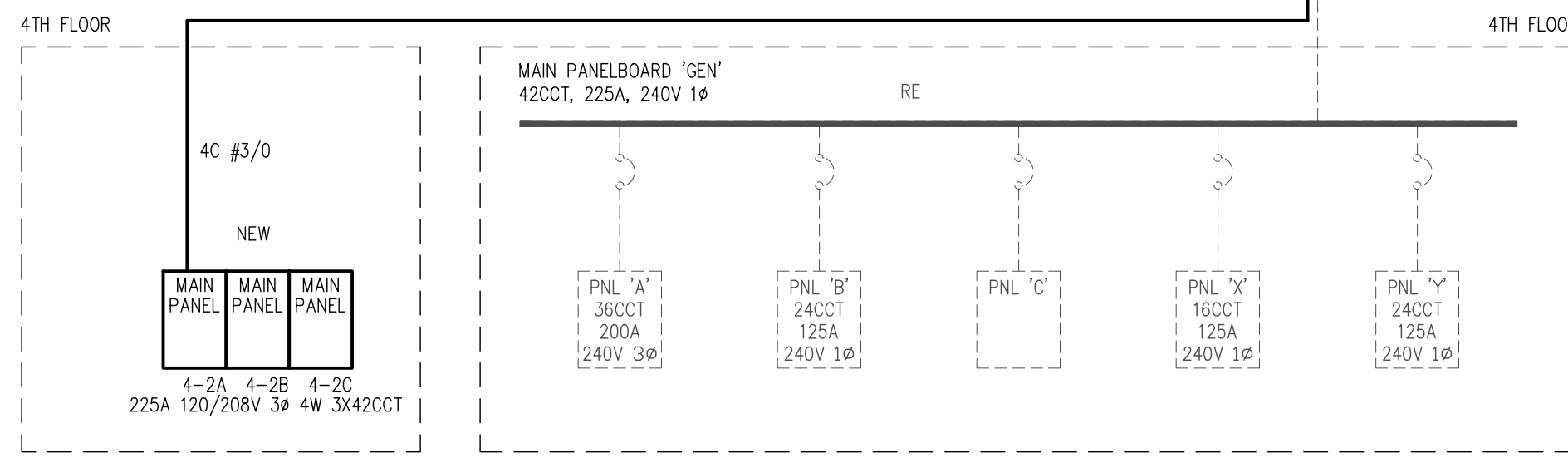
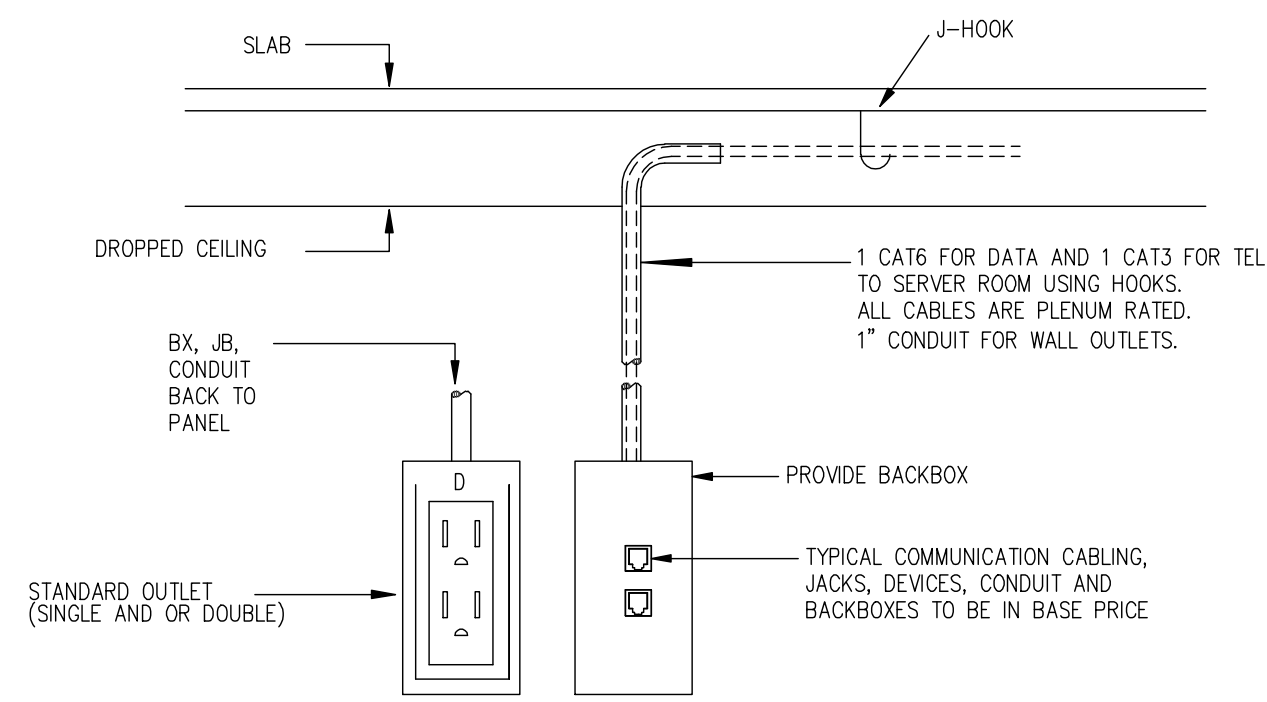


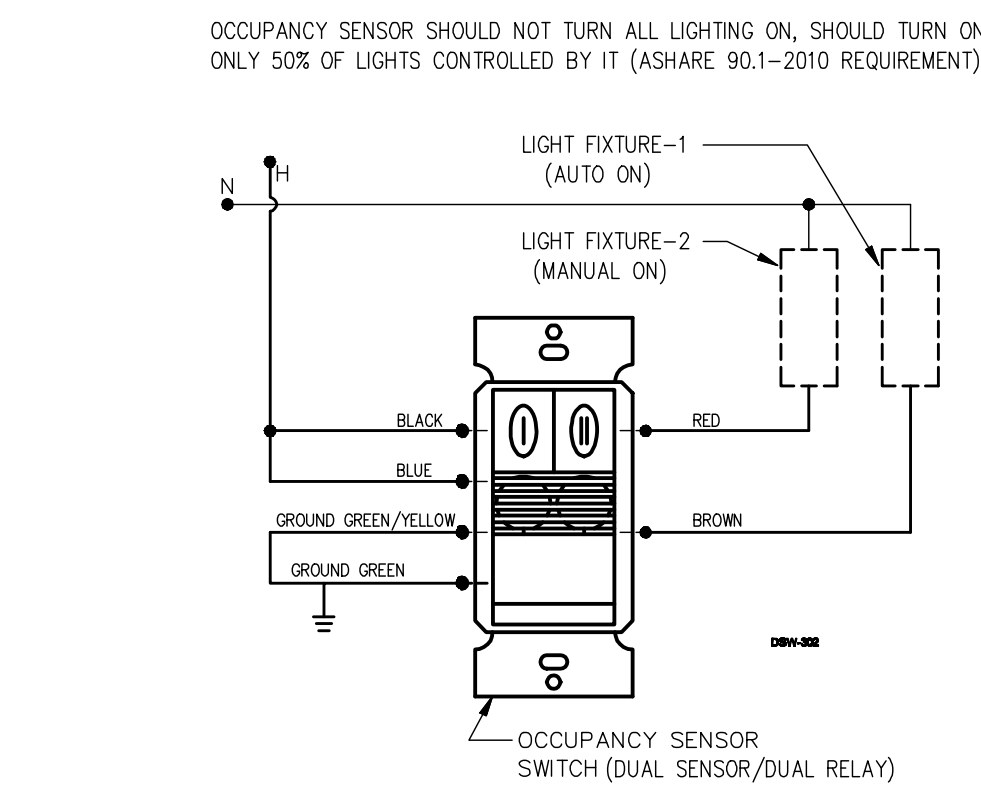
A SINGLE LINE DIAGRAM
E2 SCALE: N.T.S.



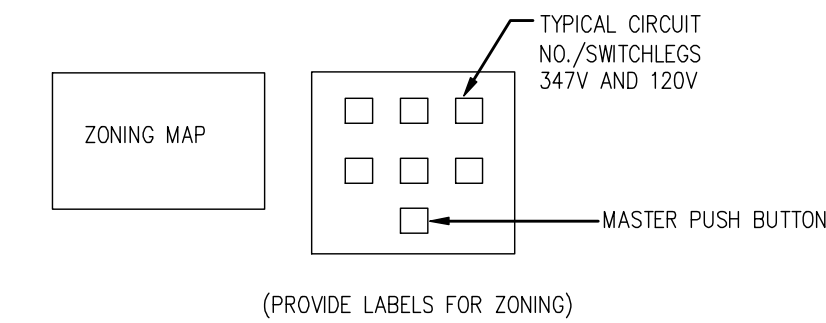
A SINGLE LINE DIAGRAM
E2 SCALE: N.T.S.



B TYPICAL COMBINATION POWER AND COMMUNICATION WALL OUTLET (AT COLUMNS ONLY)
E2 SCALE: N.T.S.

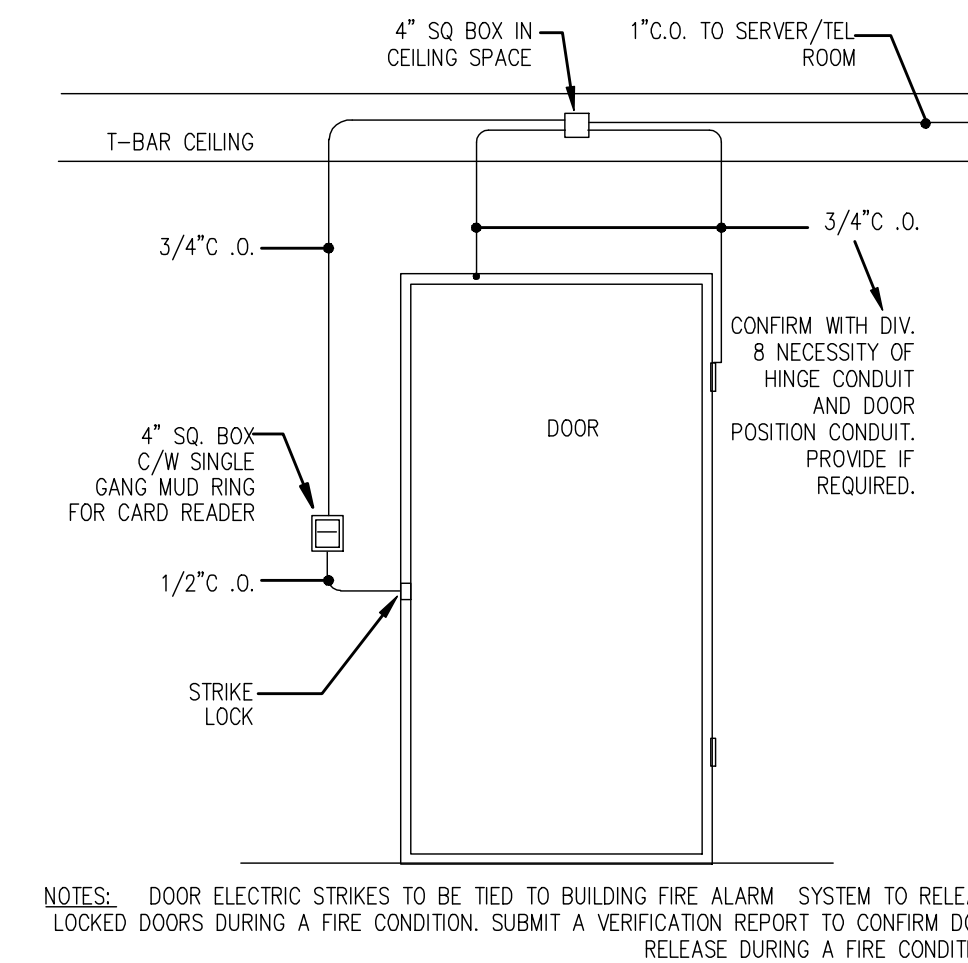


C OCCUPANCY SENSOR SWITCH DETAIL DUAL SENSOR / DUAL RELAY (TYPICAL)
E2 SCALE: N.T.S.



NOTE: PROVIDE LV RELAYS AND NEW POWER BREAKERS (SWITCH LEGS) AND CIRCUITS AS REQUIRED TO ACCOMMODATE THE NEW LIGHTING LAYOUT

D DETAIL-TYPICAL NEW MASTER SWITCH
E2 SCALE: MAKE GOOD EXISTING OR REPLACE WITH NEW



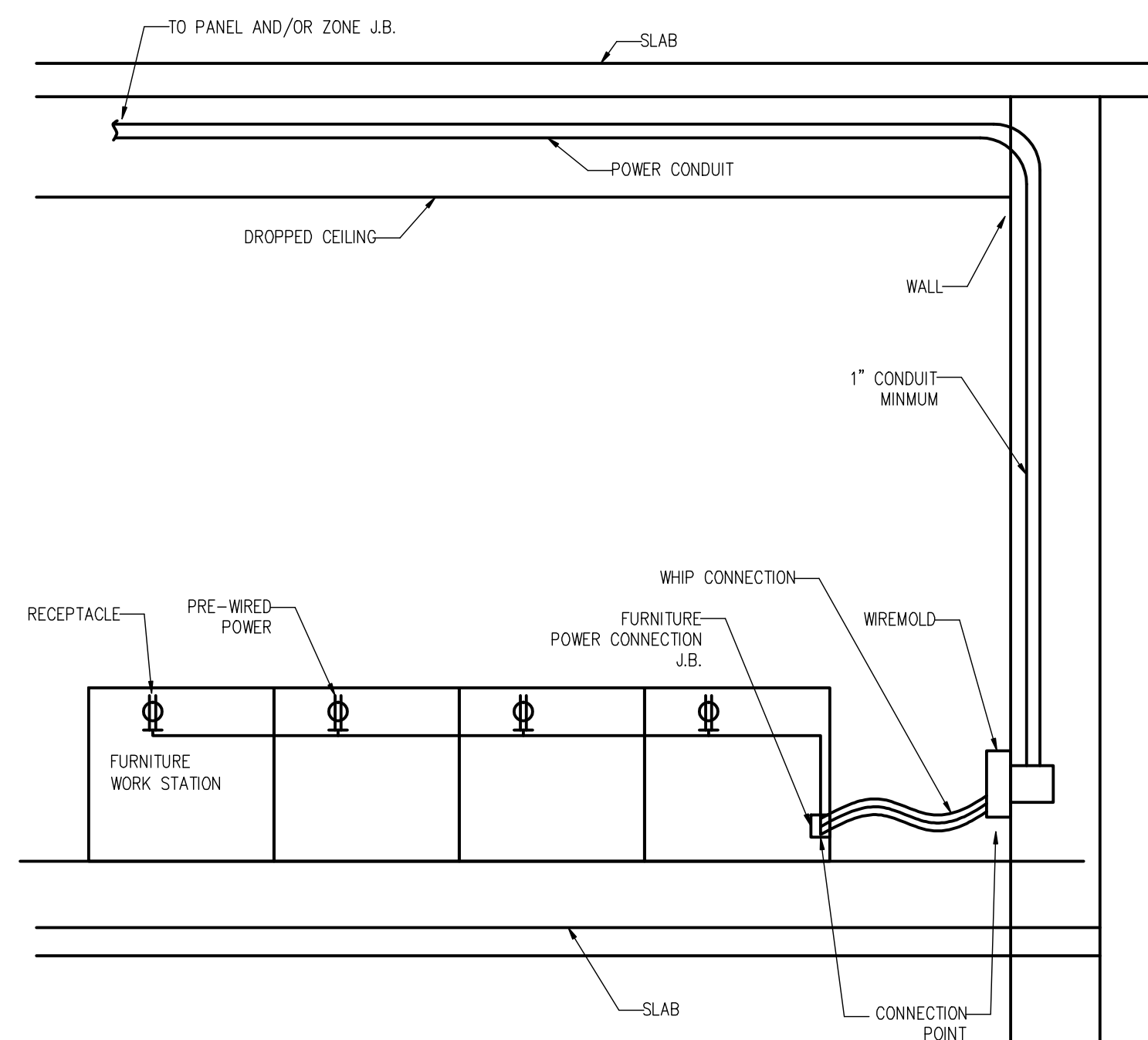
NOTES: DOOR ELECTRIC STRIKES TO BE TIED TO BUILDING FIRE ALARM SYSTEM TO RELEASE LOCKED DOORS DURING A FIRE CONDITION. SUBMIT A VERIFICATION REPORT TO CONFIRM DOOR RELEASE DURING A FIRE CONDITION.

E TYPICAL - SECURITY ACCESS DETAIL FOR ALL ENTRY/EXIT DOORS
E2 SCALE: N.T.S.

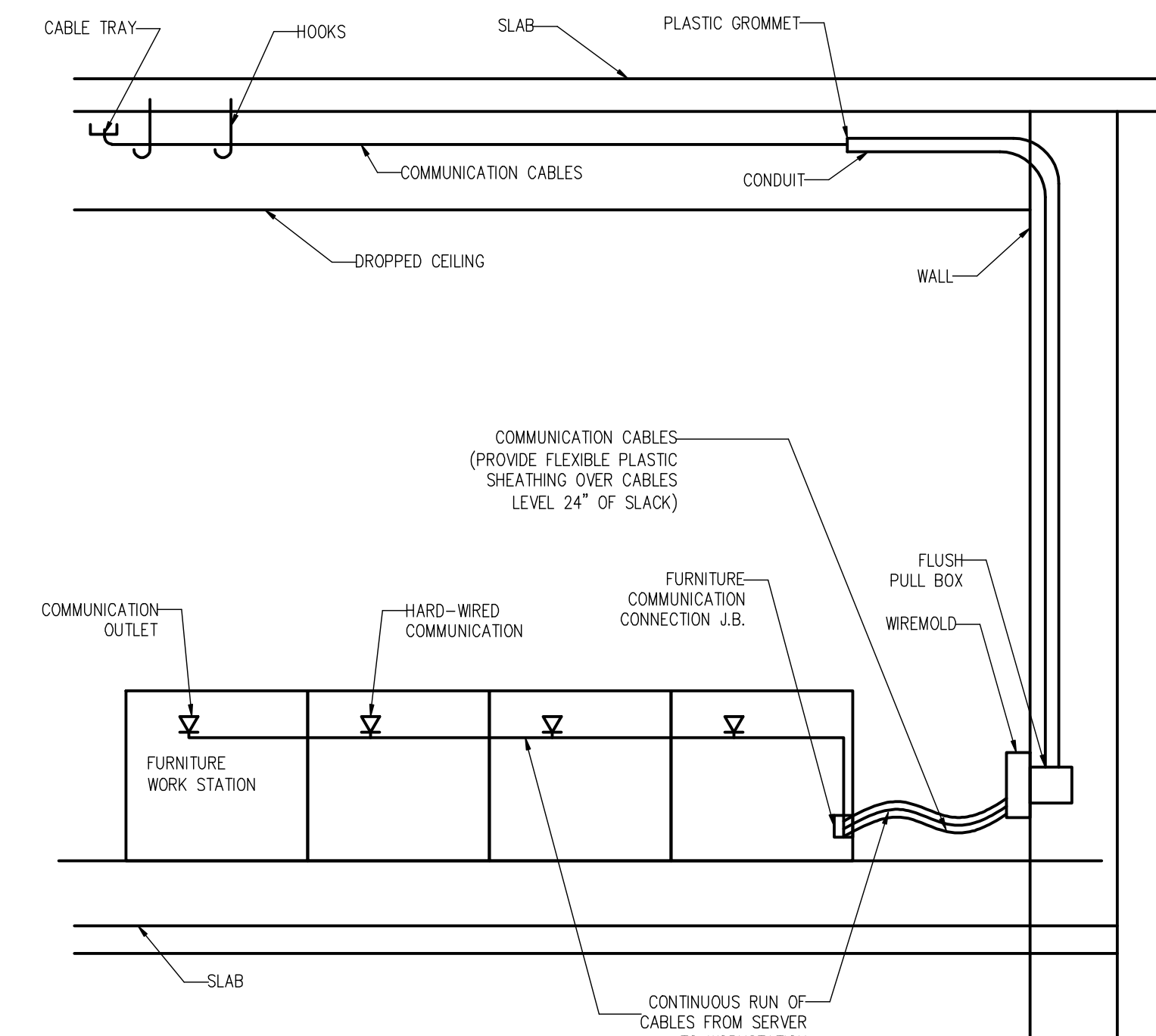
DESCRIPTION	LOAD	VOLTAGE	PHASE	CIRCUIT	BREAKER SIZE	FEEDER	GENERAL
EBB-1	500W	208V	1Ø	OCT-30,31	15A2P	2#AWG12	SEE NOTES
EBB-2.1	750W	208V	1Ø	OCT-32,33	15A2P	2#AWG12	SEE NOTES
EBB-2.2	750W	208V	1Ø	OCT-32,33	15A2P	2#AWG12	SEE NOTES
EBB-2.3	750W	208V	1Ø	OCT-34,35	15A2P	2#AWG12	SEE NOTES
EBB-X1.1	500W	208V	1Ø	OCT-34,35	15A2P	2#AWG12	SEE NOTES
EBB-X1.2	500W	208V	1Ø	OCT-36,37	15A2P	2#AWG12	SEE NOTES
EBB-X2.1	750W	208V	1Ø	OCT-38,39	15A2P	2#AWG12	SEE NOTES
EBB-X2.2	750W	208V	1Ø	OCT-38,39	15A2P	2#AWG12	SEE NOTES
EBB-X2.3	750W	208V	1Ø	OCT-40,41	15A2P	2#AWG12	SEE NOTES
FC-1	1 HP	208V	1Ø	OCT-42,43	15A2P	2#AWG12	SEE NOTES
FC-2	1 HP	208V	1Ø	OCT-44,45	15A2P	2#AWG12	SEE NOTES
FC-3	1 HP	208V	1Ø	OCT-46,47	15A2P	2#AWG12	SEE NOTES
FC-4	1 HP	208V	1Ø	OCT-46,47	15A2P	2#AWG12	SEE NOTES
ETR/RL	EXISTING						SEE NOTES

MECHANICAL EQUIPMENT NOTES

- ELECTRICAL CONTRACTOR TO SUPPLY AND INSTALL MANUAL/MAGNETIC STARTERS C/W SINGLE PHASE PROTECTION FOR ALL MOTORS. (INSTALL IN NEAREST MECHANICAL, STORAGE OR ELECTRICAL ROOM FOR WALL MOUNTED TYPE).
- ELECTRICAL CONTRACTOR TO SUPPLY AND INSTALL DISCONNECT SWITCHES FOR ALL MOTORS.
- ELECTRICAL CONTRACTOR TO SUPPLY AND INSTALL ALL CONTROL WIRING AND EQUIPMENT AS REQUIRED. MECHANICAL CONTRACT DATA DRAWINGS AND SPECIFICATIONS MUST BE USED FOR REFERENCE. COORDINATE WITH MECHANICAL CONTRACTOR FOR EXACT EQUIPMENT AMOUNT/LOCATION.
- ELECTRICAL CONTRACTOR MUST CHECK MECHANICAL DRAWINGS SPECIFICATIONS FOR EXACT AMOUNTS AND LOCATIONS FOR ALL MECHANICAL EQUIPMENT. REFER MECHANICAL DRAWINGS AND CONTRACT DOCUMENTS FOR EXACT EQUIPMENT AMOUNT/LOCATIONS/SIZES. PROVIDE ALL ELECTRICAL REQUIREMENT FOR EQUIPMENT CONNECTION.
- CHECK EXACT LOCATION OF ROUGH-INS WITH MECHANICAL PRIOR TO INSTALLATION.
- USE NEW MECHANICAL PANEL; MAKE GOOD PANEL. EC TO VERIFY ON SITE.
- MECHANICAL CONTROL DEVICES I.E. ON/OFF SWITCH, VARI-SPEEDSWITCH, TIMER, ETC. TO BE SUPPLIED BY MECHANICAL CONTRACTOR, INSTALLED AND CONNECTED BY ELECTRICAL CONTRACTOR. REFER TO MECHANICAL DRAWING FOR LOCATION.
- ELECTRICAL CONTRACTOR TO CONFIRM BREAKER SIZE AND FEEDER SIZE ON SITE BEFORE ROUGH-IN.



FURNITURE WORKSTATION POWER CONNECTION

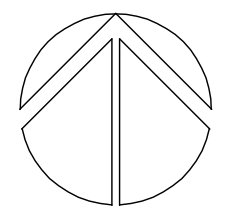


FURNITURE WORKSTATION COMMUNICATION CONNECTION

COMMUNICATION CONDUIT SIZES:
 FOR TYPICAL 4-PAIR CAT6(WITH DIVIDER)
 1"=6
 1-1/2"=15
 2"=20
 FOR TYPICAL 4-PAIR CAT5E CABLE
 1"=7
 1-1/2"=16
 2"=22

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 CITY OF VANCOUVER
 4TH FLOOR FLEX
 WORK PROJECT
 814 RICHARDS STREET
 VANCOUVER, BC



STAMP/SEAL:

NO.	ISSUE	DATE
4	ISSUED FOR TENDER	19/09/30
3	ISSUED FOR BP	19/09/18
2	ISSUED FOR BP REVIEW	19/08/29
1	ISSUED FOR REVIEW	19/08/21

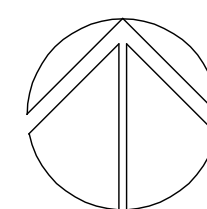
Sheet Info.
 DATE: 19/07/08
 PROJECT: 19-115
 SCALE: AS NOTED
 DRAWN: ID
 CHECKED: PL
 APPROVED: OAB
 Title

SINGLE LINE DIAGRAM AND DETAIL

Sheet

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STAMP/SEAL:

Blank rectangular area for stamp/seal.

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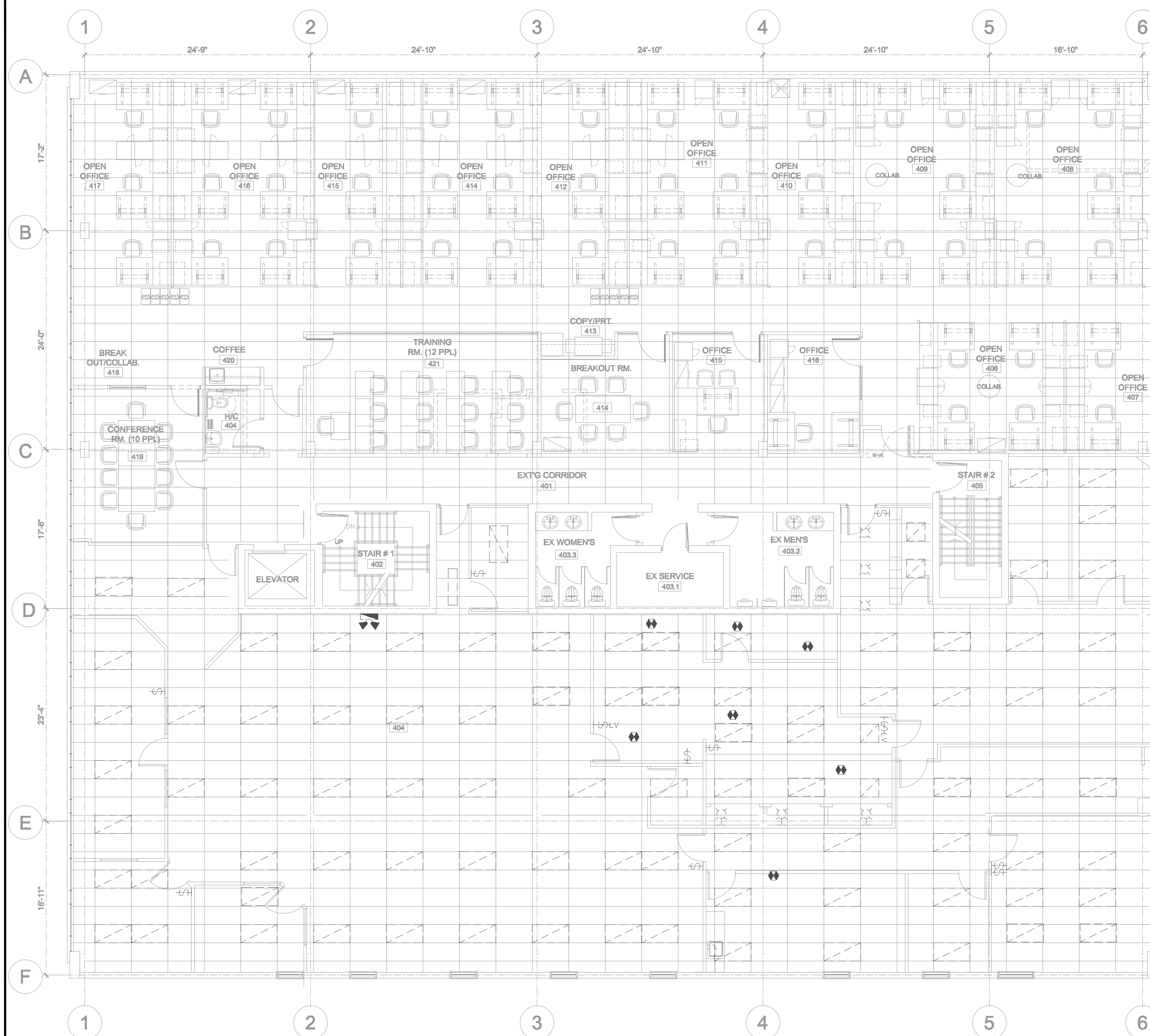
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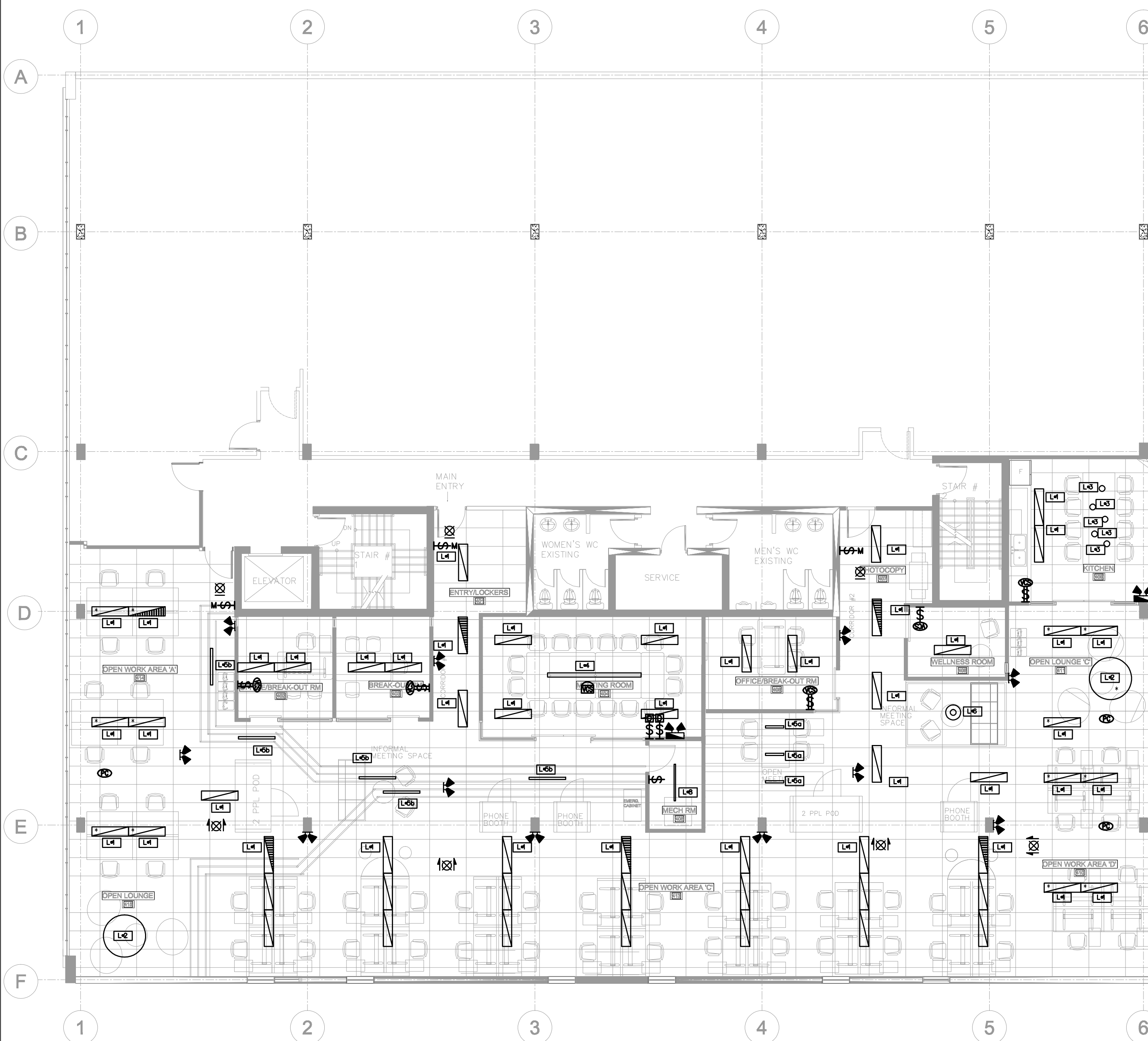
LIGHTING
 DEMO./RENO.
 PLAN

Sheet

E3



A DEMOLITION LIGHTING PLAN
 SCALE: 1/8"=1'-0"



B RENOVATION LIGHTING PLAN
 SCALE: 1/8"=1'-0"

NOTES:

- RE-WIRE NL LIGHTS AS SHOWN.
- PROVIDE MANUAL LIGHTING CONTROL IN SPACE THAT CONTROL ALL OF THE LIGHTING IN THE SPACE. EACH CONTROL DEVICE SHALL CONTROL AN AREA NO LARGER THAN 2500 FT². (ASHRAE 90.1-2016 9.4.1.1.g).
- NONE OF THE LIGHTING SHALL BE AUTOMATICALLY TURNED ON (ASHRAE 90.1-2016 9.4.1.1.b) OR RESTRICTED TO PARTIAL AUTOMATIC ON, NO MORE THAN 50% OF LIGHTING (ASHRAE

90.1-2016 9.4.1.1.b). VACANCY SENSOR CONTROLLED SWITCHES ARE SHOWN FOR THAT PURPOSE WHERE APPLICABLE.
 THE GENERAL LIGHTING IN SPACE SHALL BE CONTROLLED SO AS TO PROVIDE ONE INTERMEDIATE STEP BETWEEN 30% AND 70% OF FULL LIGHTING POWER. (ASHRAE 90.1-2016 9.4.1.1.g). DUAL RELAY SWITCHES ARE SHOWN FOR BI-LEVEL CONTROL WHERE APPLICABLE.
 DAYLIGHT SENSOR SHALL REDUCE LIGHTING (CONTINUOUS DIMMING) IN RESPONSE TO AVAILABLE DAYLIGHT

WITH AT LEAST ONE CONTROL STEP BETWEEN 50% AND 70% OF DESIGN LIGHTING POWER AND ANOTHER CONTROL STEP POINT BETWEEN 20% AND 40% OF DESIGN LIGHTING POWER AND A THIRD CONTROL POINT THAT TURNS OFF ALL THE CONTROLLED LIGHTING. (ASHRAE 90.1-2016 9.4.1.1.e). SEE DAYLIGHT SENSOR LAYOUT AND CONTROLLED LIGHTING. LIGHTS WITH "*" IN THE DRAWING TO BE DIMMED BY DAYLIGHT SENSOR. BALLAST TO BE CHANGED TO DIMMER BALLAST.

ALL LIGHTING IN ENCLOSED SPACE WITH CEILING HEIGHT PARTITIONS

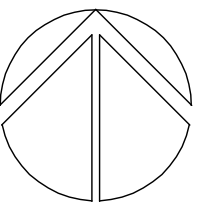
SHALL BE AUTOMATICALLY SHUT-OFF WITHIN 20 MINUTES OF ALL OCCUPANTS LEAVING THE SPACE. (ASHRAE 90.1-2016 9.4.1.1.h). VACANCY SENSORS WHERE APPLICABLE ARE SHOWN ON DRAWINGS FOR THAT PURPOSE.

ALL LIGHTING IN SPACE (EXCEPT ALREADY CONTROLLED BY VACANCY SENSORS IN ENCLOSED SPACES) INCLUDING CONNECTED TO EMERGENCY CIRCUITS SHALL BE AUTOMATICALLY SHUT-OFF DURING PERIODS WHEN THE SPACE IS SCHEDULED TO BE UNOCCUPIED USING EITHER A TIME-OF-DAY OPERATED CONTROL

DEVICE THAT AUTOMATICALLY TURNS THE LIGHTING OFF AT SPECIFIC PROGRAMMED TIMES OR A SIGNAL FROM ANOTHER AUTOMATIC CONTROL DEVICE OR ALARM/SECURITY SYSTEM. (ASHRAE 90.1-2016 9.4.1.1.i). PROVIDE A MANUAL OVERRIDE SWITCH LOCATED NEAR EACH STAFF ENTRANCE TO TURN ON LIGHTING NOT MORE THAN TWO HOURS. PROVIDE RELAYS AS REQUIRED.

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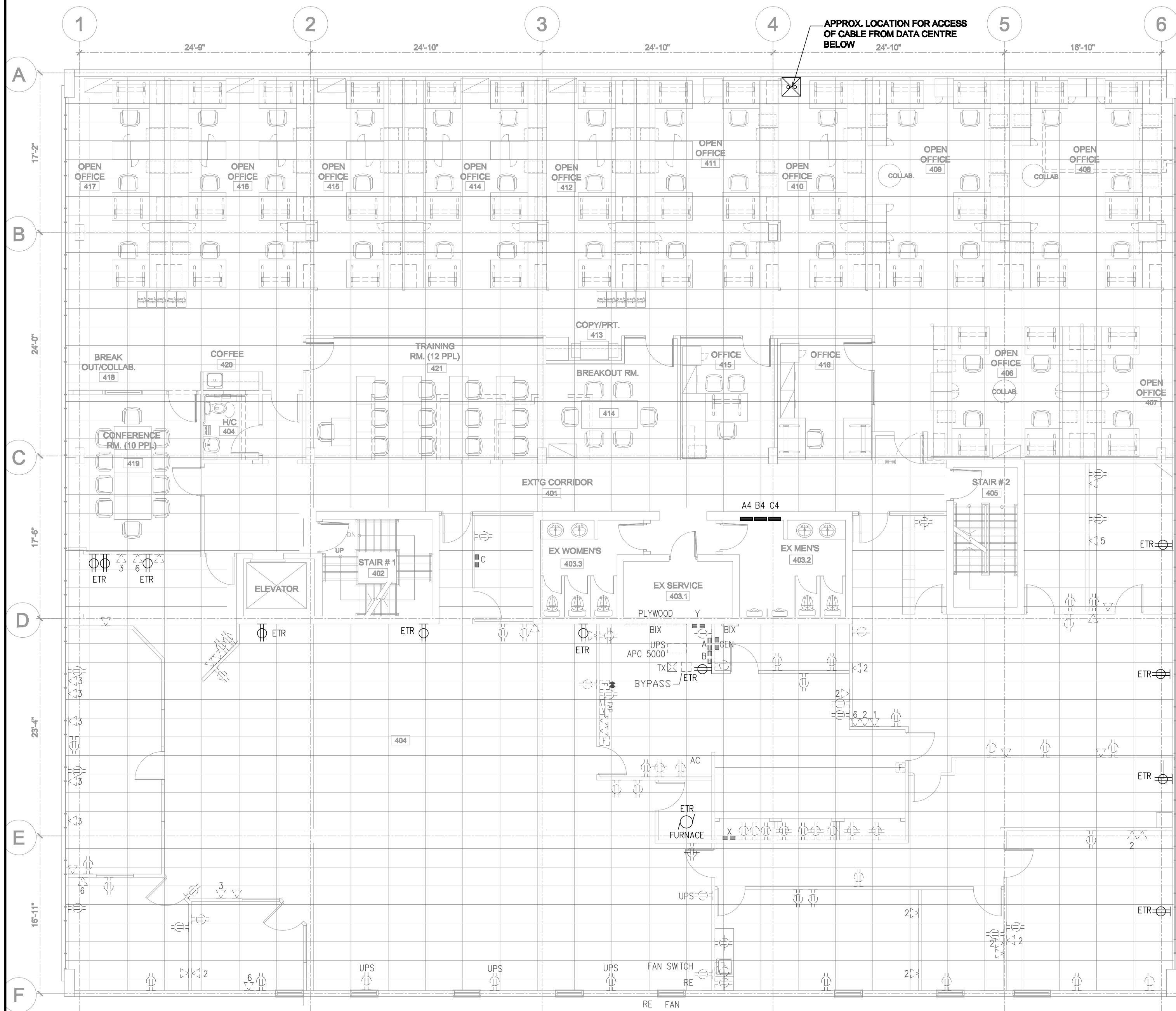
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POWER
DEMO./RENO.
PLAN

Sheet

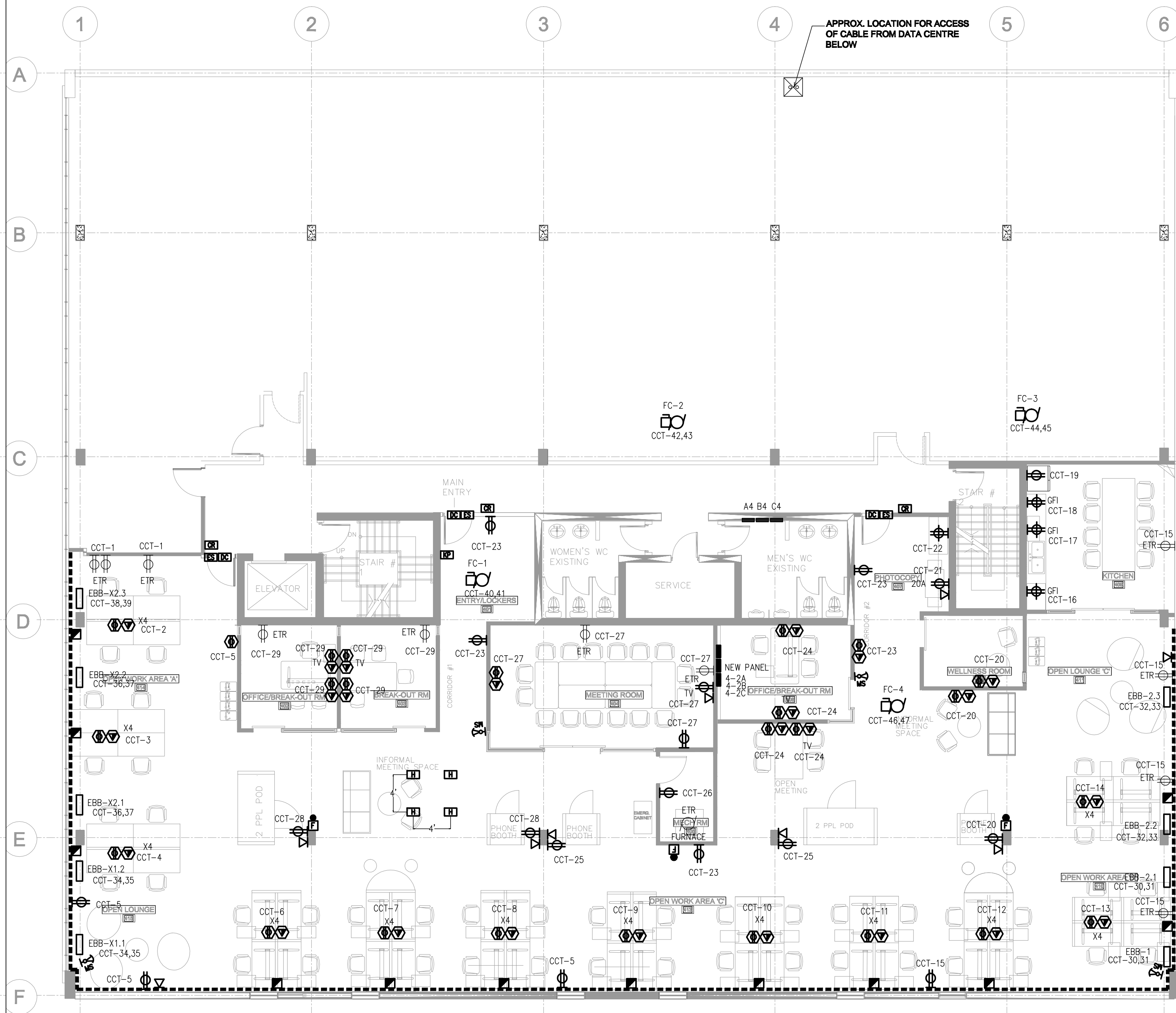
E 4



NOTES:

1. ALL EXISTING POWER/VOICE/DATA OUTLETS TO BE REMOVED, UNLESS OTHERWISE NOTED "ETR" ON THE DRAWING.

A DEMOLITION POWER PLAN
SCALE: 1/8"=1'-0"



NOTES:

1. ALL POWER/VOICE/DATA OUTLETS NEW, UNLESS OTHERWISE NOTED "ETR" ON THE DRAWING.
2. NEW CIRCUITS TO BE FED FROM PANEL 4-2A, 4-2B, 4-2C, CCT NUMBERS ON THE DRAWING ARE TYPICAL OF THE SPARE CCT OF PANELS.
3. ANY CHANGES TO ELECTRICAL PANEL/SCHEDULES, CHANGES MUST BE RE-TYPED, HAND WRITTEN OR STICKERS IS NOT ACCEPTABLE.
4. TYPICAL 2 OFFICES PER CCT, 4 STATIONS PER CCT, COPIER, PRINTER ON DEDICATE 20A CCT, KITCHEN EQUIPMENT ON DEDICATE 15A CCT.
5. ALL SECURITY DEVICES LOCATION TO BE COORDINATED WITH SECURITY CONTRACTOR ON SITE.
6. ALL COMMUNICATION CABLE RUN TO DATA CENTRE BELOW THROUGH VERTICAL CHANNEL AT GRID LINE A/4.

B RENOVATION POWER PLAN
SCALE: 1/8"=1'-0"

COMMUNICATION SPECIFICATION



flow consulting group inc.
#100 - 1075 west georgia street
vancouver, b.c. V6E 3C7
v. 604 609 0500 f. 604 609 0588

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1. GENERAL

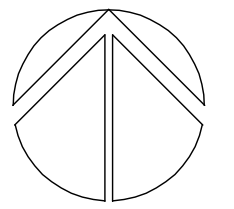
- 1.1. RELATED WORK
 - 1.1.1. SEE ELECTRICAL SPECIFICATIONS ON THIS DRAWING
- 1.2. SCOPE
 - 1.2.1. REMOVE EXISTING CABLING, FACEPLATES, JACKS AND BIX PANELS AS INDICATED ON THE PLANS, OR WHICH ARE AFFECTED BY NEW WORK. EXISTING CONDUIT AND CABLE RACEWAY SYSTEMS MAY BE REUSED. EXISTING WIRING MAY BE USED TO PULL IN NEW CABLING. NEW CONDUIT AND BACKBOXES ARE TO BE INSTALLED FOR OUTLET LOCATIONS WHERE NO CONDUIT AND BACKBOX ARE EXISTING. ALL CABLING TO BE IN CONDUIT OR RACEWAY SYSTEMS.
 - 1.2.2. SUPPLY AND INSTALL A COMPLETE CATEGORY 6, TYPICALLY 2 PER COMMUNICATION OUTLET UNLESS OTHERWISE NOTED. TYPICAL (SEE NOTES FOR MORE DETAILS) STRUCTURED CABLING SYSTEM AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN.
 - 1.2.3. SYSTEM TO BE COMPLETE WITH ALL COMMUNICATION OUTLETS, PATCH PANELS, FACEPLATES, CABLE MANAGEMENT SYSTEMS, WIRING BLOCKS, CONNECTING BLOCKS, WIRE AND CABLE TO FORM A COMPLETE SYSTEM.
 - 1.2.4. ENTIRE SYSTEM TO BE CATEGORY 6 STANDARD.
 - 1.2.5. CONTRACTOR QUALIFICATIONS
 - 1.2.5.1. THE CABLING CONTRACTOR MUST BE A CERTIFIED SYSTEM VENDOR OF THE MANUFACTURER'S COMPONENTS AND/OR CABLE BEING BID, USE ONLY TECHNICIANS FULLY TRAINED AND QUALIFIED ON INSTALLATION AND TESTING OF THE COMPONENTS TO BE INSTALLED.
 - 1.2.5.2. UPON REQUEST FROM THE ENGINEER, THE CONTRACTOR SHALL PROVIDE CERTIFIED DOCUMENTATION OF THE QUALIFICATIONS DESCRIBED ABOVE. FAILURE TO MEET OR PROVIDE SUCH DOCUMENTATION WILL BE THE BASIS FOR DISQUALIFICATION OF THE CABLING CONTRACTOR.
 - 1.2.5.3. ALL STAFF PERFORMING ANY TYPE OF WORK CONTAINED IN THIS SPECIFICATION MUST BE CERTIFIED IN THE INSTALLATION, TERMINATION AND TESTING OF ALL ASPECTS OF UTP CABLE SYSTEMS BY:
 - 1.2.5.3.1. A RECOGNIZED EDUCATION INSTITUTION, OR
 - 1.2.5.3.2. A MAJOR CABLE MANUFACTURER, OR
 - 1.2.5.3.3. BEING THE HOLDER OF THE DESIGNATION OF REGISTERED COMMUNICATIONS DISTRIBUTION DESIGNER(RCDD)
 - 1.2.5.4. SYSTEM INSTALLER TO COORDINATE ALL LABELING WITH OWNER AND CONSULTANT AND TO MATCH EXISTING.
- 1.3. ACCEPTABLE STANDARDS
 - 1.3.1. ANSI-TIA-568-B
 - 1.3.2. TIA / EIA-606-A
 - 1.3.3. TIA / EIA-569-B
 - 1.3.4. TIA / EIA-568-B.1 & ALL ADDENDUMS
 - 1.3.5. TIA / EIA-568-B.2 & ALL ADDENDUMS
 - 1.3.6. TIA / EIA-568-B.3
 - 1.3.7. NBCC-2005
 - 1.3.8. BICSI STANDARDS
- 1.4. SHOP DRAWINGS
 - 1.4.1. SHOP DRAWINGS TO BE SUBMITTED AS OUTLINED HEREIN AND CONTAIN ALL ITEMS WITHIN ONE COMPLETE SUBMISSION.
 - 1.4.2. SHOP DRAWINGS WHICH ARE SUBMITTED INCOMPLETE WILL BE RETURNED TO CONTRACTOR WITHOUT REVIEW.
 - 1.4.3. SHOP DRAWINGS TO INCLUDE A COMPLETE MATERIAL LIST WITH MANUFACTURER, STYLE, MODEL NUMBER AND QUANTITY. WIRE AND CABLE TO BE INCLUDED IN MATERIAL LIST.
 - 1.4.4. SHOP DRAWINGS TO INCLUDE MANUFACTURER'S SPECIFICATION SHEETS WITH PHOTOGRAPHIC DEPICTION OF ALL SYSTEM COMPONENTS. SPECIFICATION AND DESCRIPTIVE DATA TO INCLUDE DIMENSION, WEIGHT, APPEARANCE, CONNECTION PROVISIONS, MATERIALS, METAL GAUGES AND OPERATING SPECIFICATION, CHARACTERISTICS, FEATURES AND CONTROLS.
 - 1.4.5. SHOP DRAWINGS TO INCLUDE THE FOLLOWING DIAGRAMS:
 - 1.4.5.1. ELEVATIONS TO INDICATE NEW EQUIPMENT INCLUDING WIRE MANAGEMENT (HORIZONTAL AND VERTICAL), CABLE ROUTING, CABLE DETAILS, PORT LABELING, EXISTING EQUIPMENT (IF APPLICABLE), (IF APPLICABLE).
 - 1.4.5.2. LAYOUT DRAWINGS FOR PATCH PANELS AND JACKFIELDS.
 - 1.4.5.3. CABLE DETAILS, INCLUDING TYPE AND ELECTRICAL CHARACTERISTICS.
 - 1.4.5.4. COMPLETE ENGINEERING DRAWINGS OF ALL CUSTOM MADE COMPONENTS INDICATING ALL MATERIALS, GAUGES, FINISHES AND WIRING DIAGRAMS.
 - 1.4.5.5. COMPLETE SYSTEM BLOCK DIAGRAMS INDICATING ALL COMPONENTS, INTERCONNECTION AND CABLING.
 - 1.4.5.6. COMPLETE DETAILED SYSTEM CIRCUIT DIAGRAMS DEPICTING HOW COMPONENTS ARE INTERCONNECTED COMPONENT FUNCTIONS, CABLE TERMINATIONS, TERMINAL IDENTIFICATION AND CABLE DESIGNATION.
 - 1.4.5.7. COMPLETE SYSTEM WIRE AND CABLE DESIGNATION SCHEDULE INDICATING ORIGIN, TERMINUS, ORIGIN TERMINAL IDENTIFICATION, TERMINUS TERMINAL IDENTIFICATION, CABLE FUNCTION, CABLE TYPE AND CABLE DESIGNATION. AT EACH DEMARCATON POINT.
 - 1.4.5.8. UNDER NO CIRCUMSTANCES WILL WIRING SCHEMATICS OR TYPICAL WIRING DETAILS BE CONSIDERED AS CIRCUIT DIAGRAMS.
- 1.5. ELECTRICAL SPARE PARTS AND MAINTENANCE MATERIALS
 - 1.5.1. NONE.
- 1.6. OPERATING MANUALS
 - 1.6.1. OPERATING MANUALS TO BE FURNISHED AS SPECIFIED HEREIN. OPERATING INSTRUCTIONS TO CONSIST OF FOLLOWING:
 - 1.6.1.1. INDIVIDUAL FACTORY ISSUED MANUALS CONTAINING ALL TECHNICAL INFORMATION ON EACH TYPE OF EQUIPMENT INSTALLED. IN EVENT SUCH MANUALS ARE NOT AVAILABLE FROM THE FACTORY, SYSTEM INSTALLER TO ESTABLISH SAME AND COMPILE WITHIN THE MANUAL TO SATISFACTION OF THE OWNER AND IS SYSTEM CERTIFIED.
 - 1.6.1.2. EACH MANUAL TO CONTAIN A SYSTEM PARTS LIST, A PARTS LIST FOR INDIVIDUAL COMPONENTS, DETAILED SCHEMATICS AND RECOMMENDED MAINTENANCE PROCEDURES. ADVERTISING BROCHURES OR OPERATIONAL INSTRUCTIONS SHALL NOT BE CONSIDERED AS TECHNICAL MANUALS. REFER TO SECTION 16031 FOR MANUAL COMPILATION.
 - 1.6.1.3. ENGINEERING DRAWINGS DEPICTING LAYOUT AND INTERCONNECTION OF ALL SYSTEM COMPONENTS AND AS-BUILT CONDUIT LAYOUT.
 - 1.6.2. IN ADDITION TO THE ABOVE DESCRIBED MANUALS, SYSTEM INSTALLER TO INCLUDE ALL SHOP AND CIRCUIT DRAWINGS, WARRANTIES, INSTALLATION CERTIFICATION, WIRING SCHEDULES AND SINGLE LINE BLOCK DRAWINGS IN THE MANUALS.
- 1.7. GENERAL REQUIREMENTS
 - 1.7.1. SYSTEM TO BE COMPLETE WITH ALL NECESSARY COMPONENTS TO PROVIDE FUNCTIONS REQUIRED WHETHER OR NOT EACH AND EVERY ITEM IS NECESSARILY MENTIONED. ALL COMPONENTS TO BE PRODUCTION PROVEN MODELS. CUSTOM DESIGNED UNITS WILL ONLY BE CONSIDERED FOR THOSE ITEMS THAT ARE NOT CURRENTLY AVAILABLE ON COMMERCIAL MARKET. SYSTEM TO BE SUPPLIED AND INSTALLED BY AN ESTABLISHED COMMUNICATIONS CONTRACTING FIRM THAT IS APPROVED BY OWNER.
 - 1.7.2. SELECTION OF SYSTEM TO BE MADE ON THE BASIS OF QUALITY AND SUITABILITY OF EQUIPMENT, SERVICE FACILITIES, AND PAST PERFORMANCE OF CONTRACTING FIRM.
 - 1.7.3. BEFORE PROCEEDING WITH INSTALLATION, SUCCESSFUL SYSTEM INSTALLER TO SUBMIT TO OWNER FOR APPROVAL A COMPLETE DETAILED PROPOSAL AS OUTLINED IN CLAUSE 1.4, SHOP DRAWINGS.
 - 1.7.4. ALL CONDUIT, PULLBOXES, JUNCTION BOXES AND TERMINAL PANELS ARE TO BE INSTALLED TO PROVIDE A COMPLETE CONDUIT SYSTEM FOR THE TELEPHONE AND DATA SYSTEM.
 - 1.7.5. ALL WIRING FOR SYSTEMS TO BE TEFLON INSULATED, UNSHIELDED, TWISTED PAIR. ALL WIRING TO BE INSTALLED IN CONDUIT AND TRAY SYSTEM UNLESS OTHERWISE SPECIFIED.
 - 1.7.6. THE SYSTEM, WHEN COMPLETE, MUST PERFORM TO COMPLETE SATISFACTION OF OWNER AND MUST BE FREE OF ALL INTERFERENCE FROM CROSS-TALK, HUM, SWITCH AND RELAY NOISE, ETC.
 - 1.7.7. PERSONNEL INSTALLING COMMUNICATIONS CABLING SHALL BE TRAINED AND CONVERSANT WITH COMMUNICATIONS CABLING PRACTICES REQUIRED FOR THIS PROJECT. PROOF OF CERTIFICATION MUST BE PROVIDED PRIOR TO COMMENCEMENT OF WORK.
 - 1.7.8. THE SYSTEM SHALL BE CERTIFIED. THE SYSTEM SHALL BE INSTALLED BY A CERTIFIED CONTRACTOR DESIGNATED

- AND TRAINED BY THE MANUFACTURER OF BEING CAPABLE TO DO SO AND SHALL PROVIDE WRITTEN CONFIRMATION OF THIS FACT.
- 1.8. SYSTEM DESCRIPTION
 - 1.8.1. THE COMMUNICATION CABLING DATA SYSTEM CONSISTS OF HORIZONTAL AND VERTICAL WIRING.
 - 1.8.2. HORIZONTAL COMMUNICATION (VOICE, DATA & IMAGE) WIRING: 4-PAIR UNSHIELDED TWISTED PAIR (UTP) ENHANCED CATEGORY 6 CABLES. SEE SYMBOL SCHEDULE FOR RUNS.
- 1.9. WARRANTY/SERVICE
 - 1.9.1. SYSTEM INSTALLER TO INCLUDE WITH THEIR BASE TENDER PRICE A QUARANTEE STATING:
 - 1.9.1.1. FULL WARRANTY ON NEW SYSTEM TO BE PROVIDED TWENTY-FIVE (25) YEARS.
 - 1.9.1.2. SERVICE TO BE PROVIDED ON SYSTEM WITHIN 24 HOURS OF CALL ORIGINATION DURING THE WARRANTY PERIOD.
 - 1.9.1.3. DURING WARRANTY PERIOD SYSTEM INSTALLER AT HIS EXPENSE TO REPAIR AND REPLACE ALL SUCH DEFECTIVE WORK AND OTHER WORK TO NEW SYSTEM DAMAGED THEREBY WHICH FAILS OR BECOMES DEFECTIVE DURING TERM OF WARRANTY, PROVIDED THAT SUCH FAILURE IS NOT CAUSED BY IMPROPER USAGE OR PHYSICAL DAMAGE.
 - 1.9.1.4. WARRANTY DATE TO COMMENCE FROM DATE OF SUBSTANTIAL PERFORMANCE OF THIS WORK.
 - 1.9.1.5. SYSTEM TO BE CERTIFIED TO MEET AND OR EXCEED CATEGORY 6 STANDARDS OF GIGABIT SPEED AND OF PERFORMANCE FOR THE DURATION OF THE WARRANTY AS SPECIFIED BY THE MANUFACTURER.
- 1.10. TRAINING
 - 1.10.1. SYSTEM INSTALLER TO CONDUCT TRAINING PROGRAM FOR DESIGNATED MAINTENANCE AND OPERATING PERSONNEL. THIS PROGRAM TO INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
 - 1.10.1.1. OPERATION: DESIGNATED PERSONNEL TO BE TRAINED TO ACCOMPLISH AND UNDERSTAND ALL ASPECTS OF SYSTEM OPERATION.
 - 1.10.1.2. MAINTENANCE: DESIGNATED PERSONNEL TO BE TRAINED TO PERFORM ROUTINE MAINTENANCE ON THE SYSTEM.
 - 1.10.1.3. TRAINING PERIOD SCHEDULE TO BE ESTABLISHED BY OWNER. TRAINING PERIODS TO TAKE PLACE AFTER SUBSTANTIAL PERFORMANCE OF THE WORK AND PRIOR TO SYSTEM USE.
 - 1.11. INSTALLATION TO MATCH EXISTING CLIENT STANDARDS.
- 2. PRODUCTS
 - 2.1. CABLE
 - 2.1.1. ALL HORIZONTAL DATA AND VOICE CABLE TO BE 4-UNSHIELDED, 24 AWG, 100 OHM, SOLID COPPER CONDUCTOR INSULATED WITH A THERMOPLASTIC MATERIAL INSIDE A UNIFORMLY EXTRUDED COATING OF FLAME RETARDANT POLYMER. CONDUCTORS ARE TO BE COLOUR CODED AND TWISTED INTO 4 DISTINCT PAIRS. CABLE TO BE LISTED UNDER CSA C22.2 NO. 214 TYPE PCC F16 AND COMPLY WITH THE FCC CLASS A LIMITS OF EMI. CABLE TO BE INDEPENDENTLY VERIFIED BY A RECOGNIZED TESTING AGENCY TO MEET OR EXCEED ALL REQUIREMENTS OF TIA/EIA-568-B.1 AND TIA/EIA-568-B.2-1 FOR CATEGORY 6 CABLING AND COMPONENTS. CABLE TO BE UL LISTED TYPE NEC-CMF AND CERTIFIED BY CSA AS TYPE PCC WITH AN FT6 CAN FLAME TEST RATING. CABLE TO BE ENHANCED CATEGORY 6 SUPPLIED BY AMP FOR AN AMP SOLUTION (OR APPROVED VENDOR)
 - 2.1.2. ALL CABLES SHALL HAVE A JACKET SPLITTING CORD LAID BETWEEN THE CORE AND JACKET.
 - 2.2. COMMUNICATIONS OUTLET ASSEMBLIES
 - 2.2.1. COMMUNICATIONS OUTLET - BOXES:
 - 2.2.1.1. RECESSED BOX, 63 MM MINIMUM DEPTH WITH DOUBLE GANG BOX.
 - 2.2.1.2. 25 MM EMT, STUBBED FROM BOX TO NEAREST DROPPED CEILING AS PART OF COMMUNICATIONS CONDUIT SYSTEM WITH BUSHED CABLE EXIT(S).
 - 2.2.2. COMMUNICATIONS OUTLET - HOUSINGS:
 - 2.2.2.1. FORMED OUTLET PLATE:
 - 2.2.2.1.1. MAXIMUM DIMENSIONS: 150 MM X 150 MM X 38 MM DEEP.
 - 2.2.2.1.2. REAR AND SIDE ENTRY OF CABLE. STRAIN RELIEF PROVISIONS FOR SIDE ENTRY OF CABLE.
 - 2.2.2.2. FLAT PLATE: MINIMUM THICKNESS 3.9 MM.
 - 2.2.2.2.1. ACCEPTS MINIMUM OF FOUR SNAP-IN OR SLIDE-IN OUTLET INSERTS.
 - 2.2.2.2.2. MOUNTS TO STANDARD ONE-DEVICE, TWO-DEVICE, ELECTRICAL BOX, OR ADAPTER RING OPENING.
 - 2.2.2.2.3. CONSTRUCTED OF HIGH-IMPACT FIRE-RETARDANT THERMOPLASTIC.
 - 2.2.2.2.4. PLATES TO BE SINGLE GANG TYPE.
 - 2.2.2.2.5. COLOUR CODE: TO MATCH EXISTING.
 - 2.2.2.2.6. PROVIDE NECESSARY ADAPTERS AND FACEPLATE FOR INSTALLING OUTLETS IN FLOOR BOXES AND SURFACE RACEWAY SYSTEM.
 - 2.2.3. CATEGORY 6 UTP CABLE CONNECTORS FOR HORIZONTAL CABLING:
 - 2.2.3.1. 8P/8W MODULAR FEMALE CONNECTORS AT BOTH ENDS OF HORIZONTAL CABLING.
 - 2.2.3.2. 8P/8W MODULAR MALE CONNECTORS AT BOTH ENDS OF PATCH CORDS.
 - 2.2.3.3. ALL CONNECTORS SHALL MEET OR EXCEED ALL REQUIREMENTS OF TIA/EIA-568-B.1 AND TIA/EIA-568-B.2-1.
 - 2.2.3.4. SHALL BE BACKWARD COMPATIBLE WITH CATEGORIES DEFINED IN TIA/EIA-568-B.1 AND TIA/EIA-568-B.2.
 - 2.2.3.5. SUBMIT A THIRD PARTY ETL TESTING VERIFYING THE COMPONENT'S PERFORMANCE IN COMPLIANCE WITH TIA/EIA-568-B.2-1.
 - 2.2.3.6. NON-KEYED, 4 PAIR, 8P/8W MODULAR JACKS, T568A WIRING.
 - 2.2.3.7. USE SNAP-IN TYPE CONNECTORS AT BOTH ENDS OF CABLES.
 - 2.2.3.8. BLUE FOR DATA, PINK FOR VOICE.
- 2.3. PATCH CABLES
 - 2.3.1. SUPPLY AND INSTALL 2'-4'-0", 1'-6'-0" AND 1'-8'-0" PER COMMUNICATION DROP.
 - 2.3.2. MODULAR PATCH CABLE
 - 2.3.2.1. STRANDED CONDUCTORS CATEGORY 6 PATCH CABLE, 4 PAIR, 24AWG, 8P/8W, T568A WRID.
 - 2.3.2.2. SPECIFY REQUIRED LENGTHS AND QUANTITIES.
 - 2.3.2.3. LABEL EACH PATCH CABLE WITH SEQUENTIAL NUMBER AND CABLE LENGTH. E.G. 30-3 IS PATCH CABLE 30 WHICH IS 3M LONG.
- 2.4. PATCH PANEL
 - 2.4.1. MODULAR PATCH PANEL.
 - 2.4.2. 48-PORT, HIGH DENSITY, INDIVIDUAL CUT-OUTS FOR SNAP IN TYPE FEMALE 8P/8W.
- 2.5. POWER BAR
 - 2.5.1. COMPLETE WITH 6-OUTLETS, 12 FEET SHIELDED CORD.
 - 2.5.2. SUITABLE FOR RACK MOUNTING.
 - 2.5.3. 2-POWER BAR PER RACK.
 - 2.5.4. POWER COMPLETE WITH AMPERAGE DRAWING DISPLAY.
- 2.6. FLUSH FACE PLATES FOR WALL MOUNTED OUTLETS
 - 2.6.1. FOR USE ON ALL FLUSH MOUNTED VOICE/DATA.
 - 2.6.2. SUPPLY 4-PORT FACE PLATE, INSTALL BLANKS ON ALL UNUSED.
 - 2.6.3. SINGLE GANG, FLUSH MOUNTED-WHITE.
- 2.7. RACKS
 - 2.7.1. SUPPLY AND INSTALL AN ENCLOSED RACK.
- 2.8. BACKBONE CABLING
 - 2.8.1. EC TO SUPPLY AND INSTALL THE FOLLOWING BETWEEN MAIN TEL CLOSET TO DATA CENTRE
 - 2.8.1.1. 1-2" C/W 12 STRAND MULTIMODE FIBRE.
 - 2.8.1.2. 1-3" C/W 50 PAIR CAT 3
- 3. EXECUTION
 - 3.1. CABLE INSTALLATION:
 - 3.1.1. INSTALL DATA CABLE AND TELEPHONE CABLE IN CONDUIT AND CABLE TRAYS, WIREWAYS AND SURFACE RACEWAYS INDICATED ON DRAWINGS. NO FREE AIR CABLING WILL BE ACCEPTED.
 - 3.1.2. CONDUIT BOXES AND FITTINGS:
 - 3.1.2.1. ENSURE IN ADVANCE THAT OUTLET BOX/DATA OUTLET INSTALLATION METHODS YIELD VERTICALLY-MOUNTED DATA OUTLETS.
 - 3.1.3. WIRE AND CABLE:
 - 3.1.3.1. SWAB RACEWAY SYSTEM BEFORE INSTALLING WIRING.
 - 3.1.3.2. DO NOT EXCEED MANUFACTURER'S MAXIMUM PULLING FORCE SPECIFICATIONS.
 - 3.1.3.3. MAINTAIN NOT LESS THAN MINIMUM BENDING RADIUS FOR FIBER AND COPPER CONDUCTORS.
 - 3.2. TESTING
 - 3.2.1. TEST ALL RUNS UPON COMPLETION OF PERMANENT TERMINATIONS, USING INSTRUMENTATION ACCEPTABLE TO THE CONSULTANT. BEFORE COMMENCING TESTING, SUBMIT SAMPLE TEST DATA SHEETS AND INFORMATION WITH RESPECT TO TEST INSTRUMENTATION TO BE USED. ALL TESTING MUST BE IMPLEMENTED IN BOTH DIRECTIONS. TESTS ARE TO BE DONE BY A LEVEL III TESTER IN ACCORDANCE WITH TIA/EIA-568-B.2 AND TIA/EIA-568-B.2-1.
 - 3.2.2. ACCEPTABLE TEST INSTRUMENTS:
 - 3.2.2.1. COPPER: FLUKE MICROTEST OMNI SCANNER
 - 3.2.3. COPPER MEDIA, TEST FOR THE FOLLOWING:
 - 3.2.3.1. CONTINUITY
 - 3.2.3.2. PAIR PLACEMENT AND POLARITY.
 - 3.2.3.3. DC RESISTANCE
 - 3.2.4. CHARACTERISTICS AT 250MHZ:
 - 3.2.4.1. ATTENUATION
 - 3.2.4.2. MUTUAL CAPACITANCE
 - 3.2.4.3. NEAR-END CROSSTALK (NEXT), PAIR-TO-PAIR.
 - 3.2.4.4. FAR-END CROSSTALK (NEXT), PAIR-TO-PAIR.
 - 3.2.4.5. RUN LENGTH.
 - 3.2.4.6. WIRE MAP
 - 3.2.4.7. POWER SUM NEAR-END CROSSTALK (PSNEXT).
 - 3.2.4.8. POWER SUM FAR-END CROSSTALK (PSNEXT).
 - 3.2.4.9. EQUAL LEVEL FAR-END CROSSTALK (ELFEXT), PAIR-TO-PAIR.
 - 3.2.4.10. EQUAL LEVEL FAR-END CROSSTALK (ELFEXT), POWER SUM.
 - 3.2.4.11. POWER SUM EQUAL LEVEL FAR-END CROSSTALK (PSSELFEXT).
 - 3.2.4.12. RETURN LOSS, MEASURED FROM LOCAL END.
 - 3.2.4.13. RETURN LOSS, MEASURED FROM FAR END.
 - 3.2.4.14. PROPAGATION DELAY.
 - 3.2.4.15. DELAY SKEW FROM TELECOM ROOM TO THE WORKSTATION.
 - 3.2.5. TESTING TO COMPLY TO INDUSTRY STANDARD.
 - 3.2.6. TEST RESULTS ARE TO BE PROVIDED IN PDF FORMAT TO CONSULTANT AND OWNER.
 - 3.2.7. MARGINAL OR CONDITIONAL PASS WILL NOT BE ACCEPTABLE.
 - 3.3. REPORT
 - 3.3.1. RECORD RESULTS IN TABULAR FORM.
 - 3.3.2. SEGREGATE HORIZONTAL RUNS, INTER-ROOM RUNS, AND RISERS BY CATEGORY OR RUN AND BY TYPE OF CABLE.
 - 3.3.3. PRESENT HORIZONTAL RESULTS IN ASCENDING ORDER.
 - 3.3.4. REPORT SUBMISSION:
 - 3.3.4.1. SUBMIT TWO (2) REPORTS PRINTED ON 215 MM BY 280 M WHITE PAPER.
 - 3.3.4.2. SUBMIT TWO (2) REPORTS PREPARED IN ELECTRONIC FORM IN PDF FORMAT THROUGH EMAIL OR BY CD-ROM
 - 3.4. RECORD DRAWINGS
 - 3.4.1. THE AS-BUILT DOCUMENTATION MUST SHOW THE LOCATION OF EACH VOICE AND DATA DROP, PREFERABLY USING THE STANDARD TRIANGLE WITH ONE HALF WHITE AND THE OTHER HALF BLACK. LOCATIONS WHERE THERE IS A DATA DROP ONLY SHOULD HAVE A BLANK TRIANGLE AND FOR A VOICE DROP, A BLACK TRIANGLE.
 - 3.4.2. A LAMINATED AS-BUILT DRAWING, APPROXIMATELY 24x36 INCHES, IS TO BE SUPPLIED AND INSTALLED BY THE CONTRACTOR IN THE TELECOM ROOM AFTER THE PROJECT IS COMPLETED.
 - 3.4.3. RECORD DRAWINGS TO INDICATE NEW AND EXISTING OUTLETS THROUGHOUT.
 - 3.4.4. PROVIDE A CATEGORY 6 CERTIFICATE DOCUMENT ISSUED BY THE CABLE/COMPONENT MANUFACTURER, GUARANTEEING TRANSMISSION CAPABILITIES OF THE CABLING SYSTEM TO SUPPORT GIGABIT ETHERNET DEVICES FOR A PERIOD OF 25 YEARS.
 - 3.4.5. THE INSTALLED STRUCTURED CABLING SYSTEM MUST BE COVERED BY A WARRANTY WHICH INCLUDES, AS A MINIMUM:
 - 3.4.5.1. 25 YEAR COVERAGE.
 - 3.4.5.2. WARRANTY AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FROM THE DATE OF INSTALLATION.
 - 3.4.5.3. REPAIR OR REPLACEMENT OF FAILED COMPONENT, COVERING PARTS AND LABOUR, AT NO CHARGE TO THE OWNER.
 - 3.4.5.4. SINGLE POINT OF CONTACT FOR ALL WARRANTY SERVICE.
 - 3.4.6. UPON REQUEST AND AT NO ADDITIONAL COST TO OWNER, PROVIDE A MANUFACTURER'S TECHNICAL REPRESENTATIVE TO CONDUCT AN ON-SITE VISIT TO ENSURE COMPLETE TECHNICAL COMPLIANCE.
 - 4. GENERAL
 - 4.1. COMMUNICATION TO CONFIRM TO COV, COMMUNICATION REQUIREMENTS TYPICAL.

- 3.1.3.4. INSTALL CABLE ALONG OR AT RIGHT ANGLES TO BUILDING LINES UNLESS IMPRACTICAL TO DO SO. VERIFY SPECIFIC CASES OF DEVIATION IN ADVANCE WITH CONSULTANT.
- 3.1.3.5. MAINTAIN OPEN COPPER-CONDUCTOR CABLE AT MAXIMUM PRACTICAL DISTANCE FROM FLUORESCENT BALLASTS AND OTHER EMF - OR DISCHARGE-GENERATING EQUIPMENT.
- 3.1.3.6. ENSURE THAT CABLE IS NOT FLATTENED, SQUEEZED, OR CRIMPED AT ANY POINT ALONG ENTIRE RUN. NO SPLICES OR INTERMEDIATE TERMINATIONS IN CABLE RUNS.
- 3.1.3.7. INSTALL CABLES AND FAN INDIVIDUAL CABLES TO APPLICABLE PATCH PANELS IN NEAT, LOGICAL FASHION. THE WRAP CABLES NEATLY INTO LOGICAL BUNDLES. NO NYLON THE STRAPS ACCEPTABLE. USE ONLY VELCRO STYLE TIE WRAPS.
- 3.1.3.8. MINIMUM 1 M OF SLACK CABLE PER RUN IN THE TELECOM ROOM AND 305 MM AT THE WORKSTATION/DESK OUTLET.
- 3.1.4. CONNECTORS:
 - 3.1.4.1. USE TOOLING SPECIFIC TO CONNECTOR TYPES IN USE.
 - 3.1.4.2. USE CONNECTORS SUITABLE FOR NATURE OF CONDUCTOR IN CABLE, E.G. STRANDED VS. SOLID COPPER.
 - 3.1.4.3. ENSURE THAT CONNECTORS' STRAIN RELIEF PROVISIONS ARE USED. STRIP JACKETS ONLY AMOUNT REQUIRED.
 - 3.1.4.4. MAINTAIN PAIR TWISTS WITHIN 13 MM OF TERMINATION.
- 3.1.5. PATCH PANELS:
 - 3.1.5.1. MOUNT PATCH PANELS IN ORDERLY FASHION. SUBMIT RACK LAYOUTS FOR APPROVAL PRIOR TO INSTALLATION.
 - 3.1.5.2. GROUND AS REQUIRED BY SYSTEM.
 - 3.1.5.3. ATTACH HORIZONTAL WIRING IN AN ORDERED FASHION FOLLOWING GRID NUMBERING OF OUTLETS, ALPHA CHARACTER FIRST, E.G. A-1, A-2, ETC.
 - 3.1.5.4. ATTACH HORIZONTAL WIRING IN ORDER OF GRID NUMBER OF OUTLETS.
 - 3.1.5.5. MOUNT PANELS TO RACKS WITH AS MANY SCREWS AS THERE ARE MOUNTING HOLES OR SLOTS IN PANELS.
 - 3.1.5.6. PROVIDE AND INSTALL NECESSARY STRAIN RELIEFS AND CABLE SUPPORT BRACKETS.
 - 3.1.5.7. UTP CONNECTION CONFIGURATION IN ACCORDANCE WITH ANSI/TIA/EIA 568-A.
- 3.1.6. CABLING SYSTEM LABELING
 - 3.1.6.1. THE CONTRACTOR SHALL ADHERE TO THE OWNER'S LABELLING SYSTEM STANDARD AND TO MATCH EXISTING. RE-USE EXISTING CABLING SYSTEM AND NEW CABLE RUNS TO MATCH EXISTING LABELS.
 - 3.1.6.2. ALL LABEL PRINTING WILL BE MACHINE GENERATED USING INDELIBLE INK RIBBONS OR CARTRIDGES. SELF-LAMINATING LABELS WILL BE USED ON CABLE JACKETS, APPROPRIATELY SIZED TO THE OF THE CABLE, AND PLACED WITHIN VIEW AT THE TERMINATION POINT ON EACH END. OUTLET LABELS WILL BE THE MANUFACTURER'S LABELS PROVIDED WITH THE OUTLET ASSEMBLY. OUTLET LABELS TO BE RED TEXT ON WHITE BACKGROUND, PER EXISTING STANDARD. MATCH EXISTING FONT TYPE, SIZE AND STYLE.
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Project: CITY OF VANCOUVER 4TH FLOOR FLEX WORK PROJECT

814 RICHARDS STREET
VANCOUVER, BC



STAMP/SEAL:

Revisions

NO.	ISSUE	DATE
4	ISSUED FOR TENDER	19/09/30
3	ISSUED FOR BP	19/09/18
2	ISSUED FOR BP REVIEW	19/08/29
1	ISSUED FOR REVIEW	19/08/21

Sheet Info.

DATE:	19/07/08
PROJECT:	19-115
SCALE:	AS NOTED
DRAWN:	ID
CHECKED:	PL
APPROVED:	OAB
	Title

COMMUNICATION SPECIFICATIONS

Sheet