks and seal the blacktop parking lot. Also, repair concrete and blacktop curbs.	#278701
8. Repair the stainless steel gravel stop and replace the roof over the tunnel access structure.	#278709
9. Repair the cracked glass in the east basement door to the ramp of the 1957 addition.	#278713
Interior Maintenance Projects	Work Request
1. Repair the leak in the southwest stairwell window on the second floor southwest landing and then repair the plaster wall and the wood mutton board.	#278703
2. Repair the concealed-spline ceiling tiles around the elevator landings on each floor.	#278635

GENERAL BUILDING INFORMATION

Building Name and Number: Arps Hall #011

Building Address: 1945 N. High Street

Year of Construction: 1926 and 1959

Year of Last Renovation: 1985 (1926 building)

Building Size: (based on data from *The Office of Facilities, Planning and Development, University Space Inventory System, 8/8/02*):

Gross Square Feet: 128,464		
Net Square Feet: 110,651		Structure 17,813 S/F
Assignable Square Feet: 70,036	Mechanical/Common S/F: 40,615	

Estimated Replacement Cost: \$21,384,000 (assigned August 2003 by *The Office of Facilities Planning and Development, in the University Space Inventory System*)

Cost per Gross Square Feet: \$174.46

Current Use: (based on data from *The Office of Facilities Planning and Development, University Space Inventory System, 8/8/02*)

Department	Inst & Support	Department Research	Sponsored Research	General Admin	Student Services	Mechanical/ Common	Total
Academic Affairs	5.5%	0%	0%	1.7%	0%	4.2%	11.40%
College of Education	23.5%	0.2%	0.5%	19.0%	0.5%	25.3%	69.00%
College of Social & Behavioral Science	4.8%	5.0%	0%	2.6%	0%	7.2%	19.60%
Total	33.8%	5.2%	0.5%	23.3%	0.5%	36.7%	100.00%

Type of Construction: Masonry Skin with Masonry Walls and Concrete Structure

Number of stories/basement: Four (4) stories plus partial basement

Air Conditioning (Percentage): 100% (source: *The Office of Facilities Planning and Development. Auditor noted approximately 10% of the building is not treated*)

Wheel Chair Accessibility: From parking lot side of the 1956 building to the interior ramps and elevator to all floors.

Number of Exit Stairways: Four (4)

Number of Other Exits: Three (3)

Area Shop Responsibility: Northeast Shop

Overall Building Condition: Satisfactory (*The Office of Facilities Planning and Development, in the University Space Inventory*)

Asbestos Survey (1986): PEI Associates did an Asbestos Inspection and Risk Assessment Program in September 1986. The report indicates there is asbestos in the pipe insulation in mechanical room 027M, crawl areas, pipe chases, attic spaces, inside walls and rooms at radiators of the original building.

BUILDING SYSTEMS INFORMATION

HEATING			
Source: McCracken Power Plant System: Hot Water Building Heat: Water, 8" line located in north tunnel			
HVAC CONTROL SYSTEM			
Pneumatic and Electric with DDC system monitors			
VENTILATION SYSTEM			
4 Multi-zone air-handling units 2 VAV air-handling units 2 DX air-handling units			
COOLING			
Building: 90% Air Conditioned 1 125-ton, Carrier (1985) R-11 1 207-ton, Trane (1999) R-22 24 Window units 2 Direct expansion units			
ELECTRIC			
Primary Source: PGNS5/PGNS5 Size: 750 KVA Primary/Secondary: 13200/208/120 Switchgear: Westinghouse located in room 047M			
PLUMBING			
Water – 4" from tunnel and 4" from south to room 027 M Gas – 2" from tunnel Domestic Hot Water – 2.5" Domestic Hot Water System from tunnel Compressed Air – local			
SEWERS			
Type	4 inches	6 inches	8 inches
Storm	1	4	1
Sanitary		3	
Combined Storm/Sanitary: Yes			
METERS			
Gas – none Water – none Electric – located in room 047M			
ALARM SYSTEMS			
Fire Alarm: main panel room 047M Remote panel location - None Horns/Strobes - Yes Bells in Halls - Yes Bells in Rooms – No			
ELEVATORS			
Type: Passenger/Freight Manufacturer: Otis Size: 3,500 pound 61" x 80"			
EMERGENCY GENERATOR			
None			

History

Arps Hall was originally built for the College of Education for classroom and office space. The Board of Trustees officially named Arps Hall on September 18, 1939, in memory of George F. Arps. George F. Arps was responsible for the growth of the Psychology Department that began in 1912. Dr. Arps taught social psychology and was an able administrator who greatly increased the size of the faculty. Before its official naming, it was generally called the Education Building or the College of Education Building. The building is located at 1945 N. High Street on part of the old Ohio Field, site of the varsity football field before the construction of Ohio Stadium. The building is now used by The College of Education, the Department of Economics and swing space.

The present building has 128,464 gross square feet and was constructed in three phases:

- Construction date—1926: On 7/17/24, the Board of Trustees approved the plans and authorized Joseph N. Bradford, University Architect, to solicit contractor bids for a 4 story, 55,521 square feet building. Final payment on this building was authorized on 1/11/26. College offices moved into the building on 3/25/26.
- Construction date—1959: On 9/4/56, the Board of Trustees approved plans and related documents prepared by Sims, Cornelius & Schooley and authorized an addition of 72,894 square feet for classrooms, labs and office space. The cost was \$1,932,350.
- In 1962, a trash room with 49 square feet was added on the southwest side of the 1959 addition.

Major Renovations:

1. The original building was completely renovated during 1984-85.
2. The ground and first floors of the west wing in the 1959 building were renovated in 1999.
3. The east wing basement floor was renovated in 2002.

Major Repairs:

1. Interior and exterior accessibility ramps were added in 1977.
2. Two restrooms were remodeled to provide accessibility in 1977.
3. The roof over the 1959 building was replaced in stages during 1989-91.
4. The exterior brick was repaired in 1991.
5. The east chiller and roof-mounted cooling tower were replaced in 1999.

Miscellaneous heating and cooling coils were replaced in several air-handling units, and the 1985 cooling tower was replaced with a used cooling tower from another campus building. General maintenance projects need to be completed within the next five to ten years to repair normal wear items. The remainder of the 1959 building is in need of a total renovation.

Foundation

The structural components of the original 1926 building consist of reinforced concrete perimeter and interior spread footers with concrete walls up to the first floor. The structural components of the 1959 building consist of reinforced concrete perimeter and interior footers with reinforced concrete walls and piers to the ground floor level that support the steel columns and beams. There are no major signs of settlement or movement in the building foundation or structural supports. Some minor or local settlement cracks were noted in the exterior limestone and brick walls of the original building.

Columns & Beams

The concrete walls of the original 1926 building support load-bearing masonry walls up to the attic. The masonry walls support concrete lintels, floors and beams. Steel roof trusses on the load-bearing walls support the roof rafters with tongue and groove roof sheathing. The steel columns and beams of the 1959 building support the steel joists and metal deck with concrete floors and the flat metal roof deck with lightweight concrete fill.

Exterior Walls

Face brick was installed on the load-bearing masonry walls to form the exterior walls of the 1926 building. Limestone and brick trim around the perimeter, the gutter cornices, main entrance, windows and parapets complements the architectural elements that accent this building.

Face brick was installed on concrete block or tile masonry walls to form the exterior walls of the 1959 building. Cut limestone or brick trim around the perimeter, entrances, windows and parapets completes the architectural elements that accent this building.

The exterior brick of both buildings is in good to fair condition. Some cracking and mortar deterioration in various areas of the building was tuckpointed in 1991. The tuckpointing appears to be in good condition. The limestone cornice, trim and parapet caps should be cleaned and sealed to prevent spalling.

Exterior Windows & Doors

Openings in the brick walls for entrance doors and windows are accented with cut limestone or brick that form headers, sills and jambs. The windows in the original building were replaced in 1985 with aluminum framed double glazed windows. These windows are in good condition.

The windows in the 1959 additions have the original aluminum framed, casement styled and single glazed windows that are difficult to operate. The windows in the 1959

NARRATIVE

building leak cold air but are in fair condition. The windows need to be replaced with energy efficient windows to match the existing units.

The east entry doors in the 1959 building consist of three single aluminum doors with glass lights that are installed in aluminum frames and are in good condition. The two west and south entry doors are aluminum double doors installed in aluminum frames and are in good condition. The doors were replaced in 1985.

The north exit door from the 1926 building is a wood door with glass lights in a wood frame that needs to be replaced. There are two steel double exit doors and four steel single exit doors installed in steel frames in the 1959 building that are in good to fair condition. The wood exit door in a wood frame at the 1959 northeast stair exit is rotting and termite infested and needs to be replaced along with the canopy roof. There is a steel double door at the dock that is installed in a steel frame and is in good condition.

Roofing & Flashing

The original 1926 sloped roof consists of steel trusses and purlins that support the tongue and groove wood deck and standing seam copper roof. The copper roof is the original roof and has been repaired several times. The copper roof is 78 years old and should be replaced within the next five to ten years.

The 1959 roof structure has metal decking with a lightweight concrete fill and a built-up roof. The BUR roofing for the 1959 building was replaced in 1989-91. The roof over the dock has a modified bitumen roll roof that appears relatively new.

The roof drainage system consists of copper box gutters around the perimeter of the original building that drains to cast iron pipes located in the perimeter walls. The roof drainage system is in fair to poor condition. Some repairs should be made at gutter joints to prevent leaks.

The roof drains on the flat roofs of the 1959 building are run to interior cast iron storm drains that appear to be in good condition.

Partitions & Wall Finishes

The interior and perimeter load-bearing masonry brick walls of the 1926 building are covered with plaster finishes that form interior walls and rooms. Walls in the original building have a plaster finish on brick or wood studs with wood base and cornice trim, wainscot trim or chair rails around the rooms and at the doors.

The 1959 building is enclosed with clay tile or concrete block walls with a plaster finish to form interior walls and rooms. The original partitions in both buildings consist of wood studs with a plaster finish and are all in good to fair condition depending on the area. Remodeled areas in the building are separated with metal studs and drywall. Restrooms in the building have ceramic tile on masonry walls or drywall on metal studs. The interior partitions are primarily painted plaster walls. There are several areas where the plaster has come loose because of water leaks.

NARRATIVE

Doors

Many of the doors in the original building are wood doors in wood frames. The 1959 building additions and remodeled areas have wood doors in metal frames that are in good condition. Aluminum doors in aluminum frames have been installed at some office entrances.

The metal fire doors in the 1959 building are in good to fair condition. The doors to the southwest stairwell in the original building consist of wire glass doors with wire glass sidelights.

Some door and/or door hardware problems are showing up in maintenance calls. Lock mechanisms and door adjustments are beginning to fail and will require continued maintenance.

Floor Finishes

The corridor floors in the 1926 building have terrazzo inserts around marble installed on the concrete flooring with a marble or terrazzo base. Some office and classroom floors in the 1926 building have linoleum asphalt flooring installed on the concrete sub-floor. Other rooms have vinyl tile over the original flooring. The equipment rooms have exposed concrete floors. The restrooms have ceramic tile on the concrete sub-floor. The southwest stairs are terrazzo with oak banisters and are in good condition. The floors throughout the building have been well maintained and are in good to fair condition.

The floors in the 1959 building have terrazzo or mosaic tile on the concrete flooring with a marble or rubber base. The stairwells in the 1959 additions consist of steel stairs with a concrete fill and rubber treads. The east entrance stairs in the 1959 addition consist of concrete stairs with terrazzo treads and a marble base. Several of the office areas have been carpeted.

Asphalt tiles located in the 1926 building should be removed or sealed during any renovation.

Ceilings & Finishes

The ceilings in the 1926 building use plaster, suspended 2x4 mineral fiber tiles or are exposed. The ceilings in the first floor halls and under the stairwells have attached plaster with wood trim. As portions of the building have been remodeled, suspended 2x4 mineral fiber tiles have been used. The original plaster ceilings are in good to fair condition.

The ceilings in the 1959 building consist of attached plaster, suspended 2x4 mineral fiber tiles or concealed-spline acoustical panels. Some ceiling tiles need to be replaced where roof, duct, and/or pipe leaks have occurred. The concealed-spline ceiling tiles around the elevator landings on each floor of the 1959 building need to be repaired or replaced.

Conveying

There is one passenger/freight elevator at the southeast corner of the 1959 building. The elevator consists of a cab that is moved from floor to floor by a cable-driven system with a DC motor and reduction gearbox.

The controls consist of push buttons, relays, and solenoids that operate the motor, brake, floor levelers, doors and position lights. The passenger/freight elevator had a new control panel installed and meets ADA requirements. The elevator was operating and maintenance records did not indicate any problems; however, the elevator is 47 years old and needs to be replaced in the next five to ten years.

There is a dumb-waiter at the southeast corner of the west 1959 building addition that was used to move books to the ground floor of the old library.

Plumbing

The major service systems, domestic cold and hot water, standpipe system, natural gas, sanitary waste and storm drainage all appeared to be in good to fair condition and functioning at this time. The plumbing drainage system did not appear to have any problems. There was adequate water pressure at the faucets and fixtures on all of the floors.

The original 4" domestic cold water line enters the 1926 building on the north side through the tunnel and is connected to the 2.5" building domestic water service and the standpipe system with galvanized pipe. The 2.5" domestic water feeds restrooms and water fountains while the standpipe system feeds hose cabinets in hallways with 1.25" hoses that have been removed.

In 1959, a new 4" water supply line was installed to room 027M that enters the 1926 building on the southeast side through a 4" ductile cast iron pipe. The 4" pipe is connected to a galvanized pipe that feeds the building domestic water service and fire protection system. A 2.5" galvanized steel pipe off the 4" line supplies the domestic water system to the restrooms and water fountains in the east addition. The standpipe system feeds hose cabinets in the 1959 building hallways with 1.25" hose cabinets that have had the hoses removed.

The domestic hot water to the buildings is supplied by the power plant domestic hot water loop through the tunnel on the north side of the 1926 building. The domestic hot water piping consists of a 2.5" supply and a 1.5" return pipe that feeds all of the restrooms in the buildings. The piping for the domestic hot and cold water systems did not appear to have any problems at this time; however, some of the piping is galvanized pipe that may need to be replaced within the next five to ten years if water flows diminish.

The original building sanitary waste and vent piping has bell and spigot cast iron pipe with lead and oakum joints. Visible piping appears to be in good condition and should hold up well over the next ten to twenty years.

NARRATIVE

The interior storm drainage piping has bell and spigot cast iron pipe with lead and oakum joints and newer pipe has bell and spigot cast iron pipe with rubber gasket push joints. Visible pipes appear to be in good condition and should hold up well over the next ten to twenty years.

The storm drainage system has duplex ejector pumps in a buried sump located on the west side of room 055M that discharges to the storm line above. Another duplex ejector pump in a buried sump is located on the south side of room 051M that discharges to the storm line above. The plumbing drainage system did not appear to have any problems.

The restroom fixtures consist of water closets and urinals with flush valves and lavatories with faucets. The restroom fixtures were functioning properly and no replacements are needed; however, maintenance records did indicate that clogged water closets, sanitary waste pipe stoppages and domestic water faucet leaks are occurring more frequently.

The domestic cold and hot water, sanitary waste and storm drainage all appeared to be in good condition and functioning at this time. Various portions of the original plumbing system have been renovated since it was originally installed. In 1959, new feeds were run from the tunnel to the new building.

In 1985, a restroom was removed in the basement to make room for a new mechanical room and chiller. Several restrooms were partially remodeled to meet ADA requirements. Many of the restroom fixtures are the original fixtures. A lot of the original galvanized piping remains in un-renovated areas in the buildings. Over the next five to ten years, sections of galvanized steel water pipe left in walls and chases in both buildings will need to be replaced as water flows diminish.

All of the original plumbing piping is 76 years old and is well past its expected life cycle and will need to be replaced in the next five to ten years.

The 2" natural gas piping consists of steel pipe with screwed fittings and look as if they are functioning properly.

The laboratory service systems consist of natural gas and acid waste systems that seem to be functioning properly. There is a local neutralization tank with limestone chips located in the lab of the building.

Heating

The 8" heating hot water lines that feed the building are taped into the central heating hot water loop located on the north side of the original building. Building heating water is pumped through the buildings with pumps located in the crawl area of the original building. The hot water heating system supplies convectors and radiators located on the outside walls under some windows, fan coil units, unit-heaters, reheat coils on the VAV boxes and air-handling units. All of the heating equipment is 47 to 76 years old and is well past its expected life cycle replacement age and will need to be replaced in the next five to ten years.

Cooling & Ventilation

Although the campus records from the Office of Facility Planning and Development report the building as 100% air conditioned, the auditor noted areas in the building that are not air conditioned.

The east chiller consists of a Trane 207-ton chiller with a screw compressor, R-22 refrigerant, that was installed in 1999 and is located in room 027M. One chilled water pump located in room 027M supplies chilled water to the air-handling units on the east side of the building.

One condensing water pump moves water through the chiller heat exchanger to the BAC 207-ton open-type cooling tower that is located on the roof south of the elevator. The condensing water flows over baffles, while air flowing through the baffles into the tower core cools the condensing water before it is collected in the sump pan under the tower and pumped back to the chiller.

The west chiller in room 051M consists of a Carrier 125-ton chiller with a centrifugal compressor and R-11 refrigerant. It was installed in 1985. One chilled water pump located in room 051M supplies chilled water to the building air-handling units on the west side of the building. The 1985 R-11 chiller needs to be replaced.

One condenser water pump, located in room 051M, moves water through the chiller heat exchanger to a Marley 125-ton open-type cooling tower that is located in the parking lot. The condensing water flows over baffles, while air flowing through the baffles into tower core cools the condensing water before it is collected in the sump pan under the tower to be moved back to the chiller.

The chillers are cross-connected together so either chiller can condition the building during moderate weather or partial cooling if one chiller is down for service. About 327-tons of cooling are provided to the building. The Carrier 125-ton chiller is aging and approaching the end of its expected life cycle and will need to be replaced within the next five to ten years.

There are six air-handling units in this building that supply air to various rooms or floors. There are four multi-zone constant air volume (MZCV) air-handling units that supply air to grills and diffusers throughout the 1959 buildings. The remaining two units are variable-air-volume (VAV) units that were installed in remodeled spaces.

The original heating and ventilation system was replaced in 1985 with a high-velocity variable-air-volume system. The VAV air-handling unit has chilled water coils, prefilters and bag filters and is located in room 055M. The VAV air-handling supply air fan discharges air into a spiral high-velocity duct that supplies air to the VAV boxes located throughout the original building. A vortex discharge air damper controller determines the fan systems air volumes. As VAV boxes close, duct pressure increases and the fan vortex air damper is closed to deliver less air. The VAV boxes are controlled with a pneumatic thermostat located in the room and supply low- pressure air to diffusers or

NARRATIVE

grills located throughout the room. A ducted system returns air from the rooms back to the air-handling unit or to an exhaust damper through a return air fan.

The VAV air-handling unit installed in 1985 is nearing the end of its useful life and will need to be replaced in the next five to ten years.

The heating, ventilation, and air conditioning system in the 1999 renovated space on first and second floor of the west wing of the 1959 building has a high-velocity VAV unit. The VAV air-handling unit has a chilled water coil, pre-filters and bag filters and is located in room 182M. The VAV supply air fan discharges air into a high-velocity spiral duct that supplies air to the VAV boxes located throughout the renovated space. A variable speed motor controller determines the fan systems air volumes to the VAV boxes. As VAV boxes close, duct pressure increases the variable speed motor controller, which reduces the fan motor speed and deliver less air. The VAV boxes with reheat are controlled with electronic thermostats. The VAV boxes supply low-pressure air to diffusers located in the rooms. The VAV boxes modulate the cooling air damper and/or reheat coil from the DDC thermostat in the room. A ducted system returns air from the rooms back to the air-handling unit or an exhaust damper through a variable speed return air fan.

The original heating and ventilation system to the first floor and upper southern floors of the east wing of the 1959 building consists of a multi-zone constant air volume air-handling unit located in room 027M. A multi-zone (MZ) constant air volume unit typically has a hot and cold deck with a set of dampers to each zone that mixes the decks' discharge air with a manual damper setting. The MZ air-handling unit with hot water heating and chilled water coils and filters, supplies air to diffusers and grills located in the east wing. A ducted system returns air to the air-handling unit from the halls.

The 1959 building heating and ventilation system to the second and third floor of the east and west wing uses a multi-zone constant air volume air-handling unit located in rooms 280M, 380M and 320M. The MZ air-handling units have hot water heating and chilled water coils and filters that supply air to diffusers and grills located on the second and third floors. A ducted system returns air from the halls to the air-handling unit.

Although several of the chiller-water cooling coils have been replaced, the four MZ air-handling units serving the 1959 building are at the end of their useful life and will need to be replaced in the near future.

There was no central cooling system installed in several rooms of the 1959 building when built. Individual offices in these areas use window air conditioning units with $\frac{3}{4}$ to 1 ton of cooling each. The window units have 208-volt power supplied on a separate circuit and are mounted in steel frames for a secure installation. There are 24 offices with window air conditioning units in the east wing of the 1959 building.

Several rooms requiring special controls have single zone split system air-handling units. There is a Trane factory packaged ready-to-run VAV air-handling unit with DX cooling coils installed in room 356M. The coil was replaced in 2002. Controls for the air-

NARRATIVE

handling unit are electric and electronic. This air-handling unit supplies air to the VAV boxes and diffusers located throughout room 356. Electronic room thermostats control the VAV boxes that provide cooling. This cooling and ventilation system appeared to be operating at the time of the site visits.

A Liebert 3-ton R-22 DX condenser also located on the roof supplies the air-handling unit located in the ceiling of room 282.

Controls for the heating and cooling system are predominately pneumatic and electric and have been tied into a DDC system that is monitored at the Maintenance Building Automation Shop. Many of the room pneumatic thermostats need to be recalibrated as heating/cooling calls are made to the building. As air-handling units, chillers and pumps are replaced, they should be upgraded with DDC points to monitor or control the system.

Exhaust fans located throughout the building remove air from restrooms, common areas, conference rooms and mechanical rooms.

Electrical Service & Distribution

Arps Hall has two electrical power sources that are fed from the McCracken Power Plant at 13,200 volts, circuit numbers PGN5 and PGS5. These circuits are connected to two high voltage 13.2 KV switches with fuses located in room 047M that control the circuit in use to the transformer. The active 13.2 KV switch feeds electrical power through one 750-KVA transformer in room 047M that reduces the voltage to a usable level of 208/120 volts. Switchgear located in the room feeds equipment, lighting and power distribution panels located throughout the building.

Panel sizes vary throughout the building depending on the load. At about 5.84 watts per square foot, the building appears to just have an adequate power supply. Any large future electrical requirements would require a larger transformer and switchgear.

The electrical service was upgraded when the new transformer was installed during the remodeling project in 1985. During the 1985 renovation, several new breaker panels were installed to provide additional electric circuits to each floor.

Lighting & Power

Lighting consists of 40-watt fluorescent and incandescent light fixtures. During renovation projects, lights have been replaced with 32-watt electronic ballast and tube fixtures. Some stairwells and halls are lighted with incandescent track fixtures.

The incandescent bulbs should be replaced with fluorescent or energy-efficient halogen bulbs. A program to replace the remaining 40-watt fluorescent fixtures with 32-watt fluorescent fixtures would save energy.

There is an inadequate number of convenience and computer outlets in some areas of the building.

NARRATIVE

Safety Standards

Arps Hall is equipped with a manual fire alarm system consisting of pull stations at stairwells and exits that provide local fire annunciation from the panel to all floors. There are 1¼" hose cabinets in corridors without hoses on an undersized standpipe system. The building does not have a 2½" fire department connection in any of the stairwells. There are, however, fire hose cabinets and portable fire extinguishers on each floor.

An exterior fire escape is located on the north side of the west wing of the 1959 building. There are lighted exit signs with backup battery packs at each exit. Emergency lighting needs to be installed in the corridors and in stairwells. The fire alarm system in all buildings needs to be updated.

Automatic door openers are installed at the north entrance of the 1926 building for wheelchair access to the elevator and all floors. Handicapped access is provided by two ramps at the rear of the building from the courtyard parking area. The elevator is located in the southeast corner of the east 1959 building. There are wheelchair accessible controls and an emergency telephone in the elevator.

Asbestos

In September 1986, PEI Associates completed The Ohio Board of Regents Facilities Asbestos Inspection and Risk Assessment Program's report, "Inventory of Friable Asbestos Containing Material in Buildings of the Ohio State University (Main and Branch Campuses) and the Recommendations for Corrective Action."

Asbestos containing materials were identified in most pipe insulation located throughout the building, in mechanical rooms, crawl areas, attic spaces and pipe chases. Asbestos-containing materials have been removed from rooms 27M, 218, 229, some attic spaces and the old cooling tower located on the roof.

While total removal of the asbestos from exposed asbestos piping, plaster containing asbestos materials, drywall spackle, floor tiles and mastic is most preferred, it is not absolutely required as long as safe management techniques can be employed.

Perimeter

About 95% of the sidewalks around the building are in good condition. Some sidewalks on the south side have cracks or uneven concrete panels that need to be leveled. Approximately 288 square feet of concrete needs to be replaced.

Capstones on seat walls on the west side of the building are damaged and should be replaced.

The parking lot in the rear has been patched a few times but needs to be rebuilt with proper drainage.

NARRATIVE

The lawn areas around the building have some bare spots and should be seeded. There is mulch around the shrubbery. The ivy on the east side of the building needs to be removed.

Entrances to the building are well lighted, and area, flood, sidewalk and street lighting appear to be distributed properly. The building signs are in good condition.

BUILDING EVALUATION SUMMARY

Building Number: #011

Facility Name: Arps Hall

Year Constructed: 1926/1959

Building Size: 128,464 Gross Square Feet; 110,651 Net Square Feet

Replacement Cost: \$21,384,000*

COMPONENT RATING				
Building Component	Building Component Percentage of Total Cost**	Building Component Replacement Cost	Building Component Condition Value Multiplier	Building Component Current Value
Foundation	4.92%	\$1,052,092	77.78%	\$818,317
Columns & Beams	11.74%	\$2,510,482	77.78%	\$1,952,653
Exterior Walls	7.74%	\$1,655,122	74.51%	\$1,233,231
Ext. Windows & Doors	3.83%	\$819,007	74.01%	\$606,147
Roofing & Flashing	4.99%	\$1,067,062	62.23%	\$664,033
Partitions & Doors	8.14%	\$1,740,658	65.34%	\$1,137,346
Wall Finishes	2.50%	\$534,600	80.01%	\$427,733
Floor Finishes	4.74%	\$1,013,602	77.34%	\$783,920
Ceilings & Finishes	6.66%	\$1,424,174	77.34%	\$1,101,456
Conveying	1.03%	\$220,255	65.34%	\$143,915
Plumbing	7.66%	\$1,638,014	74.01%	\$1,212,294
Heating	8.07%	\$1,725,689	74.01%	\$1,277,182
Cooling & Vent.	9.26%	\$1,980,158	75.23%	\$1,489,673
Elect. Serv. & Dist.	1.58%	\$337,867	74.01%	\$250,055
Lighting & Power	10.90%	\$2,330,856	77.34%	\$1,802,684
Safety Standards	6.24%	\$1,334,362	67.34%	\$898,559
TOTALS	100.00%	\$21,384,000		\$15,799,198

Overall Building Condition Rating = 74%

Overall FCI (Facility Condition Index) = 10.9%***

FCI = Deferred Maintenance (\$2,323,000)/Replacement Cost (\$21,384,000) = 10.9%

* Replacement Cost assigned August 2003 by the Office of Facilities Planning and Development in the University Space Inventory System. Replacement cost does include the furnishings and fixed equipment allocation.

** Percent allocation of each building component was calculated from the Means Standard Construction Cost data for College Classroom Buildings.

*** Facility Condition Index is $([\text{deferred maintenance}] + [\text{deferred renovation}]) / [\text{total replacement cost}]$. An excellent building is 5%. As the building reaches 33%, the building needs major attention. The goal at The Ohio State University is to have an FCI of around 10%.

BUILDING EVALUATION SUMMARY

Foundation		
Refer to p. 12 for Narrative		
Foundations	<u>\$1,052,092</u>	
Component Rating	Component Replacement Cost	
	X	
	<u>77.78%</u>	
	Condition Value Multiplier	
	=	
		<u>\$818,317</u>
		Component Value
Footings		
Satisfactory	Interior Footings/Piers	Concrete
Satisfactory	Interior Footings/Bearing Walls	Spread
Satisfactory	Perimeter Footings	Spread
n/a	Grade Beams	
n/a	Piles	
n/a	Caissons	
Foundation Wall Materials		
Satisfactory	Concrete cast-in-place	
n/a	Concrete Block	
n/a	Stone	
n/a	Brick	
Waterproofing and Under-drain		
n/a	Coating	
n/a	Membrane	
n/a	Board	
Satisfactory	Drain Tile	
Slab on Grade		
Satisfactory	Plain	
Satisfactory	Reinforced	
Ground/Basement Floor Slab		
Satisfactory	Plain	in 1926 building
Satisfactory	Reinforced	in 1959 building
Special Substructures		
Satisfactory	Duct chases in crawl areas	

Comments – none

BUILDING EVALUATION SUMMARY

Columns & Beams			
Refer to p. 12 for Narrative			
Columns and Beams Component Rating	<u>\$2,510,482</u> Component Replacement Cost	X	<u>77.78%</u> Condition Value Multiplier
			=
			<u>\$1,952,653</u> Component Value
Columns and Beams			
Satisfactory	Reinforced concrete		1926 building
n/a	Pre-cast concrete		
Satisfactory	Steel columns and beams		1959 building
n/a	Fireproofing		
n/a	Wood		
Satisfactory	Iron Beams		1926 building
Floor Joists			
Satisfactory	Concrete		metal arches forming joists
Satisfactory	Steel Trusses		1959 building
n/a	Wood		
Floor Decks			
Satisfactory	Concrete Slab on load-bearing walls		1926 building
n/a	Pre-cast Slab		
Satisfactory	Metal Deck w/concrete fill		1959 building
n/a	Wood		
Roof Joists			
n/a	Concrete		
Satisfactory	Steel Trusses		1926 building
Satisfactory	Steel Joists		1959 building
n/a	Wood		
Pitched Roof System			
Satisfactory	Pitch		6/12
Satisfactory	Dormers shed type		1926 building
Satisfactory	Steel Rafters		1926 building
n/a	Wood Rafters		
n/a	Fireproofing		
Satisfactory	Underlayment 2" T&G		1926 building
n/a	Insulation		
Satisfactory	Ventilation		natural vents and power
Flat Roof System			
Satisfactory	Slope		0.25" per foot
n/a	Concrete Deck		
n/a	Pre-cast Gypsum Slab		
Satisfactory	Metal Deck w/concrete fill		1959 building
n/a	Metal Deck w/insulation		
n/a	Wood Deck		
Satisfactory	Insulation		board on top of concrete

Comments – none

BUILDING EVALUATION SUMMARY

Exterior Walls		
Refer to p. 12 for Narrative		
Exterior Walls Component Rating	<u>\$1,665,122</u> Component Replacement Cost	<u>74.51%</u> Condition Value Multiplier
	X	=
		<u>\$1,233,231</u> Component Value
Walls		
Satisfactory	Concrete cast-in-place	to first floor level
n/a	Concrete pre-cast	
n/a	Concrete Block	
Satisfactory	Brick Masonry	load bearing
Satisfactory	Brick Veneer	load bearing
Satisfactory	Slab Veneer	limestone
n/a	Window/Curtain wall	
n/a	Metal Siding	
Wall Lintels Over Openings		
n/a	Concrete pre-cast	
n/a	Concrete cast-in-place	
Satisfactory	Limestone	
Satisfactory	Brick Masonry	
Satisfactory	Steel	
n/a	Wood	
Wall Trim		
Satisfactory	Limestone	at front entrance
Satisfactory	Brick	
n/a	Marble	
n/a	Wood	
Satisfactory	Other	pre-cast limestone shapes
Finishes		
Satisfactory	Plain	
n/a	Stucco	
n/a	Paint	
n/a	Parging	
n/a	Exposed Aggregate	
n/a	Drivit	
Satisfactory	Other	plastered ceiling over the front entrance
Exterior Wall Backing System		
Satisfactory	Concrete	to first floor level
Satisfactory	Concrete Block	1959 building
Satisfactory	Brick Masonry	1926 building
n/a	Clay Tiles	
n/a	Metal Studs	
n/a	Wood Studs	

Comments

- The limestone cornice, trim and parapet caps should be cleaned and sealed to prevent spalling.

BUILDING EVALUATION SUMMARY

Exterior Windows & Doors			
Refer to p. 12 for Narrative			
Exterior Windows & Doors Component Rating	<u>\$819,007</u> Component Replacement Cost	X	<u>74.01%</u> Condition Value Multiplier =
			<u>\$606,147</u> Component Value
Window materials			
n/a	Wood		
n/a	Steel		
Satisfactory	Aluminum		1926 and 1959 buildings
n/a	PVC		
Windows type & number			
Satisfactory	Double Hung		1959 building - 117 ea.
Satisfactory	Double Hung		1985 renovation - 136 ea.
Satisfactory	Awning		1959 building - 13 ea.
n/a	Casement		
n/a	Pivoted		
n/a	Sliding		
Satisfactory	Fixed		1985 renovation - 9 ea.
Satisfactory	Other Spandrel Panels		1985 renovation - 12 ea.
Window glazing			
Satisfactory	Single pane		1959 building
Satisfactory	Double pane		1926 building and 1985 improvements
Window Wall and/or Store Front			
n/a	Store Front		
Satisfactory	Vestibule		
Satisfactory	Single pane		
Satisfactory	Double pane		
Door Materials			
Needs attention	Wood		2 double doors and 1 single door
Satisfactory	Steel		trash room and stair fire escape exits doors
Satisfactory	Aluminum		east and west entrance doors
Doors type & number			
Satisfactory	Vestibule		3 aluminum single
Satisfactory	Double		1 wood frame and trim
Satisfactory	Double		2 aluminum entrance
Satisfactory	Exit Double		2
Satisfactory	Exit		2
Satisfactory	Stair Exit		1
Needs attention	Stair Exit		1 wood frame and trim
n/a	Garage		
Hardware			
Satisfactory	Automatic opener at north door		
Satisfactory	Push bar openers with closures		
n/a	Key Cards		

Comments

- The 1959 windows need to be replaced with energy-efficient windows.
- The ground floor northeast wood door, trim, and canopy roof needs to be replaced and the area treated for termites.

BUILDING EVALUATION SUMMARY

Roofing & Flashing					
Refer to p. 13 for Narrative					
Roofing & Flashing Component Rating	<u>\$1,067,062</u> Component Replacement Cost	X	<u>62.23%</u> Condition Value Multiplier	=	<u>\$664,033</u> Component Value
Roof Covering					
Needs attention	Built-up with asphalt				516 SF
Satisfactory	Built-up w/gravel and asphalt				17,125 SF
Satisfactory	Modified Bitumen Roll				over dock-50 SF
n/a	Asphalt Shingle				
Satisfactory	Copper				1926 building, 16,510 SF
n/a	EPDM				
n/a	EPDM w/gravel				
Satisfactory	Aluminum flat seam				1926 building, 50 SF
Flashing					
	Copper (Satisfactory)		Galvanized (Satisfactory)		Aluminum (n/a)
	EPDM (n/a)		SS (n/a)		PVC (n/a)
Satisfactory	Base & Counter				1447 LF
Satisfactory	Cap				988 LF
Satisfactory	Reglet in walls				335 LF
Satisfactory	Valley & Ridge				875 LF
Gravel Stop & Edge Strips					
	Stainless Steel (needs attention) and		Galvanized (satisfactory)		74 LF
	Copper (n/a) PVC (n/a) Aluminum (n/a)				
Drainage					
Needs attention	Gutters w/ Interior Downspouts				1926 building, 420 LF
n/a	Scuppers w/o Exterior Downspouts				
Satisfactory	Drains w/ Interior Storm Drains				16 ea. – 1959 buildings
Satisfactory	Emergency Overflow				over the edge
Satisfactory	Other				10 interior downspouts 1926 building
Parapets					
n/a	Concrete				
Satisfactory	Brick/Limestone				1926 building
n/a	Pre-cast				
Parapet Caps					
	Metal	SS (n/a)	Galvanized (n/a)	Aluminum (n/a)	Copper (n/a) PVC (n/a)
n/a	Tile				
Satisfactory	Limestone				988 LF
n/a	Pre-cast				
Roof Accessories					
n/a	Lightning Protection				
Satisfactory	Roof Curbs				
Satisfactory	Equipment Frames				
n/a	Pitch Pockets				
Satisfactory	Other ventilation caps with curbs				

Comments

- The 75-year-old copper roof and gutters need to be replaced within the next five to ten years.
- Repairs need to be made at the gutter joints to prevent leaks.
- The BUR roof (516 SF) over the center stairwell needs to be replaced.
- The canopy BUR roof (16 SF) over the northeast stair exit door needs to be replaced.
- Repair the stainless steel gravel stop and replace the roof over the tunnel access structure.

BUILDING EVALUATION SUMMARY

Partitions & Doors			
Refer to p. 14 for Narrative			
Partitions & Doors Component Rating	<u>\$1,740,658</u> Component Replacement Cost	X	<u>65.34%</u> Condition Value Multiplier
			=
			<u>\$1,137,346</u> Component Value
Partition Framing			
Satisfactory	Concrete Block/Brick		1959 additions
Satisfactory	Clay Tile Block		1926 building
Satisfactory	Glazed Block		1959 restrooms
Satisfactory	Masonry load-bearing		1926 building
Satisfactory	Wood Stud		
Satisfactory	Metal Stud		remodeled areas
Special partitions and Walls			
Satisfactory	Demountable		
Satisfactory	Toilet		
Satisfactory	Screen Walls		
Satisfactory	Glass		safety glass at stairs
n/a	Gate		
Wall Material			
Satisfactory	Plaster		original in both 1926 and 1959 buildings
Satisfactory	Drywall		remodeled areas
Satisfactory	Glass		hall door transoms and arches
Satisfactory	Wood Paneling		1926 building
n/a	Steel Panels		
Satisfactory	Tile/Glazed		
Interior Doors & Frames			
Satisfactory	Met Door/Met Frame		
Satisfactory	Wood Door/Wood Frame		1926 building
Satisfactory	Wood Door/Metal Frame		
Satisfactory	Glazing		
n/a	Roll-up		
n/a	Sliding		
Hardware			
Satisfactory	Door Knobs		
Satisfactory	Door Levers		
Satisfactory	Door Closures		
Satisfactory	Kick/Push Plates		
Satisfactory	Security & Detection		
Satisfactory	Automatic Openers		
n/a	Fire Door Magnets		

Comments

- Some door and/or door hardware problems are showing up in maintenance calls.
- Lock mechanisms and door adjustments are beginning to fail and will require continued maintenance.

BUILDING EVALUATION SUMMARY

Wall Finishes	
Refer to p. 13 for Narrative	
Wall Finishes Component Rating	\$534,600 Component Replacement Cost
	X
	80.01% Condition Value Multiplier
	=
	\$427,733 Component Value
Wall Finishes	
Satisfactory	Paint
Satisfactory	Vinyl Wall Coverings
Satisfactory	Paneling Pre-finished wood and acoustical panels
n/a	Cork
n/a	Wallpaper
Satisfactory	Ceramic Tile restrooms
Satisfactory	Marble
n/a	Stone
Satisfactory	Trim & Wainscot plaster
Satisfactory	Decoration oak trim and inlays throughout the building
Satisfactory	Glass

Comments

- There are several areas where the plaster has come loose because of water leaks. These areas should be identified and repaired.

BUILDING EVALUATION SUMMARY

Floor Finishes					
Refer to p. 14 for Narrative					
Floor Finishes	<u>\$1,013,602</u>	X	<u>77.34%</u>	=	<u>\$783,920</u>
Component Rating	Component Replacement Cost		Condition Value Multiplier		Component Value
Carpet					
Satisfactory	Rolled				n some offices
n/a	Tile				
Concrete Topping					
Satisfactory	Clear Sealant				
n/a	Anti-slip				
n/a	Epoxy				
Resilient					
Satisfactory	Vinyl Composition Tile				replacement tiles
n/a	Vinyl/Plastic Tile				
Needs attention	Asphalt Tile				both buildings
Needs attention	Linoleum Tile				under some vinyl tiles
n/a	Vinyl Roll				
n/a	Rubber				
Ceramic Tile					
Satisfactory	Mosaic				
n/a	Quarry				
n/a	Pavers				
Masonry					
Satisfactory	Marble				
n/a	Granite				
n/a	Slate				
n/a	Brick				
Terrazzo					
Satisfactory	Marble				
Satisfactory	Granite				halls
Wood					
n/a	Tiles				
n/a	T&G Hardwood				
n/a	Planking				
Pedestal					
	Vinyl Tiles (n/a)	Grills (n/a)	Supply Air (n/a)	Vent (n/a)	
Base Molding					
Satisfactory	Vinyl				
Satisfactory	Wood				oak throughout the 1926 building
Satisfactory	Terrazzo				
n/a	Ceramic Tile				
Satisfactory	Masonry				restrooms
Satisfactory	Marble				1926 building

Comments

- Asphalt tiles need to be removed during any renovation.

BUILDING EVALUATION SUMMARY

Ceilings & Finishes	
Refer to p. 14 for Narrative	
Ceilings & Finishes	<u>\$1,424,174</u>
Component Rating	<u>77.34%</u>
	X
	=
	<u>\$1,101,456</u>
	Component Replacement Cost Condition Value Multiplier Component Value
System Type	
Satisfactory	Exposed
Satisfactory	Applied to Structure
n/a	Suspended Stud
Satisfactory	Suspended Steel Grid plaster throughout
Satisfactory	Suspended Aluminum Grid remodeled rooms
n/a	Suspended Sealed Grid
Needs attention	Suspended Concealed Spline
Materials	
n/a	Drywall
Satisfactory	Plaster many ceilings
Satisfactory	Mineral Fiber Board 2x4 in renovated areas
n/a	Fiberglass Board
n/a	Cementitious Fiber Board
n/a	Metal Pan Tile
Needs attention	Other concealed spline
Finishes	
Satisfactory	Paint
Satisfactory	Pre-finished Paint
n/a	Pre-finished Vinyl
n/a	Pre-finished Fabric
Openings & Inserts	
Satisfactory	Air Distribution
Satisfactory	Lighting Fixtures
Satisfactory	Access Panels
n/a	Sprinklers
Satisfactory	Smoke Detectors
n/a	Speakers
n/a	Skylights
n/a	Other

Comments

- The concealed-spline ceiling tiles around the elevator landings on each floor of the 1956 building need to be repaired or replaced.
- Some ceiling tiles need to be replaced where roof, duct and/or pipe leaks have occurred.

BUILDING EVALUATION SUMMARY

Conveying			
Refer to p. 15 for Narrative			
Conveying Component Rating	<u>\$220,711</u> Component Replacement Cost	X	<u>65.34%</u> Condition Value Multiplier =
			<u>\$143,915</u> Component Value
Elevators			
Satisfactory	Number		1 Otis
Satisfactory	Type		Passenger/Freight
Satisfactory	Speed		50 FPM
Satisfactory	Capacity (lbs.)		3,500 lbs.
Satisfactory	Dimensions		61"x80"
Satisfactory	Door Operation	<input checked="" type="checkbox"/> Side	<input type="checkbox"/> Center
Satisfactory	Accessibility Standards		
Satisfactory	Fire Codes		
Satisfactory	Cable		
n/a	Hydraulic		
Lifts and Hoists			
Satisfactory	Number		dumb-waiter
Satisfactory	Type		full height
Moving Stairs and Walks			
n/a	Number		
n/a	Type		
Conveyors			
n/a	Number		
n/a	Type		

Comments

- The elevator is 47 years old and will need to be replaced in five to ten years.

BUILDING EVALUATION SUMMARY

Plumbing					
Refer to p. 15 for Narrative					
Mechanical & Plumbing Component Rating	<u>\$1,638,014</u>	X	<u>74.01%</u>	=	<u>\$1,212,294</u>
		Component Replacement Cost			Condition Value Multiplier
Services Available					
Satisfactory	Cold Water	4" in tunnel and 4" from south			
Needs attention	Backflow Valve				
Satisfactory	Hot Water	2.5" with 1.5" return in tunnel			
Satisfactory	Natural Gas	2" in tunnel			
n/a	Compressed Air				
Satisfactory	Other	4" fire standpipe line			
Piping & Fittings					
Satisfactory	Cast Iron				
n/a	Ductile Iron				
Satisfactory	Copper Pipe				
n/a	Copper Tubing				
Satisfactory	Steel				
Satisfactory	Galvanized Steel	domestic water and standpipe system			
Water Heaters					
n/a	Gas				
n/a	Steam Converter/Tank				
n/a	Steam Instantaneous				
Satisfactory	Central Hot Water	2.5" DHWS and 1.5" DHWR			
Drainage					
Satisfactory	Storm Drains				
Satisfactory	Sanitary Drainage				
Satisfactory	Floor Drains				
Fixtures (Number)					
Satisfactory	Water Closets				38
Satisfactory	Urinals				9
Satisfactory	Lavatory Sinks				23
Satisfactory	Kitchen Sinks				3
Satisfactory	Service Sinks				9
n/a	Showers				
Satisfactory	Electric Water Coolers				8
Sprinkler Systems					
n/a	Wet				
n/a	Dry				
n/a	Carbon Dioxide				
n/a	Halon				
Standpipe Systems					
Needs attention	[X]Wet []Dry	no fire department connections			
Needs attention	Fire Hose Valve	[]2.5"	[X]1.25"		
Satisfactory	Hose Cabinets, Hoses	[]Installed	[X]Removed		

Comments

- There are no fire department valves installed in the original standpipe water system. The hoses on the 1¼" valves have been removed.
- Original plumbing systems are past the serviceable life and should be replaced.
- Galvanized steel pipes may need to be replaced if water flows diminish.
- Maintenance records indicate that many of the water closets are becoming clogged and that flush valves and faucets are failing on a continuing basis.

BUILDING EVALUATION SUMMARY

Heating											
Refer to p. 16 for Narrative											
Mechanical & Heating Component Rating	<u>\$1,725,689^c</u>	X	<u>74.01%</u>	=	<u>\$1,277,182</u>						
	Component Replacement Cost		Condition Value Multiplier		Component Value						
Heat Source											
n/a	Central Plant Steam										
Satisfactory	Central Plant Hot Water					8" HWS & R					
System Type											
n/a	Steam										
Satisfactory	Hot Water										
Satisfactory	Warm Air										
Air Handling Units											
Satisfactory	Multi-zone	<input type="checkbox"/>	Preheat	<input checked="" type="checkbox"/>	Heating	<input type="checkbox"/>	Reheat				
n/a	Dual Duct	<input type="checkbox"/>	Preheat	<input type="checkbox"/>	Heating	<input type="checkbox"/>	Reheat				
n/a	Make-up Air	<input type="checkbox"/>	Preheat	<input type="checkbox"/>	Heating	<input type="checkbox"/>	Reheat				
Satisfactory	Variable Volume Air	<input type="checkbox"/>	Preheat	<input type="checkbox"/>	Heating	<input type="checkbox"/>	Reheat				
Satisfactory	Constant Volume Air	<input type="checkbox"/>	Preheat	<input checked="" type="checkbox"/>	Heating	<input type="checkbox"/>	Reheat				
Air Filters											
Satisfactory	Pre-filter	<input checked="" type="checkbox"/>	Multi	<input type="checkbox"/>	DDAHU	<input type="checkbox"/>	MUAHU	<input checked="" type="checkbox"/>	VAVAHU	<input checked="" type="checkbox"/>	CAV
Satisfactory	Bag-filter	<input checked="" type="checkbox"/>	Multi	<input type="checkbox"/>	DDAHU	<input type="checkbox"/>	MUAHU	<input checked="" type="checkbox"/>	VAVAHU	<input type="checkbox"/>	CAV
Space Equipment											
Satisfactory	Radiators										
Satisfactory	Convectors										
Satisfactory	Unit Heaters										
Satisfactory	Reheat Coils										
n/a	DD Boxes										
Satisfactory	VAV Boxes										
Satisfactory	2-Pipe Fan Coil					at entrances					
Control Type											
Satisfactory	<input checked="" type="checkbox"/>	Pneumatic	<input checked="" type="checkbox"/>	Electric	<input checked="" type="checkbox"/>	DDC	<input type="checkbox"/>	DDC Upgrade			

Comments

- All of the air-handling units are past their useful life and need to be replaced in the next five to ten years.

BUILDING EVALUATION SUMMARY

Cooling & Ventilation						
Refer to p. 17 for Narrative						
Cooling & Ventilating Component Rating	<u>\$1,980,158</u>	X	<u>75.23%</u>	=	<u>\$1,489,673</u>	
		Component Replacement Cost			Condition Value Multiplier	
Component Value						
System/Capacity						
Satisfactory	Water					327 Tons
n/a	DX					
Chillers Capacity/Year/Refrigerant/Manufacturer						
Satisfactory	Centrifugal					125 Ton/1983/R-11/Carrier
n/a	Reciprocating					
Satisfactory	Screw					207 Ton/1999/R-22 Trane
Condenser Side						
Satisfactory	Type/Capacity	<input checked="" type="checkbox"/> CW	<input type="checkbox"/> DX			
Satisfactory	Type/Capacity	<input checked="" type="checkbox"/> CW	<input type="checkbox"/> DX			
						207 ton
						125 ton
Air Handling Units						
Satisfactory	Multi-zone	<input checked="" type="checkbox"/> CW	<input type="checkbox"/> DX	<input type="checkbox"/> HUMD		
n/a	Dual Duct	<input type="checkbox"/> CW	<input type="checkbox"/> DX	<input type="checkbox"/> HUMD		
n/a	Make-up Air	<input type="checkbox"/> CW	<input type="checkbox"/> DX	<input type="checkbox"/> HUMD		
Satisfactory	Constant Air Volume	<input checked="" type="checkbox"/> CW	<input checked="" type="checkbox"/> DX	<input type="checkbox"/> HUMD		
Satisfactory	Variable Air Volume	<input checked="" type="checkbox"/> CW	<input type="checkbox"/> DX	<input type="checkbox"/> HUMD		
n/a	Fan Coil Unit	<input type="checkbox"/> CW	<input type="checkbox"/> DX	<input type="checkbox"/> REHEAT		
Additional Air Filters						
n/a	Postfilter	<input type="checkbox"/> Multi	<input type="checkbox"/> DDAHU	<input type="checkbox"/> MUAHU	<input type="checkbox"/> VAVAHU	<input type="checkbox"/> CAV
Direct Expansion (Number)						
Satisfactory	Window units					24 units
n/a	Thru-the-wall					
Satisfactory	Single zone					2 DX units
Distribution Boxes						
Satisfactory	VAV	<input type="checkbox"/> FC	<input checked="" type="checkbox"/> REHEAT			
n/a	CAV	<input type="checkbox"/> FC	<input type="checkbox"/> REHEAT			
n/a	DUAL DUCT	<input type="checkbox"/> FC	<input type="checkbox"/> REHEAT			
Special Systems						
Satisfactory	Type					Trane supply air fan for electrical room 047M
Satisfactory	Capacity					4,400 CFM
Control Systems						
Satisfactory		<input checked="" type="checkbox"/> Pneumatic	<input checked="" type="checkbox"/> Electric	<input checked="" type="checkbox"/> DDC	<input checked="" type="checkbox"/> DDC Upgrade	
Fans						
Satisfactory	Exhaust equipment					7 exhaust fans
n/a	Re-circulating					

Comments

- The 1985 R-11 chiller needs to be replaced.
- Four MZ air-handling units serving the 1959 building need to be replaced in the near future.
- Many of the room pneumatic thermostats need to be recalibrated.
- As air-handling units, chillers and pumps are replaced, they should be upgraded with DDC points to monitor or control the system.

BUILDING EVALUATION SUMMARY

Electrical Service & Distribution					
Refer to p. 19 for Narrative					
Electrical Service & Distribution Component Rating	<u>\$337,867</u>	X	<u>74.01%</u>	=	<u>\$250,055</u>
	Component Replacement Cost		Condition Value Multiplier		Component Value
Service					
Substation	<input type="checkbox"/> Buckeye		<input checked="" type="checkbox"/> McCracken Power Plant		
Primary Voltage	<input checked="" type="checkbox"/> 13,200 Volts		<input type="checkbox"/> _____ Volts		
Switch Gear Circuit No.	PGN5/PGS5				
Transformer					
Manufacturer	Type	KVA	Secondary/Voltages	Room	
Westinghouse	Dry	750	208/120	047M	
Distribution System					
Motor Control Center (MCC) Room 055M, 027M, 051M					
Panelboard	<input checked="" type="checkbox"/> Fused	<input type="checkbox"/> Circuit Breakers			
Voltage	<input type="checkbox"/> 480/3	<input type="checkbox"/> 277/3	<input checked="" type="checkbox"/> 208/3	<input type="checkbox"/> 240/1	
Amperage	<input type="checkbox"/> 1200A	<input checked="" type="checkbox"/> 800A	<input type="checkbox"/> 600A	<input type="checkbox"/> 400A	<input type="checkbox"/> 200A
Lighting Room 047M					
Panelboard	<input checked="" type="checkbox"/> Fused	<input checked="" type="checkbox"/> Circuit Breakers			
Voltage	<input type="checkbox"/> 480/3	<input type="checkbox"/> 277/3	<input checked="" type="checkbox"/> 208/3	<input type="checkbox"/> 240/1	
Amperage	<input type="checkbox"/> 800A	<input checked="" type="checkbox"/> 400A	<input type="checkbox"/> 250A	<input checked="" type="checkbox"/> 200A	<input type="checkbox"/> 150A <input type="checkbox"/> 100A
Building Power Room 047M					
Panelboard	<input checked="" type="checkbox"/> Fused	<input checked="" type="checkbox"/> Circuit Breakers			
Voltage	<input type="checkbox"/> 480/3	<input type="checkbox"/> 277/3	<input checked="" type="checkbox"/> 208/3	<input type="checkbox"/> 240/1	
Amperage	<input type="checkbox"/> 800A	<input checked="" type="checkbox"/> 400A	<input type="checkbox"/> 250A	<input checked="" type="checkbox"/> 200A	<input type="checkbox"/> 150A <input type="checkbox"/> 100A
Isolated Ground Power Room					
Panelboard	<input type="checkbox"/> Fused	<input type="checkbox"/> Circuit Breakers			
Voltage	<input type="checkbox"/> 480/3	<input type="checkbox"/> 277/3	<input type="checkbox"/> 208/3	<input type="checkbox"/> 240/1	
Amperage	<input type="checkbox"/> 400A	<input type="checkbox"/> 250A	<input type="checkbox"/> 200A	<input type="checkbox"/> 150A	<input type="checkbox"/> 100A
Conduit and wire					
Conduit	<input checked="" type="checkbox"/> Steel	<input type="checkbox"/> Aluminum	<input type="checkbox"/> PVC	<input checked="" type="checkbox"/> Flexible	
Conductor	<input checked="" type="checkbox"/> Copper	<input type="checkbox"/> Aluminum		<input checked="" type="checkbox"/> MIT	
Wire	<input checked="" type="checkbox"/> PVC Cover	<input checked="" type="checkbox"/> Romex	<input checked="" type="checkbox"/> Armored Cable(BX)		
Emergency System					
<input type="checkbox"/> Battery backup Room					
<input type="checkbox"/> Emergency Panel Room					
<input type="checkbox"/> UPS Room					
Emergency Generator					
Size KVA, Location, Room					

Comments

- The transformer is just capable of serving the buildings. Any new load may require the transformer to be replaced.

BUILDING EVALUATION SUMMARY

Lighting & Power Refer to p. 19 for Narrative				
Electrical Lighting & Power Component Rating	<u>\$2,330,856</u>	X	<u>77.34%</u>	= <u>\$1,802,684</u>
	Component Replacement Cost		Condition Value Multiplier	Component Value
Lighting (lamp type)				
Satisfactory	Fluorescent 40 watt			a few areas left
Satisfactory	Fluorescent 32 watt			retrofitted rooms and halls
n/a	Fluorescent Can			
Needs attention	Incandescent			stairwells, some halls and crawl area
n/a	HID <input type="checkbox"/> Mercury <input type="checkbox"/> HPS <input type="checkbox"/> Metal Halide			
n/a	Low Voltage (12V)			
Lighting Levels				
Satisfactory	Halls			
Satisfactory	Rooms			
Satisfactory	Mechanical Rooms			
Fixture Condition				
Satisfactory	Fixtures			
Satisfactory	Bulbs			
Satisfactory	Fixture Lens			
Receptacles & Switches				
Satisfactory	Wall Outlet 20A			
Satisfactory	GFIC Breakers			newer restrooms
Satisfactory	Switches			
Satisfactory	Cover Plates			
Special				
n/a	Lightning Protection			
Satisfactory	Communication	<input checked="" type="checkbox"/> Clock	<input type="checkbox"/> Public Address	<input checked="" type="checkbox"/> Bells
Satisfactory	Alarm	<input checked="" type="checkbox"/> Fire	<input type="checkbox"/> Security	
Satisfactory	Telecommunication	<input checked="" type="checkbox"/> Phones	<input checked="" type="checkbox"/> Data	<input type="checkbox"/> Cable TV
Satisfactory	Data Systems			
n/a	Fiber Optics			

Comments

- Replacing the 40-watt lighting with 32-watt lighting will save energy.
- Incandescent lighting should be replaced with halogen bulbs.
- There is an inadequate number of convenience and computer outlets in some areas of the building.

BUILDING EVALUATION SUMMARY

Safety Standards	
Refer to p. 20 for Narrative	
Safety Standards Component Rating	<u>\$1,334,362</u> Component Replacement Cost X <u>67.34%</u> Condition Value Multiplier = <u>\$898,559</u> Component Value
Exits – Stair Construction	
Satisfactory	Concrete
Satisfactory	Steel with concrete fill
n/a	Wood
Satisfactory	Number of Exit Stairs 4
Satisfactory	Number of Other Exits 4
Satisfactory	Other fire escape on north side of 1959 building
Fire Rating	
n/a	Construction Type I II X III IV V VI
	Building Height 56 ft., 4 stories
Extinguishing Systems	
Satisfactory	Portable
Needs attention	Standpipe in halls
Satisfactory	Hose Cabinets
Satisfactory	Hoses removed
n/a	Sprinklers
n/a	Gas Suppression
Detection & Alarm Systems	
Satisfactory	Pull Stations
Satisfactory	Bells
Satisfactory	Horns
Satisfactory	Strobes
Satisfactory	Annunciator Panel room 027M
n/a	Smoke Detectors
n/a	Halls
Satisfactory	Elevators
n/a	Rooms
n/a	Equip Rooms
Satisfactory	Ducts
Lighting Systems	
Satisfactory	Exit Signs [X]BATTERY []EMC
Satisfactory	Exit Lighting [X]BATTERY []EMC
Satisfactory	Emergency Lighting [X]BATTERY []EMC
n/a	Emergency Generator
Lightning Protection	

Comments

- There are 1¼" hose cabinets without hoses on an undersized standpipe system that needs to be replaced. The existing standpipe systems are obsolete.
- The fire escape stairs on the north end of the 1959 building needs to be repaired and painted.
- Emergency lighting needs to be installed in the corridors and stairwells.
- The fire alarm system in all 3 buildings of Arps Hall needs to be updated.

BUILDING EVALUATION SUMMARY

Perimeter	
Refer to p. 20 for Narrative	
Building Access	
Needs attention	Parking rear of 1926 building and between 1959 wings
Satisfactory	Loading Dock rear of 1959 east building
Sidewalks	
Satisfactory	Front east
Satisfactory	Sides north and south
Satisfactory	Rear west
Steps	
Satisfactory	Front
Satisfactory	Side
Satisfactory	Rear
Satisfactory	Ramp to both wings and west basement
Lawn and Landscaping	
Needs attention	Lawn
Satisfactory	Shrubs
Satisfactory	Trees
n/a	Undesirable Insect
Satisfactory	Bedding Material
n/a	Watering System
General Site Information	
Satisfactory	Signage
Satisfactory	Address Identification
Satisfactory	Security Lights
Satisfactory	Street Lights
Satisfactory	Drainage
Satisfactory	Storm Drains

Comments

- Some sidewalks on the south side have cracks and uneven concrete panels.
- Parking area needs potholes repaired, cracks filled, surface seal coated, and curbs repaired.
- Ivy on the front walls on High Street needs to be removed.
- Bare spots in the grass around the building need to be seeded.

BUILDING AUDIT METHODOLOGY

1) BUILDING AUDIT PROGRAM OBJECTIVE

To provide a building-by-building inventory, including maintenance deficiencies that currently exist, for the 172 OSU buildings that the Department of Physical Facilities is fiscally responsible. These audits will be used to establish repair and renovation projects, prepare budget cost estimates for these projects, and determine overall levels of required maintenance funding.

2) BUILDING AUDIT APPROACH. A five-step procedure is used to meet the program objectives:

- a) Collect Historic and Inventory Data on each building.
- b) Interview Building Occupants.
- c) Perform a Building Inspection.
- d) Complete Building Evaluation Forms.
- e) Issue Written Report.

3) DATA ORGANIZATION

The data collected is stored by hard copy with field notes in a building file established for each building. The report data is being stored in a database program that allows retrieval of specific data as it is needed. The "Building Evaluation" forms contain ratings for the condition of each building component and a description of any deficiencies for those components. The "Building Information" sheets provide data on the utilities to the buildings and the type of systems in each building.

4) COST ESTIMATES

Costs are for budgeting purposes only and are based on the Means Standard Construction Cost data, auditor experience, industry sources and OSU project cost data. Costs are reported current to the year of the audit. The building component values assigned in the "Building Evaluation" forms are not cost estimates. These values are calculated from the replacement cost provided by the Office of Campus Planning and Space Utilization for each OSU building. This building replacement cost is allocated to each building component to provide an estimated value for each component. Project cost estimates will exceed the building component values in most situations because of tear-out, handling and site limitations that occur in building component replacement projects.

5) DATA USAGE

Repair and Renovation Projects: provided to assist in the budgeting process for the Department of Physical Facilities. Building Evaluation: provided to give a numeric rating for each building on campus quantifying its percentage of deficiency.

6) LIMITATIONS

- a) All inspections are visual and do not include physical tests, instrumentation or metering measurements, sampling, or monitoring.
- b) Only random typical offices or laboratories are entered. Typical spaces are deemed to be representative of average conditions throughout each building.
- c) The scope of the analysis does not include complete OSHA, energy, or physically-impaired access study. Buildings and components are inspected for condition and general safety requirements rather than specialized code conformance.
- d) It is assumed that the State of Ohio Division of Factory and Building Inspection at the time of construction approved the buildings inspected. The recommendations listed in the reports are not an attempt to bring these existing buildings up to present-day code standards. Rather, the intent is to eliminate obvious problems and to upgrade the buildings in a reasonable manner in regard to occupant safety.
- e) Cost estimates are in current year dollars and include contractor mark-ups, construction administration costs, and architectural/engineering costs where applicable. Escalation factors must be applied for future work. Combining of projects should serve to decrease costs. These estimates are strictly for purposes of budgeting, and final pricing will be required when the specific scope of work for the project is defined.
- f) The building inspections are defined as follows:
 - i) Includes
 - (1) General repainting and redecorating.
 - (2) Exterior building walls and attached items.
 - (3) First step up at all entries and ramps outside the buildings.
 - ii) Excludes:
 - (1) Wholesale replacement of building and system components.
 - (2) Ongoing maintenance, replacement and renovation projects.
 - (3) Steps and walks up to the ramp.
 - (4) Blinds, drapes, light bulbs, and movable furniture.
 - (5) Fixed equipment inside the buildings that is installed and maintained by a specific academic department or using agency.
 - (6) Utility lines supplying the buildings.
 - iii) The program needs of the using department are assumed to be satisfied.
 - iv) No consideration has been given to anticipate any changes in current occupant space needs.

ABBREVIATIONS

A/C	Air Conditioning
AHU	Air Handling Unit
ATT	Attention
BLDG	Building
BUR	Built Up Roof
CAV	Constant Air Volume
COND	Condensate Water
DDAHU	Dual Duct Air Handling Unit
DDHV	Dual Duct High Velocity
DHWH	Domestic Hot Water Heater
DHWR	Domestic Hot Water Return
DHWS	Domestic Hot Water Supply
DHWT	Domestic Hot Water Tank
DX	Direct Expansion Air Conditioner
EWC	Electric Water Cooler
FPM	Feet Per Minute
GPM	Gallons Per Minute
HID	High Intensity Discharge Light
HPS	High Pressure Steam (125 psi)
HVAC	Heating, Ventilating and Air Conditioning
KV	Kilovolts
KVA	Kilovolt Amps
KW	Kilowatts
LC	Liquid Cooled
LF	Lineal Feet
LPS	Low Pressure Steam (15 psi)
MCC	Motor Control Center
MPS	Medium Pressure Steam (50 psi)
MZ	Multi-Zone
MZCV	Multi-Zone Constant Volume Air Handling
N/A	Not Applicable
PSI	Pounds per Square Inch
RM	Room
RTU	Roof Top Unit (Heating or A/C)
S/P	Stand Pipe
SAT	Satisfactory
SF	Square Feet
SR	Steam Return Line
SS	Steam Supply Line
SY	Square Yards
TR	Terminal Reheat
V	Volts
VAV	Variable Air Volume

Reduced Scale Building Floor Plans

APPENDIX

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