

FACILITY AUDIT REPORT  
AERONAUTICAL AND ASTRONAUTICAL  
RESEARCH LABORATORY, BLDG 199

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**EXECUTIVE SUMMARY AND PROJECT LIST FOR  
AERONAUTICAL & ASTRONAUTICAL RESEARCH LABORATORY**

The Aeronautical and Astronautical Research Lab is a 27-year-old one-story structure composed primarily of large-bay laboratory/ shop space and offices. There have been very few changes to the interior space since it was built. The building mechanical/ electrical systems are aging but are not at a point in age or performance where system replacement is immediately necessary. The HVAC System has a relatively new chiller and cooling tower but will require new air handlers within the next five to ten years. The control system is to be updated to direct digital control. The lighting in the hallways should be converted to fluorescent. The faucets in the restrooms are worn and the fixtures should be replaced within the next five to ten years. The boiler that supplies heating hot water has been recently re-tubed.

There has been a history of problems with the floating floor slabs throughout the building moving relative to each other and the load-bearing portions of the foundation. The floors have been leveled in the office area but there are several locations in the shop area where smoothing the cracks would make equipment movement easier. A workorder has been written to accomplish this. Interior finishes are generally in serviceable condition. The hallway ceilings should be cleaned. The exterior of the building was being repainted during our inspection. The roof is in good condition for the most part but has reached an age where replacement should be programmed for the next five to ten years. The windows should be replaced with double-paned operable units in the office area to improve occupant comfort and energy efficiency.

**PROPOSED MAINTENANCE PROJECTS:**

<b>A. Corrective Maintenance Projects:</b>	<b>Control #</b>
1. Paint Exterior. (Funded & Underway)....\$14,000	(92-93 R&R Project)
5. Install DDC for multizone systems..... <u>9,000</u>	2120
<b>Sub Total \$ 23,000</b>	
<b>B. Building Improvement/Addition Project:</b>	
1. Replace windows.....\$18,700	2121
2. Install DDC for boiler & chiller..... 5,000	(Funded & underway)
3. Replace hallway lights with fluorescent fixtures and clean ceilings..... <u>5,480</u>	2122
<b>Sub Total \$ 29,180</b>	
<b>C. Projected (over the next 5 yrs) Component Replacement Projects:</b>	
1. Replace air handlers and controls.... \$81,500	2123
2. Replace plumbing fixtures..... 14,000	2124
3. Replace built-up roofing, add tapered insulation..... <u>196,700</u>	2125
<b>Subtotal \$292,200</b>	
<b>Total cost for estimated projects =</b>	<b>\$344,380</b>

31 AUG 93

GENERAL BUILDING INFORMATION

AERONAUTICAL AND ASTRONAUTICAL RESEARCH LAB #199

BUILDING ADDRESS: 2300 WEST CASE ROAD

GROSS SQ. FT.: 34,062

NET ASSIGNABLE SQ. FT.: 25,985

MECHANICAL/CUSTODIAL AREA SQ. FT.: 1454

YEAR OF CONSTRUCTION: 1966

YEAR OF LAST RENOVATION: NO MAJOR RENOVATIONS SINCE CONSTRUCTION

NUMBER OF STORIES/BASEMENT: ONE STORY STRUCTURE

AIR CONDITIONING (Percentage): 50%

CURRENT USE: OFFICES AND LABORATORIES FOR SPONSORED RESEARCH AND THE  
AERONAUTICAL AND ASTRONAUTICAL ENGINEERING DEPARTMENT.

TYPE OF CONSTRUCTION: STEEL FRAME WITH METAL CURTAIN WALL SKIN

ESTIMATED REPLACEMENT COST: \$4,255,000 \*

WHEELCHAIR ACCESSIBILITY: THE BUILDING IS NOT CURRENTLY WHEELCHAIR-ACCESSIBLE.  
A RAMP IS UNDER CONSTRUCTION (AS OF AUG 1993) AND THE BUILDING WILL BE ACCESSIBLE  
VIA THE NORTHWEST ENTRANCE UPON COMPLETION

OVERALL BUILDING CONDITION: SATISFACTORY \*\*

NUMBER OF EXIT STAIRWAYS: ONE-STORY STRUCTURE - NO EXIT STAIRWAYS

\* Replacement Cost assigned January, 1991 by The Office of Campus Planning and Space Utilization.

\*\* Office of Campus Planning and Space Utilization C-1 Report Condition Code.

**BUILDING SYSTEMS INFORMATION**

AERONAUTICAL & ASTRONAUTICAL RESEARCH LAB #199

**HEATING:**

Source LOCAL BOILER

Type Heating System HOT WATER RADIATION AND HEATING COILS IN HVAC SYSTEM

Steam (Line size, valve location) N/A

Building Htg Water (line size, valve location) LOCAL BOILER

**VENTILATION SYSTEM:**

6 LIQUID COOLED SYSTEMS, 2 MULTIZONE SYSTEMS

**COOLING:**

BLDG % 50 Chillers 1 - RECIP., CARRIER, 60 TONS, INSTALLED 1987

Window Units 0 Thru-the-wall 0 Direct exp. units 1 @ 12T

**HVAC CONTROL SYSTEM:** PNEUMATIC

**ELECTRIC:** Source Size(KVA) Primary/Secondary Switchgear & Main Disc. (Rm)

1. CSOP 13,200/(480Y/277) RM 125M

**PLUMBING:**

Water (size, valve location) 3", RM 129

Gas (size, valve location) 4", RM 129

Domestic Hot Water (size, valve location) GAS-FIRED HOT WATER HEATER, 125M

Compressed Air (size, location) LOCAL COMPRESSORS FOR CONTROL AIR - RM 125M

**SEWERS:** Storm 2 @ 6", 1 @ 12" Sanitary 1 - 6"

**METERS:**

Gas (location) SOUTHEAST CORNER OF STORAGE AREA ON EAST SIDE OF BLDG

Water (location) 8", SOUTH OF BUILDING AT CASE ROAD

Electric (location) RM 125M, RM 129, RM 125

**ALARM SYSTEMS:**

Fire Alarm YES Panel Location RM 125M

Fire Pump NO Pump Location N/A

Sprinklers NO Panel Location N/A

Other Alarms NONE

**ELEVATORS:**

Number 0 Type (passenger, freight) N/A

Manufacturer N/A Size N/A

**EMERGENCY GENERATOR:** Size NONE Location N/A

**KEY BOX LOCATION:** LOCATED IN RM 110J

**ASBESTOS SURVEY (1986):**

WALL PANELS OUTSIDE RM 100 CONTAIN ASBESTOS. (THESE ARE A CONTINUATION OF THE EXTERIOR ASBESTOS-CONTAINING INSULATED WALL PANELS.)

## AERONAUTICAL & ASTRONAUTICAL RESEARCH LAB NARRATIVE

### HISTORY

Construction of the Aeronautical & Astronautical (Aero & Astro) Research Lab was completed in 1966. The facility houses offices and laboratories for the Aeronautical/Astronautical Engineering Department and the Research Foundation. Facility use is 74% Laboratory and Special Use, 22% Office and miscellaneous, and 4% Mechanical/Custodial/Toilet.

### PRIMARY SYSTEMS

The building is composed of a structural steel frame and insulated metal wall panels. The structure is supported by individual footings and piers under the steel I-beams and continuous footers with cast-in-place concrete foundation walls at the perimeter. The floors are 4" thick reinforced concrete slabs under the office area and 8" thick reinforced concrete slabs under the laboratory areas.

The floor slabs are structurally isolated from the load-bearing piers and walls by a one-inch thick layer of insulation. The slabs have heaved by as much as 1/2 inch in some locations but deflection has generally been limited to about 1/4". The floors have been leveled at some of the cracks and a workorder has been written to grind the projections in the lab areas. Exterior walls are insulated steel panels. The floor slab movement does not appear to have had any structural impact. No other structural problems were observed.

The roof consists primarily of 3" thick panels composed of wood fibers and lightweight concrete supported by steel bar joists and I-beams. A small portion of the roof has steel decking. The slope of the roof should be corrected above room 121 and along a portion of the west side of the roof when the building is reroofed. There was evidence of minor ponding in those areas and the building coordinator commented that water tends to collect there. The roof appears to be functioning adequately at this time and there have been very few leaks according to maintenance records. At 27 years old, it is approaching an age where replacement should be programmed for the next five to ten years.

The exterior was being repainted during our inspection. The insulated metal panels appeared to be in good structural condition. The panels have an asbestos containing coating. Windows are limited to the office area located on the west and northwest portions of the building. The windows are a single pane fixed-sash type. They are not energy efficient and the steel sashes were rusting. We are proposing a building improvement project to replace them with double-paned, operable windows to improve occupant comfort and energy efficiency. There are several special use doors in the laboratory area that are only opened during test operations. The roof doors above the two rocket test bays appear to have leaked water.

### SECONDARY SYSTEMS

Interior partitions are composed of concrete block walls, metal panels or stud and drywall construction. The walls are in good condition throughout the building.

Floor surface finishes consist of sealed concrete in the laboratory/shop areas, ceramic tile in the restrooms, and vinyl tile in the office areas. The floor in the lounge area appears to have risen relative to the door threshold pulling the vinyl tile away from the threshold. A separate strip of flooring should be installed on the exposed surface of the foundation wall and new tile installed on the slab so that

the surfaces can move relative to each other without damaging the floor covering. Surface finishes are in serviceable condition.

The ceilings over the laboratory areas of the building are the exposed undersides of the roof. Suspended mineral fiber 2' x 4' panels are used in the office areas. The hallway ceiling would benefit from cleaning.

#### SERVICE SYSTEMS

There is no elevator in the building.

A 60-ton chiller was installed in 1987 replacing the original chiller. The cooling tower connected to the chiller was replaced in 1983. An additional cooling tower is located outside of the building for the air compressors owned by the occupants. The chiller supplies chilled water to two multizone systems and several single zone systems throughout the building. A direct expansion system with an air-cooled condenser services a computer room. Heating hot water is supplied on-site from a 60-horsepower gas-fired boiler to coils in the air handlers, unit heater and fin-tube radiators. The boiler was retubed in 1991 and is in good condition according to maintenance personnel.

The air handler housings were reported to be in poor condition and the air handlers have reached an age where replacement will be warranted in the next five to ten years. There have been problems with poor control of the heating and cooling in the building. The control systems for the multizone units are scheduled to be replaced within the next two to three years. The Utilities Division in the Department of Physical Facilities is planning an energy conservation project to control the chiller and boilers for implementation this fall.

The domestic hot water system is supplied by a 50-gallon gas-fired hot water tank. Supply is adequate and there were no major problems with the plumbing. Plumbing fixtures are original and will require replacement within the next five to ten years.

#### ELECTRICITY

The building is serviced by a Columbus and Southern Ohio Power substation that supplies approximately 2500 KVA of electrical power at 480 volts to the building. There are three transformers within the building. Two of the transformers step the current up for use by the large air compressors used for the windtunnels and direct current electric motors. There is another transformer in the building to step the voltage down to 208/120 volts for building circuits, lighting and HVAC equipment. Maintenance personnel and occupants reported that electrical power supply and distribution are adequate.

Office and laboratory areas are illuminated with fluorescent light fixtures. The hallways in the office areas are served by incandescent fixtures that should be replaced by fluorescent fixtures for energy efficiency and reduced maintenance requirements. There were no signs of overloaded circuits.

#### SAFETY STANDARDS

The building is equipped with a manual fire alarm system. The building is a one-level structure with a small mezzanine mechanical room. There are lighted exit signs and battery-powered emergency lights in the hallways. A ramp was being built for wheelchair access to the building on the west side during our inspection.

Automatic doors are to be installed as part of this project.

## ASBESTOS

The Ohio Board of Regents Facilities Asbestos Inspection and Risk Assessment Program's report: Inventory of Friable Asbestos-Containing Materials in Buildings of the Ohio State University (Main and Branch Campuses) and Recommendations for Corrective Action by PEI Associates, September 1986, identifies asbestos containing materials in the panels on the walls outside of room 100. These are the same panels used throughout the exterior of the building.

## BUILDING PERIMETER

The public entry to the building is located on the west side of the facility. There is an asphalt drive and parking lot on the west side of the building. There are several potholes in the driveway that should be filled. A gravel drive provides access to the east side of the building. There are a number of mature trees immediately adjacent to the building. There are two sets of steps on the west side of the building. The south set requires some patching. All of the exterior security lights appeared to be working.

### **Maintenance Projects (LESS THAN \$5000)**

1. Fill potholes in asphalt driveway.
2. Repair concrete steps and walk on west side of building.  
(Workorder 01-5063-005634-51 was issued for both projects)

**BUILDING EVALUATION SUMMARY**

**I. BUILDING INFORMATION**

FAC # 199 FACILITY NAME: AERONAUTICAL & ASTRONAUTICAL RESEARCH LAB  
 DATE: 8/24/93 INSPECTOR: JAMES P. HERTENSTEIN  
 YEAR CONSTRUCTED: 1966  
 GROSS SQ. FT: 34,062 NET SQ. FT: 25,985  
 REPLACEMENT COST \$ 4,255,000 \*

**II. COMPONENT RATING**

COMPONENT	BUILDING COMPONENT PERCENTAGE OF TOTAL COST**	BUILDING COMPONENT REPLACEMENT COST	CONDITION VALUE MULTIPLIER FOR BLDG. COMPONENT	BUILDING COMPONENT CURRENT VALUE
Foundation	9.6	408,480	.81	330,869
Columns and Beams	10.3	438,265	.91	398,821
Exterior Walls	9.5	404,225	.61	246,577
Windows & Doors	1.3	55,315	.75	41,486
Roofing	6.0	255,300	.66	168,498
Partitions & Drs.	8.2	348,910	.89	310,530
Wall Finishes	4.3	182,965	.76	139,053
Floor Finishes	4.7	199,985	.78	155,988
Ceilings & Finish	4.5	191,475	.71	135,947
Conveying	0	0		0
Plumbing	3.5	148,925	.78	116,162
Heating	7.5	319,125	.75	239,344
Cooling & Vent.	8.0	340,400	.63	214,452
Elec. Ser. & Dist	2.8	119,140	.89	106,035
Lighting & Power	18.9	804,195	.71	570,978
Safety Standards	.9	38,295	.72	27,572
<b>TOTALS</b>	<b>100.00</b>	<b>4,255,000</b>		<b>3,202,312</b>

**III. BUILDING RATING SUMMARY**

**Overall Building Rating = 75.0%**

\* Replacement Cost assigned November 1991 by The Office of Campus Planning and Space Utilization without the furnishings and fixed equipment allocation.

\*\* Percent allocation of each building component is calculated from The Means Standard Construction Cost data for College Classroom Buildings.

**FOUNDATIONS**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
<b>a. Footings:</b>			
Individual Footings & Piers <u>UNDER STEEL COLUMNS</u>	[ ]	[X]	[ ]
Continuous Footings <u>PERIMETER OF THE BUILDING</u>	[ ]	[X]	[ ]
Grade Beams _____	[X]	[ ]	[ ]
Piles _____	[X]	[ ]	[ ]
Caissons <u>18" CAISSONS UNDER COMPRESSOR PIT SLAB</u>	[ ]	[X]	[ ]
<b>b. Foundation Wall Materials:</b>			
Steel _____	[X]	[ ]	[ ]
Concrete Cast-in-place <u>PREDOMINANT</u>	[ ]	[X]	[ ]
Concrete Block _____	[X]	[ ]	[ ]
Other <u>1" INSULATION AT PERIMETER OF BUILDING</u>	[ ]	[X]	[ ]
<b>c. Waterproofing and Underdrain:</b>			
Coating _____	[X]	[ ]	[ ]
Membrane _____	[X]	[ ]	[ ]
Board _____	[X]	[ ]	[ ]
Drain Tile _____	[X]	[ ]	[ ]
<b>d. Slab on Grade (floor):</b>			
Plain _____	[X]	[ ]	[ ]
Reinforced <u>4" THICK AT OFFICE AREA, 8" THICK IN LAB AREAS</u>	[ ]	[X]	[ ]
<b>e. Special Substructures:</b>			
<u>APPROXIMATELY 4' THICK CONCRETE UNDER COMPRESSOR PIT</u>	[ ]	[X]	[ ]

**B. COMMENTS:**

THE 8" SLAB IS A FLOATING SLAB ISOLATED FROM LOAD-BEARING SECTIONS OF THE FOUNDATION BY 1" OF RIGID INSULATION.

**C. COMPONENT RATING:**    (\$408,500 ) X ( 81 %) = \$330,900  
                                  Possible      Condition      Component  
                                  Value            Value Multiplier    Value



**EXTERIOR WALLS**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

<b>a. Walls:</b>	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
Concrete _____	[X]	[ ]	[ ]
Masonry _____	[X]	[ ]	[ ]
Metal Siding <u>INSULATED METAL PANELS</u>	[ ]	[X]	[ ]
Wood Siding _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
<b>b. Finishes:</b>			
Stucco _____	[X]	[ ]	[ ]
Paint _____	[ ]	[ ]	[X]
Other _____	[X]	[ ]	[ ]

**B. COMMENTS:**

THE DEPARTMENT OF PHYSICAL FACILITIES HAS A FUNDED PROJECT UNDERWAY TO REPAINT THE EXTERIOR OF THE BUILDING.

**C. COMPONENT RATING:**    (\$404,200 ) X ( 61 %) = \$246,600  
                                 Possible      Condition      Component  
                                 Value      Value Multiplier      Value

**EXTERIOR WINDOWS & DOORS**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

<b>a. Windows type &amp; number:</b>	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
Wood _____	[X]	[ ]	[ ]
Steel <u>70 FIXED UNITS</u>	[ ]	[ ]	[X]
Alum _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]

<b>b. Window glazing:</b>			
Single pane <u>ALL UNITS ARE SINGLE PANE</u>	[ ]	[X]	[ ]
Double pane _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]

<b>c. Doors type &amp; number:</b>			
Wood _____	[X]	[ ]	[ ]
Steel <u>8 SINGLE AND ONE DOUBLE - ARE BEING REPAINTED</u>	[ ]	[X]	[ ]
Alum _____	[X]	[ ]	[ ]
Other <u>SEVERAL SETS OF SPECIAL-USE DOUBLE DOORS</u>	[ ]	[X]	[ ]

<b>d. Shading Devices:</b>			
Types _____	[X]	[ ]	[ ]

**B. COMMENTS:**

THERE IS A GREAT DEAL OF CORROSION AT THE BOTTOM OF THE WINDOWS. THE LOW INSULATION VALUE OF THE UNITS IS PROBABLY CONTRIBUTING TO THE HEATING/ COOLING COMPLAINTS ASSOCIATED WITH THE SPACES ALONG THE EXTERIOR WALL IN THE OFFICE WING. THE WINDOWS SHOULD BE REPLACED WITH DOUBLE PANE OPERABLE UNITS. THERE ARE SEVERAL SETS OF LARGE SWINGING DOUBLE DOORS IN THE LAB AREAS THAT ARE OCCASIONALLY OPENED FOR EXPERIMENTS. THERE APPEARS TO BE A LEAK AT THE DOORS SET IN THE ROOFS OVER THE ROCKET ENGINE TEST BAYS AT THE EAST SIDE OF THE BUILDING.

**C. COMPONENT RATING:**    (\$55,300 ) X ( 75 % ) = \$41,500

Possible	Condition	Component
Value	Value Multiplier	Value

**ROOFING**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
<b>a. Roof Covering:</b>			
Built-up _____	[X]	[ ]	[ ]
Built-up w/gravel <u>31,468 SF INSTALLED IN 1966</u>	[ ]	[X]	[ ]
Asphalt Shingle _____	[X]	[ ]	[ ]
Copper _____	[X]	[ ]	[ ]
Glass (Skylight) _____	[X]	[ ]	[ ]
Slate _____	[X]	[ ]	[ ]
Spanish Tile _____	[X]	[ ]	[ ]
Metal _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
<b>c. Flashing:</b>			
Base & Counter _____	[ ]	[X]	[ ]
Cap _____	[ ]	[ ]	[ ]
Through Wall _____	[ ]	[ ]	[ ]
Valley & Ridge _____	[ ]	[ ]	[ ]
<b>d. Gravel Stop &amp; Edge Strips:</b>			
Type <u>METAL</u> _____	[ ]	[X]	[ ]
<b>e. Drainage:</b>			
Gutters w/ Exterior Downspouts _____	[X]	[ ]	[ ]
Scuppers w/ Exterior Downspouts _____	[X]	[ ]	[ ]
Drains w/ Interior Storm Drains _____	[ ]	[X]	[ ]
<b>f. Parapets:</b>			
Concrete _____	[X]	[ ]	[ ]
Brick _____	[X]	[ ]	[ ]
Block _____	[X]	[ ]	[ ]
Precast _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
<b>g. Insulation:</b>			
Type <u>WOOD FIBER/CONCRETE STRUCTURAL DECK</u> _____	[ ]	[X]	[ ]

**B. COMMENTS**

ROOF IS IN GOOD CONDITION CONSIDERING ITS AGE. THERE ARE SEVERAL SPOTS WHERE THE SLOPE APPEARS TO INHIBIT GOOD DRAINAGE AND THE DRAIN COVERS HAVE A TENDENCY TO BECOME OBSTRUCTED BY DEBRIS FROM THE TREES SURROUNDING THE BUILDING. THE ROOF SHOULD BE REPLACED WITHIN THE NEXT FIVE TO TEN YEARS. TAPERED INSULATION SHOULD BE ADDED AT THAT TIME TO FURTHER REDUCE HEAT LOSS AND TO CORRECT SOME OF THE DRAINAGE PROBLEMS.

**C. COMPONENT RATING:**    (\$255,300) X (66 %) = \$168,500  
                                     Possible      Condition      Component  
                                     Value          Value Multiplier      Value

**PARTITIONS & DOORS**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	N/A	Sat	Att
<b>a. Partition Framing:</b>			
Concrete Block <u>PREDOMINANT</u>	[ ]	[X]	[ ]
Glazed Block _____	[X]	[ ]	[ ]
Wood Stud _____	[X]	[ ]	[ ]
Metal Stud <u>LIMITED USE</u>	[ ]	[X]	[ ]
Structural Tile _____	[X]	[ ]	[ ]
Rated _____	[X]	[ ]	[ ]
Other <u>METAL PANEL WALLS</u>	[ ]	[X]	[ ]
<b>b. Special partitions and Walls:</b>			
Toilet <u>METAL</u>	[ ]	[X]	[ ]
Screen Walls _____	[X]	[ ]	[ ]
Gate _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
<b>c. Wall Material:</b>			
Plaster _____	[X]	[ ]	[ ]
Plaster Board <u>USED WITH METAL STUDS</u>	[ ]	[X]	[ ]
Glass <u>SOME GLAZING IN INTERIOR WALLS AT LAB AREA</u>	[ ]	[X]	[ ]
Plywood _____	[X]	[ ]	[ ]
Paneling <u>LIMITED USE</u>	[ ]	[X]	[ ]
Trim & Wainscot _____	[X]	[ ]	[ ]
Tile/Glazed <u>RESTROOMS</u>	[ ]	[X]	[ ]
Other <u>CAST-IN-PLACE CONCRETE</u>	[ ]	[X]	[ ]
<b>d. Interior Doors &amp; Frames:</b>			
Met Door/Met Frame <u>SHOP AND MAINTENANCE ROOMS</u>	[ ]	[X]	[ ]
Wood Door/Wood Frame _____	[X]	[ ]	[ ]
Wood Door/Metal Frame <u>THROUGHOUT OFFICE AREA</u>	[ ]	[X]	[ ]
Glazing <u>LIMITED USE</u>	[ ]	[X]	[ ]
Rollup _____	[X]	[ ]	[ ]
Sliding _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
<b>e. Hardware:</b>			
Door Closers _____	[ ]	[X]	[ ]
Lock Sets _____	[ ]	[X]	[ ]
Kick/Push Plates _____	[ ]	[X]	[ ]
Thresholds _____	[ ]	[X]	[ ]
Panic Devices _____	[ ]	[X]	[ ]
Security & Detection _____	[ ]	[X]	[ ]
Automatic Openers _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]

**B. COMMENTS:**

PARTITIONS, DOORS AND HARDWARE ARE IN GOOD CONDITION.

**C. COMPONENT RATING:**    (\$348,900 ) X ( 89 %) = \$310,530  
    Possible      Condition      Component  
    Value      Value Multiplier      Value

**WALL FINISHES**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

<b>A. SYSTEM DESCRIPTION</b>	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
a. Paint <u>THROUGHOUT</u>	[ ]	[X]	[ ]
b. Wall Coating _____	[X]	[ ]	[ ]
c. Wall Coverings _____	[X]	[ ]	[ ]
d. Paneling			
Prefinished _____	[X]	[ ]	[ ]
Plank _____	[X]	[ ]	[ ]
e. Cork _____	[X]	[ ]	[ ]
f. Wallpaper _____	[X]	[ ]	[ ]
g. Ceramic Tile _____	[X]	[ ]	[ ]
h. Trim & Wainscot _____	[X]	[ ]	[ ]
i. Decoration _____	[X]	[ ]	[ ]
j. Glass <u>LIMITED USE</u>	[ ]	[X]	[ ]
k. Other _____	[X]	[ ]	[ ]

**B. COMMENTS**

WALL FINISHES ARE GENERALLY IN GOOD CONDITION THROUGHOUT THE HALLWAYS AND RESTROOMS.

**C. COMPONENT RATING:**    (\$183,000 ) X ( 76 % ) = \$139,100  
                                     Possible      Condition      Component  
                                     Value          Value Multiplier      Value

**FLOOR FINISHES**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	N/A	Sat	Att
<b>a. Carpet:</b>			
Rolled _____	[X]	[ ]	[ ]
Tile _____	[X]	[ ]	[ ]
<b>b. Composition:</b>			
Epoxy _____	[X]	[ ]	[ ]
Synthetic _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
<b>c. Concrete Topping:</b>			
Clear Sealant <u>SHOPS</u> <u>AND MAINTENANCE ROOMS</u> _____	[ ]	[X]	[ ]
Abrasive _____	[X]	[ ]	[ ]
Epoxy _____	[X]	[ ]	[ ]
Aggregate _____	[X]	[ ]	[ ]
<b>d. Resilient:</b>			
Vinyl Tile <u>OFFICE AREAS AND HALLWAYS</u> _____	[ ]	[X]	[ ]
Linoleum _____	[X]	[ ]	[ ]
Vinyl _____	[X]	[ ]	[ ]
Rubber _____	[X]	[ ]	[ ]
Cork _____	[X]	[ ]	[ ]
<b>e. Ceramic Tile</b> <u>RESTROOMS</u> _____			
<b>f. Masonry</b> _____			
<b>g. Terrazzo</b> _____			
<b>h. Wood</b> _____			
<b>i. Metal</b> _____			

**B. COMMENTS**

THE FLOOR AT LOUNGE AREA HAS RISEN RELATIVE TO THE EXIT DOOR PULLING THE TILE AWAY FROM THE THRESHOLD AREA.

**C. COMPONENT RATING:**    (\$200,000 ) X ( 78 % ) = \$156,000  
                                  Possible      Condition      Component  
                                  Value      Value Multiplier      Value

**CEILING AND FINISHES**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

<b>a. System Type:</b>	N/A	Sat	Att
Exposed <u>THROUGHOUT SHOP/LAB AREA (MAJORITY OF BUILDING)</u>	[ ]	[X]	[ ]
Applied to Structure _____	[X]	[ ]	[ ]
Suspended <u>OFFICES AND RESTROOMS</u>	[ ]	[X]	[ ]

<b>b. Materials:</b>			
Drywall <u>RESTROOMS</u>	[ ]	[X]	[ ]
Plaster _____	[X]	[ ]	[ ]
Mineral Fiber Board <u>2' X 4' TILES</u>	[ ]	[ ]	[X]
Metal Pan _____	[X]	[ ]	[ ]
Luminous Panels _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]

<b>c. Finishes:</b>			
Paint _____	[ ]	[x]	[ ]
Fabric _____	[X]	[ ]	[ ]
Prefinished _____	[ ]	[ ]	[X]
Other _____	[X]	[ ]	[ ]

<b>d. Openings &amp; Inserts:</b>			
Air Distribution <u>SUPPLY AND RETURN AIR REGISTERS</u>	[ ]	[X]	[ ]
Lighting Fixtures <u>OFFICE AREAS</u>	[ ]	[X]	[ ]
Access Panels _____	[X]	[ ]	[ ]
Skylights _____	[X]	[ ]	[ ]
Fire Protection _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]

**B. COMMENTS:**

THE HALLWAY CEILING WOULD BENEFIT FROM CLEANING. THE CEILING IN THE LAB/SHOP AREAS IS THE EXPOSED UNDERSIDE OF THE ROOF.

**C. COMPONENT RATING:**    (\$191,500 ) X ( 71 %) = \$135,900  
                                  Possible      Condition      Component  
                                  Value              Value Multiplier      Value

**CONVEYING**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

**a. Elevators:**

	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
Number <u>THERE ARE NO ELEVATORS IN THIS BUILDING</u>	[X]	[ ]	[ ]
Type _____	[X]	[ ]	[ ]
Speed _____	[X]	[ ]	[ ]
Capacity (lbs) _____	[X]	[ ]	[ ]
Dimensions _____	[X]	[ ]	[ ]
Door Operation:			
Center _____	[X]	[ ]	[ ]
To Side _____	[X]	[ ]	[ ]

**b. Lifts and Hoists:**

Number _____	[X]	[ ]	[ ]
Type _____	[X]	[ ]	[ ]

**c. Moving Stairs and Walks:**

Number _____	[X]	[ ]	[ ]
Type _____	[X]	[ ]	[ ]

**d. Conveyors:**

Number _____	[X]	[ ]	[ ]
Type _____	[X]	[ ]	[ ]

**e. Pneumatic Tubes:**

Number _____	[X]	[ ]	[ ]
Type _____	[X]	[ ]	[ ]

**B. COMMENTS:**

**C. COMPONENT RATING:**    (\$ N/A ) X ( N/A % ) = \$ N/A  
                                    Possible      Condition      Component  
                                    Value          Value Multiplier      Value



**MECHANICAL/HEATING**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
Central Plant Steam _____	[X]	[ ]	[ ]
Central Plant Hot Water _____	[X]	[ ]	[ ]
Boilers:    Type <u>KEWANEE - GAS</u>	[ ]	[X]	[ ]
Size <u>60 HORSEPOWER      OUTPUT</u>	[ ]	[X]	[ ]
Furnace:    Type _____	[X]	[ ]	[ ]
Size _____	[X]	[ ]	[ ]
Heat Pump: Type _____	[X]	[ ]	[ ]
Size _____	[X]	[ ]	[ ]

**b. System Type:**

Steam _____	[X]	[ ]	[ ]
Hot Water _____	[ ]	[X]	[ ]
Air <u>HOT WATER COILS</u>	[ ]	[X]	[ ]
Multizone <u>2 SYSTEMS IN OFFICE AREA</u>	[ ]	[X]	[ ]
Dual Duct _____	[X]	[ ]	[ ]
Terminal Reheat <u>NO LONGER USED - SERVES STORAGE AREA</u>	[X]	[ ]	[ ]
Variable Volume _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]

**c. Space Equipment:**

Radiators <u>FIN TUBE IN MULTIZONE AREAS EXTERIOR WALLS</u>	[ ]	[X]	[ ]
Convectors _____	[X]	[ ]	[ ]
2-Pipe Fan Coil _____	[X]	[ ]	[ ]
Unit Heaters <u>12 UNITS LOCATED THROUGHOUT SHOP/LAB AREA</u>	[ ]	[X]	[ ]
Other _____	[X]	[ ]	[ ]

**d. Control Type:**

Pneu <u>ACTUATORS</u>	[ ]	[X]	[ ]
Electric <u>THERMOSTATIC CONTROL IS REPORTED TO BE POOR</u>	[ ]	[ ]	[X]
DDC _____	[X]	[ ]	[ ]
Manual Valves _____	[X]	[ ]	[ ]

**B. COMMENTS:**

OCCUPANTS COMMENTED THAT CONTROL OF HEAT IS OFTEN A PROBLEM. THE PHYSICAL FACILITIES DEPARTMENT HAS SCHEDULED INSTALLATION OF A DIRECT DIGITAL CONTROL SYSTEM TO CONTROL THE BOILER AND THE OUTSIDE AIR CHANGEOVER ON THE FAN SYSTEM IN THE FALL OF 1993.

**C. COMPONENT RATING:**    (\$319,100 ) X ( 75 %) = \$239,300  
                                  Possible      Condition      Component  
                                  Value      Value Multiplier      Value

**COOLING & VENTILATING**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	N/A	Sat	Att
<b>a. System:</b>			
Type <u>2 MULTIZONES, ONE SINGLE AND SEVERAL LIQUID COOLED</u>	[ ]	[ ]	[X]
Capacity <u>COMBINED SYSTEM CAPACITY IS APPROXIMATELY 72 T</u>	[ ]	[X]	[ ]
<b>b. Chillers:</b>			
Centrifugal _____	[X]	[ ]	[ ]
Reciprocating <u>CARRIER 60 TONS - INSTALLED 1987</u>	[ ]	[X]	[ ]
Absorption _____	[X]	[ ]	[ ]
<b>c. Cooling Towers:</b>			
Type <u>BALTIMORE AIR COIL IN INSTALLED 1983</u>	[ ]	[X]	[ ]
Capacity <u>95 TONS NOMINAL</u>	[ ]	[X]	[ ]
<b>d. Condensers:</b> <u>AIR-COOLED CONDENSER FOR 12 TON LIEBERT</u>	[ ]	[X]	[ ]
<b>e. Space Equipment:</b>			
Direct Expansion -			
Window units _____	[X]	[ ]	[ ]
Thru-the-wall _____	[X]	[ ]	[ ]
Single zone <u>2 SYSTEMS - ONLY ONE IN USE - (LIEBERT)</u>	[ ]	[X]	[ ]
Single zone con. vol. _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
Air/Water -			
2-pipe fan coil _____	[X]	[ ]	[ ]
Unit ventilators _____	[X]	[ ]	[ ]
Terminal reheat <u>NO LONGER USED</u>	[X]	[ ]	[ ]
Variable volume _____	[X]	[ ]	[ ]
Dual Duct _____	[X]	[ ]	[ ]
Multizone _____	[X]	[ ]	[ ]
<b>f. Special Systems:</b>			
Type _____	[X]	[ ]	[ ]
Capacity _____	[X]	[ ]	[ ]
<b>g. Control Systems:</b>			
Pneu _____	[ ]	[X]	[ ]
Electric _____	[ ]	[ ]	[X]
Electronic _____	[X]	[ ]	[ ]
<b>h. Fans:</b>			
Exhaust <u>26</u>	[ ]	[X]	[ ]
Recirculating <u>8 AIR HANDLERS, 1 SUPPLY, 1 CIRCULATING</u>	[ ]	[ ]	[X]

**B. COMMENTS:**

THE MAJORITY OF AIR CONDITIONED SPACE IN THIS BUILDING IS COOLED WITH CHILLED WATER FROM THE CHILLER. THE AIR HANDLERS HAVE REACHED AN AGE AND CONDITION WHERE REPLACEMENT IS WARRANTED. ONE OF THE SINGLE ZONE SYSTEMS IS NO LONGER OPERABLE BUT SUPPLIES SPACE THAT IS NOW USED FOR STORAGE.

**C. COMPONENT RATING:**    (\$340,400 ) X ( 63 % ) = \$214,500  
                                  Possible      Condition      Component  
                                  Value      Value Multiplier      Value

ELECTRICAL/SERVICE & DISTRIBUTION

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

**(a) Service:**

Substation COLUMBUS AND SOUTHERN OHIO POWER  
 Primary Voltage 13,200 VOLTS  
 Transformer:  
 Manufacture            Type            KVA            Secondary Voltages  
GENERAL ELECTRIC    OIL            2500        480Y/277

**(b) Distribution System:**

Panelboard (type) CIRCUIT BREAKER  
 Voltage 480, 208, 120  
 Amperage 7200 AMPS  
 Conduit STEEL  
 Conductor COPPER  
 Wire (type) VARIES  
 Armored Cable LIMITED USE  
 Other 2 STEP-UP TRANSFORMERS FOR DEPARTMENTAL EQUIP.

**(c) Emergency System:**

General or (type & capacity) NONE

**B. COMMENTS:**

NO MAXIMUM UTILIZATION RECORDS - COLUMBUS AND SOUTHERN OHIO POWER METERS. OCCUPANTS AND MAINTENANCE PERSONNEL DID NOT INDICATE THAT THERE WERE ANY PROBLEMS WITH ELECTRICAL CAPACITY. THERE IS A 225 KVA TRANSFORMER IN THE BUILDING TO CONVERT THE 480 VOLT CURRENT TO 208/120 FOR THE BUILDING SYSTEMS AND LIGHTING.

**C. COMPONENT RATING: ( \$119,100 ) x ( 89 % ) = \$106,000**

Possible	Condition	Component
Value	Value Multiplier	Value



**SAFETY STANDARDS**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	<u>N/A</u>	<u>Sat</u>	<u>Att</u>
<b>(a) Exits:</b>			
Stair Construction:			
concrete _____	[X]	[ ]	[ ]
steel <u>TO MEZZANINE MAINTENANCE ROOM</u>	[ ]	[X]	[ ]
wood _____	[X]	[ ]	[ ]
Number of exits <u>13</u>	[ ]	[X]	[ ]
<b>(b) Fire Rating:</b>			
Construction Type: I ___ II ___ III <u>X</u> IV ___ V ___ VI ___			
Building Height: <u>17</u> ft., <u>ONE</u> stories			
<b>(c) Extinguishing Systems:</b>			
Portable <u>9 CO-2, 5 WATER, 1 - ABC</u>	[ ]	[X]	[ ]
Standpipe _____	[X]	[ ]	[ ]
Hose Cabinets _____	[X]	[ ]	[ ]
Sprinklers _____	[X]	[ ]	[ ]
Suppression _____	[X]	[ ]	[ ]
Other _____	[X]	[ ]	[ ]
<b>(d) Detection &amp; Alarm Systems:</b>			
Manual Alarm _____	[ ]	[X]	[ ]
Annunciator <u>RM 125M</u>	[ ]	[X]	[ ]
Smoke Detectors <u>IN DUCTS</u>	[ ]	[X]	[ ]
<b>(e) Lighting Systems:</b>			
Exit Signs <u>LIGHTED</u>	[ ]	[X]	[ ]
Exit Lighting _____	[ ]	[X]	[ ]
Emergency Lighting _____	[ ]	[X]	[ ]
Emergency Generator _____	[X]	[ ]	[ ]

**B. COMMENTS:**

SYSTEM IS ORIGINAL BUT NO DEFECTS WERE NOTED. MAINTENANCE PERSONNEL COMMENTED THAT THE FIRE ALARM RINGS THROUGH TO THE FIRE DEPARTMENT AT THE AIRPORT.

**C. COMPONENT RATING:**    (\$38,300) x (72 %) = \$27,600  
                                     Possible      Condition      Component  
                                     Value            Value Multiplier    Value

**BUILDING PERIMETER EVALUATION**

FAC # 199      DATE 8/24/93      INSPECTOR: JPH

**A. SYSTEM DESCRIPTION**

	N/A	Sat	Att
1. Building Access:			
Driveway <u>ASPHALT DRIVE FROM CASE RD TO WEST SIDE</u>	[ ]	[ ]	[X]
Loading Dock <u>NO DOCK - LOADING AREA ON EAST SIDE</u>	[ ]	[X]	[ ]
Sidewalks			
Front <u>CONCRETE AT WEST SIDE OF BUILDING</u>	[ ]	[ ]	[X]
Side _____	[X]	[ ]	[ ]
Rear <u>EAST SIDE OF BUILDING</u>	[ ]	[X]	[ ]
Steps			
Front <u>SPALLING ON SOUTH SET AT WEST SIDE OF BLDG</u>	[ ]	[ ]	[X]
Side <u>AT LOADING DOCKS</u>	[X]	[ ]	[ ]
Rear _____	[X]	[ ]	[ ]
Handicap Ramp <u>UNDER CONSTRUCTION ON WEST SIDE OF BLDG</u>	[X]	[ ]	[ ]
2. Lawn and Landscaping:			
Lawn _____	[ ]	[X]	[ ]
Shrubs _____	[ ]	[X]	[ ]
Trees _____	[ ]	[X]	[ ]
Undesirable Insect _____	[X]	[ ]	[ ]
Bedding Material <u>WEST SIDE OF BUILDING</u>	[ ]	[X]	[ ]
Watering System _____	[X]	[ ]	[ ]
3. General Site Information:			
Signage <u>WEST SIDE OF BUILDING &amp; CASE RD</u>	[ ]	[X]	[ ]
Address Identification <u>CASE RD SIGN</u>	[ ]	[X]	[ ]
Security Lights _____	[ ]	[X]	[ ]
Street Lights <u>PARKING LOT AREA</u>	[ ]	[X]	[ ]
Drainage _____	[ ]	[X]	[ ]
Storm Drains _____	[X]	[ ]	[ ]

**B. COMMENTS:**

THERE ARE SEVERAL SMALL POT HOLES IN THE ASPHALT DRIVE ON THE WEST SIDE OF THE BUILDING.

**The Ohio State University  
Department of Physical Facilities**

**BUILDING AUDIT METHODOLOGY**

1. BUILDING AUDIT PROGRAM OBJECTIVE

To provide a building-by-building inventory, including maintenance deficiencies that currently exist, for the OSU buildings that the Department of Physical Facilities has budgetary responsibility for. These audits will be used to establish corrective maintenance projects and budget cost estimates.

2. BUILDING AUDIT APPROACH

A five-step procedure is used to meet the program objectives:

1. Collect Historical and Inventory Data on each building.
2. Interview Building Occupants.
3. Perform a Building Inspection.
4. Complete Building Evaluation Forms.
5. 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.

5. LIMITATIONS

(1) All inspections are visual and do not include physical tests, instrumentation or metering measurements, sampling, or monitoring.

(2) Only random typical offices or laboratories are entered. Typical spaces are deemed to be representative of average conditions throughout each building.

(3) The scope of the analysis does not include complete OSHA, energy, or physical impaired access study. Buildings and components are inspected for condition and general safety requirements rather than specialized code conformance.

(4) It is assumed that the buildings inspected were approved by the State of Ohio Division of Factory and Building Inspection at the time of construction.

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.

(5) 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.

(6) The building inspections are defined to include the following:

- (a) Includes general repainting, redecorating and wholesale replacement of building and system components. On-going maintenance, replacement and renovation projects are included.
- (b) Includes exterior building walls and attached items.
- (c) Includes the entrance steps at all entries. Ramps outside the buildings are included. Plantings around the building exterior are included.
- (d) Movable furniture is not included.
- (e) Fixed equipment inside the buildings that is installed and maintained by a specific academic department or using agency is not included.
- (f) Utility lines supplying the buildings are not included.
- (g) The program needs of the using department are assumed to be satisfied. No consideration has been given to anticipate any changes in current occupant space needs.

## ABBREVIATIONS

ATT.....	ATTENTION
BLDG.....	BUILDING
BUR.....	BUILT UP ROOF
COND.....	CONDENSATE WATER
DD.....	DUAL DUCT AIR HANDLING SYSTEM
DDHV.....	DUAL DUCT HIGH VELOCITY
DHWR.....	DOMESTIC HOT WATER RETURN
DHWS.....	DOMESTIC HOT WATER SUPPLY
DX.....	DIRECT EXPANSION AIR CONDITIONER
FPM.....	FEET PER MINUTE
HID.....	HIGH INTENSITY DISCHARGE LIGHT
HPS.....	HIGH PRESSURE STEAM (125 PSI)
HVAC.....	HEATING, VENTILATING AND AIR CONDITIONING SYSTEM
KV.....	KILOVOLTS
KVA.....	KILOVOLTS AMPS
KW.....	KILOWATTS
LC.....	LIQUID COOLED
LPS.....	LOW PRESSURE STEAM (15 PSI)
MPS.....	MEDIUM PRESSURE STEAM (50 PSI)
MZ.....	MULTIZONE AIR HANDLING SYSTEM
N/A.....	NOT APPLICABLE
PSI.....	POUNDS PER SQUARE INCH
RM.....	ROOM
SAT.....	SATISFACTORY
SR.....	STEAM RETURN LINE
SS.....	STEAM SUPPLY LINE
TR.....	TERMINAL REHEAT AIR HANDLING SYSTEM
V.....	VOLTS
VAV.....	VARIABLE AIR VOLUME SYSTEM

**APPENDIX**  
Reduced Scale Building Floor Plans  
C-1 Building Space Assignments