

FACILITY AUDIT REPORT
CELESTE LAB OF CHEMISTRY

#371

JULY 30, 1999



CELESTE LABORATORY OF CHEMISTRY

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CELESTE LABORATORY OF CHEMISTRY

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EXECUTIVE SUMMARY FOR CELESTE LABORATORY OF CHEMISTRY

The Celeste Laboratory of Chemistry houses laboratories of the Department of Chemistry. The building was constructed in 1984/86 and occupied in May of 1986 by the Department of Chemistry with a gross area of 113,433 SF. The four story building with basement and penthouse was built for offices, classrooms and chemistry laboratories. The Celeste Laboratory of Chemistry was built to the west side of Evans Lab and was connected to Evans Lab and McPherson Lab with a three story walkway. A later addition to the southeast of Celeste Laboratory connected the walkway and tunnel to the Newman & Wolfrom Laboratory of Chemistry. The Celeste Laboratory shares various utilities, such as emergency electrical power, laser lab cooling and fire protection, entrances and exits with the other three buildings. A few of the laboratories have been remodeled over the past years to meet the changing requirements of the research. Some problems with outside air infiltration, leaking roofs, the isolated ground fault system and several room cooling boxes were noted and repairs are required.

PROPOSED MAINTENANCE PROJECTS

CELESTE LABORATORY OF CHEMISTRY #371

A. Corrective Maintenance Projects:	Control No
1. <i>Monitor basement structural components for settlement</i> \$	10,000 5561
2. <i>Replace the desuperheater.</i> \$	20,000 5562
3. <i>Insulate and seal walls behind the louvers with foam.</i> \$	18,000 5563
Sub Total	\$ 48,000
B. Building Improvement/Addition Projects:	
1. <i>Clean, seal and caulk the limestone windowsills.</i> \$	18,000 5564
2. <i>Install hot water coils on the six make-up air handling units in the penthouse.</i> \$	25,000 5565
3. <i>Install 32 watt lighting throughout the building.</i> \$	125,000 5566
Sub Total	\$ 168,000
C. Building Component Replacements expected within the next 5-10 years:	
1. <i>Replace the two R-11 chillers, pumps and towers.</i> \$	1,100,000 5567
Sub Total	\$ 1,100,000
 Total Cost for all Projects	 \$ 1,316,000

**RENOVATION PROJECTS IN PROGRESS OR COMPLETED
SINCE LAST AUDIT**

CELESTE LABORATORY OF CHEMISTRY #371

Projects:

		Control No
1. Renovate room 100.	\$ 30,483	5061-PF950601
2. Replace purge unit on chiller.	\$ 7,580	5061-003079
3. Rebuild the DDC panel.	\$ 11,163	5061-002916
4. Replace the hot water tube bundle.	\$ 10,324	5061-002398

GENERAL BUILDING INFORMATION

CELESTE LABORATORY OF CHEMISTRY #371

BUILDING ADDRESS: *120 West Eighteenth Avenue*

GROSS SQ. FT.: *113,433*

NET ASSIGNABLE SQ. FT.: *97,119*

MECHANICAL/CUSTODIAL AREA SQ. FT.: *18,730*

YEAR OF CONSTRUCTION: *1984/1986*

YEAR OF LAST RENOVATION: *none*

NUMBER OF STORIES/BASEMENT: *Four stories with basement and penthouse*

AIR CONDITIONING (Percentage): *100%*

CURRENT USE: *The Department of Chemistry*

TYPE OF CONSTRUCTION: *Steel Structure with Reinforced Concrete and Masonry Skin*

ESTIMATED REPLACEMENT COST: *\$ 20,524,000 **

COST PER GROSS SQUARE FEET: *\$180.95*

WHEELCHAIR ACCESSIBILITY: *From the south side of the building to the corridor and the elevators.*

OVERALL BUILDING CONDITION: *Satisfactory ***

NUMBER OF EXIT STAIRWAYS: *Three (3)*

NUMBER OF OTHER EXITS: *Seven (7)*

AREA SHOP RESPONSIBILITY: *Northeast Shop*

* *Replacement Cost assigned January 1999 by The Office of University Resource Planning & Institutional Analysis.*

** *The Office of University Resource Planning & Institutional Analysis C-1 Report Condition Code.*

BUILDING SYSTEMS INFORMATION

CELESTE LABORATORY OF CHEMISTRY #371

HEATING:

Source – *Power plant*

Type Heating System – *Hot water*

Main Steam Feed (Line size, valve location) – *6" HPS to room 1M*

Building Htg. Water (line size, valve location) – *6" in room 1M*

VENTILATION SYSTEM: *Powered exhaust, make-up air and DDVAV systems*

COOLING:

BLDG. 100%, *One 1985 Trane 275 Ton centrifugal R-11 chiller in room 530M,*

One 1985 Trane 450 Ton centrifugal R-11 chiller in room 530M, One 1985 Trane

150 Ton reciprocating R-22 chiller in room 1M for the laser labs process/cooling

Window Units: *none*, Thru-the-wall: *none*, Direct expansion units: *none*

HVAC CONTROL SYSTEM: *Electric/pneumatic controls with DDC upgrade*

ELECTRIC:

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

PGN5/PGS5 2000 13,200/ 480/277 540M

PGN5/PGS5 750 13,200/ 208/120 540M

PGN5/PGS5 500 13,200/ 480/277 13M

PGN5/PGS5 500 13,200/ 208/120 13M

PLUMBING SERVICES:

Water (size, valve location) – *8" to room 010M, 6" to fire, 4" to domestic*

Gas (size, valve location) – *2-3" from east pad, 3" from tunnel*

Domestic Hot Water (size, valve location) – *4" DHWS, 1" DHWR room 001M*

Compressed Air (size, location) – *2@3/4", 1-1/4" HP air from room 001M*

SEWERS:

Storm - *2@8", 2@6", 1@4", Sanitary -1@6", 1@6"AW, Combined Storm/San-0*

METERS:

Gas (size, location) – *2-1/2" & 3" on east pad*

Water (size, location) – *6" in room 010M and 2" 520M to cooling tower*

Electric (location) - *room 540M and east pad*

ALARM SYSTEMS:

[X] Fire Alarm room 550M, Remote Panel Location at Room x107C

[X] Fire Pump @ 1200 GPM, Pump Location- Room 10M

[X] Sprinkler, Valve Location Room 10M and 161J, []100%, [X]Partial, []Limited

[] Strobes, [X]Bells in [X]Halls, []Rooms

[X] Other Alarms – *equipment and labs*

ELEVATORS:

Number- *Two*, Type (passenger/freight)- *Freight/Passenger*

Manufacturer – *Otis*, Size- *3,000#, & 4,500#, 66”x80”*

EMERGENCY GENERATOR:

Size- *33 KVA in room 550M*

ASBESTOS SURVEY (1986): *This building not identified in the 1986 survey.*

CELESTE LABORATORY OF CHEMISTRY NARRATIVE

HISTORY

The Celeste Laboratory of Chemistry houses laboratories of the Department of Chemistry. The building was constructed in 1984/86 and occupied in May of 1986 by the Department of Chemistry with a gross area of 113,433 SF. The four story building with basement and penthouse was built for offices, classrooms and chemistry laboratories. The Celeste Laboratory of Chemistry was built to the west side of Evans Lab and was connected to Evans Lab and McPherson Lab with a three story walkway. A later addition to the southeast of Celeste Laboratory connected the walkway and tunnel to the Newman & Wolfrom Laboratory of Chemistry. The Celeste Laboratory shares various utilities, such as emergency electrical power, laser lab cooling and fire protection, entrances and exits with the other three buildings. A few of the laboratories have been remodeled over the past years to meet the changing requirements of the research.

The building appears to basically be functioning as designed, at this time. However, some items noted in this report need to be repaired or replaced. These items when completed will protect and enhance the building performance and create a satisfying visual environment for students, faculty, staff and visitors.

More than normal maintenance problems are showing up in the fume hoods, window leaks, temperature controls, doors and door hardware, clogged toilets and leaking faucets.

In an interview with the building coordinator, it was learned that the occupants are basically satisfied with the overall condition and performance of the building systems, however, the items noted above and herein are of concern.

Occupancy of the building, reported by The Office of University Resource Planning & Institutional Analysis in the C-1 Building Space Assignment Report dated January 1999 for a Net Assignable Area of 113,433 SF, is as follows; Classrooms 0.9%, Scheduled Labs 38.5%, Research 10.0%, Faculty offices 2.7%, Administrative and Staff offices 2.3%, Mechanical 19.3% Custodial/Toilet 2.1%, and Circulation 24.2%.

PRIMARY SYSTEMS

The structural components of this building consist of perimeter footers beyond the interior columns with reinforced concrete walls up to the first floor level. Caissons driven to bedrock support the interior concrete encased steel columns and beams that support the precast reinforced concrete floors. These form the basic skeletal components of this four-story building with basement and penthouse. The penthouse roof consists of steel columns, beams and purlins that support the steel metal deck roof structure.

There were some signs of differential settlement and/or movement between the perimeter building foundation and the interior structure and in some structural columns and supports. There were also signs of the basement floor settling and/or heaving at several locations thus causing doors to be out of plumb or jammed and cracked concrete block walls. Much of the problems noted appear to be the cause of the changing water table beneath the building and should be monitored.

Prefabricated brick veneer panels were installed on the structural steel to form the exterior walls. Openings in the brick for windows, store front windows, louvers and entrance doors are accented with limestone sills or brick that form the head, sill or jambs. Cut limestone panels and brick corbels are used for wall and entrance trim. The penthouse has insulated metal, louver siding or prefabricated brick veneer panels around the perimeter. A louver screen wall is located on three sides of the penthouse level to hide equipment on the roof. Accent louvers with an air space between the louvers and interior walls are located on the four corners of the building up to the penthouse level.

The two-hour wall system behind the louvers is made up of wallboard on each side of a three and one half-inch metal stud with insulation in the center without a vapor barrier. In cold weather the wall system behind the louvers leaks cold air that has frozen piping in the past. The walls in the chase behind the louvers should be better insulated and sealed. It is recommended that three inches of roofing foam be sprayed on these walls to provide an R-25 insulation quality and retard cold air infiltration.

The exterior masonry brick is in good condition. Control and expansion joints were originally installed and appear to be in good condition. The limestone windowsill trim should be cleaned and sealed. No settlement was noted in the perimeter walls.

The single glazed windows are a fixed or awning type that is installed in aluminum frames. Some of the caulking is missing in sloping sill joints under windows and should be installed to prevent water from getting behind the wall. Some window locking hardware needs to be repaired or replaced.

Three single doors on the south and two double doors at the west entry are aluminum with glass inserts and storefront glass panels to the brick wall and soffit and are in good to fair condition. The south inner doors are also aluminum with glass inserts. The storefront glass panels at the south entry have aluminum frames with single pane glass inserts to the brick wall and soffit and are in good condition. A steel roll-up garage door and single door are used at the dock and a single steel door is used at the southeast stairwell exit. Five other steel doors connect to the walkway.

The roof areas of the penthouse floor are of the precast concrete deck type, concrete insulation, insulation board, and an EPDM roof installed with gravel ballast. Emergency wall scupper roof drains are installed around the perimeter of the

building at the penthouse floor level. The penthouse roofs consist of steel beams and purlins with a steel deck, insulation and an EPDM roof installed with gravel ballast. The first floor roofs consist of steel beams and purlins with a steel deck, insulation and a sloping standing seam metal roof. The EPDM roofs are 13 years old and are in good condition. The aluminum parapet cap and counterflashing around the perimeter on the penthouse roof are in good condition. The steel standing seam roof needs to be repaired on the north side. There are gutters and downspouts over the elevator.

INTERIOR SYSTEMS

The reinforced concrete floors and columns of the building are enclosed with concrete block or metal studs and drywall that form interior walls, halls, rooms and stairwells. The perimeter rooms in the building have concrete block or metal studs and drywall up to the next floor. The partitions and walls are generally in good condition and first floor hall walls are being repaired and painted at this time.

As noted above, rooms located on the corners of the building up to the penthouse level are drafty and cold during the winter months causing some areas to freeze water in piping.

The majority of the doors in this building are wood doors in metal frames and are in good condition. Steel fire doors in steel frames are used at mechanical rooms, some labs and stairwells. The metal fire doors in this building are in good condition. Some door and/or door hardware problems are showing up in maintenance calls.

The floors in this building have some vinyl tiles, carpet in offices and vinyl roll goods in halls and labs. The equipment rooms have exposed concrete floors that have been sealed with a clear sealant. The floors throughout the building are in good condition and have been well maintained. The stairs and landings are metal framed with concrete fill and rubber covering and are in good condition. Minor cracking was noted in the concrete floors throughout the building that shows through the vinyl roll goods.

The ceilings in rooms consisted of a suspended aluminum 2x4 grid with 2x4 or 2x2 mineral fiber ceiling tiles or are exposed. The mineral fiber tile ceilings are in good to fair condition. Some ceiling tiles need to be cleaned or repaired where leaks have occurred. The aluminum grid, diffusers and lighting are deteriorating in many general chemistry labs and will need to be replaced in the next five to ten years.

SERVICE SYSTEMS

The major domestic services consisting of cold water, hot water, natural gas, standpipe and sprinkler system, sanitary and storm drainage all appeared to be in good condition and functioning at this time. The domestic cold and hot water piping appears to have copper pipe and is in good condition. The main water

supply, standpipe and sprinkler system appear to be cast iron and steel pipe. The domestic hot water system is connected to the central hot water system in room 1M and has a hot water return pump. The plumbing drainage system has a duplex sewage ejector in a buried sump located on the east side of the room 01M that discharges to the sanitary waste line above. There was adequate water pressure at the faucets and fixtures on all of the floors. The restroom fixtures are in good condition. The plumbing drainage system did not appear to have any problems. Maintenance records did indicated a large number of reoccurring problems with clogged water closets and urinals, malfunctioning flush valves and sink faucets in many restrooms. The storm drainage system has duplex ejector pumps in a buried sump located on the west side of the room 01M that discharges to the storm line above.

The laboratory services consist of natural gas, nitrogen, deionized water, compressed air and acid waste and all appeared to be in good to fair condition and functioning at this time. Duriron pipe and drainage fittings were used on the underground acid waste system while glass pipe and fittings were used on the above ground pipes. Some problems of vertical glass pipes being broken by falling solid objects was noted. There is an acid neutralization tank with limestone chips located on the southeast corner of the building that discharges to the sanitary sewer next to the tank. Emergency showers are located in the labs. A copper piped nitrogen system serves this building. There are two welded steel natural gas lines serving this building. One of the lines serves the emergency generator while the other serves the labs. The central power plant and site compressors supply compressed air to the building. The laboratory compressed air system consists of two high-pressure air compressor and air dryer that feeds the copper piping distribution system. The central power plant compressed air line is tied to a storage tank that feeds the distribution piping system. The laboratory deionized water systems consist of a softener, charcoal filter, osmosis filter, storage tank and pump that feeds the PVC piping distribution system.

The passenger/freight elevators are 13 years old and are in good condition. The elevators do not meet present access and fire codes. The elevators were operating and maintenance records did not indicate any problems with the elevators over the past year.

The 6" HPS line that feeds the building is tapped into the Central High Pressure Steam loop located on the south side from the tunnel off Eighteenth Avenue. The 6" HPS steam line feeds the 200/70-PSI pressure reducing station in room 1M. There is a desuperheater in the line after the pressure reducing station that is fed from the condensate return pumps instead of separate pumps. The (LPS) Low Pressure Steam is piped to the hot water heat exchanger near the ceiling on the west end of room 1M from the 70/15-PSI pressure reducing station also located in this room. Heating hot water is pumped from the heat exchanger to the air handling units' hot water heating or reheat coils, convection radiation under windows, fan coil units at entrances and unit heaters. A 6" heating hot water line that feeds the

buildings air handling units preheating coils only is tapped into the Central Hot Water Heating loop located on the south side from the tunnel off Eighteenth Avenue. The heating system was not operating at the time of the site visits.

The desuperheater cools superheated steam delivered from the power plant at 600 °F to 325 °F with condensate water. Condensate is collected in a receiver tank where a desuperheater pump raises the pressure of the liquid to 10 PSI above the pressure of the steam to be cooled. The condensate liquid is metered through a control valve before it enters the desuperheater. The size of the system is dependent on the total quantity of steam used in the building. The desuperheater is oversized by 25 to 50 percent thus causing excessive wear on the desuperheater pumps and control valves. One of the desuperheater pumps has recently failed and was replaced. The complete desuperheater system needs to be replaced with a properly sized system parts as they are replaced.

Two 1985 Trane centrifugal R-11 chillers with 275 and 450 Tons each are located in room 530M and supply chilled water to the DDVAV air handling unit cooling coils in room 1M. Two Marley cooling towers of like capacities cool the condensing water for the chillers. Chilled water pumps supply water to air handling units 1, 2 & 3 which serves air condition zones in the building. The Trane chillers use R-11 refrigerant that is no longer produced and the chillers are 14 years old and near the end of their useful life and will need to be replaced in the next five to ten years or when R-11 refrigerant supplies are depleted.

The building heating, ventilation, and air conditioning systems consist of three (DD) dual duct high velocity (VAV) variable air volume systems. The DDVAV air handling units with hot water preheat, heating, reheat and chilled water coils, filters and steam humidifiers are located in room 01M. The DDVAV air handling units supply air to DDVAV boxes located throughout the building. A variable speed motor controller determines the systems fan air volumes. A ducted system returns some air back to the air handling units. The DDVAV boxes located in the rooms with hoods adjust to make up the difference of lab hood exhaust to control room temperature and static pressure. The cooling and ventilation system appeared to be operating at the time of the site visits. Some of the DDVAV boxes and thermostats need to be adjusted.

Controls for the heating and cooling system are pneumatic, electric that have been tied into a control system with a DDC upgrade.

There are eight main general hood exhaust systems located in the penthouse that have glycol heat recovery coils that temper the air to six make-up air handling units that supply air to the fourth floor labs. Each system has exhaust fans with stacks on the roof above. Other fans remove air from hoods, cabinets, restrooms, equipment rooms, common areas and conference rooms.

A 1985 Trane 150 Ton, R-22, reciprocating chiller located in room 10M supplies chilled water to the Liebert air handling units and the lab process cooling water system. Two glycol coolers with 210 ton capacity operate throughout the year cooling condensing water for the chiller, Liebert units and lab equipment. Cooling water is piped to the heat exchanger on the wall of room 10M from the glycol coolers. Cooling water is pumped from the heat exchanger to the Liebert units and the lab process cooling water stations in the laser labs. A back-up system with 3" crossover piping from Newman Wolfrom laboratory is located in the basement room 10M of the Celeste Lab Building.

Laser lab areas requiring special cooling requirements have constant air volume (CAV) Liebert units with electric reheat and humidification that are located in rooms next to the laser lab spaces.

ELECTRIC

The McCracken substation circuit number PGN5/PGS5 feeds the 2000 KVA 480/277 volt and the 1000 KVA 208/120 volt transformers located in the penthouse and the 500 KVA 480/277 and 500 KVA 208/120 volt transformers on the east pad. The 480/277 volt switchgear located in room 540M and 13M feeds the MCC panels in room 530M and 01M and the lighting distribution panels located throughout the building. The 208/120-volt switchgear located in room 540M and 13M feed the power distribution panels located on all floors. The east pad transformers supply lower levels. Panel sizes vary throughout the building depending on the load. At about 30 watts per square foot the building appears to have an adequate power supply in all circuits. The laser lab areas have extensive electrical and electronic equipment that are fed with an isolated ground power system. The 1600 Amp main ground fault breaker is fed from room 13M.

The building has 32 watt surface and recessed fluorescent tube light fixtures throughout most of the building. A program to replace the remaining 40 watt fixtures with 32 watt fluorescent fixtures would save energy. Entrance areas are illuminated with fluorescent recessed can fixtures. There are an adequate number of convenience and lab outlets throughout the building.

SAFETY STANDARDS

Celeste Laboratory Of Chemistry is equipped with a manual fire alarm system consisting of pull stations at exits, stairwells and labs that provide local fire annunciation from the panel in room 550M to all floors. A remote fire annunciation panel at the south front entrance displays the system's status. The wet standpipes and 4" dry pipe limited sprinkler systems to the basement sprinklers are fed from the Fire Pump in room 10M and appear to be in good condition. There are portable fire extinguishers located throughout the building. Fire hoses have been removed from the hose cabinets and 2.5" fire department hose connections are located in stairwells.

There are lighted exit signs at each exit and stairwell and night lighting. Emergency lights, life safety systems and lab safety systems are fed from the emergency generator panel located in room 550M. The emergency generator in room 530M is a 33 KVA natural gas driven generator.

ASBESTOS

Asbestos containing materials were not identified since this building was built after 1986. Generally buildings constructed during this time are basically asbestos free, however, in some cases the use of asbestos containing materials in floor tiles, mastics, caulking, gaskets, lab hoods etc. could have been used. Consideration should be given to a survey of products that may potentially contain asbestos materials within the limits of the building and, if identified, should be removed during any renovation or repairs.

PERIMETER

All of the sidewalks around the building are in good condition. Some sidewalks on the northwest side at the building have sections of cracked or spalled concrete and need to be sealed to prevent further deterioration.

All of the shrubbery and trees need to be mulched.

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

Minor Maintenance Projects (Less Than \$5000) EXTERIOR

CELESTE LABORATORY OF CHEMISTRY #371

- 1 Seal spalled or cracked sidewalk sections on the northwest side to prevent further deterioration of the concrete.
Customer Request #13554
- 2 Trim the trees and shrubs around the building.
Customer Request #13555
- 3 Repair the brick wall on the south and northeast corner of the building and seal all of the brick retaining and planting walls to prevent further cracking.
Customer Request #13556
- 4 Repair the metal roof on the north side of the building.
Customer Request #13557
- 5 Backfill around the blowout panels on the north side of the building where the ground has washed away.
Customer Request #13561
- 6 Repair the loose louver bird netting on the northwest side of the building.
Customer Request #13562
- 7 Caulk the joint between the sidewalk and steps on the southwest and the open building insulation on the southeast corner.
Customer Request #13563
- 8 Repair the loose handrail at the northwest entrance door.
Customer Request #13565
- 9 Some leaks were noted in the soffit at the south door that needs to be repaired.
Customer Request #13566
- 10 The soffit at the northwest door needs to be repaired and painted.
Customer Request #13567
- 11 Repair the loose EPDM roofing at the access door to the east roof.
Customer Request #13568
- 12 Repair the louver doors to the roofs off the penthouse.
Customer Request #13569
- 13 Repair the counterflashing at the southeast side of the roof for leaks.
Customer Request #13570

Minor Maintenance Projects (Less Than \$5000) INTERIOR

CELESTE LABORATORY OF CHEMISTRY #371

1. Replace insulation removed from piping for repairs in the equipment room 01M.
Customer Request #13572
2. Replace stained ceiling tiles predominately on the fourth floor and throughout the building.
Customer Request #13573
3. Repair the window in room 260.
Customer Request #13574
4. Test and/or repair the storm duplex sump pumps in room 01M.
Customer Request #13575 Completed
5. Repair the vinyl tile in west hall x5c.
Customer Request #13577 Completed
6. Balance/repair the DD box to room 142, 160A & 160B to deliver proper cooling.
Customer Request #13578 Completed
7. Customer the leak in east walkway x308c.
Work Request #13579
8. Balance/repair the DD box to room 110 & 120 to deliver proper cooling.
Customer Request #13580 Completed

BUILDING EVALUATION SUMMARY

BUILDING INFORMATION

Fac # 371, Facility Name: *CELESTE LABORATORY OF CHEMISTRY*

Date: 7/30/99, Inspector: JAO, Year Constructed: 1985/86, Gross Sq. Ft: 113,433

Net Sq. Ft: 97,119, Replacement Cost: \$ 20,524,000 *

COMPONENT RATING

COMPONENT	BUILDING COMPONENT PERCENTAGE OF TOTAL COST **	BUILDING COMPONENT REPLACEMENT COST	BUILDING COMPONENT CONDITION VALUE MULTIPLIER	BUILDING COMPONENT CURRENT VALUE
Foundation	4.18	857,046	92	791,416
Columns and Beams	11.28	2,315,528	92	2,138,212
Exterior Walls	6.68	1,371,274	91	1,246,455
Ext. Windows & Doors	3.34	685,637	88	603,416
Roofing & Flashing	2.15	442,055	82	363,498
Partitions & Doors	8.60	1,765,214	88	1,553,532
Wall Finishes	2.12	436,041	80	348,861
Floor Finishes	4.85	995,376	88	876,012
Ceilings & Finishes	4.97	1,019,434	88	897,184
Conveying	2.27	466,113	88	410,217
Plumbing	17.74	3,641,694	88	3,204,986
Heating	7.03	1,443,446	88	1,270,350
Cooling and Vent.	11.43	2,345,600	79	1,860,992
Elect. Serv. & Dist.	1.39	285,682	85	241,900
Lighting and Power	8.06	1,653,949	85	1,400,474
Safety Standards	3.90	799,910	82	657,759
TOTALS	100.00	20,524,000	87	17,865,264

BUILDING RATING SUMMARY

Overall Building Rating = **87%**

* Replacement Cost assigned January 1999 by The Office of University Resource Planning & Institutional Analysis 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 #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>857,046</u>) x (<u>92%</u>) = \$ <u>791,416</u>						
<table style="margin: auto; border: none;"> <tr> <td style="padding: 0 10px;">Possible</td> <td style="padding: 0 10px;">Condition</td> <td style="padding: 0 10px;">Component</td> </tr> <tr> <td style="padding: 0 10px;">Value</td> <td style="padding: 0 10px;">Value Multiplier</td> <td style="padding: 0 10px;">Value</td> </tr> </table>	Possible	Condition	Component	Value	Value Multiplier	Value
Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat	Att	DESCRIPTION
		a. Footings:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Interior Piers..... <i>on caissons to bedrock</i>
<input type="checkbox"/>	<input type="checkbox"/>	Interior Footings/Bearing Walls.....
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Perimeter Footings..... <i>concrete footers on soil</i>
<input type="checkbox"/>	<input type="checkbox"/>	Grade Beams.....
<input type="checkbox"/>	<input type="checkbox"/>	Piles
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Caissons <i>to bedrock</i>
		b. Foundation Wall Materials:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Concrete Cast-in-place..... <i>basement to first floor window</i>
<input type="checkbox"/>	<input type="checkbox"/>	Concrete Block.....
<input type="checkbox"/>	<input type="checkbox"/>	Stone
<input type="checkbox"/>	<input type="checkbox"/>	Brick.....
<input type="checkbox"/>	<input type="checkbox"/>	Other
		c. Waterproofing and Underdrain:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Coating.....
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Membrane
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Board..... <i>2" Styrofoam board</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Drain Pipe <i>shown on exterior of footer on drawings</i>
		d. Slab on Grade:
<input type="checkbox"/>	<input type="checkbox"/>	Plain
<input type="checkbox"/>	<input type="checkbox"/>	Reinforced.....
		e. Ground/Basement Floor Slab:
<input type="checkbox"/>	<input type="checkbox"/>	Plain
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Reinforced.....
		f. Special Substructures:
<input type="checkbox"/>	<input type="checkbox"/>

COMMENTS:

The exterior walls are supported on the perimeter footers while the interior columns and floors are installed on caissons to bedrock. The two supporting systems expand and contract at different rates and have caused minor settlement cracks between the two systems.

The reinforced concrete floors in the basement are heaving or settling in various places due to variances in the ground water under the floor.

COLUMNS AND BEAMS

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>2,315,528</u>) x (<u>92%</u>) = \$ <u>2,138,212</u> <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>

SYSTEM DESCRIPTION preventors

Sat Att

a. Columns and Beams:

- Reinforced Concrete
- Precast Concrete
- Steel*from basement to penthouse (concrete encased)*
- Fireproofing*on columns, beams and cross bracing*
- Wood
- Other

b. Floor Joists:

- Concrete.....
- Steel.....
- Wood
- Other.....

d. Floor Decks:

- Concrete Slab.....
- Precast Slab *concrete flexacore*
- Metal Deck w/insulation.....
- Wood

e. Roof Joists:

- Concrete.....
- Steel *over penthouse*
- Wood

f. Pitched Roof System:

- Pitch []3/12, []4/12, []10/12 *steel standing seam*
- Dormers
- Steel Purlins..... *in first floor roofs*
- Wood Rafters.....
- Fireproofing
- Underlayment
- Insulation
- Ventilation
- Other.....

g. Flat Roof System:

- Slope..... *0.25" per foot*
- Concrete Deck
- Precast Slab*concrete at penthouse level*
- Metal Deck w/concrete fill

- Metal Deck w/insulation..... *over penthouse*
- Wood Deck
- Insulation..... *1.2" & 1" insulation*
- Other

COMMENTS:

Some fine-line cracking in the precast concrete slab and topping in some of the halls under the vinyl tile flooring was noted.

Some minor differential settlement was noted at various locations throughout the building.

EXTERIOR WALLS

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>1,371,274</u>) x (<u>91%</u>) = \$ <u>1,246,455</u>						
<table style="margin: auto; border: none;"> <tr> <td style="text-align: center; padding: 0 10px;">Possible</td> <td style="text-align: center; padding: 0 10px;">Condition</td> <td style="text-align: center; padding: 0 10px;">Component</td> </tr> <tr> <td style="text-align: center; padding: 0 10px;">Value</td> <td style="text-align: center; padding: 0 10px;">Value Multiplier</td> <td style="text-align: center; padding: 0 10px;">Value</td> </tr> </table>	Possible	Condition	Component	Value	Value Multiplier	Value
Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. Walls:

- [] [] Concrete []CIP []PRECAST
- [] [] Concrete Block/brick.....
- [X] [] Brick []MASONRY [X]VENEER .*prefabricated panels*
- [X] [] Veneer..... *on concrete*
- [] [] Window/Curtainwall
- [X] [] Metal Siding*on fifth floor penthouse*
- [X] [] Other*blanked insulated louvers on penthouse*
- [] [X] Other *accent louver screen walls at penthouse*

b. Wall Lintels Over Openings:

- [] [] Concrete []PRECAST []CIP
- [] [] Limestone
- [] [] Brick Masonry
- [X] [] Steel
- [] [] Wood
- [] [] Other.....

c. Wall Trim:

- [] [X] Limestone *sloping window sills*
- [X] [] Brick*perimeter recessed band every floor*
- [] [] Marble.....
- [] [] Wood
- [] [X] Other *brick wing walls and air intakes*

d. Finishes:

- [X] [] Plain.....
- [X] [] Stucco *soffits at south door*
- [] [] Paint.....
- [] [] Parging.....
- [] [] Exposed Aggregate
- [] [] Drivit
- [] [] Other.....

e. Exterior Wall Backing System:

- [X] [] Concrete.....
- [X] [] Concrete Block
- [] [] Brick Masonry
- [] [] Ceramic Glazed Clay Tiles.....
- [X] [] Metal Studs..... *at prefabricated wall systems*

[] [] Wood Studs

COMMENTS:

All of the limestone should be cleaned and sealed.

The limestone window trim should have had caulking under the lip to prevent water from dripping back into the brick.

The top cap course of the wing walls needs to be regouted and sealed to prevent freeze though cycles from damaging the cap.

Some of the blanked insulated louvers on penthouse need to be repaired.

EXTERIOR WINDOWS AND DOORS

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>685,637</u>) x (<u>88%</u>) = \$ <u>603,416</u>						
<table style="margin: auto; border: none;"> <tr> <td style="padding: 0 10px;">Possible</td> <td style="padding: 0 10px;">Condition</td> <td style="padding: 0 10px;">Component</td> </tr> <tr> <td style="padding: 0 10px;">Value</td> <td style="padding: 0 10px;">Value Multiplier</td> <td style="padding: 0 10px;">Value</td> </tr> </table>	Possible	Condition	Component	Value	Value Multiplier	Value
Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. Window materials:

- [] [] Wood
- [] [] Steel
- [X] [] Alum..... *window frames*
- [] [] PVC
- [] [] Other

b. Windows type & number:

- [] [] Double Hung
- [] [X] Awning..... *48 glass windows*
- [] [] Casement
- [] [] Pivoted.....
- [] [] Sliding
- [X] [] Fixed..... *207 glass windows*
- [] [] Other

c. Window glazing:

- [X] [] Single pane *on all windows and doors*
- [] [] Double pane.....

d. Window Wall and/or Store Front:

- [X] [] Store Front..... *at south entrance*
- [X] [] Vestibule..... *at south entrance*
- [X] [] Single pane
- [] [] Double pane.....
- [] [] Other

e. Door Materials:

- [] [] Wood
- [X] [] Steel..... *dock doors*
- [] [X] Alum..... *entrance doors*

f. Doors type & number:

- [X] [] Vestibule Three Single..... *at south entrance*
- [X] [] Double.....*two sets at west stairwell entrances*
- [X] [] Exit.....*from loading dock*
- [X] [] Stair Exit..... *at west and southeast entrances*
- [X] [] Garage..... *steel*
- [X] [] Special..... *six walkway exits*

g. Hardware:

- Automatic opener.....
- Push Bar Openers wt Closures.....
- Key Cards.....

COMMENTS:

Some of the window locks need to be repaired or replaced.

ROOFING

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>442,055</u>) x (<u>82%</u>) = \$ <u>363,498</u>		
Possible Value	Condition Value Multiplier	Component Value

SYSTEM DESCRIPTION

Sat Att

a. Roof Covering:

- [] [] Built-up []Asphalt []Coal Tar []Modified
- [] [] Built-up w/gravel []Asphalt []Coal Tar.....
- [] [] Modified asphalt Roll.....
- [] [] Asphalt Shingle
- [] [] Copper
- [X] [] EPDM..... 19,400 SF
- [] [X] Other.....*metal standing seam 850 SF*

b. Flashing:

- [X] [] Materials: []Cu []Galv [X]Al []EPDM []SS []PVC....
- [] [X] Base & Counter1515 LF
- [X] [] Cap.....*aluminum 1050 LF*
- [X] [] Reglet.....*in walls 465 LF*
- [] [] Valley & Ridge.....

c. Gravel Stop & Edge Strips:

- [] [] Type []SS []Galv []Al []Cu []PVC

d. Drainage:

- [X] [] Gutters w/ Exterior Downspouts 22 LF
- [] [] Scuppers w/o Exterior Downspouts
- [X] [] Drains w/ Interior Storm Drains *drains*
- [X] [] Emergency Overflow.....*scuppers*

e. Parapets:

- [] [] Concrete.....
- [X] [] Brick/wood*at penthouse roof 390 LF*
- [] [] Precast
- [] [] Other.....

f. Parapet Caps:

- [X] [] Metal []SS []Galv [X]Al []Cu []PVC390 LF
- [] [] Tile
- [] [] Limestone
- [] [] Precast
- [] [] Other

h. Roof accessories:

- [] Lightning Protection
- [] Roof Curbs
- [] Equipment Frames
- [] Pitch Pockets
- [] Other*duct sleeves*

COMMENTS:

The roofs are 14 years old and are in good condition.

Several of the standing seam roof caps on the north side need to be repaired.

Some of the EPDM roof flashing on the south and east side needs to be repaired or checked for leaks.

PARTITIONS AND DOORS

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>1,765,214</u>) x (<u>88%</u>) = \$ <u>1,553,532</u>						
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Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. Partition Framing:

- [] Concrete Block *at equipment rooms*
- [] Clay Tile Block.....
- [] Glazed Clay Tile Block
- [] Masonry.....
- [] Wood Stud.....
- [] Metal Stud
- [] Other.....

b. Special partitions and Walls:

- [] Demountable.....
- [] Toilet
- [] Screen Walls.....
- [] Glass
- [] Gate.....
- [] Other.....

c. Wall Material:

- [] Concrete Block
- [] Plaster
- [] Drywall..... *throughout the building*
- [] Glass
- [] Wood Paneling
- [] Composite Paneling.....
- [] Steel Panels.....
- [] Tile/Glazed
- [] Other.....

d. Interior Doors & Frames:

- [] Met Door/Met Frame.....*fire doors and to some labs*
- [] Wood Door/Wood Frame
- [] Wood Door/Metal Frame *predominate throughout*
- [] Glazing
- [] Roll-up..... *at storage areas*
- [] Sliding
- [] Other.....

e. Hardware:

- [] Door [X]Knobs []Levers
- [] Door Closures.....

- Kick/Push Plates
- Security & Detection..... *some door key card locks*
- Automatic Openers
- Fire Door Magnets
- Other

COMMENTS:

Maintenance records indicate that door and/or door hardware are being adjusted and/or repaired on a continual basis.

Some of the concrete block walls in the basement are cracking due to the floor heaving in places and should be sealed.

WALL FINISHES

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>436,041</u>) x (<u>80%</u>) = \$ <u>348,861</u>						
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Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. Wall Finishes:

- | | | |
|-------------------------------------|--------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Paint |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Vinyl Wall Coverings |
| <input type="checkbox"/> | <input type="checkbox"/> | Prefinished Paneling |
| <input type="checkbox"/> | <input type="checkbox"/> | Cork |
| <input type="checkbox"/> | <input type="checkbox"/> | Wallpaper |
| <input type="checkbox"/> | <input type="checkbox"/> | Ceramic Glazed Tile |
| <input type="checkbox"/> | <input type="checkbox"/> | Marble |
| <input type="checkbox"/> | <input type="checkbox"/> | Stone |
| <input type="checkbox"/> | <input type="checkbox"/> | Trim & Wainscot |
| <input type="checkbox"/> | <input type="checkbox"/> | Decoration |
| <input type="checkbox"/> | <input type="checkbox"/> | Glass |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Other <i>synthetic resin</i> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Other <i>brick front entrance</i> |

COMMENTS:

Some first floor walls are being repainted at this time.

FLOOR FINISHES

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>995,376</u>) (<u>88%</u>) = \$ <u>876,012</u> <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>

SYSTEM DESCRIPTION

Sat	Att	DESCRIPTION
		a. Carpet:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rolled..... <i>in offices and conference rooms</i>
<input type="checkbox"/>	<input type="checkbox"/>	Tile
		b. Concrete Topping:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Clear Sealant..... <i>on equipment room</i>
<input type="checkbox"/>	<input type="checkbox"/>	Antislip.....
<input type="checkbox"/>	<input type="checkbox"/>	Epoxy
		c. Resilient:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vinyl Composition Tile
<input type="checkbox"/>	<input type="checkbox"/>	Vinyl/Plastic Tile
<input type="checkbox"/>	<input type="checkbox"/>	Asphalt Asbestos Tile
<input type="checkbox"/>	<input type="checkbox"/>	Linoleum Tile.....
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Resilient Vinyl Roll <i>predominate throughout</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rubber..... <i>stairwells</i>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	d. Ceramic Tile <input checked="" type="checkbox"/> Mosaic <input type="checkbox"/> Quarry <input type="checkbox"/> Pavers.....
<input type="checkbox"/>	<input type="checkbox"/>	f. Masonry <input type="checkbox"/> Marble <input type="checkbox"/> Granite <input type="checkbox"/> Slate <input type="checkbox"/> Brick.....
<input type="checkbox"/>	<input type="checkbox"/>	g. Terrazzo <input type="checkbox"/> Marble <input type="checkbox"/> Granite
<input type="checkbox"/>	<input type="checkbox"/>	h. Wood <input type="checkbox"/> Tiles <input type="checkbox"/> T&G Hardwood <input type="checkbox"/> Planking.....
<input type="checkbox"/>	<input type="checkbox"/>	i. Pedestal <input type="checkbox"/> Vinyl Tiles <input type="checkbox"/> Grills <input type="checkbox"/> Supply Air <input type="checkbox"/> Vent. ...
		j. Base Molding:
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Vinyl <i>rolled up on walls</i>
<input type="checkbox"/>	<input type="checkbox"/>	Wood.....
<input type="checkbox"/>	<input type="checkbox"/>	Terrazzo
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Ceramic Tile <i>restrooms</i>
<input type="checkbox"/>	<input type="checkbox"/>	Masonry

COMMENTS:

Floor finishes are in good condition.

CEILINGS AND FINISHES

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>1,019,434</u>) x (<u>88%</u>) = \$ <u>897,184</u>						
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Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. System Type:

- [] Exposed *in equipment rooms and laser labs*
- [] Applied to Structure
- [] Suspended Stud
- [] Suspended Steel Grid
- [] Suspended Aluminum Grid
- [] Suspended Sealed Grid.....
- [] Suspended Concealed Spline.....

b. Materials:

- [] Drywall *in restrooms and stairwells*
- [] Plaster
- [X] Mineral Fiber Board *predominate throughout*
- [] Fiberglas Board.....
- [] Cementitious Fiber Board.....
- [] Metal Pan Tile
- [] Other

c. Finishes:

- [] Paint.....
- [] Prefinished [X]Paint []vinyl []Fabric
- [] Other

d. Openings & Inserts:

- [X] Air Distribution
- [] Lighting Fixtures
- [] Access Panels
- [] Sprinklers.....
- [] Smoke Detectors.....
- [] Speakers.....
- [] Skylights
- [] Other

COMMENTS:

Several tiles are stained from water leaks and need to be replaced.

Many of the diffusers need to be cleaned.

CONVEYING

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ 466,113) x (88%) = \$ 410,217

Possible Value	Condition Value Multiplier	Component Value
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SYSTEM DESCRIPTION

Sat Att

a. Elevators:

- [X] [] Number *One Dover*
- [X] [] Type *Passenger*
- [X] [] Speed..... *100 FPM*
- [X] [] Capacity (lbs.) *4,000 Lbs.*
- [X] [] Dimensions *72"x96"*
- [X] [] Door Operation: [X] Center [] To Side.....
- [] [X] Accessibility Standards.....
- [] [X] Fire Codes.....

b. Elevators:

- [X] [] Number *One Dover*
- [X] [] Type *Passenger/Freight*
- [X] [] Speed..... *100 FPM*
- [X] [] Capacity (lbs.) *4,500 Lbs.*
- [X] [] Dimensions *60"x108"*
- [X] [] Door Operation:
- [X] [] Door Operation: [X] Center [] To Side.....
- [] [X] Accessibility Standards.....
- [] [X] Fire Codes.....

c. Lifts and Hoists:

- [] [] Number
- [] [] Type

d. Moving Stairs and Walks:

- [] [] Number
- [] [] Type

e. Conveyors:

- [] [] Number
- [] [] Type

COMMENTS:

The elevator is not ADA compliant but has voice communication.

MECHANICAL/PLUMBING

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ 3,641,694) x (88%) = \$ 3,204,986

Possible Value	Condition Value Multiplier	Component Value
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SYSTEM DESCRIPTION

Sat Att

a. Services Available:

- [] Cold Water4" domestic and 6" fire 10M
- [X] Backflow Valve
- [] Hot Water4" in room 01M
- [] Natural Gas..... 1-2-1/2" & 3" next to room 10M
- [] Compressed Air..... 2- 3/4" & 1" HP air in room 01M
- [] Other.....3" process chilled water in room 10M
- [] Other.....1.5" distilled water in room 510M
- [] Other.....1.5" nitrogen next to room 140M

b. Piping & Fittings:

- [] Cast Ironsanitary and storm
- [] Duriron on acid waste underground piping
- [] Copper Pipe ...compressed air, water & nitrogen piping
- [] Copper Tubing.....
- [] Steel on gas, standpipe and sprinklers
- [] Galv. Steel
- [] Other glass piping on acid waste, PVC on distilled water

c. Water Heaters:

- [] Gas.....
- [] Steam Converter/Tank.....
- [] Steam Instantaneous
- [] Central Hot Water.....4" DHWS & 1" return

d. Drainage:

- [] Storm Drains.....1@4", 2@6", 2@8" to the north
- [] Sanitary Drainage ..1@6" San and 1@6" AW to the south
- [] Floor Drains
- [] Sump Pumps sanitary duplex east in room 001M
- [X] Sump Pumps storm duplex west in room 001M

e. Fixtures: Number

- [] Water Closets 12
- [] Urinals 8
- [] Lavatory Sinks 16
- [] Kitchen Sinks 1
- [] Service Sinks 6
- [] Showers emergency in labs
- [] Electric Water Coolers 5

- f. Sprinkler Systems:**
- Wet*limited*
- Dry*in laser labs*
- Carbon Dioxide.....
- Halon.....
- g. Standpipe Systems:**
- []Wet []Dry
- Fire Hose Valves []2.5" []1.25" *in stairwells*
- Hose Cabinets, Hoses []Installed []Removed

COMMENTS:

The main water valve for the domestic water piping is in room 10M.

The main water valve for the standpipe piping is in room 10M.

The water piping in the walkway froze up two years ago due to probable air leaks in the wall system.

The storm duplex sump pump in room 01M on the west side was checked for proper operation and repaired.

MECHANICAL/HEATING

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>1,443,446</u>) x (<u>88%</u>) = \$ <u>1,270,350</u>						
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Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. Heat Source:

- [] Central Plant Steam6" HPS from the south tunnel
- [] Central Plant Hot Water ..6" HHW from the south tunnel

b. System Type:

- [] Steam
- [] Hot Waterheating hot water
- [] Warm Air.....

c. Air Handling Units:

- [] Multizone Preheat Heating Reheat.....
- [] Dual Duct Preheat Heating Reheat VAV
- [] Make-up Air Preheat Heat Recovery Reheat.....
- [] Variable Volume Air Preheat Heating Reheat
- [] Constant Volume Air Preheat Heating Reheat....
- [] Other.....

d. Air Filters:

- [] Prefilter Multi DDAHU MUAHU VAVAHU CAV
- [] Bagfilter Multi DDAHU MUAHU VAVAHU CAV
- [] Other.....

e. Space Equipment:

- [] Radiators.....
- [] Convectors.....under windows
- [] Unit Heaters..... in equipment rooms
- [] Reheat Coils
- [] DD Boxes VAV throughout building
- [] CAV Boxes.....
- [] 2-Pipe Fan Coil.....at entrances
- [] Other..... electric reheat on Liebert units

f. Control Type:

- [] Pneu Electric DDC DDC upgrade

COMMENTS:

The desuperheater is oversized by 25 to 50 percent.

The make-up air units that serve the fourth floor labs should have the hot water inlet temperature increased when outside temperatures drop below zero.

COOLING/VENTILATING

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>2,345,600</u>) x (<u>79%</u>) = \$ <u>1,860,992</u>						
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Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

- a. System/Capacity:**
- [X] [] Water..... 725 tons
- [X] [] Glycol..... 120 ton dry cooler
- b. Chillers Capacity/Year/Refrigerant/Manufacturer:**
- [] [X] Centrifugal 1985 Trane 450 & 275 ton R-11 chillers
- [X] [] Reciprocating 1985 Boan 78 ton R-22 chiller
- [] [] Absorption
- [] [] Screw
- c. Condenser Side:**
- [X] [] Type/Capacity [X]CW []DX two Marley cooling towers
- [X] [] Other 120 ton dry glycol cooler for lab equipment
- d. Air Handling Units:**
- [] [] Multizone []CW []DX []HUMD
- [X] [] Dual Duct [X]CW []DX [X]HUMD..... VAV
- [X] [] Make-up Air []CW []DX []HUMD glycol heat recovery
- [] [] Variable Volume []CW []DX []HUMD
- [X] [] Constant Volume [X]CW []DX [X]HUMD 4 Liebert units
- [] [] Other
- e. Additional Air Filters:**
- [] [] Postfilter []Multi []DDAHU []MUAHU []VAVAHU []CAV
- [] [] Other []HEPA []BAG []CARTRIDGE []CHARCOAL
- f. Direct Expansion: Number**
- [] [] Window units.....
- [] [] Thru-the-wall
- [] [] Single zone.....
- [] [] Other
- g. Distribution Boxes:**
- [] [] VAV []FC []REHEAT.....
- [] [] CAV []FC []REHEAT.....
- [X] [] DUAL DUCT []FC []REHEAT
- h. Special Systems:**
- [X] [] Type lab exhaust system with heat recovery
- [] [] Capacity
- i. Control Systems:**
- [X] [] [X]Pneu [X]Electric []DDC [X]DDC Upgrade.....

j. Fans:

- Exhaust equipment *general exhaust fans*
- Recirculating.....

COMMENTS:

The 78 ton chiller is used year around to supply chilled water to the laser lab and equipment.

The 120 ton dry glycol cooler supplies condenser water for the lab Liebert units and the 78 ton chiller.

Two chillers and a cooling tower for McPherson Lab were installed in room 580M and the west roof of the penthouse.

The two Trane R-11 chillers, pumps and cooling towers on the south roof of the penthouse will need to be replaced if R-11 refrigerants become depleted.

Some DDVAV boxes to various rooms need to be checked for proper operation and repaired.

ELECTRICAL SERVICE AND DISTRIBUTION

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>258,682</u>) x (<u>85%</u>) = \$ <u>241,900</u> <div style="display: flex; justify-content: space-around; font-size: small;"> Possible Value Condition Value Multiplier Component Value </div>

SYSTEM DESCRIPTION

a. Service:

Substation: Buckeye, McCracken Power Plant AEP

Primary Voltage: 13,200 Volts, Volts

Switch Gear Circuit No.: PGN5/PGS5

Transformer:

Manufacture	Type	KVA	Secondary/Voltages	Location
West Air	dry	2000	480/277	room540M
West Air	dry	750	208/120	room540M
West Air	oil	500	480/277	southeast pad
West Air	oil	500	208/120	southeast pad

b. Distribution System:

1. Motor Control Center (MCC) Room 001M, 10M & 540M
 Panelboard Fused, Circuit Breakers
 Voltage 480/3, 277/3, 208/3, 240/1
 Amperage 1600A, 800A, 600A, 400A, 200A
2. Lighting Room 540M & 13M
 Panelboard Fused, Circuit Breakers
 Voltage 480/3, 277/3, 208/3, 240/1
 Amperage 800A, 600A, 250A, 200A, 150A, 100A
2. Building Power Room 540M & 13M
 Panelboard Fused, Circuit Breakers
 Voltage 480/3, 277/3, 208/3, 240/1
 Amperage 600A, 400A, 250A, 200A, 150A, 100A
4. Isolated Ground Power Room 13M,
 Panelboard Fused, Circuit Breakers
 Voltage 480/3, 277/3, 208/3, 240/1
 Amperage 600A, 250A, 200A, 150A, 100A

c. Conduit and wire:

Conduit Steel, Aluminum, PVC, Flexible
 Conductor Copper, Aluminum, MIT
 Wire: PVC Cover, Romex, Armored Cable(BX)

d. Emergency System:

Battery backup Room
 Emergency Panel Room 550M
 UPS Room

e. Emergency Generator: 33 KVA in room 550M

COMMENTS: none

ELECTRICAL LIGHTING AND POWER

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ 1,653,949) x (85%) = \$ 1,400,474						
<table style="margin: auto; border: none;"> <tr> <td style="padding: 0 10px;">Possible</td> <td style="padding: 0 10px;">Condition</td> <td style="padding: 0 10px;">Component</td> </tr> <tr> <td style="padding: 0 10px;">Value</td> <td style="padding: 0 10px;">Value Multiplier</td> <td style="padding: 0 10px;">Value</td> </tr> </table>	Possible	Condition	Component	Value	Value Multiplier	Value
Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

- a. Lighting (lamp type):**
- [] [X] Fluor 40 watt.....
- [X] [] Fluor 32 watt.....
- [X] [] Fluor Can *in entrances of the building*
- [X] [] Incandescent
- [X] [] HID []Mercury []HPS [X]Metal Halide*exterior*
- [] [] Low Voltage (12V).....
- [] [] Other
- b. Lighting Levels**
- [X] [] Halls.....
- [X] [] Rooms.....
- [X] [] Mechanical Rooms
- c. Fixture Condition**
- [X] [] Fixtures
- [X] [] Bulbs.....
- [X] [] Fixture Lens.....
- d. Receptacles & Switches:**
- [X] [] Wall Outlet 20A
- [X] [] GFIC Breakers.....
- [X] [] Switches.....
- [X] [] Cover Plates.....
- e. Special:**
- [X] [] Lightning Protection.....
- [X] [] Communication [X]Clock []Public Address [X]Bells
- [X] [] Alarm [X]Fire [X]Security.....
- [X] [] Telecommunication [X] Phones [X]Data []Cable TV
- [X] [] Data Systems
- [X] [] Fiber Optics

COMMENTS:

The majority of the 40 watt fluorescent lighting fixtures were replaced in 1994. The balance of the 40 watt fluorescent lighting fixtures needs to be replaced with 32 watt lighting fixtures.

SAFETY STANDARDS

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

COMPONENT RATING: (\$ <u>799,910</u>) x (<u>82%</u>) = \$ <u>657,759</u>						
<table style="margin: auto; border: none;"> <tr> <td style="text-align: center; padding: 0 10px;">Possible</td> <td style="text-align: center; padding: 0 10px;">Condition</td> <td style="text-align: center; padding: 0 10px;">Component</td> </tr> <tr> <td style="text-align: center; padding: 0 10px;">Value</td> <td style="text-align: center; padding: 0 10px;">Value Multiplier</td> <td style="text-align: center; padding: 0 10px;">Value</td> </tr> </table>	Possible	Condition	Component	Value	Value Multiplier	Value
Possible	Condition	Component				
Value	Value Multiplier	Value				

SYSTEM DESCRIPTION

Sat Att

a. Exits:

- Stair Construction:
- [] [] concrete.....
 - [X] [] steel..... *with concrete fill*
 - [] [] wood
 - [X] [] Number of Exit Stairs*three*
 - [X] [] Number of Other Exits.....*four*

b. Fire Rating:

- [] [] Construction Type: I_ II_ III_ IV X V_ VI___
- Building Height: *68 ft., 4 stories plus penthouse*

c. Extinguishing Systems:

- [X] [] Portable
- [X] [] Standpipe *in stairwells*
- [X] [] Hose Cabinets *hoses removed*
- [] [] Hoses.....
- [X] [] Sprinklers *limited coverage*
- [] [] Gas Suppression.....
- [] [] Other

d. Detection & Alarm Systems:

- [X] [] Pull Stations
- [X] [] Bells
- [] [] Horns.....
- [] [] Strobes
- [X] [] Annunciator Panel..... *520M with remote panel at hall*
- [X] [] Smoke Detectors
- [] [] Halls.....
- [X] [] Elevators
- [] [] Rooms.....
- [] [] Equip Rooms
- [X] [] Ducts.....

e. Lighting Systems:

- [X] [] Exit Signs [] BATTERY [X] EMC
- [X] [] Exit Lighting [] BATTERY [X] EMC.....
- [X] [] Emergency Lighting [] BATTERY [X] EMC
- [X] [] Emergency Generator..... *in room 550M*

f. Lightning Protection

COMMENTS:

There is a ground fault in the fire alarm system that trips when the ground becomes wet. The fault needs to be located and repaired.

BUILDING PERIMETER EVALUATION

FAC #: 371

DATE: 7/30/99

INSPECTOR: JAO

SYSTEM DESCRIPTION

Sat Att

a. Building Access:

- | | | | |
|-------------------------------------|-------------------------------------|-------------------|--------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Driveway..... | <i>east side</i> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Loading Dock..... | <i>east side</i> |
| | | Sidewalks | |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Front | <i>south</i> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Side..... | <i>west</i> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Rear..... | <i>north</i> |
| | | Steps..... | |
| <input type="checkbox"/> | <input type="checkbox"/> | Front | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Side..... | <i>to dock and walkway connector</i> |
| <input type="checkbox"/> | <input type="checkbox"/> | Rear..... | |
| <input type="checkbox"/> | <input type="checkbox"/> | Ramp | |

b. Lawn and Landscaping:

- | | | | |
|-------------------------------------|--------------------------|-------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Lawn | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Shrubs | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Trees..... | |
| <input type="checkbox"/> | <input type="checkbox"/> | Undesirable Insect..... | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Bedding Material | |
| <input type="checkbox"/> | <input type="checkbox"/> | Watering System..... | |

c. General Site Information:

- | | | | |
|-------------------------------------|--------------------------|-----------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Signage..... | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Address Identification..... | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Security Lights | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Street Lights | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Drainage..... | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Storm Drains | |

COMMENTS:

The southeast corner of the building needs to be sealed at the open joint in the building insulation board.

The trees and shrubs need to be mulched.

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 172 OSU buildings that the Department of Physical Facilities is budgetary responsible. These audits will be used to establish repair and renovation projects, budget cost estimates for these projects, and overall levels of required maintenance funding.

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. 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 numerical rating for each building on campus quantifying its percentage of deficiency.

6. 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 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.

(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 and redecorating, wholesale replacement of building and system components on-going maintenance, replacement and renovation projects are not included.

(b) Includes exterior building walls and attached items.

(c) Includes the first step up at all entries. Ramps outside the buildings are included; the steps and walks up to the ramps are not included.

(d) Blinds, drapes, light bulbs, and movable furniture are 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

A/C.....	AIR CONDITIONING
AW.....	ACID WASTE
AHU.....	AIR HANDLING UNIT
ATT.....	ATTENTION
BLDG.....	BUILDING
BUR.....	BUILT UP ROOF
COND.....	CONDENSATE WATER
CAV.....	CONSTANT AIR VOLUME
CW.....	CONDENSER WATER OR CHILLED WATER
DCW.....	DOMESTIC COLD 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
EMC.....	EMERGENCY CIRCUIT
FPM.....	FEET PER MINUTE
GPM.....	GALLONS PER MINUTE
HID.....	HIGH INTENSITY DISCHARGE LIGHT
HHW.....	HEATING HOT WATER
HPS.....	HIGH PRESSURE STEAM (125 PSI)
HVAC.....	HEATING, VENTILATING AND AIR CONDITIONING
KV.....	KILOVOLTS
KVA.....	KILOVOLTS AMPS
KW.....	KILOWATTS
LF.....	LINEAL FEET
LPS.....	LOW PRESSURE STEAM (15 PSI)
MCC.....	MOTOR CONTROL CENTER
MPS.....	MEDIUM PRESSURE STEAM (50 PSI)
MZCV.....	MULTIZONE CONSTANT VOLUME AIR HANDLING
N/A.....	NOT APPLICABLE
PSI.....	POUNDS PER SQUARE INCH
RM.....	ROOM
RTU.....	ROOF TOP UNIT (HEATING OR A/C)
SF.....	SQUARE FEET
S/P.....	STAND PIPE
SY.....	SQUARE YARDS
TR.....	TERMINAL REHEAT
V.....	VOLTS
VAV.....	VARIABLE AIR VOLUME

APPENDIX

Reduced Scale Building Floor Plans
C-1 Building Space Assignments