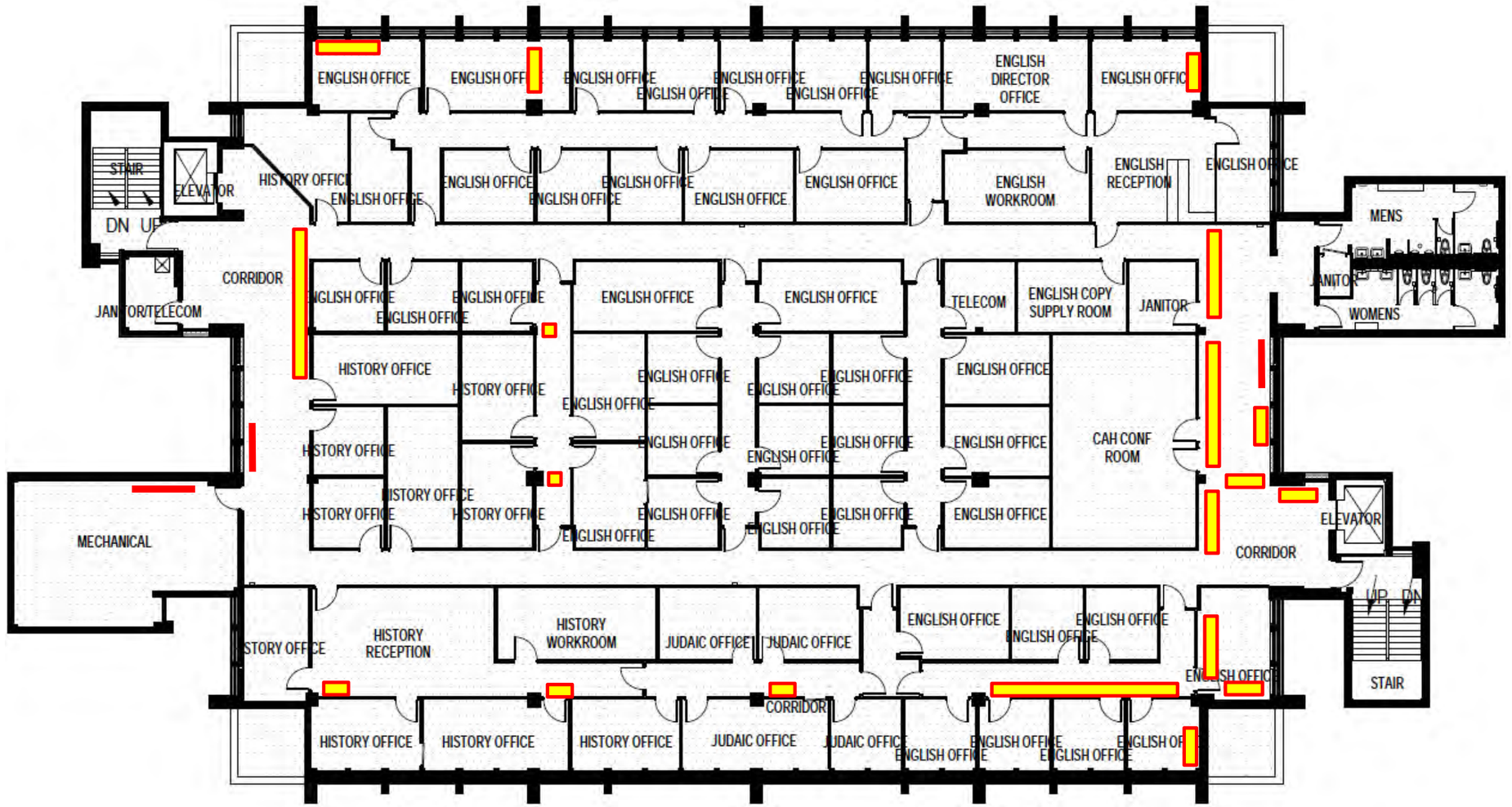


EXHIBIT LEGEND:

APPROXIMATE LOCATION OF ABOVE-CEILING OBSERVATIONS

APPROXIMATE LOCATION OF CMU WALL SPR SCAN

SCHENKELSHULTZ ARCHITECTURE

CLANCY & THEYS CONSTRUCTION COMPANY

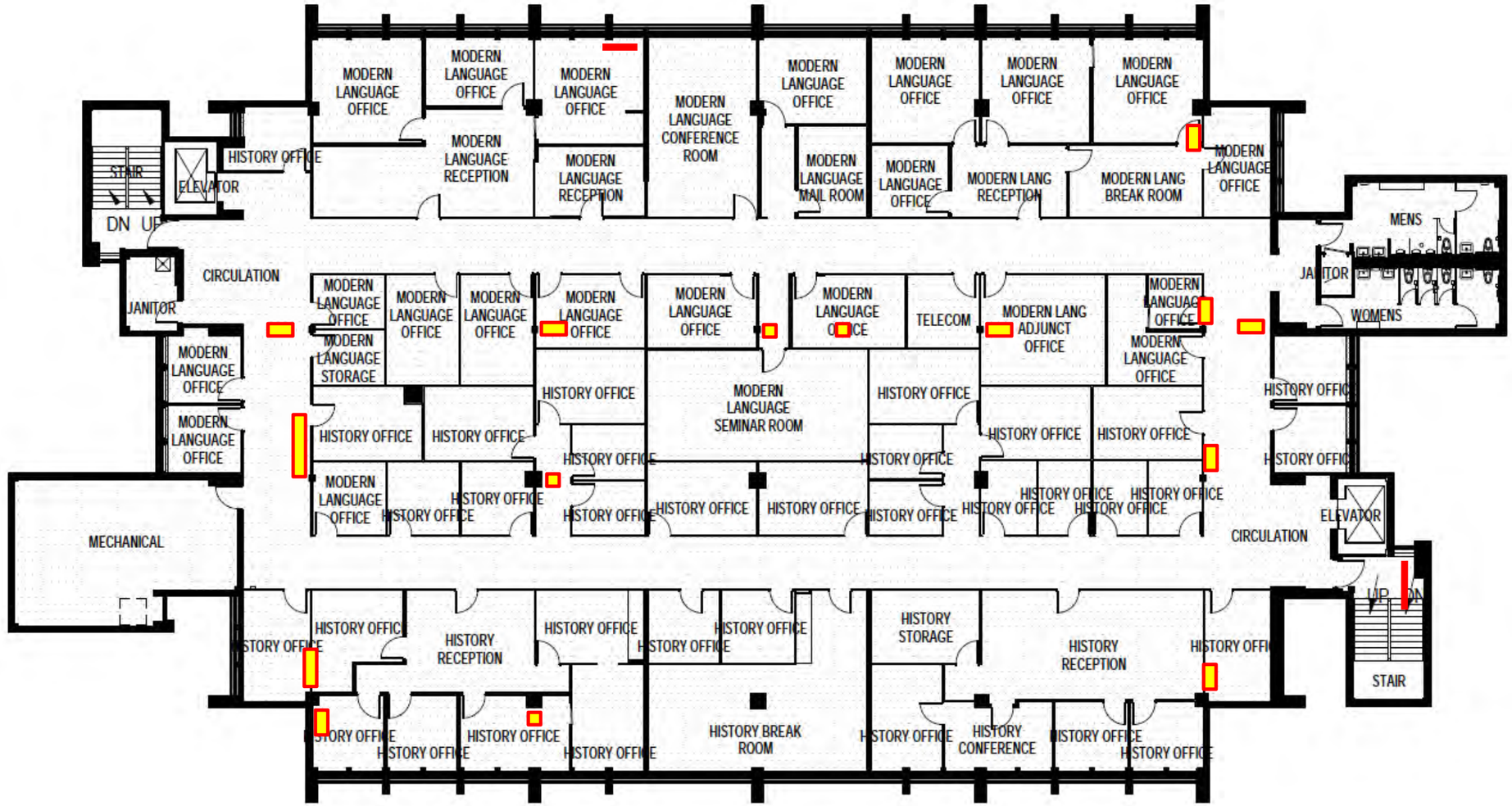
TLC ENGINEERING FOR ARCHITECTURE

WALTER P MOORE

UCF COLBOURN HALL

Exhibit EX-17

Interior Observations – Level 4



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TLC ENGINEERING FOR ARCHITECTURE

WALTER P MOORE

UCF COLBOURN HALL

Exhibit EX-18

Interior Observations – Level 5

Summary

This report summarizes an analysis of the Architectural and ME/FP Life Safety components of the building. Architectural and ME/FP items that are not related to Life Safety are found under the Building Condition Analysis section. Photos of each item are located in the Life Safety Appendix and are referred to by number throughout this report. Items are classified into PRIORITY categories as described in the Executive Summary; PRIORITY 1 items are CRITICAL, PRIORITY 2 items are POTENTIALLY CRITICAL, PRIORITY 3 items are NECESSARY, and PRIORITY 4 items are RECOMMENDED.

Code Review

I. Alterations to the building will fall under one of three categories as outlined by the Florida Building Code 2010 – Existing Buildings
   a. Repair, FBC Section 202. "The patching, restoration and/or minor replacement of materials, elements, components, equipment and/or fixtures for the purposes of maintaining such materials, elements, components, equipment and/or fixtures in good or sound condition." This applies to minor fixes of elements that are not completely replaced.
   b. Alteration – Level 1, FBC Section 403.1. "Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose." This applies to elements that may be removed and replaced.
   c. Alteration – Level 3, FBC Section 404.1. "Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment." This applies to the replacement of building systems such as windows and HVAC, and the reconfiguration of any space that may be a part of the scope of the project.

II. Compliance with FBC 2010
   a. Section 701.3 Compliance – "All new construction elements, components, systems, and spaces shall comply with the requirements of the Florida Building Code, Building."
   b. Section 202 Definitions – Technically Infeasible – "An alteration of a building or a facility that has little likelihood of being accomplished because the existing structural conditions require the removal or alteration of a load-bearing member that is an essential part of the structural frame or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the minimum requirements for new construction and that are necessary to provide accessibility."
   c. Therefore, if renovations are to be made in any particular area, they must be done to current code standards unless it is technically infeasible.

Building Life Safety Analysis - Architectural

I. Overview – in general, the components related to Architectural Life Safety in the building are PRIORITY 3 or 4 items, with limited PRIORITY 2 items. The building does have issues with the condition of several systems – such as rusting handrails and degrading stairs – but these are not urgent items and can be improved within the University's ongoing maintenance schedule for the building. See the following section for a detailed analysis of the building's various Life Safety Systems

II. Tower Exit Stairs – Capacity – NOT AN ISSUE
   a. Occupants - The Occupancy Group of Colbourn Hall is Group B – Business, as its primary occupancy is office. Occupancy Group B requires occupancy be calculated at 1 occupant per 100 gross square feet of the building, per FBC Table 1004.1.1. The largest floor plate is the fifth floor, which is 16,400 gsf. This equates to 164 occupants on this floor.
   b. Stair Door Egress Capacity - The floor is served by two exit stairs on opposite sides of the building. Each exit stair has a 3'-8" wide door. Per FBC Section 1005.1, doors (other egress components) allow 0.2 inches per occupant. Therefore, a 3'-8" door will allow 220 egress occupants, and the building's two 3'-8" doors (one to each stair) will allow 440 egress occupants. Therefore, the stair door egress capacity is well above the required width.
   c. Stair Width Egress Capacity – Each exit stair is 4'-5" wide. Per FBC Section 1005.1, stairs allow 0.3 inches per occupant. Therefore, a 4'-5" stair will allow 176 egress occupants, and the building's two 4'-5" stairs will allow 352 egress occupants. Therefore, the stair egress capacity is above the required width.

III. Tower Exit Stairs – Treads and Risers – see picture LS1
   a. PRIORITY 4 – exit stairs have 7" risers and 10" treads. The current FBC requires 11" treads – however because the existing stairs are within a structural shell that is technically infeasible to alter, they do not need to be replaced. However, the condition of the steps is poor and could use to be cleaned and treated with a non-slip coating product or rubber tread product.

IV. Tower Exit Stairs - Handrails – see picture LS1
   a. PRIORITY 4 – the existing exit stairs have handrails and guardrails as required by code, except the handrails do not have the current FBC code required extensions at the top landing and they do not return to the walls. However, these were presumably built to the original code requirements, so they do not need to be replaced.

V. Level 1&2 Exit Stairs – see picture LS2
   a. PRIORITY 4 – like the tower exit stairs, the level 1&2 exit stairs have 7" risers and 10" treads. See section III above for an identical description.

VI. Fireproofing
   a. PRIORITY 3 - Per FBC Table 503 Allowable Building Heights and areas, an unsprinklered Group B building that is Type IIA (fireproofing on structure) is allowed to be 5 stories tall and have a floor plate of 37,500sf; a Type IIB (no fireproofing on structure) is allowed to be 3 stories tall and have a floor plate of 23,000sf. In both cases, the Colbourn footprint of 16,400sf is well under the maximum allowed. However, no fireproofing was observed on the building steel, which would classify the building in today's FBC code as a Type IIA building, which is limited to 3 stories tall. Therefore, if built to today's FBC 2010 code, the building would require fireproofing of the steel structure in order to be a 5 story building. Adding fireproofing to the existing members would require significant renovations to the building. However, these were presumably built to the original code requirements, so they do not need to be replaced.
   b. It should be noted that the current FBC also requires all buildings 3 stories or taller to have an automatic sprinkler system. If this system was installed, it would negate the need for additional fireproofing on the structure. See the Fire Protection section below for additional information.

VII. Level 3, 4, and 5 corridor walls, fire rating – see pictures LS3 and LS4
   a. PRIORITY 3 – the building uses a return air plenum for the HVAC system, therefore none of the interior walls of the building go to the underside of the structure above. As such, none of the interior walls on the project are fire rated or are fire partitions (with the exception of the recently renovated first floor which has some fire rated walls and ceilings). FBC Section 1018 Corridors states "Corridors shall be fire-resistance rated in accordance with Table 1018.1". Table 1018.1 states that for a Group B building where the corridor serves more than 30 occupants, that a 1hr corridor wall is required for non-sprinklered buildings. As Colbourn Hall does not have sprinklers, and does not have corridor walls that are fire partitions, the building is not compliant with this code section (with the exception of the recently renovated first floor). Converting the interior corridor walls to fire partitions would require significant renovations to the building, including the addition of fire dampers each time a supply duct crosses the fire partition.
   b. It should be noted that the current FBC also requires all buildings 3 stories or taller to have an automatic sprinkler system. If this system was installed, it would negate the need for 1hr corridor walls. See the Fire Protection section below for additional information.

VIII. Combustible Materials – see pictures LS5 and LS6
   a. PRIORITY 3 – FBC Section 603 addresses Combustible Material in Type I and II Construction. Colbourn Hall is Type II Construction, and therefore should comply with this code section. FBC Section 603.1.1 allows Fire-retardant-treated wood. Several offices throughout the project were observed to have wood paneling. Judging from the age of the wood paneling, it is unlikely that this product is fire-retardant. These combustible materials are recommended to be replaced with non-combustible materials in any future interior renovation of the building.

IX. Level 2 Exit Door/Sign – see picture LS7
   a. PRIORITY 2 – A complete review and documentation of the exit signs in the building was performed with only one area of concern. On the second floor Reception Space 205 for the Digital Research Department, an exit sign is located over an exterior door which has been welded shut, has a sign on it which reads "NOT AN EXIT", and has furniture blocking its use. Immediately adjacent is another door which serves as the primary entry/exit in the space, but has no exit sign over it. It is recommended that the exit sign in this space be relocated to the operable door which is clearly the proper exit path.

X. Restroom Quantities – NOT AN ISSUE
   a. Water Closet quantity - For a Group B occupancy, the FBC Plumbing requires 2 water closets for both men and women for the first 50 occupants, and 1 water closet for both men and women for every 50 occupants thereafter. As the largest floor has 164 occupants (82 men, 82 women), the building requires 3 mens water closets (or 2 water closets and 1 urinal) and 3 women's water closets per floor. The building currently has 2 mens water closets, 3 mens urinals, and 4 womens water closets. Therefore, the project has more water closets and urinals than are required by code. If renovation of the toilets becomes part of the project scope, this can help solve any ADA and space issues with the current restroom configuration by removing fixtures to meet code minimums.
   b. Lavatory quantity – For Group B occupancy, the FBC Plumbing requires 2 lavatories for every 80 occupants, and 1 lavatory for every 80 occupants thereafter. As the largest floor has 164 occupants (82 men, 82 women), the building requires 3 mens lavatories

and 3 womens lavatories per floor. The building currently has exactly this number, so it meets code for lavatory counts.

c. Drinking Fountain quantity – For Group B occupancy, the FBC Plumbing requires 1 drinking fountain for every 100 occupants. As the largest floor has 164 occupants, the building requires 2 drinking fountains per floor. The building currently has exactly this number, so it meets code for drinking fountain counts.

XI. Restroom ADA

a. PRIORITY 2 - Entry/Exit to Rooms – at all restrooms on all floors, the ADA required push and pull clearances on the entry/exit doors do not meet the ADA required minimums for 18" on the pull side of the door, 12" on the push side of the door, and 48" clear of the door. This can be solved by modifying the CMU near the women's restroom entry and installing ADA pushbuttons to operate these doors on both the outside and inside of each restroom.

b. PRIORITY 2 – Water Closets – The first and second floors have full ADA stalls. However, the spacing within these stalls does not meet the current spacing requirements for ADA. Specifically, the face of the sink must be 60" from the face of the toilet to allow adequate space for a wheelchair person to access the water closet. Also, on the third through fifth floors, there are no full ADA stalls, only ambulatory stalls. It is recommended that the restrooms be renovated to provide the proper ADA stalls and clearances. Eliminating excess restroom fixtures will help provide more space to accomplish these space requirements.

c. PRIORITY 2 – Lavatories – The current layout of lavatories in the women's restrooms meet ADA requirements (15" clear from obstructions from the center of the lavatory to either side). However, the men's restroom lavatories are extremely tight with these clearances. We recommend adjusting these clearances with any restroom renovation.

d. PRIORITY 2 – Drinking Fountains – see pictures LS8 and LS9 - while the drinking fountain quantities are sufficient in the project, the drinking fountains themselves appear to be original to the building and are not designed for ADA access. We recommend replacing all drinking fountains in the project with ADA compliant fixtures.

XII. Fire Extinguisher Locations

a. Fire extinguishers are required to be located within 75' of any point of the building. In general, there are visible fire extinguishers which meet this requirement throughout the building. However, on the second floor there are two suites – for the Humanities and Digital Research, and for the CAH Student Affairs – where no fire extinguisher was observed. We recommend adding fire extinguishers in the public areas of these two suites.

XIII. See the Building Conditions Analysis for additional code deficiency items which do not affect Life Safety.

Building Life Safety Analysis - Mechanical

I. No Life Safety Items to note. See the Building Conditions Analysis for code deficiency items which do not affect Life Safety.

Building Life Safety Analysis - Electrical

I. Overview – Generally, most of the electrical equipment appears original to the building (1974 on nameplate of main switchboard). The first floor was renovated a few years ago, and the first floor mechanical/electrical room has a few new panels serving the first floor. The fire alarm

system is a Simplex 4100 Series with a Simplex 4009 IDNET NAC Extender, and a 4-zone slave/dialer. The system does not have mass notification. The building is not sprinklered, but does have fire alarm notification and area smoke detectors, manual pull stations. There were NFPA code violations observed (which are noted below), as well as insufficient fire alarm smoke detector coverage (currently the building is not sprinklered and has area smoke detection), and notification (not all areas have adequate strobe coverage).

II. Emergency Lighting
    a. PRIORITY 1 - NFPA 101 7.9 Emergency Lighting requires exit access to be provided with an average of 1-ft candle and, at any point, not less than 0.1 ft candle in the event of failure of normal power for a minimum of 1-1/2 hours; it is not known if the fixtures in the covered building perimeter are provided with a battery back-up source, which would still be part of the path leading to the "public way". They do not appear to be. In the interior corridors, emergency lighting appears to be approximately 36' on center. It is recommended that existing light fixtures in the path of egress for the covered building perimeter be replaced with fixtures that have integral battery packs to provide life safety lighting. Additionally, it was not clear whether exit lights and stairwell lights are provided with integral battery packs.

III. Exit Stair Lighting
    a. PRIORITY 1 - NFPA 101 7.10.1.2.1 Exits; Exit lights on the 2nd floor near the tower stairs are in the wrong place (currently directing occupants to exit down the exterior open stairs). The open exterior stairs are provided with HID wall packs, which will not provide emergency lighting upon loss of normal power. It is recommended that the exit lights be relocated to direct occupants to the correct tower exit stairs.

IV. Electrical Equipment and Panel Clearances – see pictures LS10 to LS13
    a. PRIORITY 2: NFPA 70, NEC 110.26 "Spaces About Electrical Equipment". There were several noted NEC code violations of existing electrical equipment which is located within the mechanical rooms on each floor. While this doesn't fall under NFPA 101, it should still be considered a hazardous condition for the maintenance personnel if they're working in that room.
        i. Main Switchboard is rated 1200A and is more than 6' in width. 2008 NEC 110.26(C)(2) requires that there shall be one entrance to and egress from the required working space not less than 24" wide and 6-1/2" high at each end of the working space. Only where there is a continuous and unobstructed way of egress travel, or where the working depth is twice that required by 110.26(A)(1), which would be 8' for this switchboard, is there allowed to be a single entrance. In addition, 110.26(C)(3) requires that the door be equipped with a panic bar and that it open in the direction of egress. To solve this issue, a second means of egress from the first floor main mechanical/electrical room must be added to allow two means of egress, and panic hardware should be added to all exit doors in the room.
        ii. In addition, there were several floor-mounted transformers and panels that did not have proper NEC clearances per NEC Table 110.26(A)(1). The air handling units are located extremely close to this equipment, and there is a chilled water pipe within approximately 18" directly in front of one of the panels. It was not possible to stand directly in front of the panel and open the panel.

V. See the Building Conditions Analysis for additional code deficiency items which do not affect Life Safety.

Building Life Safety Analysis – Fire Alarm and Fire Protection

I. Fire Alarm Pull Stations
   a. PRIORITY 1 - NFPA 101 9.6.2.3(2); manual fire alarm pull stations are required to be located within the natural path of egress or within 5' of exit door doorways. There are some fire alarm pull stations interior corridors at the exit doors that were not within 5'. It is recommended to add fire alarm pull stations to meet current code requirements.

II. Smoke detector coverage (5th floor in particular)
   a. PRIORTY 1 – NFPA 101 9.6.2.9; 2013 NFPA 72 17.5.3.1; where a total coverage smoke detection system is required, automatic detection of smoke shall be provided in all occupiable areas in environments that are suitable for proper smoke detector operation. There is inadequate smoke detector coverage noted, specifically on the 5th floor offices and common spaces. We recommend adding smoke detectors tied to the building's fire alarm system in all common area spaces on the fifth floor. Note that this will not be an issue if the building is directed to be fully sprinklered per 2010 FBC 903.2.11.3.

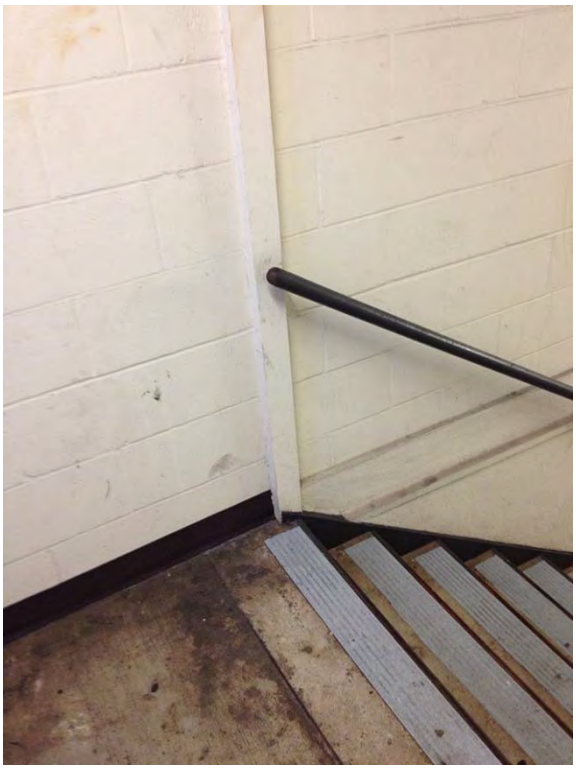
III. Fire strobe coverage (5th floor in particular)
   a. PRIORITY 2 –2009 NFPA 1 Fire Code 13.7.1.4.10.5.3 - existing fire alarm systems shall not be required to comply with provision for visible signals. However, there is not adequate coverage in common offices areas on the 5th floor if the current system is upgraded to meet current UCF Design and Construction Standards.

IV. Corridor Fire-Resistance Rating
   a. PRIORITY 3 – FBC Section 903.2.11.3. The building is currently not sprinkled. Per FBC 903.2.11.3, "Any building which is of three stories or more in height shall be equipped with an approved automatic sprinkler system installed in accordance with Section 903.1."
   b. PRIORITY 3 – FBC Section 1018.1 Construction. The corridors at Colbourn Hall are not rated and the building is not sprinkled. Table 1018.1 Corridor Fire-Resistance Rating now requires either the corridor to be rated or the building to be sprinkled. To correct this issue, the building will be required to be fully sprinklered on all floors and may require replacement of the fire and booster pumps.

V. Fire Booster Pump
   a. PRIORITY 3 – NFPA 20 Section 4.12.1.1.4. The fire pump is currently installed in the same room as the mechanical and electrical equipment. Per NFPA 20, "Except as permitted in 4.12.1.1.5, rooms containing fire pumps shall be free from storage, equipment, and penetrations not essential to the operation of the pump and related components." Section 4.12.1.1.5 states that, "Equipment related to domestic water distribution shall be permitted to be located within the same room as the fire pump equipment." To correct this issue, a room within the mechanical room will be required to only house the fire pumps and possibly domestic water distribution. A separate space not within the mechanical room may be required to provide proper clearances for the mechanical equipment.

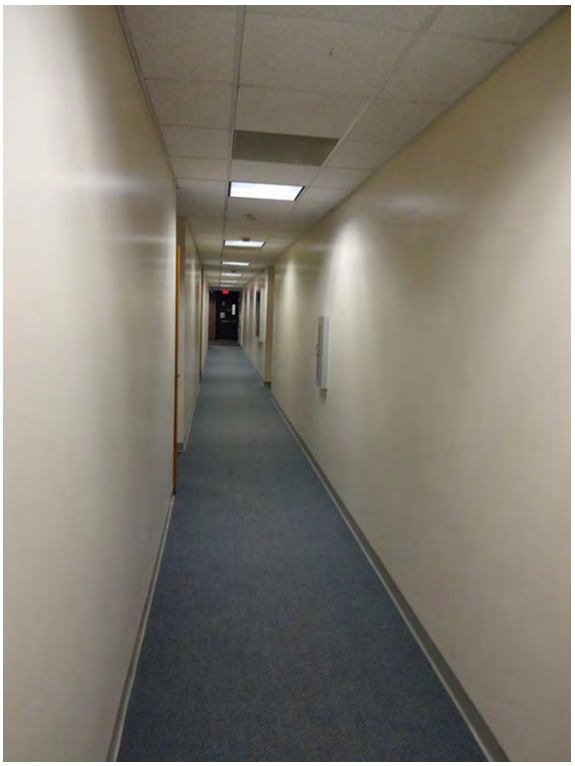
VI. See the Building Conditions Analysis for additional code deficiency items which do not affect Life Safety.

Appendix LS – Life Safety Photographs



LS1 – stair handrails, tread/riser

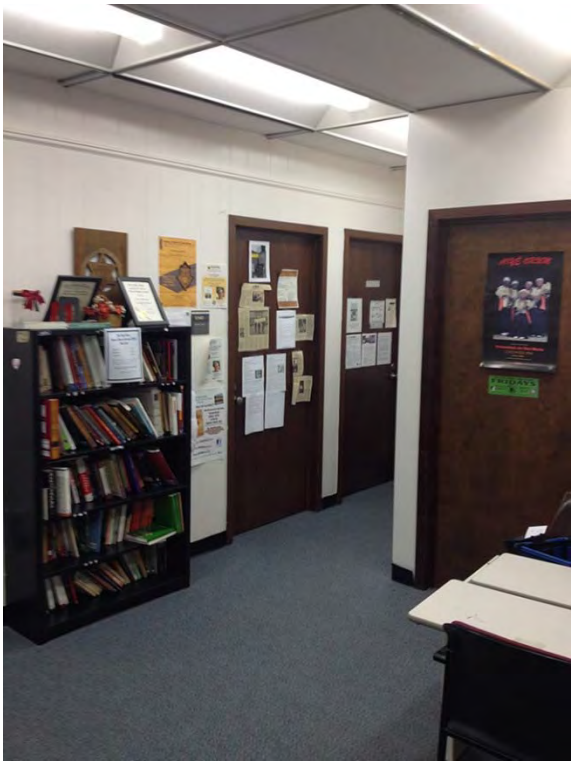
LS2 – stair 1&2 tread/riser



LS3 – level 4 corridor walls not rated

LS4 – level 5 corridor walls not rated

Appendix LS – Life Safety Photographs



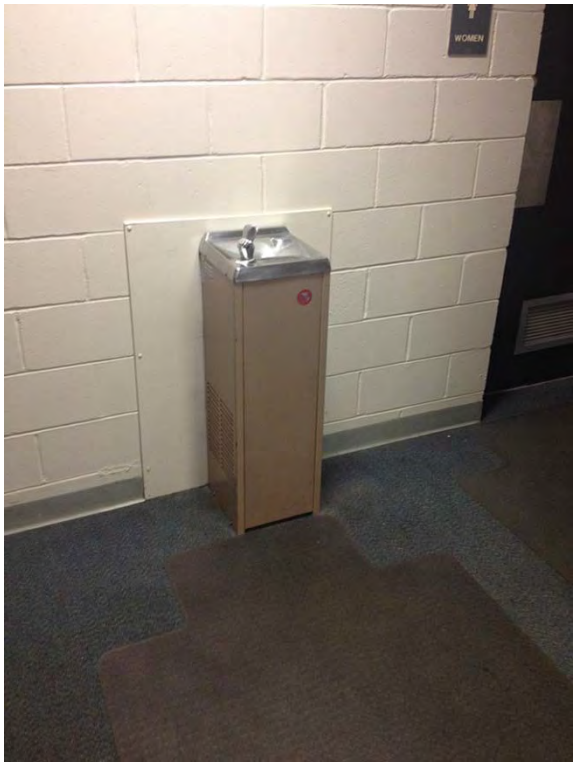
LS5 – combustible material

LS6 – combustible material

LS7 – improper exit sign (not on door at right reads “NOT AN EXIT”)

Appendix LS – Life Safety Photographs

LS8 – non-ADA drinking fountains

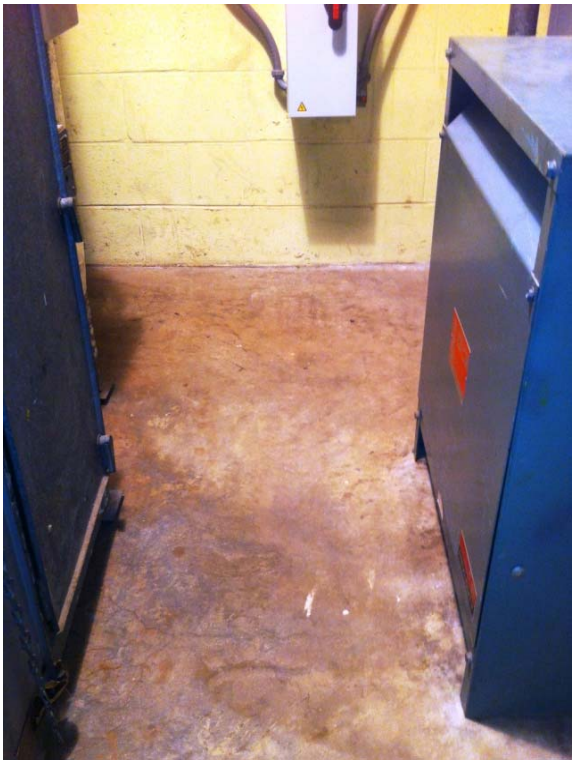


LS9 – non-ADA drinking fountains

LS10 – insufficient clearance at electrical main switchboard

Appendix LS – Life Safety Photographs

LS11 – insufficient clearance at transformer



LS12 – insufficient clearance at transformer

LS13 – insufficient clearance at elec panel

LS14 – breaker in MDP serving “emergency Panel”, not connected to ATS or generator

Summary

This report summarizes an analysis of the Architectural and MEP/FP components of the building related to the current version of the UCF Standards titled "Standards 2013". The intent of this analysis is to point out any deficiencies of the building in relation to the current UCF Standards. As the building is four decades old, it is expected that it will not be in full compliance with the current UCF Standards – therefore this list is intended to help UCF prioritize which items are of most importance for improvement. Photos of each item are located in the UCF Standards Appendix. Items are classified into PRIORITY categories as described in the Executive Summary; PRIORITY 1 items are CRITICAL, PRIORITY 2 items are POTENTIALLY CRITICAL, PRIORITY 3 items are NECESSARY, and PRIORITY 4 items are RECOMMENDED. As all items in this list are above and beyond building code minimums, we have assigned all items to be PRIORITY 4, RECOMMENDED.

UCF Standards - Architectural

I. Overview – this list of items follows the CSI standard division organization, which is also used in the UCF Standards 2013; it is not listed in order of importance.

II. Site
   a. Seating and Retaining Walls – there are several low walls on the first floor made of brick. Per UCF Standards page 101, "All exterior seating and retaining walls must be designed with integral anti-skateboarding devices." These devices are not present in the existing walls. To comply with this UCF Standard, surface applied anti-skateboarding devices would need to be added to these low walls.

III. Division 03 – Concrete
   a. Stairs – the existing north and south exterior stairs are cast-in-place concrete. Per UCF Standards pg 104, "Cast-in place stair systems must not be used. All exterior concrete stairs must be pre-cast." To comply with this UCF Standard, these stairs would need to be demolished and re-built, or recovered with precast treads and risers. Note that these stairs are over the elevator machine rooms, which would be difficult to keep in service if the stairs are demolished.
   b. Non-slip finish – the exterior walkway on level 3, and all interior and exterior stairs, are concrete. Per UCF Standards pg 104, "All ramps, stairs, landings, and exterior walks must have an integral non-slip finish." To comply with this UCF Standard, a non-slip finish must be added to areas listed without this finish.

IV. Division 04 – Masonry
   a. No deviations noted. However, see the Architectural and Structural reports related to the condition of the brick and masonry.

V. Division 05 – Metals
   a. Handrails and Railings – see pictures UCF1 and UCF2 – all handrails on the project (both interior and exterior) are painted steel. Per UCF Standards pg 106, "All exterior handrails and posts must be brushed aluminum pipe. Painted handrails are not permissible. Building interior stairway guardrails between floors will be painted steel with brushed aluminum handrails." To comply with this UCF Standard, the handrails on the interior and exterior of the project must be replaced.

VI. Division 06 – Wood & Plastics
   a. Several offices have wood paneling and wood partitions. Per UCF Standards pg 106, "All facility components must be of non-wood and non-combustible materials except as noted in Division 06." Division 06 allows wood doors, pressure treated and fire rated materials, plastic laminate casework, and millwork…but does not permit wood paneling

or wood stud walls. To comply with this UCF Standard, the millwork paneling walls and door trim must be replaced with gypsum wallboard walls and hollow metal door frames.

VII. Division 07 – Thermal & Moisture Protection

a. Walk Paths – see picture UCF3 – roof membrane, which was recently replaced, appears to be modified bitumen. Per UCF Standards pg 109, "All roofs must have three (3) feet wide continuous walking pads from points of access to all equipment, around the equipment and must be of the same material type as the roof membrane." No walk paths were observed to the roof fans. To comply with this UCF Standard, modified bitumen walk paths must be added to the roof.

b. Modified Bitumen Minimum Requirement – see picture UCF3 – roof membrane, which was recently replaced, appears to be modified bitumen. Per UCF Standards pg 109, "Vented (new construction) metal deck, lightweight concrete, rigid insulation (R-38 minimum in all areas), base sheet, two inter-ply sheets, and white cap sheet." It is unclear the layers of the new roof and its insulation, therefore this item may comply. Consider reviewing paperwork from the re-roof project to determine compliance.

VIII. Division 08 – Doors & Windows

a. Hinges - doors in the project typically have 3 hinges per door. Per UCF Standards pg 112, "All doors must be installed with a minimum of four (4) hinges with four (4) screws in each hinge-leaf." To comply with this UCF Standard, the existing doors and door frames must be replaced with 4 hinge doors and door frames.

b. Positive Slope – the second and third floor exterior doors under the covered walkway do not generally have positive slope from the doors. Per UCF Standards pg 112, "Exterior doorways must be explicitly designed against water intrusion into the building. Adequate positive slope away from the doorway with trench drains and/or overhangs must be provided."

c. Building Entrances – see pictures UCF5 and UCF6 - the existing building entrances on all levels are directly from exterior concrete to the interior of the building. Per UCF Standards pg 113, "All building pedestrian exterior entrances must be designed with a recessed entrance grating or grid to collect tracked-in dirt and to provide positive drainage." To comply with this UCF Standard, a recessed grating product with a ½" section will need to be installed at all main entry locations, and will require a transition piece to be installed at the change from recess grating to concrete.

d. Glazing – see picture UCF7 – all existing windows on the project are single pane glazing in an aluminum storefront system. Per UCF Standards pg 114, "All metal windows must be a minimum dual pane glass and thermal break-insulation filled frames." To comply with this UCF Standard, all windows and frames would need to be removed and replaced with new frames and insulated glazing.

IX. Division 09 – Finishes

a. Stucco – see picture UCF8 – the soffits of the exterior walkways and building overhangs are all stucco, and are in need of maintenance. Per UCF Standards pg 116, "Exterior stucco finishes are not permitted." To comply with this UCF Standard, all exterior stucco soffits would need to be removed and replaced with an EIFS or other exterior suspended ceiling product.

b. Suspended Acoustical Tile Ceilings – the fifth floor ceilings are an acoustic tile product, but appears to perhaps be original to the building as it is an unusual grid and unusual tile size (approximately 2'-6" x 5'-0", versus the industry standard 2' x 4'). The grid also appears to allow return air through it into a ceiling return plenum – there are no return

or supply grills in the ceilings. The UCF Standards pg 117 list the basis of design Acoustical Tile Ceiling products, which are of course in line with current industry standard products. To comply with this UCF Standard, the fifth floor existing ceilings would need to be removed and replaced with new acoustic ceiling tile and suspension systems consistent with the UCF Standards; this renovation will likely also require significant modifications to supply lines and the addition of supply and return diffusers in the ceilings.

c. Special Floor Coatings – see picture UCF4 and UCF9 – the telecom and janitor rooms currently have either exposed concrete floors or carpet floors. Electrical rooms are currently combined with mechanical rooms and have exposed concrete floors – see picture UCF9. Per UCF Standards pg 120, "Mechanical, electrical, telecom, custodial closets, and recycling rooms must be non-slip epoxy sealed." To comply with this UCF Standard, the floors of these rooms would need to be properly cleaned and prepared, and receive a non-slip epoxy finish.

X. Division 10 – Specialties

a. Fire Extinguisher Signs – see picture UCF10 - the existing building has fire extinguishers and fire extinguisher cabinets, but no signage for these. Per UCF Standards pg 124, "Provide (fire extinguisher) signs at all fire extinguisher locations as pictured below with white letters on red background including arrow and symbol." To comply with this UCF Standard, the required signs would need to be installed over the existing FE and FEC units.

b. Fire Extinguisher Cabinets – on the fifth floor, the fire extinguishers in the corridors are mounted on wall brackets rather than in wall cabinets. Per UCF Standards pg 128, "Fire Extinguisher units must be located in common or corridor spaces in recessed cabinets." To comply with this UCF Standard, recessed FEC cabinets will need to be installed in the corridors of the fifth floor to house the existing fire extinguishers.

c. Pegasus Logo – per UCF Standards pg 126, "Letter-Light signs for building names and the Pegasus Logo must be provided on all major campus buildings. Both the Letter-Light and the Pegasus Logo must be backlighted." The existing Letter signs for the building are not back-lit, and there is not a Pegasus Logo sign on the building. To comply with this UCF Standard, the existing building name sign will need to be replaced with a new backlit building name sign, with power being installed for the lighting. Additionally, a backlit Pegasus Logo sign must be located and installed, with power being installed for the lighting.

d. Recycling – see picture UCF11 - currently the recycling toters are stored on the first floor on the exterior of the building along a circulation path. Per UCF Standards pg 129, "A 200 square foot room must be provided within close proximity of the loading dock", and "A screened area outside of the building must be provided for trash and recycling toters." To comply with this UCF Standard, an interior room of the building must be designated as the new recycle room, and a location on the exterior of the building (the existing location is not recommended, preferably a location outside of the circulation path) should be designated and screened for recycling toter storage.

e. Trash and Custodial – see picture UCF4. The current Custodial rooms vary in finishes from painted drywall walls to painted CMU walls, from exposed concrete floor to carpet floor. Per UCF Standards pg 129, "Each room must have seamless vinyl flooring with seamless cove base, wall shelving space, and a floor mop sink, which must be precast, corner splash pans with a maximum six (6) inch front curb, hot and cold water service,

and trap drains." To comply with this UCF Standard, the floor finishes of these rooms must be replaced with UCF Standard compliant floor finishes, and the existing mop sinks must be replaced with UCF Standard compliant mop sinks.

XI. Division 11 – Equipment
   a. No deviations noted.

XII. Division 12 – Furnishings
   a. No deviations noted.

XIII. Division 13 – Special Construction
   a. No deviations noted.

XIV. Division 14 – Conveying Systems
   a. Dedicated Rooms – see pictures UCF4, UCF9, and UCF 12 - currently the elevator pump room is in its own room under the exterior stairs. However, the mechanical and electrical rooms of the building are in the same room with non-code compliant clearances, and the janitor and telecom (telephone) rooms of the project share space. Per UCF Standards pg 141, "Dedicated rooms must be provided for each of the following: electrical, telecommunications, mechanical, elevator, and custodial. Each room's access must be located directly off a main corridor or common area with no spaces in between." To comply with this UCF Standard, telecom rooms must be separated from janitor rooms, and mechanical rooms must be separated from electrical rooms. If full renovations of the mechanical systems proceed, however, we recommend installing new AHUs which will save space in the existing mechanical rooms and allow proper electrical panel clearances – this may allow the electrical items to remain in their current location yet be walled off to create separate rooms from the mechanical rooms. However, they would still be accessed through the mechanical rooms and we would request a variance to that part of this standard to save the cost and space of relocating electrical items to other spaces within the existing floor plan.

UCF Standards - Mechanical

I. Division 15 – Mechanical Equipment - The existing systems have been reviewed to determine compliance with the latest UCF Design, Construction, and Renovation Standards. It was found that a majority of the existing mechanical systems no longer meet UCF Standards as indicated below.

II. Mechanical Rooms
   a. PRIORITY 4 - UCF Standard Page 150. The 5th floor mechanical room is being used as a return air plenum. Per UCF Standard, "Mechanical rooms must not be used as return air plenums." To correct this issue, duct must be routed from the AHU to the transfer air duct terminated in the mechanical room. Outside air will also need to be ducted to the return with a 2-position motorized damper installed.
   b. PRIORITY 4 - UCF Standard Page 150. The mechanical rooms also houses electrical, plumbing and fire protection equipment. Per UCF Standard, "Dedicated rooms must be provided for each of the following: electrical, telecommunications, mechanical, elevator, and custodial." To correct this issue, the electrical and fire pump equipment need to be relocated or a room will be required to be built around the existing equipment. It does not appear possible to build a room around the existing equipment and provide adequate clearances for all the equipment located in the mechanical rooms. If the mechanical system changes, different units could be selected to alleviate clearance requirements.

c. PRIORITY 4 - UCF Standard Page 150. The existing mechanical room doors do not allow for removal of existing AHU's. Per UCF Standard, "All grade level mechanical rooms must have double doors that swing out to the exterior of the building. Mechanical rooms with equipment wider than 60 inches must have an insulated rollup door." New door are required to be installed in accordance with UCF Standard.

III. Chilled Water Booster Pump
   a. PRIORITY3 - UCF Standard Page 145. There is only one chilled water booster pump serving the building. Per UCF Standard, "The chilled water pressure must be boosted by a variable volume chilled water booster pump sized for N+1 redundancy located within the building."
   b. PRIORITY 4 - UCF Standard Page 149. The existing chilled water pump is not insulated. Per UCF Standard, "Removable insulation box with aluminum jacketing and quick release latches for chilled water pump bodies must be provided."
   c. PRIORITY 4 - UCF Standards Page 149. The chilled water pump is installed with a suction diffuser. Per UCF Standard, "Ten (10) pipe diameters of straight pipe must be provided upstream of all chilled water pump suction flanges." To correct all three issues indicated above, the existing pump should be replaced with two same sized pumps and installed in accordance with UCF Standard.

IV. Hot Water boiler
   a. PRIORITY 4 - UCF Standard Page 145. The heating hot water boiler is non-condensing type. Per UCF Standard, "Reheat must be provided by a centralized high efficiency, condensing, boiler located within the building." To solve this issue, the boiler is required to be replaced with a high efficiency condensing boiler.

V. Mechanical Air Handling Units
   a. PRIORITY 3 - UCF Standard Page 150. There is not adequate coil pull access or a means of removal for any of the five (5) existing AHU's. Per UCF Standard page 150, "Clearance around mechanical equipment in mechanical rooms must meet or exceed the manufacturer's required clearance, including adequate clearance for full coil replacement."
   b. PRIORITY 3 - UCF Standard Pages 154 & 155. None of the AHU's meets the chilled water air handling unit requirements indicated on the UCF Standard pages indicated above. Per UCF Standards, "All chilled water air-handling units must have the following: Insulated stainless steel drain pan, Modulating two-way pressure-independent control valves, pressure and temperature gauges on coil inlet and outlet, modular construction, double wall-insulated construction with no metal to metal conduction paths from interior to exterior, hex keys must be provided for all applicable modular air handling units, coil access sections on the entering and leaving sides of the coil, fan access doors on both sides of unit, the units must be sized and located so that the coils can be easily removed, integral internal structure for motor removal and replacement, or appropriate portable motor removal equipment must be provided by the contractor, separate factory installed differential pressure gauges for pre-filters and final filters and interior lights for walk-in air handling units." To solve both items, the AHU are required to be replaced and relocated.

VI. Mechanical Plenums
   a. PRIORITY 3 - UCF Standard Page 154. The return air duct for each AHU terminates directly outside of the mechanical room and uses the space above the ceiling as a return air (RA) plenum. Per UCF Standard, "Ceiling return air plenums are not permitted."

VII. Air Distribution
   a. PRIORITY 3 - UCF Standard Page 152. The supply ductwork routed in the mechanical rooms has interior lined insulation. Per UCF Standard, "Interior lined ductwork is not permitted." To meet current UCF standards all supply air ductwork is required to be replaced.

VIII. Ductwork Insulation
   a. PRIORITY 4 - UCF Standard Page 152. The outside air ductwork serving each AHU is not externally insulated. Per UCF Standard, "All outside air ductwork must be externally insulated." To meet current UCF standards all outside air ductwork must be externally insulated.

UCF Standards - Electrical

I. Division 16 – Electrical Equipment - The existing systems have been reviewed to determine compliance with the latest UCF Design, Construction, and Renovation Standards. It was found that several items of existing electrical systems no longer meet UCF Standards as indicated below.

II. Spare Conduits
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 17; two 2" empty spare conduits are required below grade for each major exterior wall for future use. These would have to be added for this building to comply.

III. Arc Flash
   a. PRIORITY 2: 2013 UCF Design, Construction and Renovation Standards; Page 180; arc flash analysis and labeling is required for all renovation construction projects. The majority of the existing equipment currently do not have arc flash labels. These would have to be added to the existing equipment unless a deviation is granted by UCF.

IV. Conductors
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 180; conductors are required to be carefully formed and harnessed so that each conductor drops off directly opposite to its terminal. The terminations in each panelboard and in the switchboard would have to be checked by an electrician to verify that the terminations comply with UCF standards unless a deviation is granted by UCF for the existing equipment.

V. Generator
   a. PRIORITY 4: UCF Design, Construction and Renovation Standards; Page 181; generator and automatic transfer switch are required for life safety loads and at least one elevator. It is ancitipated that a 50-100KW generator with two automatic transfer switches (one for life safety, one for elevator) would be required unless a deviation is granted from UCF.

VI. Dedicated Electrical Rooms
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 182 dedicated electrical rooms; The electrical equipment is located within the mechanical room, and not in a dedicated room per UCF standards. However, since some of the electrical equipment, include the main service switchboard, are in violation of the NEC required clearances (see Life Safety Analysis above), it is recommended that dedicated rooms be provided with new electrical equipment.

VII. Surge Suppression
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 182; surge suppression required; the existing main switchboard would be required to have a surge protection device added.

VIII. Occupancy Sensors, Daylight Sensors
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 183; classrooms, offices, hallways to be provided with occupancy sensors; daylight sensors in spaces that receive natural lighting. There are some existing occupancy sensors, but it is not consistent. Daylight sensors would need to be added to perimeter rooms.

IX. Dedicated Neutral
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 184 dedicated neutral for each branch circuit;"; it is assumed that the wiring for the building has shared neutrals due to the year in which it was constructed. This will have to be verified by an electrical contractor. There are two options available: pull new wiring in existing raceways for branch circuits to include individual neutrals to comply with UCF. At a minimum, if UCF grants a deviation, the breakers feeding branch circuits with a common neutral would have to be replaced with multi-pole breakers to meet the NEC requirements.

X. Service Entrance
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 183; "Category C3 for Service Entrance"; there did not appear to be TVSS on the main switchboard.

XI. Incandescent Lighting not compliant
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 184 "No incandescent lighting permitted"; mechanical rooms appear to have high wattage incandescent fixtures.

XII. Emergency Lighting Dedicated Circuits
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 185 "Emergency lighting and illuminated exit signage must be designed on dedicated circuits"; it is assumed that these are not on dedicated circuits, due to the year in which the building was constructed. This will have to be verified by an electrical contractor.

XIII. Dedicated Telecom Rooms
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 185. There are dedicated telecommunications rooms on each floor that appear to meet the current space requirements, however, some of the rooms tagged as janitorial closets did have some telephone backboards located within them with telephone terminations.

XIV. Fire Alarm Upgrade
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 189 "If an existing fire alarm system is more than ten years old, it must be upgraded to the current standard"; current system is more than 10 years old. This would be required to be upgraded.

XV. Mass Notification
   a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 190 "fire alarm voice evacuation system required and must be connected to the campus mass notification system"; current system does not meet this requirement. It is recommended that the fire alarm system be upgraded to meet the current standards.

XVI. Class A Fire Alarm Circuits

a. PRIORITY 4: 2013 UCF Design, Construction and Renovation Standards; Page 191 "Class A circuits required"; current system does not meet this requirement. It is recommended that the fire alarm system be upgraded to meet the Class A circuiting requirement.

UCF Standards - Plumbing

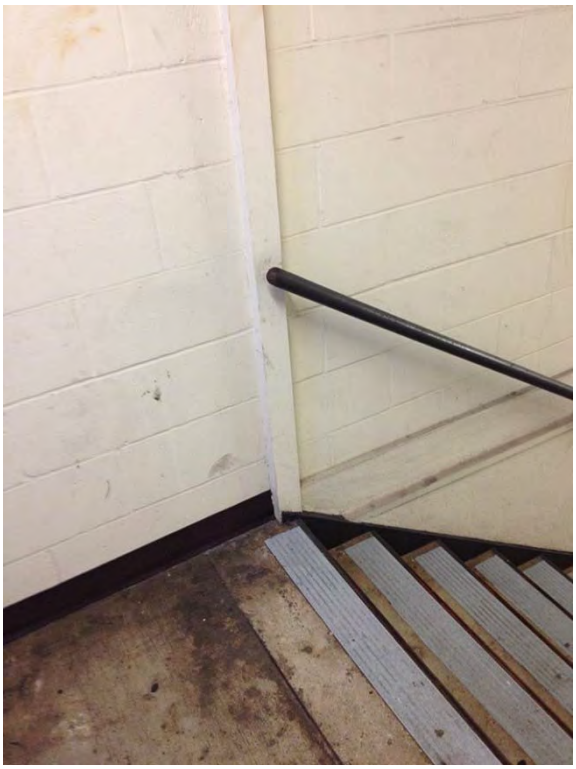
I. Toilet Rooms

a. PRIORITY 4 - UCF Standard Page 157. It is assumed that urinals are currently not pint flush type. Per UCF Standard, "All urinals must be pint flush." To correct this, all urinals are required to be replaced.

b. PRIORITY 4 - UCF Standard Page 157. Toilets are currently not dual flush type. Per UCF Standard, "All water closets must be equipped with dual flush valves." To correct this, all toilet flush valves require replacement.

c. PRIORITY 4 - UCF Standard Page 157. Lavatories are manually operated and it's assumed that flow rates are above 0.5 gallons per minute. Per UCF Standard, "All lavatories must be provided with hardwired touch-free controlled faucets and 0.5 gallons per minute (gpm) flow rates." To correct this, all urinals are required to be replaced." To correct this all sink hardware must be replaced.

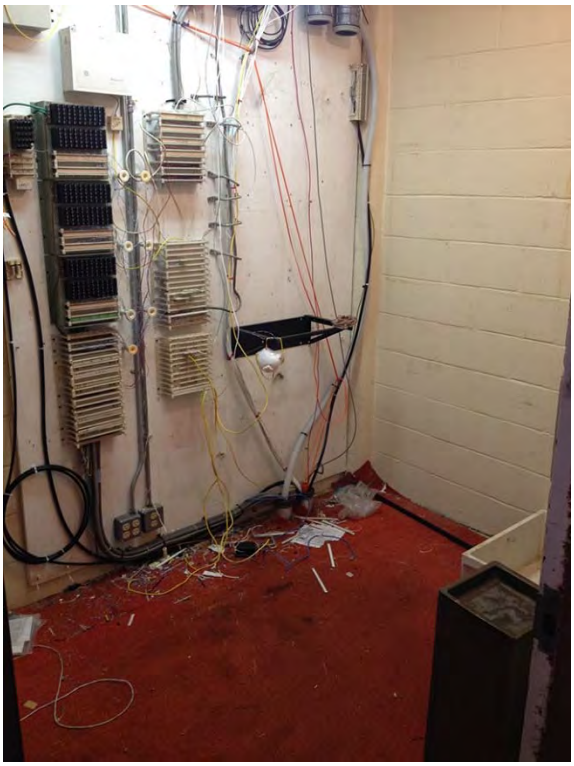
Appendix UCF – UCF Standards Photographs



UCF1 – handrails painted steel (not aluminum)

UCF2 – handrails painted steel

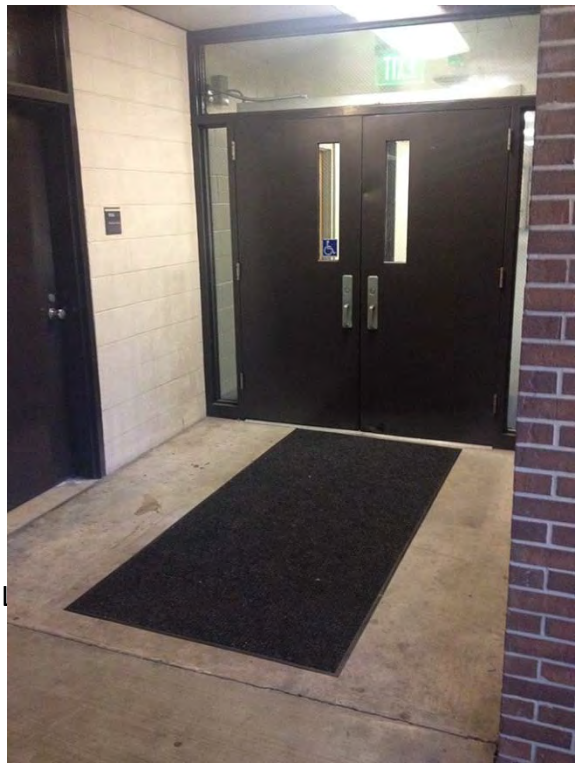
UCF3 – no roof walk paths



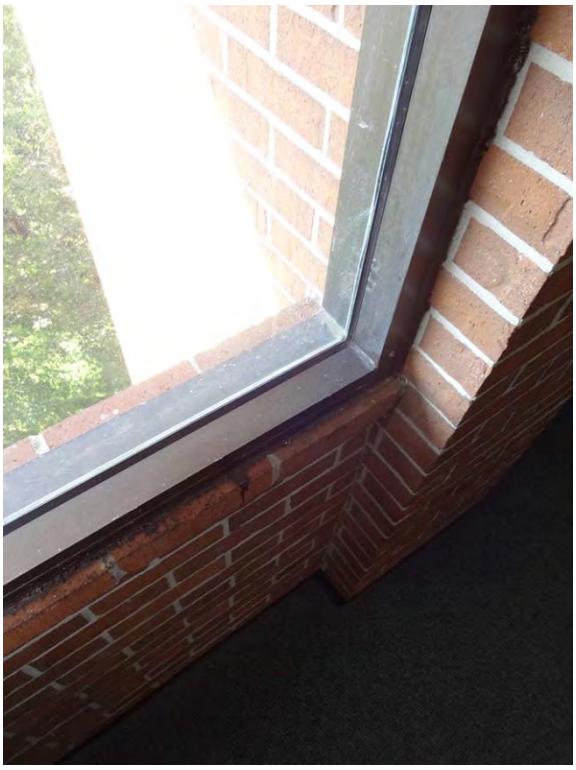
UCF4 – Janitor finishes (no carpet)

Appendix UCF – UCF Standards Photographs

UCF5 – no integral walk-off matt



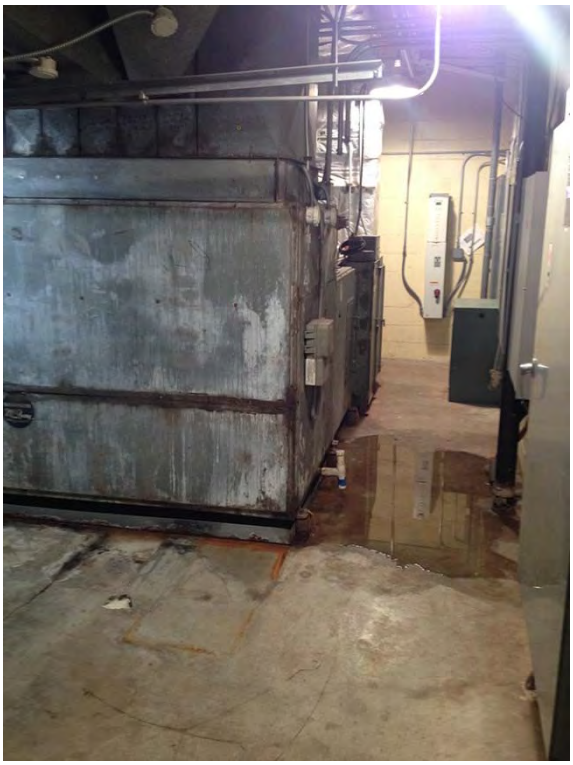
UCF6 – no integral walk-off matt



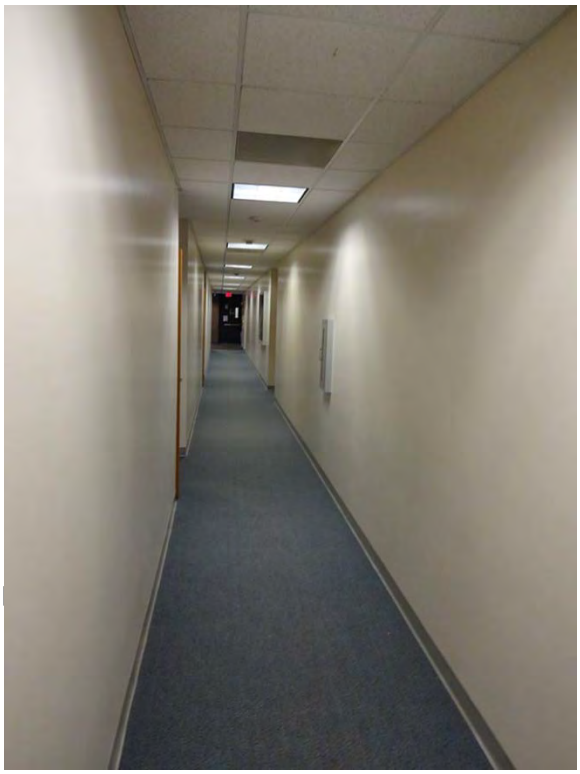
UCF7 – single pane glazing

UCF8 – exterior stucco soffits typical

Appendix UCF – UCF Standards Photographs



UCF9 – no epoxy floor in mechanical rooms



UCF10 – fire extinguisher signs missing

UCF11 – non-screened recycle toters

UCF12 – elec panels improper clearance

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Summary

The ME/FP systems of Colbourn Hall are nearing the end of their life. This section summarizes proposed replacement Mechanical, Electrical, and Fire Protection systems for the building for UCF consideration and to assist in the pricing of these items.

Existing Mechanical Systems

Mechanically, the existing building is being conditioned by five (5) chilled water multi-zone air handling units (AHU's) with hot water heat, each serving independent floors. The AHU supply fans are controlled using variable frequency drives (VFD's). The VFD's appear to be recently replaced and in good operating condition. The AHU casings are rusting and in poor condition. Multiple AHU's are rusted to the point where condensation is leaking from the AHU and secondary drain pan, then pooling on the mechanical room floor. The AHU's supply air through internally lined supply ducts, which are no longer used in today's construction practices for interior air quality reasons. Air is returned back to the AHU using a plenum return air system which is no longer allowed by current UCF Standards.

The existing AHU's utilize the existing campus chilled water distribution loop. One base mounted end-suction tertiary pump is being used to circulate chilled water from the campus chilled water loop to all five (5) AHU's. The pump is currently located in the second floor mechanical room adjacent to the AHU and exterior wall and is controlled by a VFD. The pump appears old, rusted and nearing the end of its usable life. The pump impellor casing appears to be leaking and pooling into a drain pan.

Heating hot water is being produced by a single 1380 MBH natural gas Patterson-Kelley Thermific boiler which is currently located in the 4th level mechanical room. Hot water is circulated to each AHU heating coil using a single 2hp Armstrong vertical inline pump located in the 4th floor mechanical room. The system is piped in a constant volume configuration using three way control valves at each AHU heating coil. The boiler and pump appear old and nearing the end of their usable life.

The existing control system was pneumatic; however, has been semi-retrofitted with electronic direct digital control (DDC) devices. The multi zone control dampers are pneumatic, while the heating hot water valves, chilled water valves and outside air dampers have been retrofitted with electronic actuators. Pneumatic controls are no longer used in today's construction practices and are no longer allowed by UCF Standards. The existing pneumatic control compressor is located in the first floor mechanical room and appears to have been replaced recently and in good operating condition.

Given the items above and the issues indicated in the Life Safety Analysis and UCF Standard Analysis, TLC recommends replacing the existing HVAC system with a new Chilled Beam HVAC system. The Chilled Beam system would allow for smaller AHUs and supply air ductwork, and may allow the existing mechanical room to be reconfigured to allow proper clearances for electrical panels (avoiding the creation of new electrical rooms, which would have to take space from the existing offices and have considerable cost in relocation of these items). Below is TLC's approach for a chilled beam HVAC system.

Proposed Mechanical Systems

The following publications will be used as reference for design of the HVAC systems on this project:

a. ASHRAE
b. 2010 Florida Mechanical Code
c. SMACNA
d. National Fire Protection Association (NFPA) Codes (latest additions)
e. Occupational Safety and Health Standards
f. Florida Energy Conservation Code
g. 2010 Florida Building Code
h. Latest Editions of the UCF Design, Construction, and Renovation Standards

The following will be the design conditions used to determine building load requirements and sizing of mechanical cooling and heating systems:

a. Summer Outside: 95°F DB / 76°F WB
b. Winter Outside: 32°F
c. Summer Inside: 74°F / 50% RH (60% RH max)
d. Winter Inside: 70°F

Chilled Beams

The building sensible load will be conditioned using 8 foot active chilled beams. Outside air flow is ducted to each beam at approximately 100 CFM with an entering air temperature of 55°F. The coils will be sized for an entering water temperature of 57°F and a 6 to 10°F ΔT. TLC anticipates approximately 66 to 70 chilled beams per floor. Refer to the attached chilled beam layout for the 1st floor.

Dedicated Outside Air Units

There will be a total of five (5) new 100% dedicated dehumidification outside air handling units, one AHU per floor. Each AHU will be sized for approximately 3000 CFM of 100% outside air and will be ducted to each individual space to provide minimum ventilation and positive building pressure.

Air Distribution

Supply air distribution shall be delivered to the space through diffusers located in acoustical ceiling tile. It is anticipated that the following grilles/diffusers will be incorporated in the design.

a. 24x24 Lay-In Architectural Plaque supply air diffusers (UCF Design Standards Require 3 Cone Diffuser but a Deviation Request would be provided for this approach).
b. Linear supply air diffusers in areas with drywall ceilings
c. Surface mounted plaque diffusers
d. Perforated exhaust and transfer air grilles

Chilled Water System

The new chilled water system will utilize the existing campus chilled water loop. The system will be made up of two different loops, one to serve the new OA units and one to serve the new chilled beams.

The OA units will be served by two (2) new vertical inline pumps each sized for 100% redundancy. The pumps are estimated to be approximately 10hp each. Water will be circulated directly from the existing campus loop and controlled using variable frequency drives to maintain a building chilled water loop pressure. Pump bypass piping will be installed to bypass the tertiary pumps when not needed to maintain the system loop pressure, during high campus loop system pressure conditions.

The chilled beams will be served by two (2) additional vertical inline pumps each sized for 100% redundancy. The pumps are estimated to be approximately 25hp each. Water will be circulated from a new heat exchanger (HX) to each chilled beam. The campus loop side of the HX will be sized for a 16°F ΔT with 45°F entering water temperature (EWT). The building loop will be sized for a 6°F ΔT with a 57°F leaving water temperature (LWT). Bypass piping will be installed around the HX and modulated to maintain a leaving water temperature of approximately 57°F.

Variable air Volume (VAV) Terminal Units

Single duct VAV terminal units with electric heat will be used to distribute outside air to each space. Each terminal unit will serve approximately 3 to 4 smaller spaces of similar function and exposure. Larger conference rooms and classrooms will have individual terminal units. Heating will be achieved utilizing electric heat with SCR control.

Demand Control Ventilation System

Each variable air volume (VAV) terminal unit will be interfaced with its associated area occupancy sensor using the building automation system. The terminal unit will modulate between its maximum outside airflow set point (CFM per sqft. + CFM per person) and its minimum outside airflow set point (CFM per sqft.) as calculated for each space.

Energy Efficiency

The following items will be used for this design to achieve maximum energy conservation.

a. All VAV air handlers will utilize variable frequency drives and high efficiency motors.
b. The tertiary chilled water booster pumps, both primary and backup, will utilize a variable frequency drive to adjust to the changing demand. The system would be equipped with a pump by-pass to utilize the chilled water primary pumping pressure when proper conditions exist.
c. Demand Control Ventilation
d. Static Pressure Resetting
e. Leaving Air Temperature Resetting
f. Pressure-Independent Characteristic Control Valves are intended to provide valve feedback and flow to the AHU's. These valves will provide feedback to reset pumping set point.

Building Automation System (BAS)

The controls system will be designed around a direct digital control system by one of five pre-approved control vendors by UCF. They are the following companies:

a. Automated Logic Controls
b. Delta Controls
c. Johnson Controls
d. Siemens Controls
e. Trane; Worldwide Applied Systems Group

BTL listed products, if available, must be provided. UCF reserves the right to specify which generation of products will be permitted for use on the project. Selected Controls System provider shall implement latest published revision of controller, server, and workstation firmware and software. This includes all work for updates and/or changes that are necessary or required to vendor's existing control equipment.

The BAS shall be a web-enabled system with a secure interface. A static IP address and connectivity will be provided by the University of Central Florida to utilize the web based interface with their campus system.

An Operator Workstation will be provided. Since there an ever-increasing technology improvements with desktop and laptops, UCF prefers to carry an allowance for computer hardware and peripheral devices. A $3,500 bid allowance for purchase of operator workstation software, service tools, configuration tools, etc. will be designed. Contractor shall indicate in their shop drawings that this allowance is provided. Controls contractor shall provide UCF workstation options for hardware and peripheral equipment for selection.

Trends will be programmed following completion of occupancy of the building and all commissioning activities. Overall data collection will be collected on-going basis by the University of Central Florida personnel. Onsite computers shall be capable of storing trended data at 5 minute intervals for a minimum of 5 years.

Commissioning

The new mechanical equipment will be verified for proper operation through a commissioning process. The systems that will require commissioning would be the following:

a. Electric Domestic Water Heaters
b. Variable Frequency Motor Controllers
c. Testing, Adjusting, and Balancing For HVAC
d. Instrumentation and Control For HVAC
e. Hydronic Pumps
f. Heat Exchanger System
g. Dedicated OA AHU's
h. Chilled Beams
i. HVAC Power Ventilators
j. Air Terminal Units
k. Fan Coil Units

l. Domestic Water Fixtures
m. Lighting Control Devices
n. Network Lighting Controls

Measurement & Verification

A Measurement & Verification Plan for the University of Central Florida will be required. This Measurement and Verification Plan will be based on the IPMVP standards. As a general rule the following will occur to properly monitor and evaluate energy consumption within the facility.

a. Common area lighting systems are provided with check meters at each lighting power panel.
b. Power meter will be monitored and trended at main switchboard and each distribution panel.VAV box heaters are provided with check meters at the power panel at each floor.
c. VAV box heaters will be trended through the DDC BAS system for operation and discharge air temperature to compare to the anticipated operation model.
d. VFD operation is trended through monitoring the kWh parameter of the VFD and reporting back to the DDC BAS.
e. Building cooling load will be monitored through the new DDC BAS through the building's BTU meter that will be provided.
f. Building cooling load will be trended through the DDC BAS for airside and waterside. The outside air temperatures and AHU discharge temperatures are recorded to document cooling loads within the building. The BTU meter information is trended to document cooling loads, also. This information is compared to full load operation to document energy savings.
g. Building outside air will be trended through the DDC BAS for outside air conditioning reductions.
h. Hot water heating is trended through the DDC system. This information is compared to full load operations to document consistencies with the provided model.
i. Water use is recorded by a new totalizing main building water meter. The ongoing water use by the building is measured by recording the main water meter data and is monitored by the DDC BAS system. Monthly monitor will be reviewed with respect to the anticipated full load model to document reductions and savings.

Existing Electrical Systems

Electrically, the existing building currently has its service entrance electrical equipment located on the ground floor co-mingled with the chilled water pump rooms, air handling equipment, and fire pump. With the exception of a few new panels in the first floor mechanical room which were added for the first floor renovations a few years ago, the rest of the equipment appears original to the building. There is an enclosed transformer yard with two pad-mounted utility transformers fairly close to the building on the west end. There were no existing electrical drawings available at the time of this building survey, so information listed in this report is based on observations.

The existing electrical service is 1200A at 277/480V 3-phase, fed from a switchboard located on the north wall, west end in the first floor mechanical room, along with a 75 KVA step-down transformer serving 120/208V panels on that floor. The electrical equipment (277/480V lighting/mechanical

equipment panel, step-down transformer, 120/208V receptacle panels) for the upper floors are located in the mechanical room on the north wall serving the loads on its respective floor.

Within the switchboard is a 100A/3P breaker that serves Panel H-E and is tagged as "emergency panel". However, there is no automatic transfer switch or standby generator associated with this building, so it is assumed that this is intended to serve as a dedicated breaker for Panel H-E for exit lights, life safety lights, fire alarm. Panel H-E panel directory indicated it serves exit lights, emergency lights, a 120/208V step-down transformer that feeds Panel LE for fire alarm panel, hallway lights.

The fire alarm system is a Simplex 4100 Series with a Simplex 4009 IDNET NAC Extender, and a 4-zone slave/dialer. The system does not have mass notification. The building is not sprinklered, but does have fire alarm notification and area smoke detectors, manual pull stations. The manual pull station for both egress stairs was beyond 5' from the stair door. Many of the notification devices have yellowed lenses due to age. There were some common areas with no area smoke detection (3rd floor lounge). The second floor corridor appeared to have inadequate audible coverage by observation of the placement of the combination speaker/strobe (it was located in a cross corridor).

There are stacked rooms tagged as janitor's/emergency equipment rooms on the west end of the building; they have mop sinks in there as well as telephone backboard and punch down blocks for telephone lines. It is not clear whether this is being used as a demark room for incoming telephone/site fiber. There are existing dedicated, stacked telecommunications room located on the interior of the building in the northeast corner.

There is a lightning protection system on the roof at the perimeter and intermediate roof. The down conductors at the perimeter through the roof appear to be in good condition (i.e., there were no loose terminals observed).

The first floor corridor lighting is relatively new, utilizing 2x4 recessed indirect fluorescents in the gypboard ceilings in the corridor, and in the other adjacent renovated spaces. Office lighting generally consists of 2x4 2-lamp T8 12-cell fluorescent parabolic fixtures and appeared to have occupancy sensors or wall switches. Hallway lighting was noted to be manually switched.

Proposed Electrical Systems

General

The electrical design will be compliant with the 2010 Florida Building Code, State of Florida Elevator Code, Americans with Disability Act, State University System (SUS) Professional Services Guide, NFPA Codes 70, 72, 101, and 780, UCF Design and Construction Standards and State of Florida adopted codes.

Arc Flash

An Arc Flash and electrical hazard analysis will be performed for the new electrical equipment. Documentation will be delivered to the Owner prior to final completion. Danger/Warning labels will be affixed to each piece of the following electrical equipment as indicated in NFPA 70 Art.110.16 and NFPA 70E: Switchboards, panelboards, fused and non-fused disconnects that are likely to require examination, adjustment, servicing, or maintenance while energized.

Normal Power

The UCF Design and Construction Standards require dedicated rooms for each of the following: electrical, telecommunications, mechanical, elevator, and custodial. Each room's access must be located directly off a main corridor or common area with no spaces in between.

Based on this requirement, the existing facility will be renovated with a new 1,600 amp electrical service. The load on the building is not expected to exceed 750 kVA of load. The building's utilization voltage will be 480/277 volts, 3-phase, 4-wire, 60 hertz. The electrical service main disconnecting means will be contained in a floor-mounted switchboard.

The new switchboard will supply power to the following: Mechanical equipment panels providing power to the AHU's and VTU's, lighting panels, elevators, fire pump, step-down transformers to feed 120/208V branch panels for general receptacles, 120V lighting, small mechanical loads and miscellaneous power. In addition, it will be provided with a digital meter and surge protection device. In order to comply with the NEC, the new service feeder will need to be run directly underground from the new switchboard main circuit breaker section to the pad-mounted transformer. The NEC requires that the service feeder be outside the building underground, or in a concrete chase to the point of disconnect means. The switchboard would be provided with a 1200A distribution breaker to backfeed the existing 1200A switchboard in order to maintain operation of the building during the transition from existing equipment to new equipment. As each floor is renovated, that floor's existing electrical equipment will be demolished after transitioning existing circuits to the new panels. Any existing branch circuiting that is to remain would have to be intercepted and rerouted to the new electrical room panels.

Each floor will be provided with a new electrical room. Each electrical room will have a lighting panel with solenoid operated circuit breakers similar to the Square D Powerlink system that will provide both the code required over current/overload protection and automatic lighting controls. As an alternative, a relay based lighting control panel system may be used for the lighting controls. The lighting panels will be rated at 225 amps served with dedicated feeders from the building switchboard. For cost savings a lighting panel distribution system using feed thru lugs to serve multiple lighting panels with a single feeder may be considered. The electrical rooms will also be provided with a 75kVA dry-type energy efficient K-rated transformer. Transformers will feed 208/120 volt panelboards to serve receptacle and other miscellaneous 120 volt and 208 volt loads. Receptacle panels are anticipated to be two-section panels with 84 poles and a main breaker rated at 300 amps. A mechanical panel located in each electrical room and operating at 480/277 volts, 3-phase, 4 wire, will serve the VAV terminal boxes with and without electrical heat and the floor mechanical air handling units. The panel will be rated at 225 amps and be provided with 42 poles.

The electrical distribution system will be a fully-rated system with circuit breakers coordinated per the requirements of the NEC. The expected ampere interrupting rating of the switchboard will be 42 kAIC.

To comply with UCF's Measurement and Verification, the main switchboard, mechanical equipment panels, lighting panels, and the secondary feeders of 120/208V transformers will be equipped with Veris power meters tied into the building controls system. Additionally, exterior

lighting will be metered separately so that the interior lighting power consumption can be calculated to deduct the exterior lighting power consumption. Refer to mechanical analysis for a more complete description.

Emergency Power

A new automatic starting diesel fueled generator to pick up the building emergency loads will be provided, unless a deviation to the University's Design and Construction Standards is permitted. The emergency distribution system will be provided with automatic transfer switches for the life safety emergency branch, as a minimum. Additional transfer switches will be provided as may be necessary to serve load types other than life safety (i.e., elevator, IDF/MDF servers, BAS control panels). The generator will be sized to include 25% spare future capacity.

The generator will be located outside with a weatherproof enclosure, in an enclosed yard (possibly enlarging the existing enclosed transformer yard to accommodate the new generator); the generator will include an integral fuel storage base tank to operate the generator at anticipated normal building emergency load for a minimum run time of 24 hours. The generator will have an hour-meter and an automatic "exerciser" in its control system.

Transient Voltage Surge Suppression (TVSS)

Surge protective devices will be provided at the new service entrance switchboard and each 120/208V panelboard (Category B3) serving receptacles, computer and other sensitive electronic equipment loads. Additional surge suppression devices will be provided for all fire alarm circuits exiting building and for site lighting circuits.

Lighting

Existing outdoor lighting fixtures located on the 1st through 3rd floors (exterior corridors) shall be removed and replaced. The replacement fixture will be based on whether the fixture will remain an exterior-grade fixture type or if the wall system will extend to the wall face of the facility. The lighting fixture is contemplated to be LED type for energy and maintenance savings.

Lighting in the indoor office spaces should be upgraded to new more efficient lighting fixtures. General interior areas in offices and conference rooms will be provided with fluorescent 2'x4', volumetric fixtures similar to the Lithonia RT5 fixture, T5 lamps and electronic ballast. Occupancy sensing technology shall be installed in all classrooms, offices, and hallways. In addition, automated light harvesting technology shall be installed in all spaces which receive natural lighting.

Multi-level lamp switching will be provided where required to comply with State of Florida Energy Code and ASHRAE 90.1 requirements. Dimming systems will be provided within any classroom space and any conference room space.

Industrial fluorescent strip fixtures will be used in mechanical rooms, electrical rooms, telecommunications rooms, janitor closets and other similar back-of-house spaces, complete with wire guard, lamp sleeves, T5 lamps and electronic ballast.

Consideration for special lighting will be given to the lobby and lounge spaces to provide a unique and inviting atmosphere. Lounge spaces should be considered for areas in the pathways of the elevator access.

Emergency lighting will be provided by emergency battery ballasts installed within the fluorescent fixtures, unless a generator is provided. If generator emergency power is provided for the facility, fixtures will be wired to emergency power panel(s) to automatically energize upon loss of building normal power. All emergency and exit lighting fixtures must be identified and permanently labeled (not with a permanent marker pen) with an applied numbering system.

Wiring Devices

New wiring devices installed shall be furnished with a warranty for lifetime replacement as required by UCF Design Standards.

Straight blade and twist lock style receptacles on dedicated circuits shall be provided in the main telecommunications room to meet UCF CS&T requirements.

Grounding

The grounding system will be evaluated to ensure it meets UCF standards. Ground rods must be twenty (20) feet in length using sectional copper-clad steel rods, ¾-inch in diameter.

General Communications

Telecommunication rooms will be required to meet the UCF Design and Construction Standard. Currently, janitor closets are comingled with telecommunication equipment. There are also existing stacked telecommunications rooms which appear to meet the physical size requirements of UCF, as mentioned previously in this report, however, they are not exterior to the building. It will have to determined whether UCF will allow a deviation for the location of these rooms. The first floor interior telecommunications room could be used as the MDF room if acceptable to UCF, but exterior site fiber and copper will have to be rerun to this room.

New distribution to the facility to meet the University's latest standards should be considered as part of this renovation.

A minimum of four (4) 4" PVC conduits will be provided from an existing site telecommunications manhole to the new communication room (MDF) in the new building. The MDF room is anticipated to be 200 sf to accommodate the entrance facility and cabling for the first floor, if the existing first floor telecommunications room interior to the building is not acceptable to UCF.

New telecommunications rooms will be stacked in the building to afford a practical method of system wiring with regard to the distance to the user.

Telecommunications and TV wall outlets will be a two-gang 6-port faceplate consisting of two data, two voice and two blank jacks or two data, two voice, one video "F" connector and one blank jack. Floor boxes will include two duplex receptacles for power, two data and two voice outlets.

Data racks will be provided in the IDF room for network equipment provided by UCF, with an overhead ladder cable tray from the rack to the wall.

Overhead cable tray will be provided as a telecommunication distribution system throughout the facility, with conduits used for connecting cable tray paths across inaccessible ceilings. The cable tray will be wire mesh type with nominal dimensions of 2-inches deep and 12-inches wide.

Data and telephone cables from the outlets will terminate on 110 blocks on the plywood backboard of the associated MDF or IDF. Each system will have a separate designated area on the backboard at which to terminate.

Fire Alarm and Monitoring System

The existing fire alarm system is a Simplex 4100 Series panel and uses horn/strobe occupant notification devices. It is contemplated that the system will be replaced with a Class A system using voice alarm speakers as the typical occupant notification appliance. This system will also allow inclusion and integration with a mass notification warning system for the building occupants. Visual indicating appliances installed in the outdoor corridors will be replaced where the strobe light lens(es) have been yellowed.

Manual pull stations and annunciating devices will be provided at Code required locations. Audible/visual indicating appliance devices will be provided throughout the building. The system will be designed to current ADA and NFPA requirements. The fire alarm system will be interfaced with the mechanical air handling and exhaust system equipment for automatic shut down upon fire alarm actuation.

New fire alarm devices will be provided to accommodate any building expansion.

Data System

The data system wiring will be provided in compliance with UCF telecommunications specifications, and will consist of T568B RJ-45 jacks at designated locations, Category 6 UTP cabling terminated in 110 blocks at the designated MDF or IDF. Fiber optic cabling (In 1" innerduct) will be provided from MDF to each IDF and terminated in rack mounted fiber optic distribution centers (FDC). The data riser cable shall be 62.5 µm multi-mode / 9 µm single mode fiber optic cable. The data system shall exhibit a forward band-pass of 1 GHz.

Any copper or fiber optic cable that is installed in conduits in the ground shall be provided as flooding cable or be provided with a water blocking compound.

Telephone System

The voice system wiring will be provided in compliance with UCF telecommunications specifications, and will consist of T568B RJ-45 jacks at designated locations, Category 6 UTP cabling terminated in 110 blocks at the designated MDF or IDF. The number of telephone pairs required will be coordinated with the UCF Telecommunications Department.

Telephone lines will be provided in the building elevators, which utilize a permanently mounted telephone. Wall mounted outlets for emergency telephones (Provided by UCF) will be provided on each floor.

Broadband TV System

A new, broadband TV system will consist of type “F” outlets at selected locations (As determined by UCF), RG-6 coaxial cable from each outlet to associated MDF or IDF, and all required active and passive distribution equipment. Active and passive distribution equipment will consist of amplifiers, taps, splitters and line equalizers as required to provide a minimum signal strength of +7dB at the farthest outlet.

Security System

A system of empty raceways and outlets will be provided for an owner provided building security system. Location of devices will be as determined by UCF.

End of proposed ME/FP system narratives.

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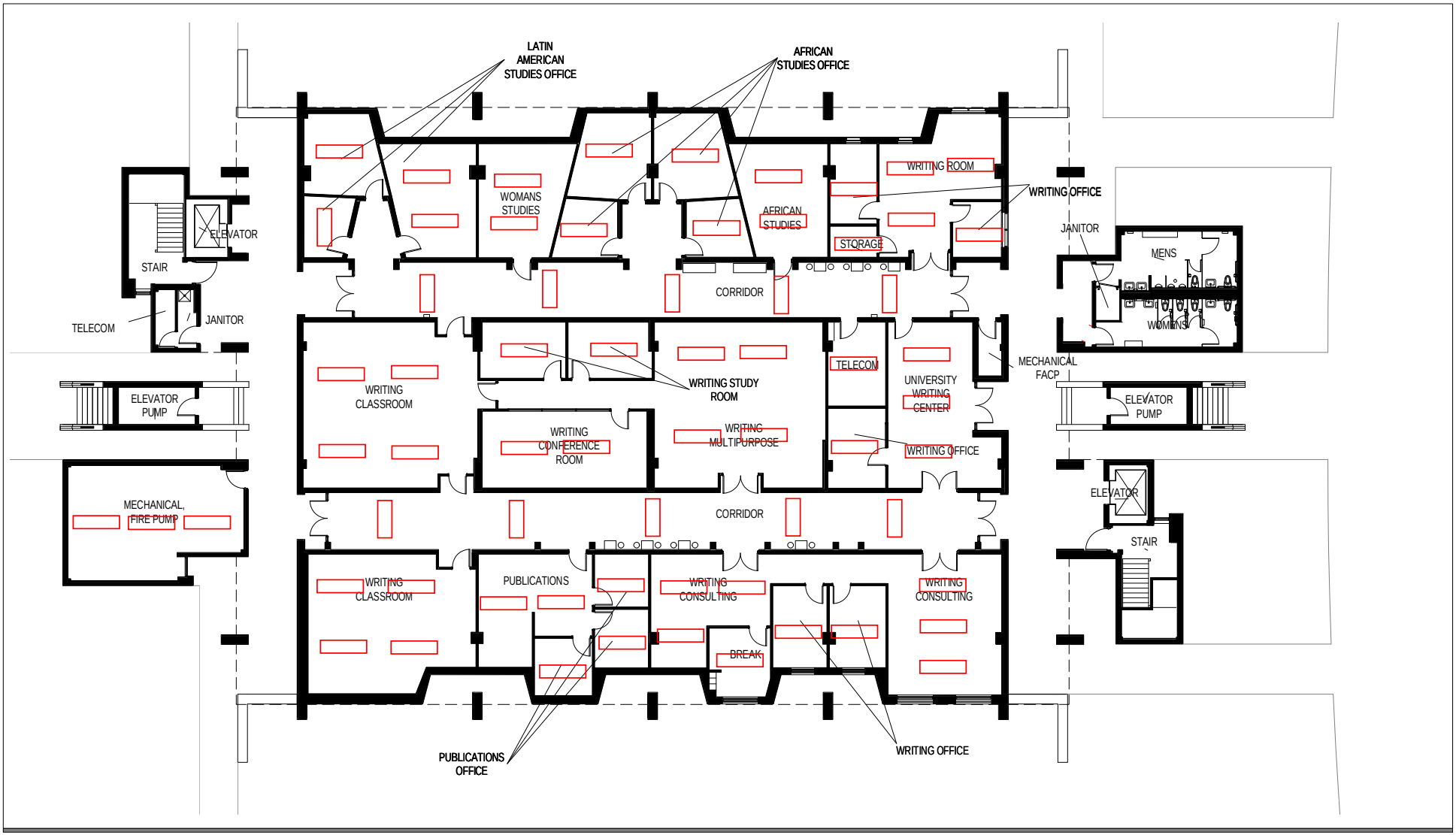

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CLANCY & THEYS CONSTRUCTION CO.
ENGINEERING FOR SUCCESS
WALTER P MOORE

UCF COLBOURN HALL

comm no.: 1320210

SCALE 1/16" = 1'-0"

X001

LEVEL 1 PLAN

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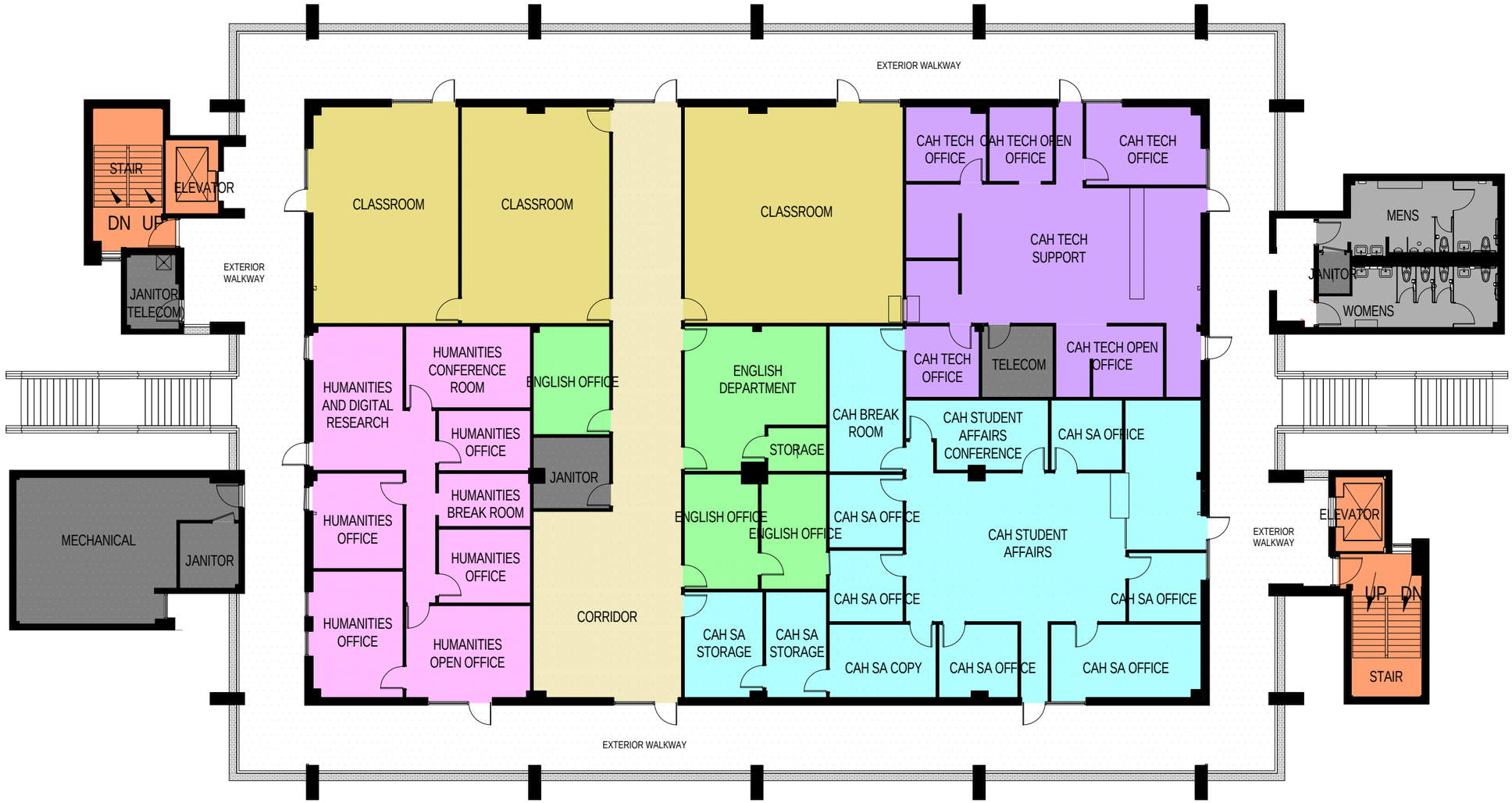
CIRCULATION | ELEVATOR | OFFICE WRITING | STAIR

CLASSROOM | M / E/ P | RESTROOMS | OFFICE MINORITY

X001C

LEVEL 1 PLAN



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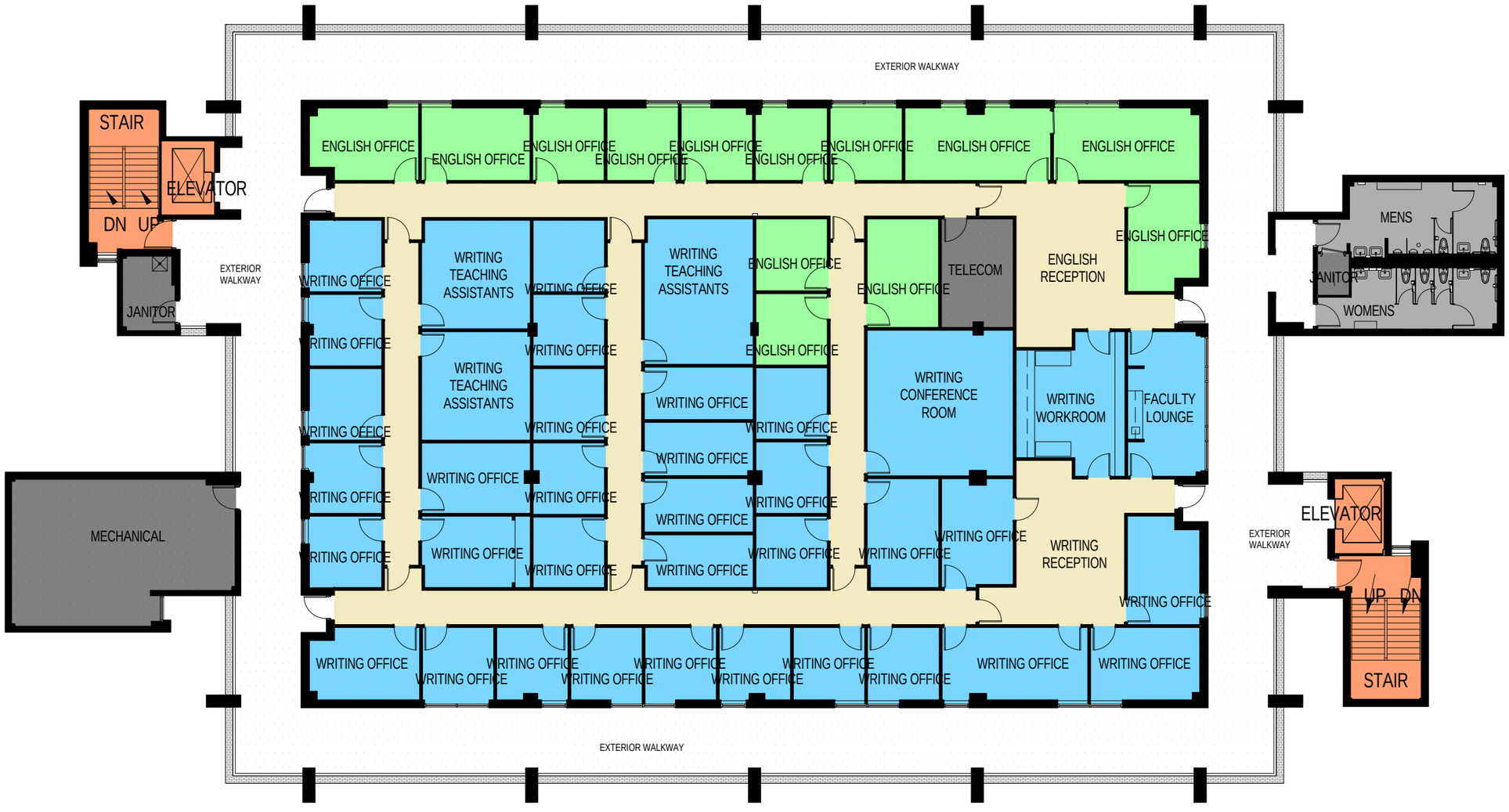
- CIRCULATION
- CLASSROOM
- ELEVATOR
- M / E/ P
- OFFICE CAH TECH SUPPORT
- OFFICE ENGLISH
- RESTROOMS
- OFFICE CAH STUDENT AFFAIRS
- OFFICE HUMANITIES

X002C

LEVEL 2 PLAN



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CIRCULATION

M / E/ P

OFFICE WRITING

ELEVATOR

OFFICE ENGLISH

RESTROOMS

X003C

LEVEL 3 PLAN

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SCALE 1/16" = 1'-0"

CIRCULATION

M / E/ P

RESTROOMS

OFFICE HISTORY

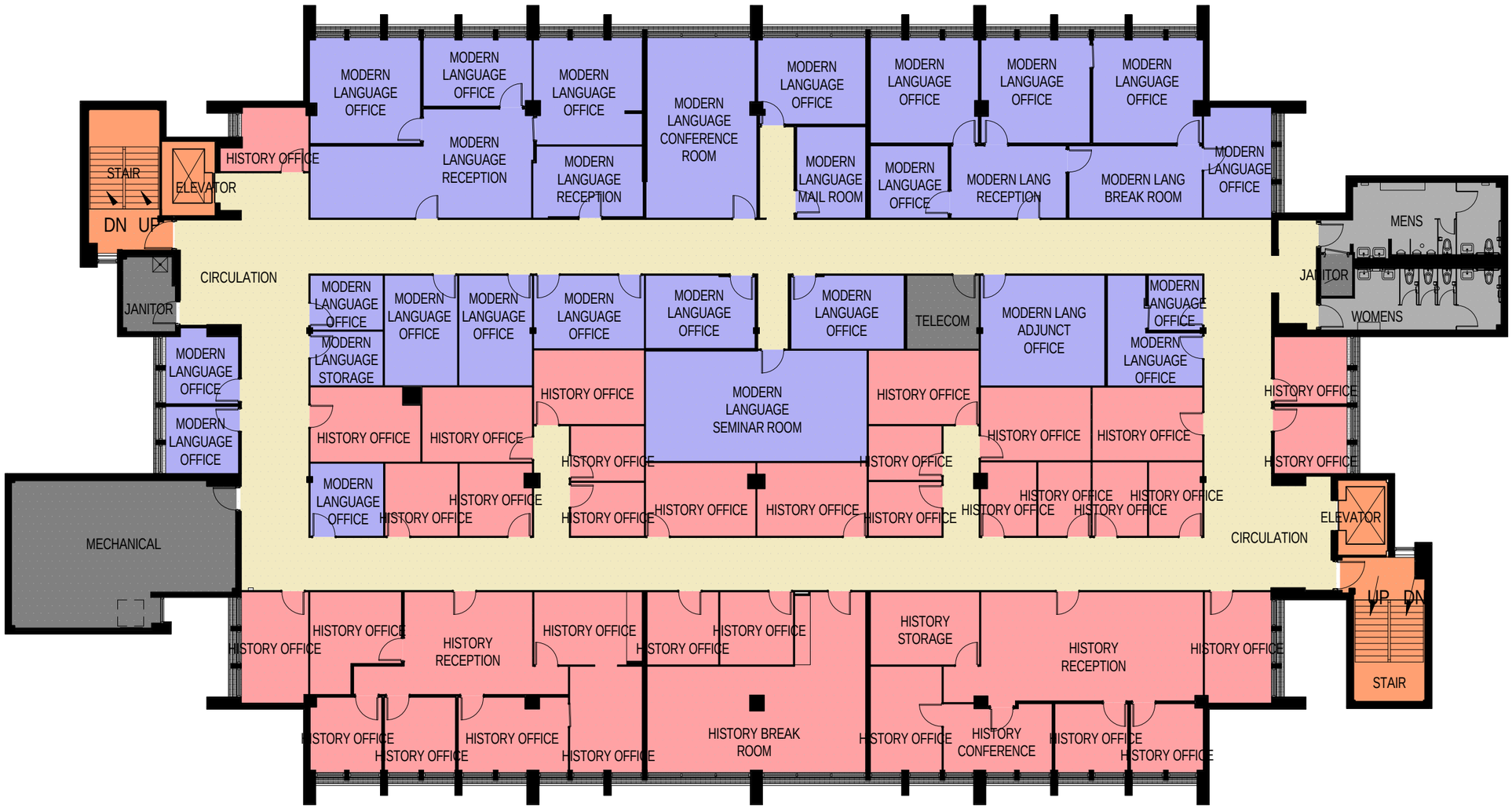
ELEVATOR

OFFICE ENGLISH

OFFICE JUDAIC

X004C

LEVEL 4 PLAN



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comm no.: 1320210

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CIRCULATION

ELEVATOR

M / E/ P

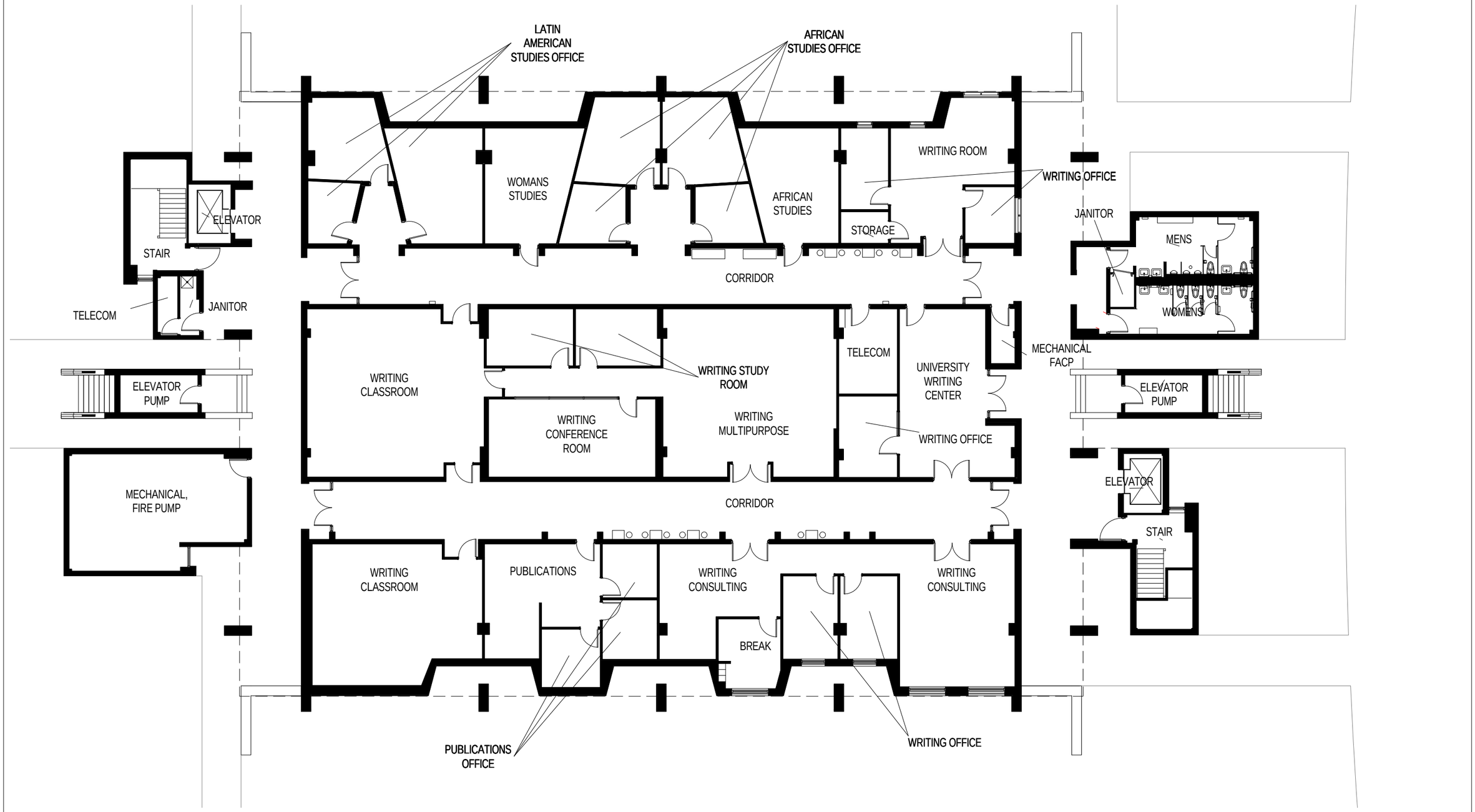
RESTROOMS

OFFICE HISTORY

OFFICE MODERN LANGUAGE

X005C

LEVEL 5 PLAN



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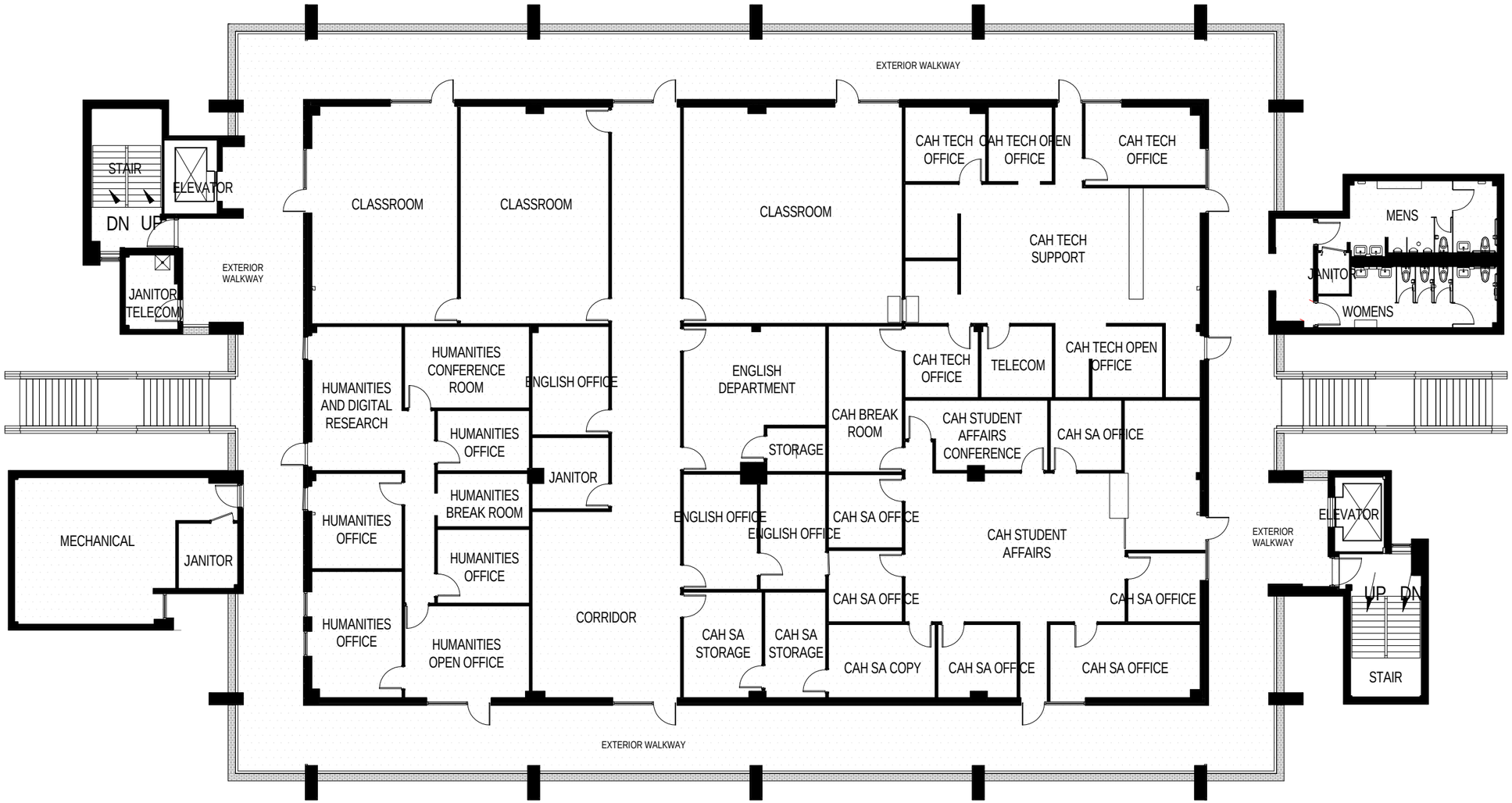
X001

LEVEL 1 PLAN



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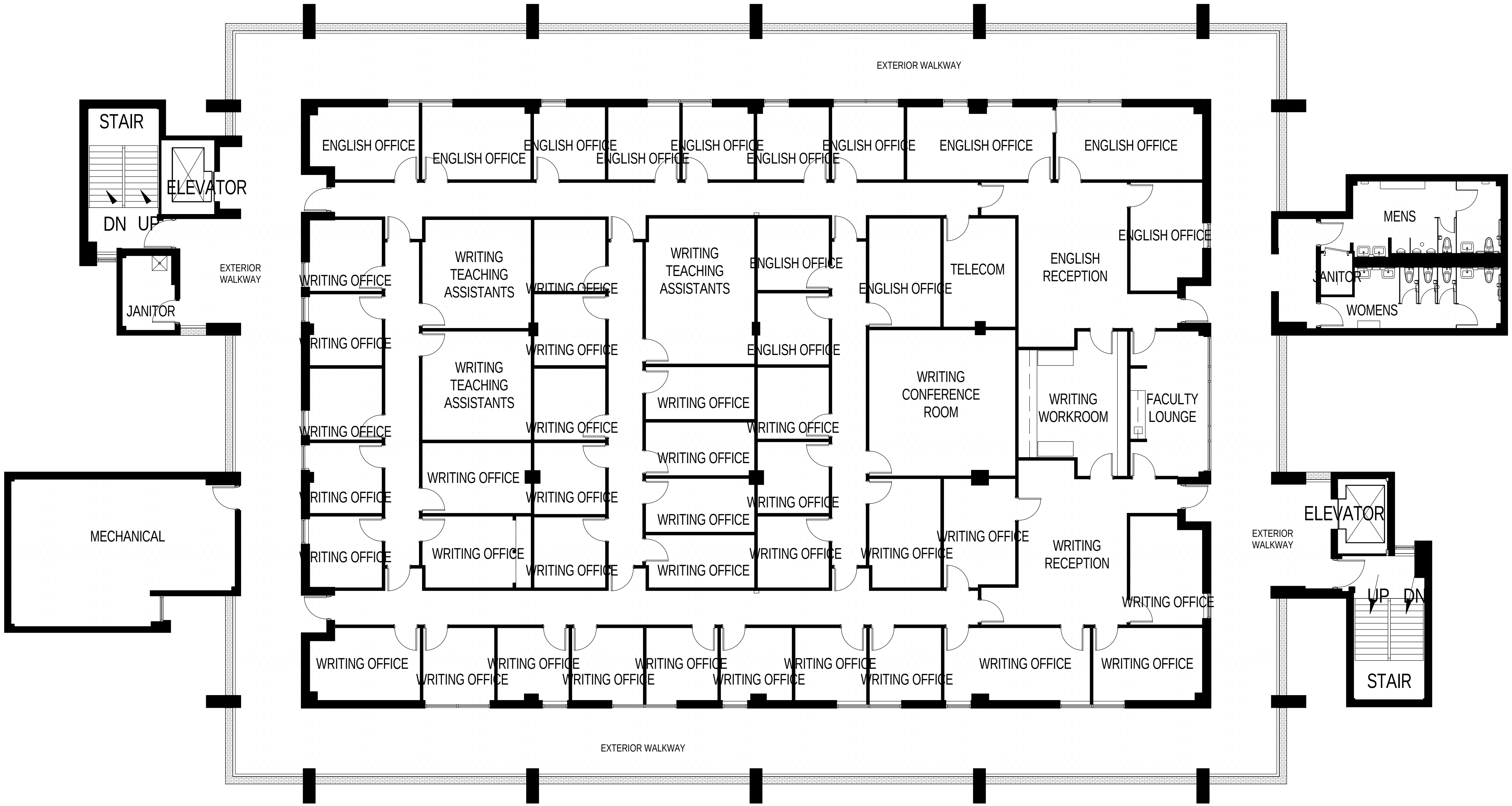
X002

LEVEL 2 PLAN



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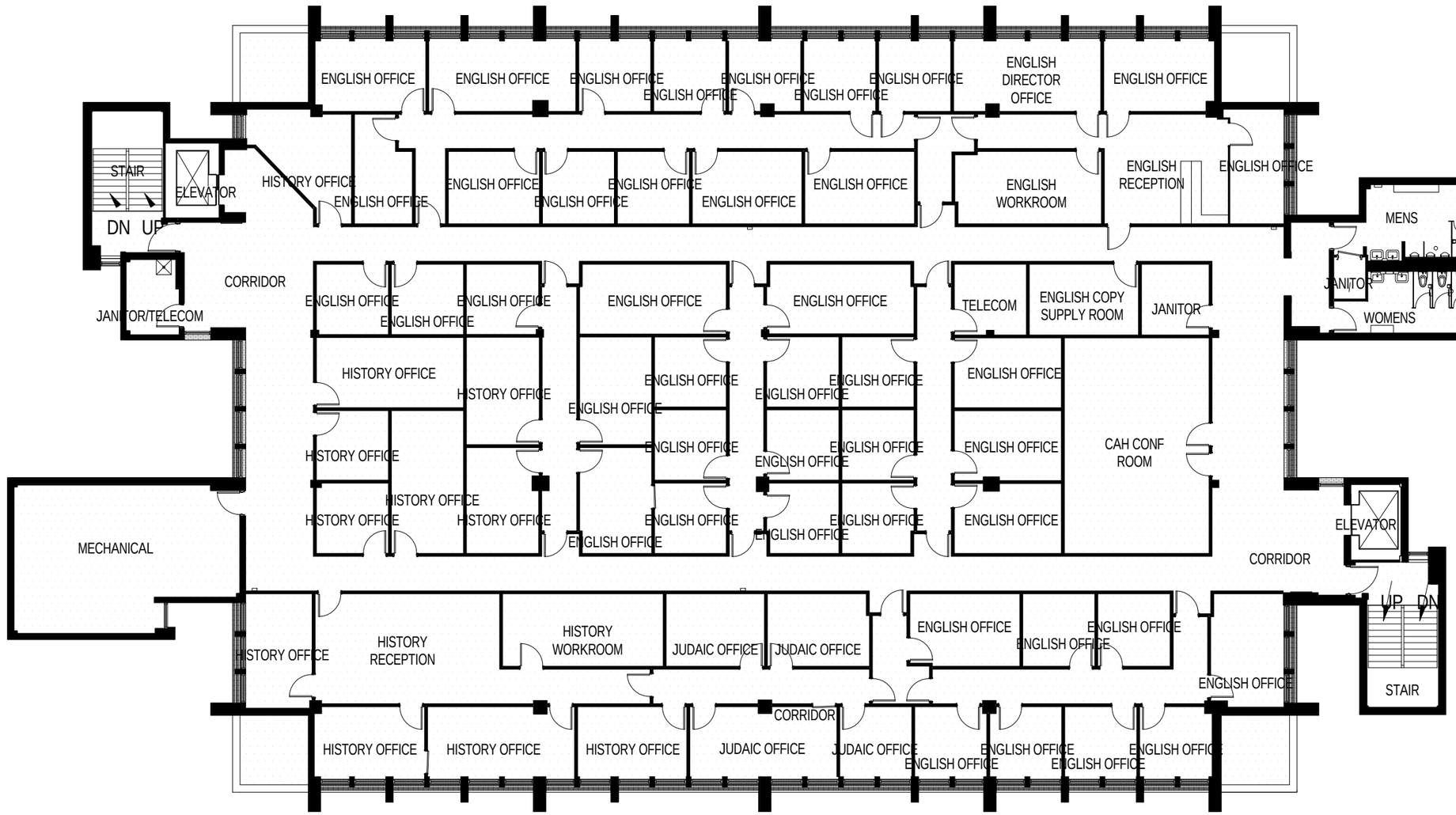
X003

LEVEL 3 PLAN



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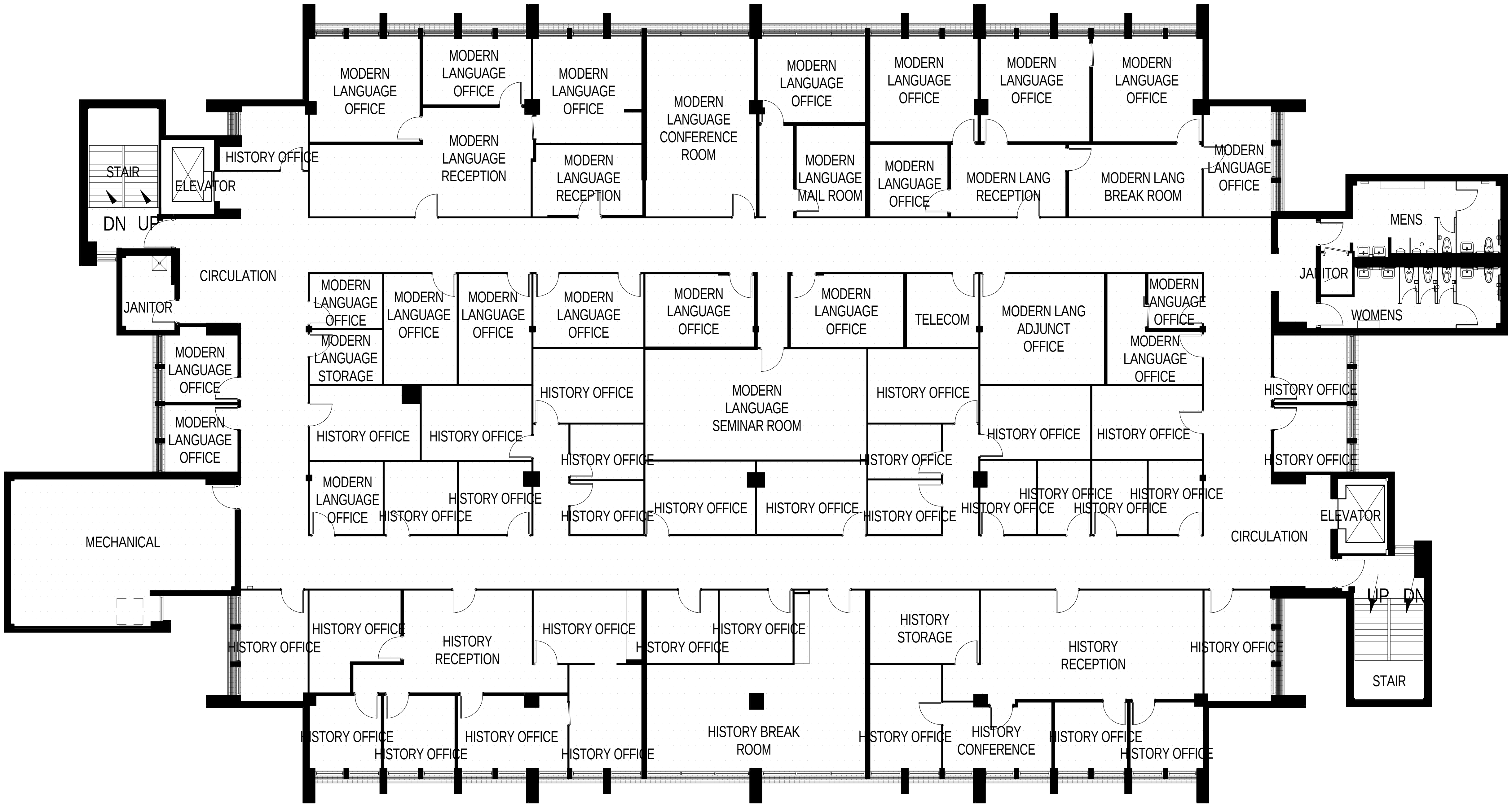
X004

LEVEL 4 PLAN



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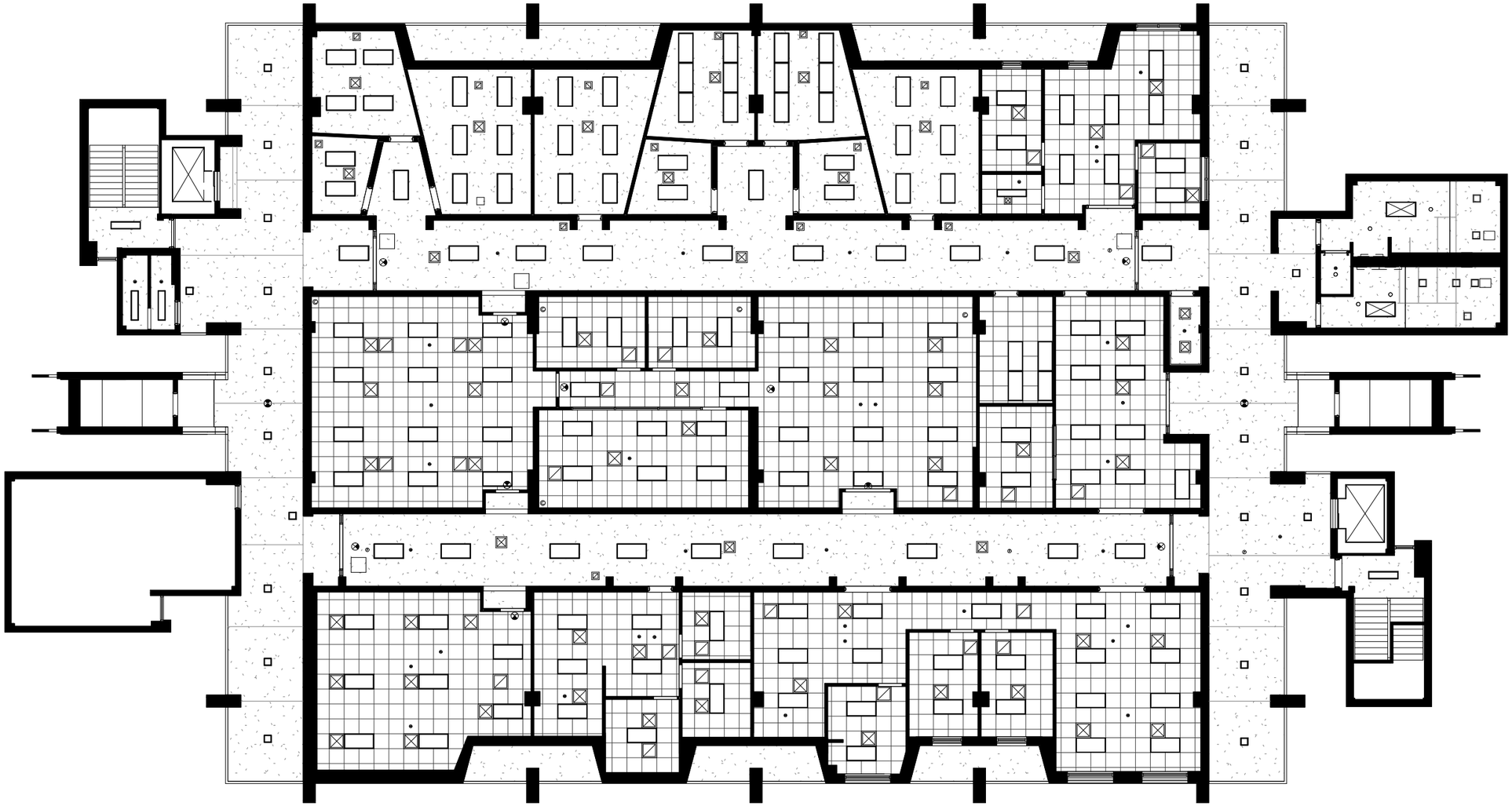
X005

LEVEL 5 PLAN



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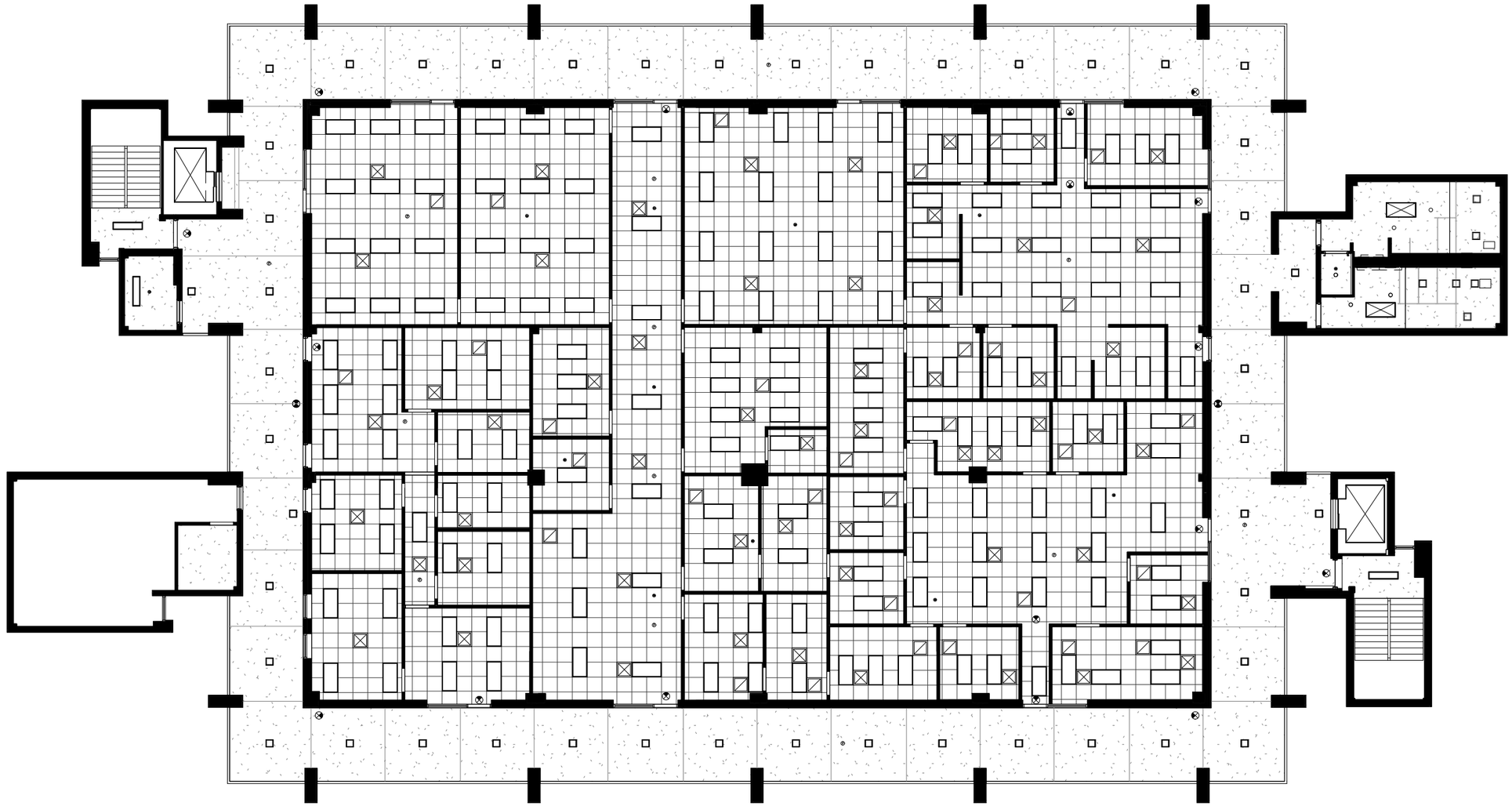
X001RCP

LEVEL 1 RCP



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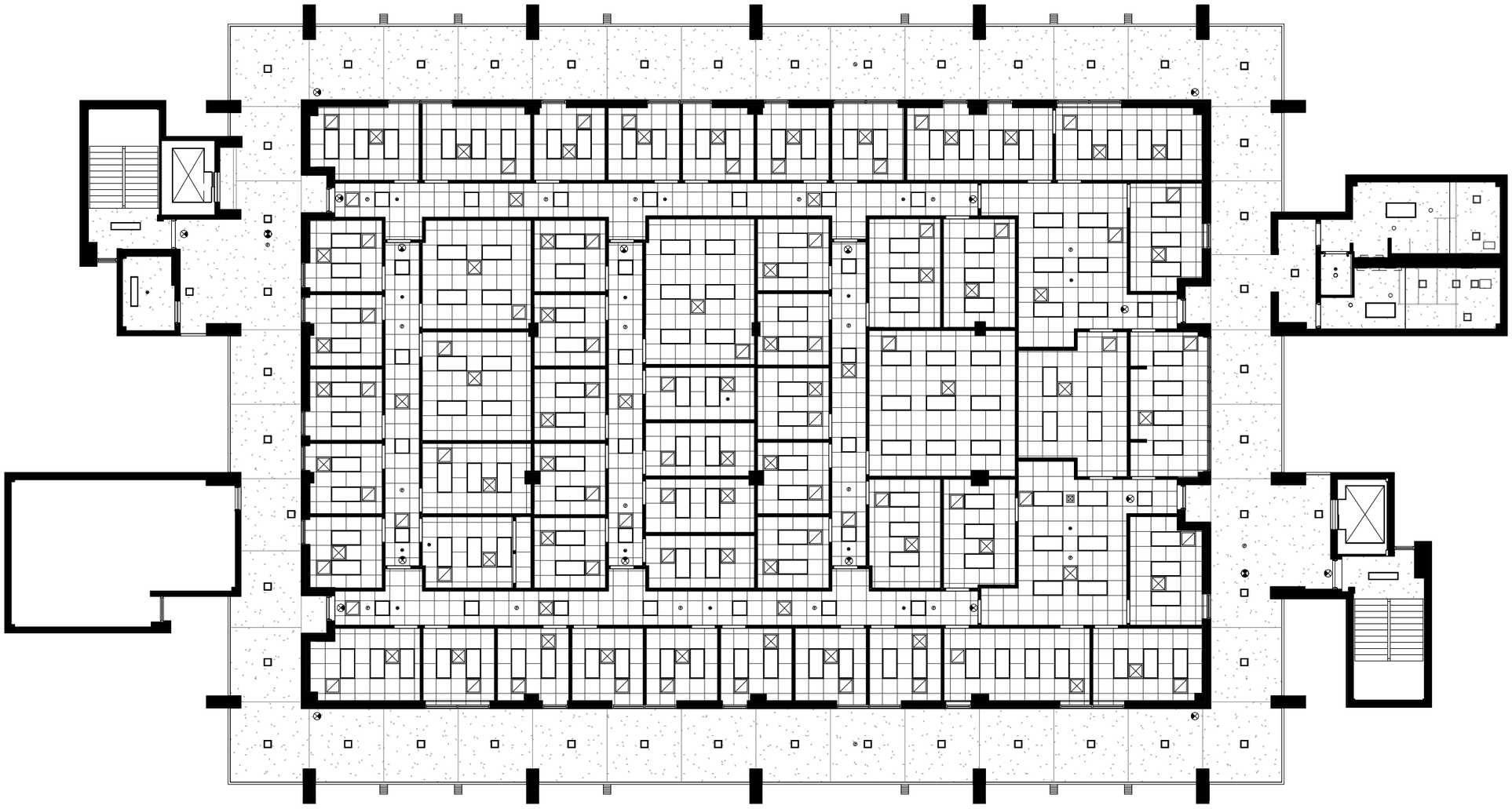
X002RCP

LEVEL 2 RCP



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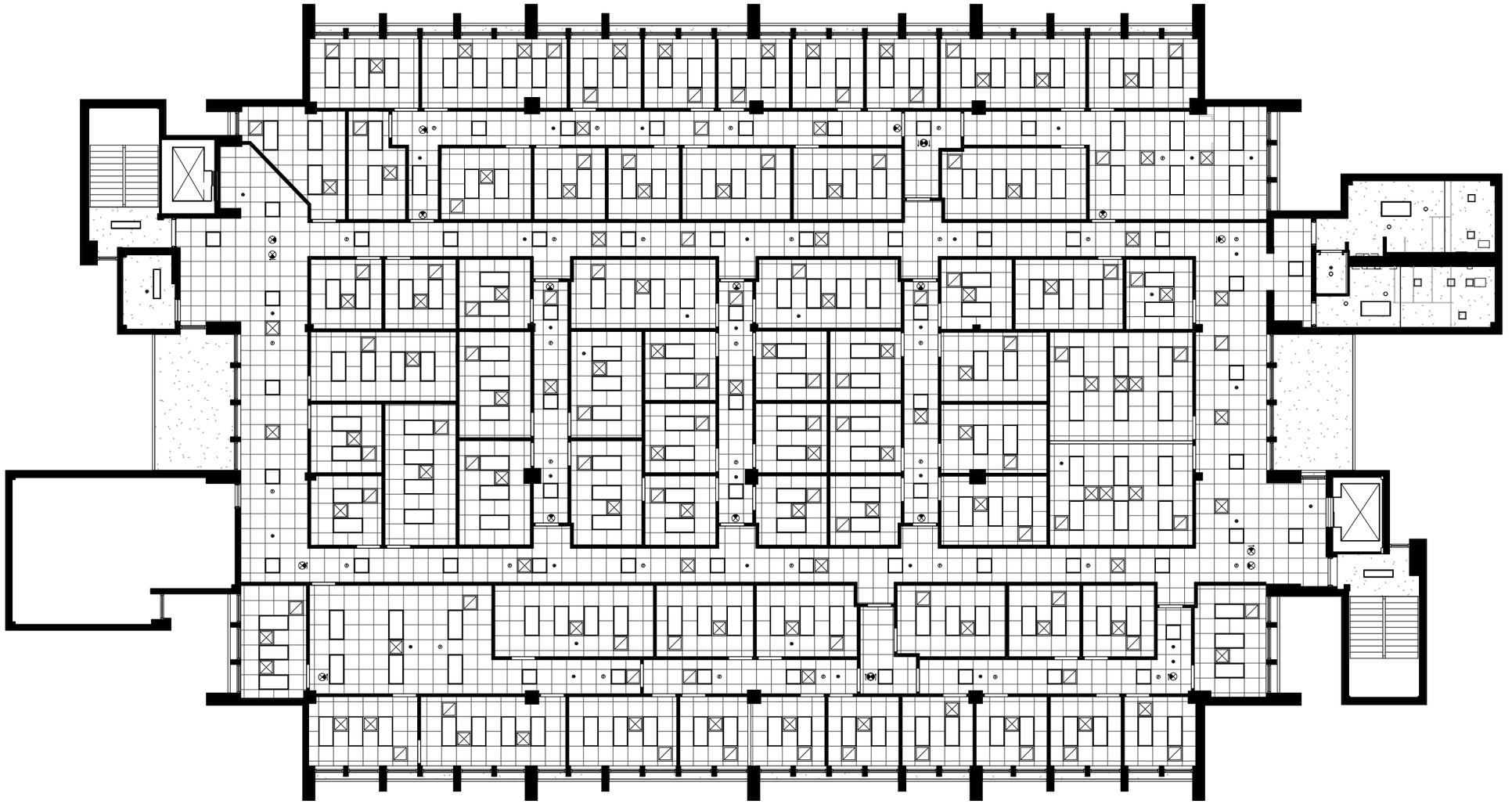
X003RCP

LEVEL 3 RCP



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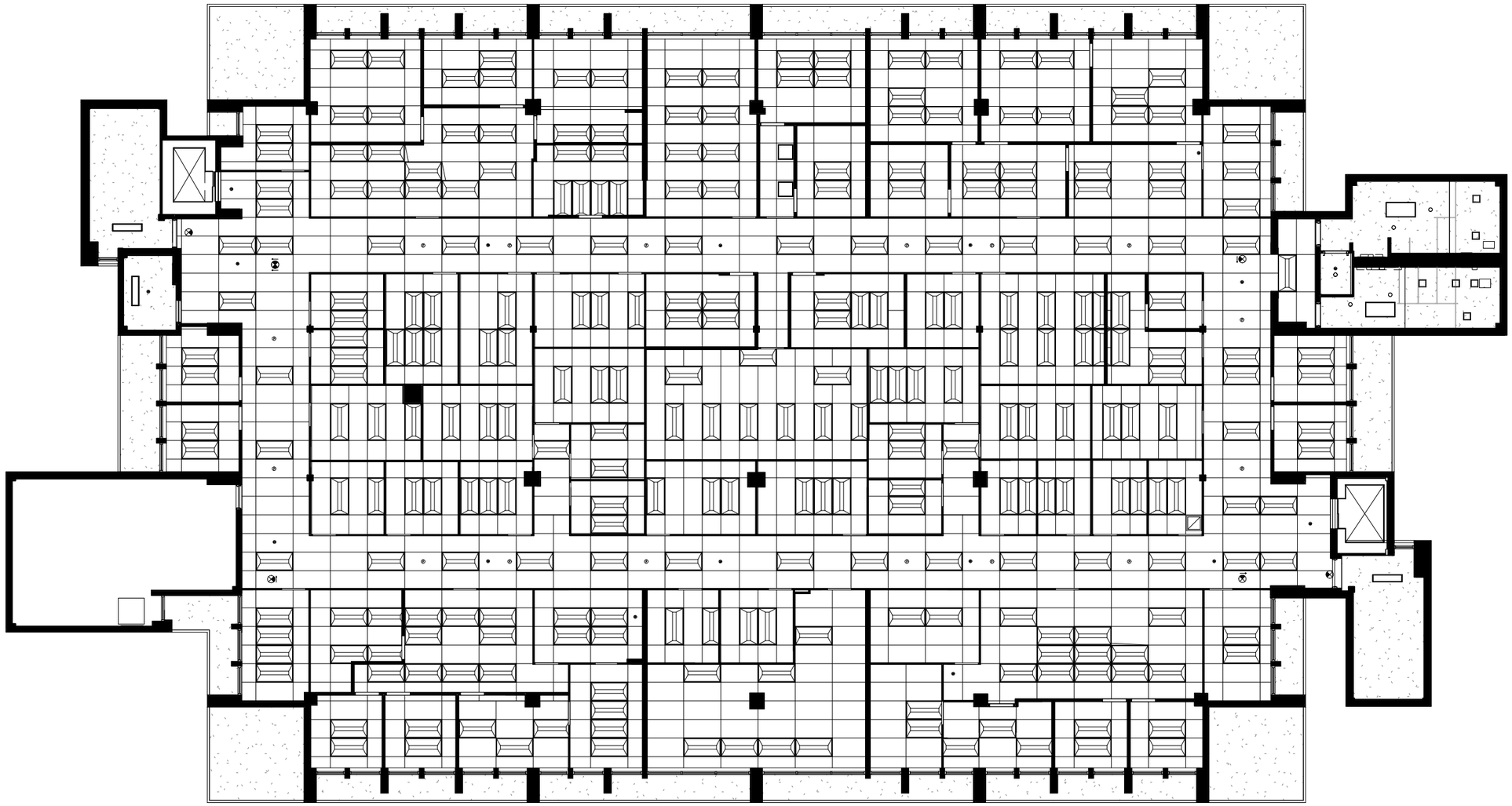
X004RCP

LEVEL 4 RCP



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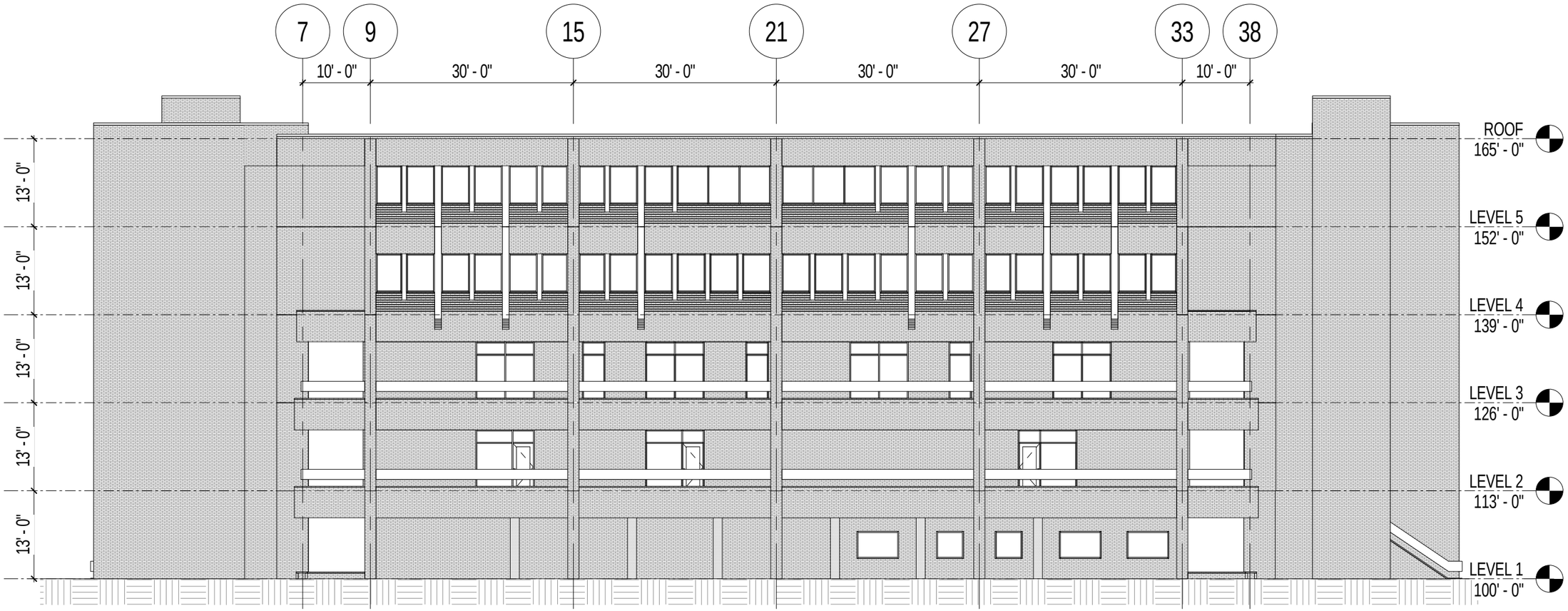
X005RCP

LEVEL 5 RCP



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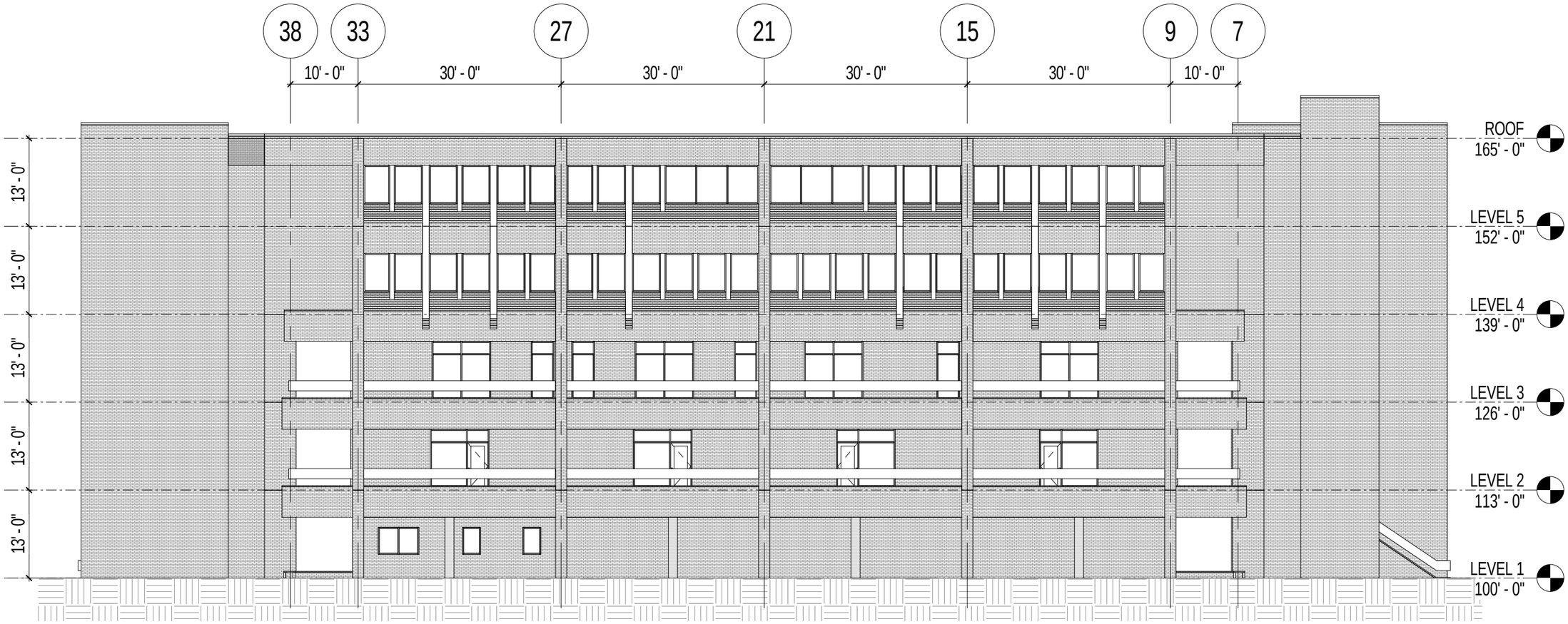
X006

SOUTH ELEVATION



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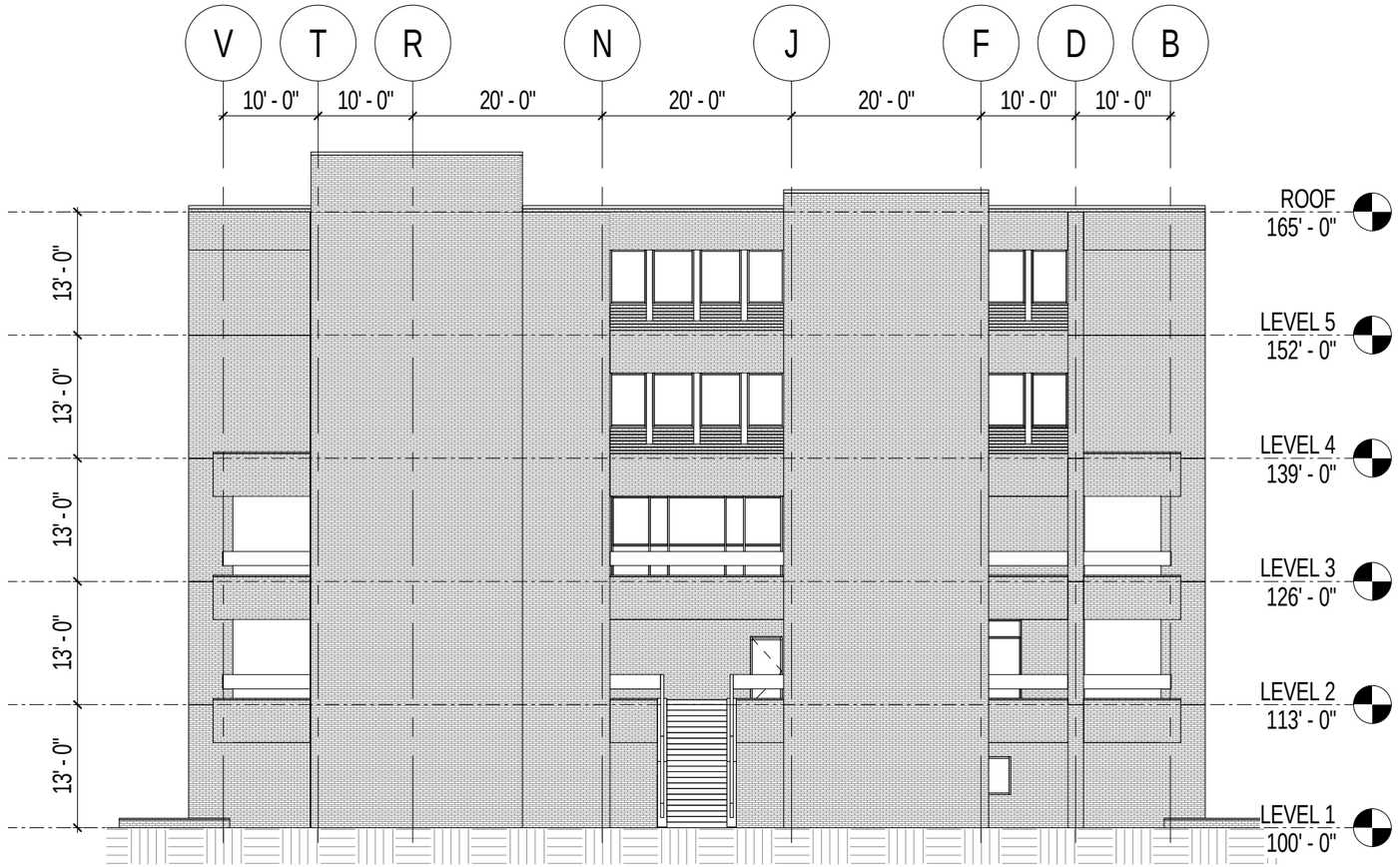
X007

NORTH ELEVATION



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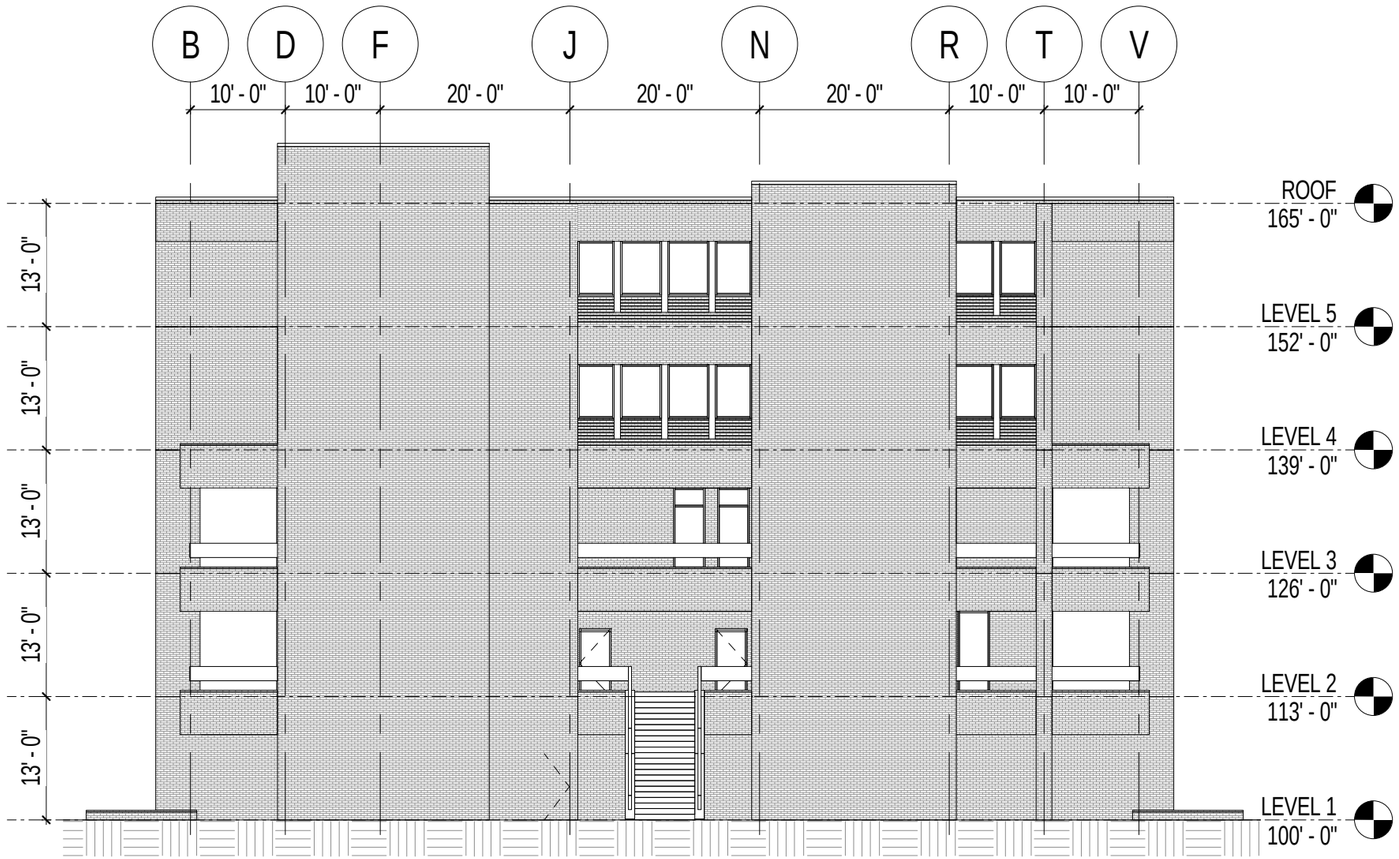
X008

EAST ELEVATION



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X009

WEST ELEVATION

NORTH ELEVATION

SCHENKELSHULTZ ARCHITECTURE

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SCALE 1/16" = 1'-0"

X010

REVIT MODEL PERSPECTIVE