

# WAREHOUSE AND OFFICE HEADQUARTERS

**45 BLOWERS CRES,  
AJAX, ON,L1Z 0N4**

DRAWING SCHEDULE	
DWG. NO	DRAWING TITLE
M-000	COVER SHEET AND DRAWING LIST
M-001	MECHANICAL SPECIFICATION
M-002	MECHANICAL SPECIFICATION AND LEGEND
M-003	MECHANICAL SCHEDULE
M-004	MECHANICAL DETAILS
M-100	GROUND FLOOR MECHANICAL HVAC PLAN
M-101	SECOND FLOOR MECHANICAL HVAC PLAN
M-200	GROUND FLOOR MECHANICAL PLD PLAN
M-201	SECOND FLOOR MECHANICAL PLD PLAN
M-300	GROUND FLOOR MECHANICAL SP PLAN
M-301	SECOND FLOOR MECHANICAL SP PLAN
M-400	MECHANICAL ROOF PLAN

CONTENT	ISSUED FOR	DATE	PROJECT NO.
MECHANICAL DRAWINGS	FINAL REVIEW	JULY 08, 2024	FH2024029

NOISSUED FOR	DATE
1 50% REVIEW	2024-05-29
2 FINAL REVIEW	2024-07-08
<p><b>FARHEATER ENGINEERING INC.</b>            15 WERTHEIM COURT, SUITE 511            RICHMOND HILL, ONTARIO, L4B 3H7            CONTACT@FARHEATER.COM            WWW.FARHEATER.COM            TELL: 437-999-2424</p> 	
<p><b>STAMP:</b></p>	
<p><b>PROJECT NAME:</b>            WAREHOUSE AND OFFICE HEADQUARTERS</p>	
<p><b>PROJECT ADDRESS:</b>            45 BLOWERS CRES, AJAX, ON, L1Z 0N4</p>	
<p><b>NORTH:</b></p>	
<p><b>DRAWN BY:</b> H.L</p>	<p><b>DATE:</b> 2024-05-14</p>
<p><b>CHECKED BY:</b> F.M</p>	<p><b>SCALE:</b> N.T.S.</p>
<p><b>DRAWING TITLE:</b></p> <p>COVER SHEET AND DRAWING LIST</p>	
<p><b>PROJECT NUMBER:</b> FH2024029</p>	<p><b>DRAWING NUMBER:</b> M-000</p>

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# FARHEATER ENGINEERING INC.

15 WERTHEIM COURT, SUITE 511  
RICHMOND HILL, ONTARIO, L4B 3H7  
CONTACT@FARHEATER.COM  
WWW.FARHEATER.COM  
TELL: 437-999-2424



**FARHEATER**  
Engineering Inc.

STAMP:

## PROJECT NAME: WAREHOUSE AND OFFICE HEADQUARTERS

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## MECHANICAL SPECIFICATION

PROJECT NUMBER: FH2024029

DRAWING NUMBER: M-001

## MECHANICAL SPECIFICATIONS

<p>1. GENERAL</p> <p>1.1. COMPLY WITH ALL REQUIREMENTS OF DIVISION 1, OWNER, PROJECT MANAGER AND/OR CONSTRUCTION MANAGER. PERFORM ALL MECHANICAL WORK DETAILED ON THESE DRAWINGS IN ACCORDANCE WITH THE MOST STRINGENT INDUSTRY STANDARDS TO PROVIDE A COMPLETE AND FULLY OPERATIONAL SYSTEM TO THE SATISFACTION OF THE OWNER AND/OR MECHANICAL CONSULTANT.</p> <p>1.3. WORK SPECIFIED ON THESE DRAWINGS IS INTENDED TO SHOW OVERALL MECHANICAL SCOPE. DIVISION OF RESPONSIBILITY BETWEEN MECHANICAL CONTRACTOR AND THEIR SUB-TRADES IS THE RESPONSIBILITY OF THE PRIME MECHANICAL CONTRACTOR.</p> <p>1.4. NO SYSTEM SHALL BE CONCEALED/BURIED/COVERED PRIOR TO INSPECTION BY MECHANICAL CONSULTANT AND LOCAL AUTHORITIES HAVING JURISDICTIONS. THIS CONTRACTOR SHALL CONTACT FARBATER ENGINEERING INC. PRIOR TO ANY BURIED OR COVERED INSPECTION OR SUTAIN SYSTEMS WORK SCHEDULE. CONCEALED/BURIED/COVERED PRIOR TO THIS INSPECTION WITHOUT WRITTEN CONSENT BY THE MECHANICAL CONSULTANT, THE MECHANICAL CONTRACTOR SHALL UNCOVER/EXPOSE ALL SUCH SYSTEMS AT NO ADDITIONAL COST.</p> <p>1.5. THE MOST RIGOROUS OF THIS SPECIFICATION AND BASE BUILDING STANDARDS SHALL FORM THE BASIS FOR THIS CONSTRUCTION. COMPLY WITH ALL BUILDING OWNERS OR LANDLORD'S REQUIREMENTS FOR MECHANICAL SYSTEM INSTALLATIONS AND EXISTING SYSTEM DUCTWORK AND CONNECTION.</p> <p>1.6. OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND FEES TO PERFORM THE WORK WITHIN THESE DOCUMENTS. ADHERE TO ALL CODES, STANDARDS AND BY-LAWS. ARRANGE AND PAY FOR ALL REQUIRED INSPECTIONS FROM LOCAL AUTHORITY'S HAVING JURISDICTION. INCLUDE ALL COSTS ASSOCIATED TO THIS BY THE TRADES. ANY DEFICIENCIES NOTED BY AUTHORITY'S HAVING JURISDICTION SHALL BE IMMEDIATELY REPORTED TO THE MECHANICAL CONSULTANT INCLUDING REQUIRED CORRECTIVE MEASURES.</p> <p>1.7. THIS CONTRACTOR SHALL VISIT THE SITE TO REVIEW EXISTING CONDITIONS PRIOR TO SUBMITTING TENDER PRICING. INCLUDE IN THE TENDER AMOUNT ALL REQUIRED LABOUR AND MATERIALS TO SUIT EXISTING CONDITIONS. NO EXTRAS WILL BE AWARDED TO SUIT EXISTING CONDITIONS.</p> <p>1.8. CUTTING, PATCHING AND CORE DRILLING REQUIRED BY THIS TRADE SHALL BE PAID FOR FOR BY THIS CONTRACTOR. ARRANGE AND PAY TO XRAY AND SCAN EXISTING CONCRETE STRUCTURES IN ACCORDANCE WITH OWNER/LANDLORD STRUCTURAL ENGINEERS REQUIREMENTS. PROVIDE DETAILS OF NEW OPENINGS THROUGH STRUCTURAL COMPONENTS FOR BASE BUILDING STRUCTURAL ENGINEERS APPROVAL AT MECHANICAL CONTRACTORS COST.</p> <p>1.9. PROVIDE ALL REQUIRED FIRE STOPPING FOR MECHANICAL SYSTEMS THROUGH RATED PARTITIONS INCLUDING 60-MINUTE RATED PARTITIONS, FIRE STOP SHALL BE UL LISTED FOR THE REQUIRED SEPARATION AND BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S LIST AND ALL FIRE STOPPING SHALL BE REVIEWED BY MANUFACTURER'S REP. ACCEPTABLE MANUFACTURERS: 3M, HILTI</p> <p>1.10. MEET CONSTRUCTION SPECIFICATION AS PREPARED BY ARCHITECT/GENERAL CONTRACTOR/OWNER INCLUDING ALL PHASING.</p> <p>1.11. INCLUDE ALL PREMIUM LABOUR TO SUIT REQUIREMENTS AS LISTED WITHIN THESE DOCUMENTS, AND TO MEET PROJECT SCHEDULE. CONFIRM WITH OWNER AND/OR OWNER FOR SUITABLE ATTENDANCE.</p> <p>1.12. FLASHING AND COUNTER FLASHING FOR EXTERIOR PENETRATIONS OR WATER-PROOFED FLOORS SHALL BE PROVIDED BY MECHANICAL CONTRACTORS SUB-CONTRACTORS AND INCLUDED IN MECHANICAL TENDER PRICE. USE PREFABRICATED ALUMINUM OR PVC FLASHINGS FOR ROOF, AND MESSAGING OR COPPER FOR WALLS AND FLOORS. ENSURE ALL OPENINGS THROUGH VERTICAL AND HORIZONTAL BUILDING SURFACES PROOF AND WATER PROOF, USING AN APPROVED FLEXIBLE SEALANT.</p> <p>1.13. ALL EQUIPMENT SHALL BE PROVIDED BY MANUFACTURER LISTED WITHIN THESE DOCUMENTS AS BEING BASIS OF DESIGN OR APPROVED. WHERE A LIST OF MANUFACTURERS IS NOT PROVIDED, PROVIDE EQUIPMENT FROM MANUFACTURER LIST ON THE DOCUMENTS. REQUESTS FOR EQUIPMENT SUBSTITUTION SHALL BE PROVIDED IN WRITING INCLUDING BALANCE POINTS AND EQUIPMENT DATA. THE QUALITY AND PERFORMANCE CHARACTERISTICS OF THE SUBSTITUTED PRODUCT SHALL BE EQUIVALENT TO THE SPECIFIED PRODUCT. ALL SUBSTITUTE PRODUCTS SHALL BE APPROVED BY CONSULTANTS. ANY ADDITIONAL COSTS INCURRED BY THE MECHANICAL CONTRACTOR.</p> <p>1.14. ALL CONTROLS WORK SHALL BE PERFORMED BY OWNER'S/LANDLORD'S APPROVED CONTRACTOR AND INCLUDED IN MECHANICAL TENDER PRICE. ENSURE CONTROLS CONTRACTOR INCLUDES ALL LABOUR AND MATERIAL REQUIRED TO COMPLETE THE CONTROL SCOPE OF WORK DETAILED ON THESE DRAWINGS. PROVIDE ALL CONTROLS WIRING AND CONDUIT TO PERFORM SAID WORK, INCLUDING ALL HIGH VOLTAGE POWER WIRING AND TRANSFORMERS AS REQUIRED TO COMPLETE THIS WORK. WHICH IS NOT EXPRESSLY CALLED FOR ON ELECTRICAL DRAWINGS.</p> <p>1.15. ACCESS DOORS SHALL BE PROVIDED IN ALL HARD SURFACES TO ALLOW FOR INSPECTION/MAINTENANCE OF MECHANICAL SYSTEMS. ACCESS DOOR FINISHES SHALL BE AS PER ARCHITECT/ENGINEER/ENGINEERS REQUIREMENTS. PROVIDE ACCESS DOORS WITH SUITABLE RECESSES TO ACCEPT WALL FINISHES (TILE, CARPET, ETC.). PROVIDE FIRE RATED ACCESS DOORS AS REQUIRED.</p> <p>1.16. PROVIDE ONE YEAR LABOUR AND MATERIAL WARRANTY FOR THE COMPLETE MECHANICAL INSTALLATION FROM DATE OF SUBSTANTIAL COMPLETION.</p> <p>1.17. SUBMIT OPERATING AND MAINTENANCE MANUALS IN PDF FORMAT FOR REVIEW. ONCE APPROVED SUBMIT FINAL PDF COPY AND THREE (3) HARD COPIES OF DOCUMENTS TO OWNER. INCLUDE ALL APPROVED SHOP DRAWINGS, WARRANTY LETTERS, AIR AND WATER BALANCING REPORTS, OPERATING INSTRUCTIONS, MAINTENANCE PROCEDURES, CONTRACTOR AND SUB-CONTRACTOR CONTACT INFORMATION, INSPECTION REPORTS FROM THIRD PARTY INSPECTION AGENCIES AND AUTHORITIES HAVING JURISDICTION AND ALL OTHER PERTINENT INFORMATION. FINAL HARD-COPY SHOP DRAWINGS SHALL BE SEPARATED WITH DIVIDERS IN A NEAT AND ORDERLY FASHION COMPLETE WITH TABLE OF CONTENTS. ALLOW A MINIMUM OF 5% OF CONTRACT VALUE TO BE HELD UNTIL SUCH TIME THAT OPERATING AND MAINTENANCE MANUALS ARE ACCEPTED AND RECEIVED BY OWNER IN HARD COPY.</p> <p>1.18. AS-BUILT DRAWINGS SHALL BE COMPLETED USING AUTOCAD. RECORD ACCURATELY INSTALLED WORK ON SITE AND TRANSFER INFORMATION TO AUTOCAD. SUBMIT BOTH PDF AND AUTOCAD FILES AS-BUILT. ALLOW A MINIMUM OF 5% OF CONTRACT VALUE TO BE HELD UNTIL SUCH TIME THAT AS-BUILT DRAWINGS ARE APPROVED.</p> <p>1.19. CHANGE NOTICE QUOTATIONS SHALL BE SUBMITTED COMPLETE WITH DETAIL COST BREAKDOWN OF LABOUR AND MATERIALS. FAILURE TO PROVIDE DETAILED BREAKDOWNS WILL RESULT IN REJECTION. ALL MECHANICAL CHANGE NOTICES SHALL BE PROVIDED IN ACCORDANCE WITH MECHANICAL CONTRACTORS ASSOCIATION (MCA) LABOUR RATES AND MARK UPS (NOT TO EXCEED 20%). ALL MATERIALS SHALL BE IDENTIFIED INCLUDING ALLPHER LIST PRICE, AND A MINIMUM OF 25% DISCOUNT.</p> <p>1.20. TEMPORARY FILTERS 25MM (1 IN.) SHALL BE PROVIDED AT ALL BASE BUILDING RETURN AIR OPENINGS WHICH REMAIN OPERATIONAL DURING CONSTRUCTION. FILTERS TO BE REPLACED WHEN 50% USABLE LIFE REMAINS OR WEEKLY (WHICHEVER COMES FIRST). REMOVE UPON CONSTRUCTION COMPLETION.</p> <p>1.21. RETURN ALL BASE BUILDING MECHANICAL COMPONENTS TO LANDLORD/OWNER AS DIRECTED. COORDINATE REQUIREMENTS WITH OWNER/LANDLORD PRIOR TO COMMENCEMENT OF DEMOLITION. RELOCATE ALL COMPONENTS WITHIN THE PROPERTY AS PER LANDLORD/OWNER'S DIRECTION.</p> <p>1.22. THE MECHANICAL CONTRACTOR SHALL BE SOLELY RESPONSIBLE TO KEEP ALL AREAS PERTAINING TO HIS WORK INCLUDING CONSTRUCTION AREA, STORAGE AND STAGING CLEAN AND TIDY. ALL AREAS SHALL BE FREE OF SURPLUS DEBRIS AND RUBBISH.</p> <p>1.23. DO NOT ALLOW MATERIAL/EQUIPMENT TO BE STORED IN EXCESS OF BUILDING STRUCTURE LIMITATION.</p> <p>1.24. MECHANICAL CONTRACTOR SHALL PROTECT ALL EXISTING PROPERTY AND ADJACENT PROPERTIES FROM DAMAGE. INCLUDING WORK COMPLETED BY OTHER TRADES WITHIN THE PROJECT SCOPE OF WORK. MECHANICAL CONTRACTOR SHALL BE FULLY RESPONSIBLE TO PAY FOR CORRECTIVE MEASURES TO ALL DAMAGE CAUSED BY THEM, THEIR PERSONNEL, OR THEIR SUB-TRADES.</p> <p>1.25. DIVISION 5 CONTRACTORS ARE RESPONSIBLE TO ENSURE THAT THEIR EMPLOYEES AND SUB-TRADES OBSERVE ALL SAFETY REGULATIONS, SECURITY REGULATIONS AND FIRE SAFETY RULES, INCLUDING CONDUCT THEIR WORK WITHIN ACCORDANCE WITH LOCAL WORKPLACE HEALTH AND SAFETY REGULATIONS.</p> <p>1.26. ALL MATERIALS SHALL BE NEW, UNLESS SPECIFICALLY STATED AS BEING USED; AND FREE OF DEFECT. ALL MATERIALS AND EQUIPMENT SHALL BARE THE APPROVAL OF LOCAL AUTHORITIES INCLUDING CSA, ILC ETC) AND BE ACCEPTABLE FOR USE IN CANADA.</p> <p>1.27. ALL EQUIPMENTS SHALL MEET THE MINIMUM PERFORMANCE SPECIFIED IN THESE DOCUMENTS INCLUDING SPATIAL PROPERTIES, SUPPLY EQUIPMENT FROM THE BASIS OF DESIGN, OR APPROVED ALTERNATE MANUFACTURERS AS LISTED ON THESE DOCUMENTS. BASE BID PRICE SHALL INCLUDE EQUIPMENT AS SPECIFIED ON THESE DRAWINGS WITH OPTIONAL EQUIPMENT SUBSTITUTIONS LISTED AS COST SAVINGS.</p> <p>1.28. REQUESTS FOR ALTERNATE EQUIPMENT MANUFACTURERS SHALL BE PROVIDED IN WRITING AND INCLUDE ALL RELEVANT PERFORMANCE AND CONSTRUCTION INFORMATION. INCLUDE IN REQUEST COST SAVING TO OWNER OFFERED TO USE ALTERNATE EQUIPMENT. DO NOT PROCEED WITH ALTERNATE MANUFACTURER WITHOUT WRITTEN APPROVAL FROM CONSULTANT/OWNER.</p> <p>1.29. ADHERE TO ALL BASE BUILDING STANDARDS FOR NEW EQUIPMENT. OBTAIN OWNER/LANDLORD APPROVAL FOR ALL NEW EQUIPMENT.</p> <p>1.30. PROVIDE ALL REQUIRED SUPPORTS, HANGERS RODS, FRAMES, MISCELLANEOUS METALS AND OTHER MATERIAL REQUIRED TO ADEQUATELY SUPPORT AND INSTALL NEW EQUIPMENT. ALL SUPPORTS SHALL BE DESIGNED AND STAMPED BY A STRUCTURAL ENGINEERING LICENSED IN THE PROVINCE OF THE PROJECT. SUBMIT ALL STAMPED SUPPORT SHOP DRAWINGS FOR REVIEW PRIOR TO ORDERING EQUIPMENT.</p> <p>1.31. INSTALL SUPPORTS TO MEET REQUIREMENTS OF APPLICABLE CODES, AND TO SUITABLE SUPPORT THE EQUIPMENT WITHOUT UNDER STRESS/STRAIN TO THE EQUIPMENT AND ASSOCIATED SYSTEMS.</p> <p>1.32. ALL EQUIPMENT SHALL BE SUPPORTING FROM BUILDING STRUCTURES, DO NOT SUPPORT EQUIPMENT FROM OTHER EQUIPMENT PRODUCTS OR THEIR SUPPORT SYSTEMS.</p> <p>1.33. PROVIDE LAMACOND NAME PLATES ON ALL NEW AND EXISTING MECHANICAL EQUIPMENT SHOWING VOLTAGE, DESIGNATION, CIRCUIT AND USE, NUMBERS AND LETTERS TO BE 38" (10MM) HIGH NAME PLATES SHALL BE PERMANENT AND NOT FADE OVER TIME.</p> <p>1.34. IDENTIFY ALL VALVES WITH TAGS. PROVIDE A FRAME LIST OF VALVES, INDICATING THEIR LOCATION AND USE. SUPPLY TO OWNER/TENANT. PROVIDE NEW (OR UPDATE) VALVE TAG LOCATION MAP ON FRAMES 11X17 PRINTS. PROVIDE PDF COPIES TO OWNER.</p>	<p>1.1. THIS MECHANICAL CONTRACTOR SHALL BARE THE RESPONSIBILITY TO COORDINATE ALL NEW MECHANICAL EQUIPMENT AND SYSTEMS WITH OTHER CONTRACTORS INCLUDING, BUT NOT LIMITED TO, ARCHITECTURAL, STRUCTURAL, LEED, ELECTRICAL, AND CIVIL DISCIPLINES.</p> <p>1.2. MECHANICAL CONTRACTOR SHALL BE FULLY RESPONSIBLE AND TAKE IN PROVIDED INTERFERENCE DRAWINGS FOR ALL TRADES. OBTAIN ALL INFORMATION FROM OTHER TRADES AND PREPARE ONE COMBINED SET OF INTERFERENCE DRAWINGS AND INFORMATION FOR ALL TRADES INCLUDING ALL DIMENSIONS OF EXISTING STRUCTURE AND EQUIPMENT AND INCLUDE IN INTERFERENCE DRAWINGS.</p> <p>1.3. ALL MECHANICAL FINISHES AND LOCATIONS SHALL BE REVIEWED AND APPROVED BY ARCHITECTURAL DIVISION AND/OR OWNER INCLUDING, BUT NOT LIMITED TO, AIR TERMINALS, THERMOSTAT CONTROLS, EXPOSED INSULATION DUCTWORK, WHERE A DISCREPANCY EXISTS BETWEEN MECHANICAL AND ARCHITECTURAL DRAWINGS AS TO THE LEVEL OF FINISHED REQUIRED, THE MOST STRINGENT/COSTLY REQUIREMENTS SHALL BE CARRIED IN THE TENDER AMOUNT. OBTAIN CLARIFICATION FOR FINAL FINISH PRIOR TO ORDERING.</p> <p>1.4. ALL MECHANICAL EQUIPMENT WEIGHTS, SUPPORTS, AND OPENING SHALL BE REVIEWED AND APPROVED BY A STRUCTURAL ENGINEER, WHEN APPLICABLE, HIRE BASE BUILDING STRUCTURAL ENGINEER TO PERFORM ALL SUCH REVIEWS. MECHANICAL CONTRACTOR SHALL PAY FOR ALL SUCH REVIEWS AND INCLUDE COST IN TENDER AMOUNTS.</p> <p>2. EQUIPMENT START-UP AND BALANCING</p> <p>2.1. PROVIDE ALL TEMPORARY FOR ALL NEW MECHANICAL EQUIPMENT. START UP REPORT SHALL BE PREPARED BY A FACTORY TRAINED REPRESENTATIVE AND SHOW THAT THE EQUIPMENT IS IN GOOD CONDITION.</p> <p>2.2. PROVIDE ALL TEMPORARY POWER, GAS, AND OTHER UTILITIES AS REQUIRED TO PERFORM START UP OF EQUIPMENT.</p> <p>2.3. PERFORM BALANCING OF MECHANICAL SYSTEMS ONCE ALL COMPONENTS ARE INSTALLED AND PRESSURE TESTED.</p> <p>2.4. PERFORM BALANCING TO SUIT PROJECT SCHEDULE, IF REQUIRED PAY AND PROVIDE ALL TEMPORARY POWER AND UTILITIES IF EQUIPMENT TO BE BALANCED PRIOR TO SAID SERVICES BEING IN PLACE TO SUIT PROJECT SCHEDULE.</p> <p>2.5. WHERE START UP OF EQUIPMENT OCCURS WHILE THE BUILDING IS STILL IN CONSTRUCTION, REPLACE ALL FILTERS AND STRAINERS AFTER START UP.</p> <p>2.6. GENERALLY SPEAKING ALL CEILINGS, WALLS, DOORS, WINDOWS, PLenums, SHEET METAL, AND BUILDING COMPONENTS AFFECTING THE PERFORMANCE OF A UNIT SHALL BE FULLY COMPLETE PRIOR TO THE BALANCING.</p> <p>2.7. ALL BALANCING SHALL BE COMPLETED BY A SINGLE FIRM INCLUDING BOTH AIR AND WATER SYSTEMS. FOLLOWING IN THE TENDER AMOUNT. OBTAIN CLARIFICATION FOR FINAL FINISH PRIOR TO ORDERING.</p> <p>2.8. AIR SYSTEMS SHALL TESTED ONCE THE DUCTWORK SYSTEMS ARE COMPLETED AND SEALED. FILTERS ARE CLEAN, FAN ROTATION HAS BEEN VERIFIED TO BE IN THE CORRECT DIRECTION, ALL CONTROL ELEMENTS INCLUDING THERMOSTATS, SMOKE, DETECTORS, AND DUCT MOUNTED SENSORS ARE INSTALLED, COLLS ARE CLEAN, DUCT ACCESS DOORS ARE CLOSED, ALL PRESSURE CONTROL DAMPERS ARE INSTALLED AND FUNCTIONAL.</p> <p>2.8.1. TEST ALL AIR SYSTEMS TO BE +/- 5% OF THE DESIGN VOLUME.</p> <p>2.8.2. PERFORM REBALANCING OF SYSTEMS AS MANY AS REQUIRED TO OBTAIN SUITABLE READINGS.</p> <p>2.8.3. BALANCING DAMPERS WITH FLOW EXHIBIT VISIBLE ON AND ROBE SHALL BE REPLACED.</p> <p>2.9. ONCE AIR SYSTEMS ARE BALANCED, ALLOW SYSTEMS TO CONTINUE TO RUN FOR FIVE DAYS, AFTER RUNNING, REPLACE ALL FILTERS, INSPECT ALL MOVING COMPONENTS AND CONFIRM SYSTEM OPERATION. PROVIDE ALL ADDITIONAL NOISE/IBRATION CONTROL ELEMENTS TO ELIMINATE EXCESS NOISE/VIBRATION. LOCULATE ALL MOVING PARTS AND REPAIR ANY NOTICEABLE DEFECTS IN THE SYSTEM.</p> <p>2.10. WATER SYSTEMS SHALL BE TESTED ONCE ALL PIPE WORK IS COMPLETE, FILLED, PRESSURE TESTED, VENTED AND VOID OF AIR. PUMPS PROVEN TO OPERATE IN CORRECT DIRECTION, STRAINERS IN PLACE AND CLEANED, ALL MAINS AND CIRCUIT BALANCING VALVES ARE INSTALLED AND SYSTEMS ARE COMPLETE.</p> <p>2.10.1. TEST ALL WATER SYSTEMS TO BE +/- 5% OF THE DESIGN VOLUME.</p> <p>2.10.2. PERFORM REBALANCING OF SYSTEMS AS MANY TIMES AS REQUIRED TO OBTAIN SUITABLE READINGS.</p> <p>2.11. SUBMIT PDF COPIES OF BALANCING REPORTS ONCE SYSTEMS MEET TRESHOLDS NOTED ABOVE.</p> <p>2.12. TEST ALL CONTROL SYSTEMS INCLUDING FUNCTION OF THERMOSTATS AND READINGS OF CONTROL POINTS.</p> <p>3. COMPLETION OF CONTRACT</p> <p>3.1. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL LABOUR AND MATERIAL TO INSTALL ALL SYSTEMS SHOWN AND/OR IMPLIED ON THESE DRAWINGS IN GOOD WORKING ORDER.</p> <p>3.2. A MINIMUM OF 10% OF THE CONTRACT VALUE SHALL BE RESERVED FOR PROJECT COMPLETION.</p> <p>3.3. AT THE COMPLETION OF THE PROJECT PROVIDE THE FOLLOWING INFORMATION TO THE CONSULTANT FOR REVIEW:</p> <p>3.3.1. WARRANTY LETTERS</p> <p>3.3.2. AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMAT</p> <p>3.3.3. CLOSE OUT DOCUMENTS INCLUDING A BINDER OF APPROVED SHOP DRAWINGS, TAB REPORTS, AND O7M MANUALS.</p> <p>3.4. NFA 13 BOND LETTER IF APPLICABLE</p> <p>3.4. SCHEDULE WORK TO MEET PROJECT SCHEDULE, ARRANGE TO PROVIDE CLOSE OUT DOCUMENTS PRIOR TO SCHEDULE COMPLETION TO ENSURE NO DELAY IN PROJECT CLOSE.</p> <p>3.5. ALL SYSTEMS SHALL BE COMPLETED AND FULLY FUNCTIONAL AT PROJECT COMPLETION. REPLACE ALL FILTERS AND STRAINERS AT PROJECT COMPLETION. ENSURE ALL TEMPORARY CONSTRUCTION AIDS, AND OR CONSTRUCTION DEBRIS IS REMOVED FROM SITE, WHERE WORKING IN EXISTING BUILDING, ALL EXISTING FINISHES TO REMAIN SHALL BE IN AS NEW CONDITION.</p>	<p>1.13. PROVIDE ALL REQUIRED VALVES TO FACILITATE THE REMOVAL OF SYSTEMS WITH PORTIONS REMAINING.</p> <p>1.13.1. INCLUDE FOR ALL PIPE FREEZING AND SYSTEM DRAINING TO FACILITATE PARTIAL REMOVAL OF SYSTEMS, WHERE SYSTEMS ARE DRAINED TO ALLOW FOR PARTIAL REMOVAL. INCLUDE ALL REQUIRED LABOUR AND MATERIAL TO ALL AT THE COMPLETION OF THE WORK. HIRE BASE BUILDING CHEMICAL TREATMENT FIRM TO BRING SYSTEMS CHEMICAL TREATMENT BACK UP TO PRE-CONSTRUCTION LEVELS EACH TIME SYSTEMS IS DRAINED AND REFILLED.</p> <p>1.14. WHERE REMOVAL OF MECHANICAL SYSTEMS REQUIRED ELECTRICAL, ARCHITECTURAL OR STRUCTURAL WORK TO PERFORM A FULL AND COMPLETE REMOVAL, HIRE SAID TRADES TO PERFORM SAID WORK.</p> <p>1.15. WHERE REMOVING EXISTING VALVES, REMOVE ALL VALVE TAGS AND UPDATE VALVE TAG CHART IN MECHANICAL RECORDS.</p> <p>1.16. WHERE DEMOLITION OCCURS IN EXISTING BUILDING TO REMAIN, PERFORM ALL WORK TO MINIMIZE DISRUPTION TO OPERATING AREAS OF THE BUILDING. ONLY USE CORRIDORS, BUILDING ENTRANCES, ELEVATORS, ESCALATORS, STAIRWELLS, AND LOADING AREAS AS APPROVED BY THE OWNER, WHERE PASSAGE IS REQUIRED THROUGH OPERATING SECTIONS OF THE BUILDING. PERFORM SAID WORK AFTER HOURS AND ARRANGE AND PAY FOR USE OF AREAS BE BASE BUILDING CLEANING STAFF PRIOR TO THE START OF THE NEXT BUSINESS DAY.</p> <p>1.17. WHERE DEMOLITION IS REQUIRED IN ACTIVE AREAS OF THE BUILDING, ARRANGE AND PAY FOR SECURITY TO PRESENT FOR FULL DURATION OF THE DEMOLITION. INCLUDE ALL TEMPORARY PROTECTION OF BUILDING SURFACES AND TENANT MERCHANDISE AS REQUIRED TO ALLOW FOR THE WORK TO CONTINUE. ALL SAID SPACES SHALL BE CLEANED AND RENESTATED A MINIMUM OF 1 HOUR BEFORE THE NEXT BUSINESS DAY.</p> <p>1.18. ALL MATERIAL SHALL BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH LOCAL JURISDICTIONS. RECYCLE ALL CONTENT SUITABLE FOR RECYCLING, DO NOT STORE DEMOLISHED EQUIPMENT/MATERIAL ON SITE.</p> <p>1.19. ALL EQUIPMENT/MATERIAL SCHEDULED TO BE RETURNED TO THE OWNER SHALL BE RELOCATED TO THE OWNER SHALL BE RELOCATED ANYWHERE WITHIN PROPERTY FOR SUITABLE STORAGE. PROTECT EQUIPMENT/MATERIAL FROM THE FULL DURATION OF THE PROJECT.</p> <p>1.20. INCLUDE FOR THE REMOVAL OF ALL HAZARDOUS WASTE SUCH AS THAT FOUND WITHIN DRAINAGE PITS, INTERCEPTORS, AND THE LIKE.</p> <p>1.21. OBTAIN THE BUILDING HAZARDOUS SUBSTANCE REPORT FROM THE OWNER PRIOR TO COMMENCEMENT OF WORK. ADHERE TO ALL REQUIREMENTS OF THE HAZARDOUS SUBSTANCE GUIDELINES FOR THE BUILDING. WHERE HAZARDOUS SUBSTANCES ARE FOUND IN SITE, INCLUDING BUT NOT LIMITED TO THE ASBESTOS AND/OR MOLD, IMMEDIATELY STOP WORK AND NOTIFY OWNER AND CONSULTANT. DO NOT RETURN TO AREA OF WORK UNLESS AS SAID SUBSTANCE HAS BEEN ABATED AND REMOVED FROM SITE BY SPECIALIZED ABATEMENT FIRMS.</p> <p>1.22. RECLAIM AND DISPOSE OF ALL REFRIGERANT IN ACCORDANCE WITH LOCAL BY-LAWS, STANDARDS AND REGULATIONS.</p> <p>1.23. WHERE MECHANICAL SYSTEMS BEING REMOVED RUN THROUGH WALLS/FLOORS/ROOFS/EXTERIOR SURFACES, MAKE GOOD ALL SURFACES.</p> <p>1.23.1. HIRE BASE BUILDING ROOFING AND WATERPROOFING CONTRACTORS TO MAKE GOOD ALL PENETRATIONS THROUGH BUILDING EXTERIOR.</p> <p>1.23.2. WHERE REMOVING ROOF TOP EQUIPMENT ON CURBS, REMOVE ASSOCIATED CURB AND MAKE GOOD ROOF.</p>	<p>FLUMBING AND DRAINAGE</p> <p>1. GENERAL</p> <p>1.1. PROVIDE ALL PLUMBING AND DRAINAGE SYSTEMS COMPLETE WITH ALL EQUIPMENT, PIPING, CONNECTIONS, SUPPORTS, HANGERS AND ACCESSORIES TO PROVIDE A FULLY COMPLETE AND FUNCTIONAL SYSTEM. PROVIDE ALL SYSTEMS BETWEEN UTILITY CONNECTIONS (WATER AND DRAINAGE) AND EQUIPMENT AND/OR CAPPED TERMINALS.</p> <p>1.2. PROVIDE ALL PLUMBING FIXTURES INCLUDING ALL REQUIRED TRIM AND SUPPORTS. COORDINATE FIXTURE FINISHES AND ACCESSORIES WITH ARCHITECTURAL DEMAND.</p> <p>1.3. ROUGH-IN AND PROVIDE FINAL CONNECTION TO ALL EQUIPMENT.</p> <p>1.4. PROVIDE ALL REQUIRED FIRE EXTINGUISHERS IN ACCORDANCE WITH OBC, OFC AND NFPA STANDARDS.</p> <p>1.5. PRESSURE TEST ALL PIPING SYSTEMS IN ACCORDANCE WITH LOCAL &amp; PROVINCIAL CODES FOR LEAKS. BEFORE INSULATION IS ADDED, SUBMIT REPORT TO THE OWNER AND A COPY TO THE ENGINEER.</p> <p>1.6. PROVIDE ALL TRENCHING AND BACKFILLING REQUIRED FOR DIVISION 15 WORK.</p> <p>1.7. ALL PLUMBING FIXTURES SHALL BE VENTED IN ACCORDANCE WITH LOCAL PLUMBING CODES. CONNECT NEW VENTING TO EXISTING SYSTEMS OR PROVIDE NEW VENTING SYSTEMS WHERE EXISTING ARE NOT SUFFICIENT.</p> <p>1.8. PRIME ALL TRAPS AS REQUIRED TO MEET CODE REQUIREMENTS AND REQUIREMENTS OF LOCAL AUTHORITIES. PROVIDE NEW TRAP SEAL PRIMERS AS NECESSARY.</p> <p>1.9. ALL PLUMBING FIXTURES SHALL BE INSTALLED IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.</p> <p>1.10. FOR UNDERGROUND INSTALLATIONS, PROVIDE SUITABLE BEDDING, COVERAGE AND SLOPE TO EASE DRAINAGE.</p> <p>1.11. PROVIDE TEMPORARY CAPS AND/OR SCREEN ON ALL SYSTEMS DURING CONSTRUCTION TO PREVENT DEBRIS FROM ENTERING. AT THE COMPLETION OF CONSTRUCTION, FLUSH ALL SYSTEMS TO REMOVE DEBRIS.</p> <p>1.12. SEPARATE DISSIMILAR METALS BY MEANS OF GASKETS, DIELECTRIC UNIONS OR COUPLINGS THAT PREVENT ELECTROLYTIC ACTION, (E.G. BRASS BETWEEN COPPER AND STEEL).</p> <p>1.13. COORDINATE THE INSTALLATION OF ALL PLUMBING AND DRAINAGE SYSTEMS WITH OTHER TRADES. INSTALL SYSTEMS AS HIGH AS POSSIBLE. SUPPORT ALL SYSTEMS FROM BUILDING STRUCTURE.</p> <p>1.14. PROVIDE SUITABLE DRAIN DOWN LOCATIONS FOR ALL SYSTEMS. INSTALL SYSTEMS TO ALLOW THEM TO BE DRAINAGE.</p> <p>1.15. PROVIDE ALL POINT OF USE CSA APPROVED BACKFLOW PREVENTERS AT EQUIPMENT AS REQUIRED BY CODE AND AS SHOWN ON THESE DRAWINGS. ALL BACKFLOW PREVENTER SHALL DRAIN TO SUITABLE HUB DRAIN AND BE INSTALLED TO ALLOW FOR INSPECTION.</p> <p>1.16. PROVIDE SLEEVES FOR ALL PIPES PASSING THROUGH WALLS, FLOORS AND CEILINGS. SLEEVES SHALL BE SCHEDULE 40 BLACK STEEL AND PACKED TO ENSURE A WATER TIGHT INSTALLATION. PROVIDE 3M OR EQUAL FIRE SEAL.</p> <p>1.17. ALL SYSTEMS SHALL BE SUPPORTED FROM BUILDING STRUCTURE (SUPPORTS FROM OTHER EQUIPMENT OR GASKET-DRAINED SUPPORTS WILL NOT BE ACCEPTED). SUPPORTS AND HANGERS SHALL BE INSTALLED ON THE EXTERIORS OF INSULATION AND BE SECURED WITH SADDLES.</p> <p>1.18. EXISTING SANITARY DRAIN LOCATIONS AND INVERT ELEVATIONS SHALL BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF WORK.</p> <p>2. PIPING MATERIALS:</p> <p>2.1. SANITARY DRAINAGE AND VENT PIPE ABOVE GROUND:</p> <p>2.1.1. 2-1/2" AND SMALLER TO BE DWV COPPER WITH DWV DRAINAGE FITTINGS WITH 1/2" TINYANTIMONY SOLDER JOINTS.</p> <p>2.1.2. 3" AND LARGER TO BE CSA CLASS 400 CAST IRON PIPE AND FITTINGS WITH MECHANICAL JOINTS.</p> <p>2.2. SANITARY DRAINAGE AND VENT PIPE BELOW GROUND:</p> <p>2.2.1. 2-1/2" AND SMALLER TO BE PVC SEWER PIPE AND FITTINGS WITH SOLVENT WELDED FITTINGS.</p> <p>2.2.2. 3" AND LARGER TO BE PE RING-TRIEE SDR35 CSA CERTIFIED TO B162.2 PVC GASKETTED SEWER PIPE.</p> <p>2.3. DOMESTIC HOT COLD AND RECIRCULATION PIPING TO BE TYPE 1 HARD COPPER WITH WROUGHT IRON COPPER FITTING WITH 1/2" TINYANTIMONY SOLDER JOINTS.</p> <p>2.4. PROVIDE NEW KITZ PIG 44 200 PSI SOLDERED GATE VALVES.</p> <p>3. GAS PIPING</p> <p>3.1. PROVIDE ALL LABOUR, MATERIALS, PRODUCTS AND ACCESSORIES TO SUPPLY AND INSTALL A FULLY OPERATIONAL NATURAL GAS DISTRIBUTION SYSTEM IN ACCORDANCE WITH THE LATEST VERSION OF CSA B49, TSSA REGULATIONS AND THE CANADIAN GAS ASSOCIATED'S REQUIREMENTS.</p> <p>3.2. ALL SYSTEMS SHALL BE INSTALLED BY PERSONNEL LICENSED BY TSSA TO PERFORM SUCH WORK.</p> <p>3.3. PROVIDE ALL SEISMIC CONTROL AND RESTRAINT DEVICES AS REQUIRED TO SUIT LOCAL CODES.</p> <p>3.4. TAG ALL SYSTEMS WITH INSTALLATION TAG INCLUDING DATE OF INSTALLATION, COMPLIANCE CODE FOLLOWED, INSTALLING CONTRACTOR, INSTALLATION SUPERVISORS, AND DATE OF RAU INSPECTION. TAGS SHALL NOT FADE OR BE DAMAGED OVER TIME AND BE FULLY LEGIBLE FOR THE LIFE OF THE GAS SYSTEM.</p> <p>3.5. ARRANGE AND PAY FOR GAS SERVICE AND METER INSTALLATION TO BE PROVIDED BY LOCAL GAS UTILITY. SCHEDULE WORK WITH GAS UTILITY TO MEET ALL CONSTRUCTION SCHEDULES. PROVIDE ALL APPLICATION DOCUMENTS TO UTILITY AS REQUIRED.</p> <p>3.6. ALL GAS PIPE SHALL BE SCHEDULE 40 MILD BLACK CARBON STEEL, ASTM A53 GRADE B COMPLETE WITH MALLEABLE CAST IRON SCREWED FITTING AND JOINTS FOR PIPES 50MM (2") AND SMALLER, OR BELVEILED AND COMPLETE WITH BUTT WELDED FITTINGS AND JOINTS FOR PIPES 65MM (2-1/2") AND LARGER.</p> <p>3.7. SCREWED BALL VALVES SHALL BE CSA CERTIFIED MINIMUM 3100 KPA (450 PSIG) WOG RATED 3/4" TURN FULL PORT NON-LUBRICATED BRASS BALL VALVES WITH TEFLO PTFE SEAT, CHROME PLATED SOLID BALL, AND REMOVABLE LEVEL HANDLE AS MANUFACTURED BY NEO VALVES, KITZ, OR TOYO VALVE COMPANY.</p> <p>3.8. PROVIDE ISOLATION VALVES AT ALL EQUIPMENT AND AS REQUIRED BY CSA B149 AND LOCAL CODES AND STANDARDS.</p> <p>3.9. PROVIDE AND INSTALL ALL PRESSURE REGULATING STATIONS INCLUDING PRESSURE REDUCING AND PRESSURE RELIEF COMPONENTS AS SHOWN ON DRAWINGS AND AS REQUIRED TO REDUCE BUILDING GAS PRESSURE SYSTEMS TO SUIT EQUIPMENT REQUIREMENTS. PROVIDE GAS PRESSURE RELIEF STATIONS DOWNSTREAM OF ALL PRESSURE REGULATING STATIONS.</p> <p>3.10. ALL PRESSURE REGULATING STATION SHALL BE VENTED TO ATMOSPHERE IN ACCORDANCE WITH LOCAL, CSA B149 AND LOCAL CODES AND BY LAWS, WHERE VENTING REGULATORS TO ATMOSPHERE IS NOT POSSIBLE, AND WHERE APPROVED BY CONSULTANT PROVIDE VENTLESS REGULATORS. ALL RELIEF VENTS SHALL BE PIPED INDIVIDUALLY TO ATMOSPHERE AND SIZED FOR A MAXIMUM PRESSURE DROP OF 10% OF THE PRESSURE REDUCING VALVE SETPOINT WITH A 25% SAFETY FACTOR.</p> <p>3.11. VENTED PRESSURE REGULATORS SHALL BE SPRING-LOADED SELF OPERATED, TIGHT CLOSING, SELECTED FOR THE FACILITY GAS PRESSURE AND PIPING PRESSURE LOSS; AND CONNECTED EQUIPMENT LOAD AT FULL FIRING RATE PLUS 20% SPARE CAPACITY COMPLETE WITH 100% KPA (150 PSIG) RATED CAST IRON BODY WITH CORROSION RESISTANT EPOXY ENAMEL, ALUMINUM DIAPHRAGM WITH SPRING CASE WITH NITRILE DIAPHRAGM DISC, AND BODY CHARGING, THROTTLING TYPE HIGH FLOW RATE TIGHT SHUT-OFF RELIEF VALVE SELECTED TO PROTECT EQUIPMENT DOWNSTREAM OF REGULATOR.</p> <p>3.12. NON VENTED REGULATORS SHALL BE LEVER ACTION, DEAD END LOCKUP TYPE COMPLETE WITH A VENT LIMITER, SELF ALIGNING VALVE, DISCAST ALUMINUM HOUSING, AND SYNTHETIC RUBBER COMPOUND DIAPHRAGM. THESE VALVES SHALL ONLY BE USED WHERE THE BUILDING PERFORMANCE IS IN CONFORMANCE WITH THEIR LISTINGS INCLUDING VENTILATION AIR REQUIREMENTS.</p> <p>3.13. CLEARLY IDENTIFY ALL SYSTEM PRESSURE, UPSTREAM AND DOWNSTREAM OF PRESSURE REGULATORS WITH STENCILLED MARKING ON DRAWINGS, AND LAMACOD PRESSURE TAGS.</p> <p>3.14. ACCEPTABLE PRESSURE REGULATOR MANUFACTURERS ARE MAITROLL, JORDAN VALVE, FISHER CONTROLS, AND LESLIE CONTROLS.</p> <p>3.15. PROVIDE 6 MM (1/4") DIAMETER TEST PORTS UPSTREAM AND DOWNSTREAM OF EACH REGULATOR ASSEMBLY.</p> <p>3.16. ALL REGULATOR STATIONS SHALL BE ACCESSIBLE WITHOUT THE USE OF LADDERS OR LIFTS.</p> <p>3.17. SLOPE GAS PIPING IN THE DIRECTION OF FLOW TO LOW POINTS. PROVIDE FULL PIPE DIAMETER 150 MM (6") LONG DRIP SOCKETS AT THE BOTTOM OF ALL VERTICAL RISERS, AT ALL PIPING LOW POINTS, AND WHERE SHOWN ON DRAWINGS AS REQUIRED BY CODE.</p> <p>3.18. PAINT ALL NATURAL GAS PIPING INSIDE AND OUTSIDE OF BUILDING WITH TWO COATS OF YELLOW ANAMEL APPLIED OVER PRIMER. PIPE SHALL PAINTED IN ITS ENTIRETY INCLUDING BELOW SUPPORTS. PROVIDE SMS LTD. (OR STENCIL PAINTED) LABELS SHOWING GAS PRESSURE, DIRECTION OF FLOW AND NAT. GAS.</p> <p>3.19. PROVIDE GAS CONNECTIONS TO ALL EQUIPMENT INCLUDING KITCHEN EQUIPMENT IN ACCORDANCE WITH DRAWINGS, PLANS, SCHEDULES, AND MANUFACTURER'S RECOMMENDATIONS.</p> <p>3.20. GAS SUPPORTS ON ROOF SHALL BE COMPRISED OF SINGLE PIECE VULCANIZED RUBBER COMPLETE WITH GALVANIZED STEEL CHANNEL SUPPORTS AND STRUTS. SUPPORTS SHALL WEIGH NO LESS THAN 1 LBS PER 1" IN LENGTH. INSTALL SUPPORTS ON 50MM X 50MM (2" X 2") PLATE PAWER ON TOP OF 50MM X 50MM (2" X 2") 20' 25' MM (1") THICK RIGID ROOF DECK INSULATION. PROVIDE WEATHER PROOF COATING ON EXTERIOR EDGE OF ROOF INSULATION TO PREVENT DETERIORATION OVER TIME.</p>
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## MECHANICAL SPECIFICATIONS

<p><b>4. TESTING</b></p> <p>4.1. CARRY OUT NOT LESS THAN THE FOLLOWING TESTS:</p> <p>4.2. BALL TEST ALL SANITARY DRAINS.</p> <p>4.3. PERFORM WATER PRESSURE TESTS ON ALL DRAINAGE AND VENT SYSTEMS WHEN ROUGH-IN OF THE SYSTEM COMPLETED. SYSTEM SHALL BE FILLED WITH WATER FOR 2 HOURS WITHOUT NOTICEABLE LEAKS.</p> <p>4.4. PRESSURE TEST ALL PLUMBED SANITARY SYSTEM AT 150% OF SYSTEM PRESSURE FOR A MINIMUM OF 6HRS WITHOUT PRESSURE LOSS.</p> <p>4.5. PROVIDE ALL TESTING AND BALANCING OF EXISTING AND NEW HVAC SYSTEMS AND PROVIDE BALANCING REPORTS AND START UP REPORTS OF EQUIPMENT TO CONSULTANT.</p> <p>4.6. PROVIDE ALL ADDITIONAL TESTING AS REQUIRED BY LOCAL AUTHORITIES IN THEIR PRESENCE.</p> <p>4.7. PERFORM TESTS PRIOR TO CONCEALING SYSTEMS.</p> <p>4.8. REMOVE ALL COMPONENTS WHICH WILL NOT WITHSTAND TEST PRESSURE, AND REPLACE AFTER TESTS.</p> <p>4.9. FAILURE OF TEST WILL REQUIRE SYSTEMS TO BE REINSTALLED UNTIL SUCH TIME AS THE TEST IS PASSED. REPEAT TESTS AS MANY TIMES AS REQUIRED UNTIL SYSTEM PASSES. DO NOT CAULK OR COVER LEAKS. REMOVE AND REPLACE SYSTEMS AS NECESSARY.</p> <p><b>5. INSTALLATION</b></p> <p>5.1. CLEANING AND DISINFECT ALL DOMESTIC WATER SYSTEMS TO ACCEPTABLE LOCAL AUTHORITY STANDARDS. PROVIDE ALL TESTING OF DOMESTIC WATER SYSTEMS IN ACCORDANCE WITH AWWA STANDARD C651.86. PROVIDE TEST RECORDS TO OWNER. ARRANGE AND PAY FOR ALL WATER QUALITY TESTS BY INDEPENDENT TESTING LABORATORY.</p> <p>5.2. FLUSH ALL DRAINAGE SYSTEMS AFTER SYSTEM HAS BEEN INSTALLED. REMOVE ALL DEBRIS AND PROVIDE CAMERA SCOPE OF LINES TO VERIFY CONDITIONS.</p> <p>5.3. PROVIDE FINAL CONNECTION TO ALL FITCHEN EQUIPMENT INCLUDING ALL ISOLATION VALVES, HOSES, AND FLEXIBLE PIPES. ADHERE TO MANUFACTURER'S RECOMMENDED INSTALLATION REQUIREMENTS FOR SPECIFIC INSTALLATION REQUIREMENTS.</p> <p>5.4. PROVIDE ALL BACKFLOW PREVENTERS FOR KITCHEN EQUIPMENT IN ACCORDANCE WITH CSA STANDARDS.</p> <p>5.5. PROVIDE ALL TRAP SEAL PRIMERS TO SUIT NEW DRAINS IN ACCORDANCE WITH LOCAL PLUMBING CODE.</p>	<p>1.24. PROVIDE ADDITIONAL SPRINKLER HEADS OF EACH TYPE AS REQUIRED BY CODE, INSTALLED IN METAL CABINET IN SPRINKLER ROOM, OR AS DIRECTED BY OWNER. COMPLY WITH ALL TOOLS REQUIRED TO CHANGE OUT SPRINKLER HEADS.</p> <p>1.25. EACH SPRINKLER HEAD BRANCH LINE SHALL INCLUDE A 20MM (1") CAPPED CONNECTION FOR FUTURE SPRINKLER HEAD. DESIGN BRANCH LINES TO HANDLE THE GREATER OF 1 ADDITIONAL SPRINKLER HEAD PER BRANCH OR 10% ADDITIONAL SPRINKLER HEADS PER BRANCH.</p> <p>1.26. INSTALL SPRINKLER SYSTEM AS HIGH AS POSSIBLE AND COORDINATE INSTALLATION WITH ALL OTHER TRADES.</p> <p>1.27. SLOPE ALL HORIZONTAL SPRINKLER PIPING SO THAT IT CAN BE EASILY COMPLETELY DRAINED. PROVIDE CAPPED DRAINS AT ALL LOW POINTS.</p> <p>1.28. COORDINATE REQUIREMENT OF SPRINKLER SYSTEM FIRE ALARM CONNECTION WITH ELECTRICAL DIVISION AND FIRE ALARM CONTRACTOR. MECHANICAL CONTRACTOR SHALL TAKE LEAD ROLE IN COORDINATED ALL SUCH WORK.</p> <p>1.29. NO SPRINKLER WORK SHALL BE CONCEALED UNTIL SUCH TIME AS IT HAS BEEN APPROVED BY THE ENGINEER OF RECORD AND THE AUTHORITY HAVING JURISDICTION.</p> <p>1.30. TEST ALL SPRINKLER SYSTEMS TO NFPA 13 REQUIREMENTS.</p> <p>1.31. TEST ALL STANDPIPE AND FIRE HOSE SYSTEM TO NFPA 14 REQUIREMENTS.</p> <p>1.32. TEST ALL SYSTEM IN ACCORDANCE WITH OFC, LOCAL FIRE MARSHAL AND BUILDING OFFICIALS REQUIREMENTS.</p> <p>1.33. INSTALL ALL TEST AND DRAIN CONNECTION IN ACCORDANCE WITH NFPA 13 REQUIREMENTS. PIPING DRAIN TO NEAREST BUILDING SANITARY DRAINAGE SYSTEMS. DO NOT DRAIN TO OUTDOORS.</p> <p>1.34. PROVIDE GUARDS FOR SPRINKLER HEAD IN AREAS SUBJECT TO DAMAGE INCLUDING, BUT NOT LIMITED TO, ELEVATOR MACHINE ROOMS, STORAGE ROOMS, ELEVATOR SHAFTS, GARBAGE ROOMS, MECHANICAL ROOMS, LOW HEAD ROOM LOCATION, AND ANY OTHER LOCATION WHERE SPRINKLER HEAD COULD BE DAMAGED.</p> <p>1.35. PROVIDE PROTECTION OF SPRINKLER HEADS FOR FULL DURATION OF CONSTRUCTION. REPLACE AT NO ADDITIONAL COST ANY SPRINKLER HEAD THAT IS DAMAGED, ALTERED, PAINTED, OR OTHERWISE AFFECTED.</p> <p>1.36. PROVIDE NFPA SIGN-OFF LETTER AT THE COMPLETION OF PROJECT.</p> <p>1.37. REMOVE AND REPAIR/REPLACE ANY SYSTEM COMPONENT WHICH DOES NOT PASS INSPECTION/TESTING.</p> <p>1.38. REMOVE AND REINSTALL ANY SPRINKLER COMPONENT NOT SUITABLE FOR TEST PRESSURES.</p> <p>1.39. PROVIDE AS BUILT DRAWINGS IN CAD AND PDF FORMAT AT THE COMPLETION OF PROJECT.</p>	<p><b>1. INSULATION</b></p> <p>1.1. PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO INSULATE ALL MECHANICAL SYSTEMS AS SPECIFIED WITH THIS SECTION AND AS NOTED ON DRAWINGS.</p> <p>1.2. UNLESS OTHERWISE SPECIFIED, INSULATION THERMAL PERFORMANCE IS TO MEET OR EXCEED THE MORE STRINGENT REQUIREMENTS OF THE LATEST EDITIONS OF THE NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS AND ASHRAE 90.1.</p> <p>1.3. ALL SYSTEM SUBJECT TO CONDENSATION (INCLUDING COLD AND DUAL TEMPERATURE) SHALL BE INSULATED COMPLETELY WITH VAPOUR BARRIER. VAPOUR BARRIER SHALL BE INSTALLED OVER ALL SYSTEM COMPONENTS INCLUDING VALVES, VAPOUR BARRIER SHALL BE COMPLETE AND CONTINUOUS INTS ENTIRETY. ANY DAMAGE TO VAPOUR BARRIER SHALL REQUIRE FULL REMOVAL AND REPLACEMENT. DO NOT PATCH NEW VAPOUR BARRIERS INSTALLED AS PART OF THIS CONTRACT.</p> <p>1.4. INSULATION SHALL ONLY BE APPLIED ONCE SYSTEMS HAVE BEEN TESTED AND REVIEWED BY ENGINEER AND AUTHORITY HAVING JURISDICTION.</p> <p>1.5. INSTALL INSULATION ON PIPES AND DUCTS WHICH ARE CLEAN AND DRY, AND WITH ENVIRONMENTAL CONDITIONS AS REQUIRED BY THE INSULATION MANUFACTURER.</p> <p>1.6. STORE ALL INSULATION MATERIAL ON SITE IN A DRY STORAGE AREA AND ENVIRONMENTAL CONDITIONS AS REQUIRED BY THE INSULATION MANUFACTURER.</p> <p>1.7. ALL INSULATION OF MECHANICAL SYSTEMS SHALL BE APPLIED BY A SINGLE INSULATION CONTRACTOR.</p> <p>1.8. ALL INSULATION SHALL HAVE FLAME AND SMOKE SPREAD RATINGS OF 2550 AND AS REQUIRED BY THE LOCAL BUILDING CODE AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND AS PER CANULC-S114 AND CANULC-S101.</p> <p>1.9. ACCEPTABLE INSULATION MANUFACTURERS ARE: JOHNS MANVILLE, OWENS CORNING, MANSON INSULATION, AND KNAUF OR AS LISTED BELOW.</p> <p>1.10. ALL PIPE/DUCT LABELS SHALL BE APPLIED OUTSIDE OF INSULATION USING STENCILS OR WITH PIPE WRAP LABELS INSTALLED IN SUCH A WAY AS TO BE VISIBLE FROM THE INSULATION.</p> <p>1.11. ALL INSULATION BUTT JOINTS SHALL BE FIRMLY CONNECTED JOINED AND INSTALLED IN SUCH A WAY AS TO NOT SEPARATE OVER TIME.</p> <p><b>2. PIPE INSULATION</b></p> <p>2.1. FOR SYSTEMS UP TO 250 (1021 C) PROVIDE BELFORM INSULATION LTD KOOLEPHEN-K-BLOCK INSULATED PIPE SUPPORT INSERTS, A MINIMUM OF 5' (1500MM) LONG, PRE-MOULDDED, RIGID, SECTIONAL PHENOLIC FOAM INSULATION (MATCHING THICKNESS OF ADJACENT INSULATION) WITH REINFORCED FOL AND KRAFT PAPER VAPOUR JACKET AND A 180 DEGREE CHARTIVE GALVANIZED STEEL SADDLE.</p> <p>2.2. FOR ABOVE GROUND PIPE PROVIDE PREFORMED MINERAL FIBRE RIGID SECTIONAL SLEEVE TYPE INSULATION TO ASTM STANDARD 0.541, STANDARD SPECIFICATION FOR MINERAL FIBRE PIPE INSULATION, WITH A FACTORY APPLIED VAPOUR BARRIER JACKET EQUAL TO JOHN MANVILLE INC MICROLOK 4K-1 PLUS, KNAUF FIBER GLASS FIBRE INSULATION WITH ASI-SSSI, JACKET, MANSON INSULATION INC ALLEY V WRAP FSK, JOHNS MANVILLE INC PIPE INSULATION.</p> <p>2.3. FOR ALL VALVES AND ACCESSORIES IN PIPING SYSTEMS PROVIDE BLANKET MINERAL FIBRE TYPE ROLL INSULATION TO ASTM C553, STANDARD SPECIFICATION FOR MINERAL FIBRE BLANKET THERMAL INSULATION FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS, 24 KG/M<sup>3</sup> (1-1/2 LB./FT<sup>3</sup>) DENSITY WITH A FACTORY APPLIED VAPOUR BARRIER FACING.</p> <p>2.4. PROVIDE THE FOLLOWING INSULATION THICKNESS:</p> <p>2.4.1. DOMESTIC COLD WATER PIPING UP TO AND INCLUDING 4" (100MM) - 1" (25MM) WITH VAPOUR BARRIER</p> <p>2.4.2. DOMESTIC COLD WATER PIPING LARGER THAN 4" (100 MM) - 1-1/2" WITH VAPOUR BARRIER</p> <p>2.4.3. DOMESTIC HOT WATER AND RECIRC PIPING UP TO AND INCLUDING 1-1/2" (40MM) - 1" (25MM)</p> <p>2.4.4. DOMESTIC HOT WATER AND RECIRC PIPING LARGER THAN 1-1/2" - 2" (50MM)</p> <p>2.4.5. STORM PIPING - 1" (25MM) WITH VAPOUR BARRIER</p> <p>2.4.6. ABOVE GROUND SANITARY PIPING - 1" (25MM) WITH VAPOUR BARRIER.</p> <p>2.5. WRAP ALL EXPOSED INSULATION WITH WHITE SHEET PVC AND FITTING COVERS JACKET. INSTALL JACKET WITH OVERLAPPING LONGITUDINAL AND CIRCUMFERENTIAL JOINTS AND PROVIDE WATER TIGHT INSULATION. PROVIDE SLIP-TYPE JACKET EXPANSION JOINTS WHERE REQUIRED.</p> <p>2.6. INSULATION SHALL BE APPLIED DIRECTLY TO THE PIPE AND NOT AROUND HANGERS AND SUPPORTS.</p> <p>2.7. INSTALL ALL INSULATION IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.</p> <p>2.8. PROVIDE PREFORMED INSULATION ON ALL BARRIER FREE LABORATORIES INCLUDING PATRAP, ANGLE STOPS AND PIPING INSULATION.</p> <p>2.9. ALL INSULATION SHALL BE CONTINUOUS AND BE EXTENDED THROUGH WALL AND FLOOR OPENINGS, SUPPLY SOUND PROOF AND FIRE PROOF PENETRATIONS TO SUIT.</p> <p>2.10. ALL INSULATION APPLIED IN TWO LAYERS SHALL HAVE JOINTS STAGGERED.</p> <p>2.11. INSULATE OVER FLANGES AND MECHANICAL COUPLINGS WITH INSULATION TO MATCH PIPE INSULATION THICKNESS AND OUTSIDE DIAMETER OF FLANGE/COUPLING. FILL THE VOID BETWEEN THE FLANGE/COUPLING INSULATION AND THE PIPE INSULATION WITH THE SAME MATERIAL. ENSURE A CONTINUOUS VAPOUR SEAL ACROSS FULL INSTALLATION.</p> <p>2.12. DO NOT INSULATE TERMINAL UNIT CONTROL VALVES SO LONG AS THEY ARE SITUATION ABOVE CONDENSATE PAN. INSTALLED BY FIRE PROTECTION CONTRACTOR IN ACCORDING WITH N.F.P.A. #20 AND FACTORY MUTUAL DATA SHEETS.</p> <p>2.13. WHERE INSULATING IN LINE COMPONENTS WITH FLEXIBLE INSULATION, DO NOT COMPRESS PRODUCT MORE THAN 50% OF ORIGINAL FACTORY THICKNESS. APPLY LAYERS AS REQUIRED TO ACHIEVE MINIMUM THICKNESS VALUES.</p>	<p>3. SHEET METAL INSULATION</p> <p>3.1. FOR EXPOSED RECTANGULAR DUCTS PROVIDE PREFORMED BOARD TYPE INSULATION TO ASTM 0912, STANDARD SPECIFICATION FOR MINERAL FIBRE ROCK AND BOARD THERMAL INSULATION WITH A FACTORY APPLIED PREFORMED ALUMINUM FOL AND KRAFT PAPER FACING EQUAL TO KNAUF FIBER GLASS INSULATION BOARD WITH FSK FACING. MANSON INSULATION INC AC BOARD FSK, JOHNS MANVILLE INC TYPE 814 SPRINGGLAS OR OWENS CORNING 703, T04.</p> <p>3.2. FOR EXPOSED ROUND OR OVAL DUCTS PROVIDE ROLL FORM INSULATION TO ASTM C1383 STANDARD SPECIFICATION FOR PERPENDICULARLY ORIENTED FIBER ROLL AND SHEET THERMAL INSULATION FOR PIPES AND TANKS WITH A FACTORY APPLIED VAPOUR BARRIER FACING CONSISTING OF CUT STRIPS OF RIGID MINERAL BOARD INSULATION GUES TO AN ALUMINUM FOL AND KRAFT PAPER FACING ACCEPTABLE TO MULTIGLASS INSULATION TO MULTITEX MFG. GLASS-CELL FABRICATORS LTD. R-FLEX, OWENS CORNING PIPE AND TANK INSULATION, JOHNS MANVILLE INC PIPE AND TANK INSULATION.</p> <p>3.3. FOR CONCEALED RECTANGULAR OR OVAL DUCTS PROVIDE BLANKET TYPE ROLL FORM INSULATION TO ASTM STANDARD C553 STANDARD SPECIFICATION FOR MINERAL FIBRE BLANKET THERMAL INSULATION 24 KG/M<sup>3</sup> (1-1/2 LB./FT<sup>3</sup>) DENSITY WITH A FACTORY APPLIED VAPOUR BARRIER FACING EQUAL TO KNAUF FIBER GLASS BLANKET INSULATION AND MULTIPURPOSE FSK FACING. MANSON INSULATION INC ALLEY WRAP FSK, JOHNS MANVILLE INC DUCT WRAP TYPE 150 MICROLOUTE OR ISOFAB FACED FLEXIBLE FSK INSULATION.</p> <p>3.4. FOR DUCTS AND PIPES INSTALLED OUTSIDE OF THE BUILDING PROVIDE SHEET OR ROLL FORM OF C FREE CLOSED CELL SELF ADHERING ELASTOMERIC RUBBER INSULATION IN ACCORDANCE WITH REQUIREMENTS ASTM C534 STANDARD SPECIFICATION FOR PERFORMED FLEXIBLE ELASTOMERIC CELLULAR THERMAL INSULATION IN SHEET AND TUBULAR FORM WITH ALL REQUIRED INSTALLATION ACCESSORIES EQUAL TO ARMOCELL APARAPAR FSK AND WRAPPED IN ALUMINUM SHEETING WITH ALUMINUM BANDING WITH ALL JOINTS SEALED WITH WEATHERPROOF SEALANT.</p> <p>3.5. PROVIDE THE FOLLOWING INSULATION THICKNESS:</p> <p>3.5.1. OUTDOOR AIR INTAKE DUCTS, CASINGS, PLENUMS UP TO MIXING BOXES OR COILS - 1-1/2" (40MM)</p> <p>3.5.2. PRE-TREATED OUTDOOR AIR DUCTS, CASINGS, PLENUMS - 1-1/2" (40MM)</p> <p>3.5.3. SUPPLY AIR DUCTS - 2" (50MM)</p> <p>3.5.4. FINAL 10 FEET OF EXHAUST DUCTS WORK BEFORE BUILDING EXTERIOR - 1" (25MM)</p> <p>3.5.5. EXPOSED DUCT/WORK IN AREAS WHICH IT IS NOT SERVING - 1" (25MM)</p> <p>3.6. DUCT/WORK EXPOSED WITHIN THE SPACE IT SERVES DOES NOT REQUIRE EXTERNAL INSULATION.</p> <p>3.7. DUCT/WORK LINED WITH ACOUSTIC INSULATION CAN SUBTRACT THE THICKNESS OF ACOUSTIC INSULATION FROM THE REQUIRED EXTERNAL INSULATION TO DETERMINE FINAL EXTERNAL INSULATION.</p> <p>3.8. INSULATION SHALL BE APPLIED DIRECTLY TO THE DUCT AND NOT AROUND HANGERS AND SUPPORTS. PROVIDE RIGID BOARD INSULATION BELOW HANGERS WITH ALUMINUM SADDLE WEAR PLATE BETWEEN INSULATION AND CARRIERS.</p> <p>3.9. INSTALL ALL INSULATION IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.</p> <p>3.10. ALL INSULATION SHALL BE CONTINUOUS AND BE EXTENDED THROUGH WALL AND FLOOR OPENINGS, SUPPLY SOUND PROOF AND FIRE PROOF PENETRATIONS TO SUIT.</p> <p>3.11. INSULATION APPLIED IN TWO LAYERS SHALL HAVE JOINTS STAGGERED.</p> <p>3.12. INSULATE OVER FLANGES WITH INSULATION TO MATCH PIPE INSULATION THICKNESS AND OUTSIDE DIAMETER OF FLANGE/COUPLING. FILL THE VOID BETWEEN THE FLANGE/COUPLING INSULATION AND THE PIPE INSULATION WITH THE SAME MATERIAL. ENSURE A CONTINUOUS VAPOUR SEAL ACROSS FULL INSTALLATION.</p> <p>3.13. PROVIDE ACOUSTIC DUCT LINING WHERE NOTED ON DRAWINGS AND AS A MINIMUM THE FIRST 10 FEET ON BOTH SUPPLY AND RETURN DUCTS DOWNSTREAM OF FAN/TERMINAL UNITS PLUS AT LEAST TWO CHANGES OF DIRECTION.</p> <p>3.14. ACOUSTIC DUCT LINING SHALL BE A MINIMUM OF 1" (25MM) THICK ACOUSTIC LINING MATERIAL MEETING NFPA 90A REQUIREMENTS AND FLAME AND SMOKE SPREAD DEVELOPMENT FIRE HAZARD RATINGS OF CANULC-S102 FLEXIBLE FOR ROUND DUCT, BOARD TYPE FOR RECTANGULAR DUCTS, CONSISTING OF A BONDED FIBERGLASS MAT COATED ON THE INSIDE (WIND) FACE WITH A BLACK FIBRE-RESISTANCE RATING. MATERIAL SHALL HAVE NOISE REDUCTION COEFFICIENT OF 70 OR HIGHER.</p> <p>3.15. INSUL Lining IN ACCORDANCE WITH ANSIS/AMCA HVAC DUCT CONSTRUCTION STANDARDS PLUS FOR ALL INSTALLATION REGARDLESS OF VELOCITY AT THE LEADING AND TRAILING EDGES OF DUCT LINER SECTION PROVIDE GALVANIZED STEEL NOISE CHANNELS AS PER ANSIS/AMCA STANDARDS.</p>	<p><b>GENERAL LEGEND</b></p> <p>M VALVE</p> <p>R THREE WAY VALVE</p> <p>PIPE UP</p> <p>PIPE DOWN</p> <p>CAPPED PIPE</p> <p>FAN/BISE CONTROLLER</p> <p>METER</p> <p>THERMOSTAT</p> <p>BACKFLOW PREVENTER</p> <p>EXISTING GAS FLOW PRESSURE</p> <p>GAS LOW PRESSURE</p> <p><b>HVAC LEGEND</b></p> <p>NEW DIFFUSER</p> <p>RETURN AIR GRIEL</p> <p>EXISTING SA</p> <p>EXISTING RA</p> <p>EXISTING EQUIPMENT TO REMAIN</p> <p>AIRFLOW</p> <p>MANUAL BALANCING DAMPER</p> <p>SQUARE SUPPLY AIR DUCT UP</p> <p>SQUARE RETURN OR EXHAUST AIR DUCT UP</p> <p>SQUARE RETURN OR EXHAUST AIR DUCT DOWN</p> <p>ROUND RETURN OR EXHAUST AIR DUCT UP</p> <p>ROUND RETURN OR EXHAUST AIR DUCT DOWN</p> <p>FLEXIBLE DUCT</p> <p>RIGID DUCT</p> <p>BAFFLE ONE SIDE OF DIFFUSER</p> <p>THERMOSTAT ELECTRIC OR PROGRAMATIC</p> <p>DAMAGED</p> <p>VOLUME DAMPER</p> <p>FIRE DAMPER</p> <p>JANER CUT DOOR 18MM</p> <p><b>PD LEGEND</b></p> <p>NEW DOMESTIC COLD WATER</p> <p>NEW DOMESTIC HOT WATER</p> <p>EXISTING DOMESTIC COLD WATER</p> <p>NEW BIASED SANITARY DRAIN</p> <p>EXISTING BIASED SANITARY DRAIN TO REMAIN</p> <p>NEW GAS PIPE</p> <p>FLOOR DRAIN</p> <p>DRAIN WITH CLEANOUT</p> <p>RAINING TRAP WITH CLEANOUT</p> <p>HOT WATER SUPPLY</p> <p>HOT WATER RETURN</p> <p>RECYCLATING HOT WATER</p> <p><b>LEGEND SP</b></p> <p>NEW SPRINKLER LINE</p> <p>EXISTING EXTENDED COVERAGE TYPICIT PROTECT (H.25)</p> <p>EXISTING CONCEALED PENDENT (H.25) (H.60)</p> <p>FIRE EXTINGUISHER</p> <p>1/2" RFP STANDARD COVERAGE DRY SIDEWALL</p> <p>1/2" RFP STANDARD COVERAGE PENDING (H.60) (H.6)</p>
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<p><b>FIRE PROTECTION</b></p> <p><b>1. GENERAL</b></p> <p>1.1. PROVIDE ALL LABOUR, MATERIAL, EQUIPMENT, ENGINEERING, AND SERVICES REQUIRED TO SUPPLY A CODE COMPLIANT FIRE PROTECTION SYSTEM IN ACCORDANCE WITH THESE DOCUMENTS.</p> <p>1.2. THESE DOCUMENTS ARE INTENDED TO SHOW A GENERAL SCOPE OF WORK RELATED TO FIRE PROTECTION. A SYSTEM SHALL BE IN STRICT ACCORDANCE WITH:</p> <p>1.2.1. NFPA 10</p> <p>1.2.2. NFPA 13</p> <p>1.2.3. NFPA 14</p> <p>1.2.4. ONTARIO BUILDING CODE (OBC)</p> <p>1.2.5. ONTARIO FIRE CODE (OFC)</p> <p>1.2.6. LOCAL FIRE MARSHALL'S REQUIREMENTS</p> <p>1.2.7. OWNER'S INSURANCE PROVIDERS REQUIREMENTS</p> <p>1.3. FIRE PROTECTION CONTRACTOR SHALL PROVIDE THE FOLLOWING SCOPE OF WORK INCLUDED IN THEIR TENDER AMOUNT:</p> <p>1.3.1. HYDRAULICALLY DESIGN ALL NEW AND MODIFICATIONS OF EXISTING FIRE PROTECTIONS SYSTEM BY A QUALIFIED SPRINKLER ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF INSTALLATION.</p> <p>1.3.2. THE SPRINKLER CONTRACTORS ENGINEER SHALL BECOME THE SPRINKLER ENGINEER OF RECORD AND SUBMIT ALL REQUIRED DESIGN TO THE CITY BUILDING DEPARTMENT, FIRE MARSHALL AND BUILDING INSURANCE PROVIDER.</p> <p>1.3.3. PROVIDING FIRE PROTECTION ZONING IN ACCORDANCE WITH EXISTING BUILDING ZONING AND AS PER THESE DOCUMENTS.</p> <p>1.3.4. PROVIDE SPRINKLER SYSTEM HYDRAULIC PERFORMANCE TO SUIT THE HAZARD CLASSIFICATION OF THE SPACE.</p> <p>1.3.5. ADHERE TO ALL FM GLOBAL REQUIREMENTS WHERE APPROPRIATE.</p> <p>1.3.6. PROVIDE ALL REQUIRED SPRINKLER HEADS REQUIRED TO PROVIDE CODE COMPLIANT DESIGN. THESE DOCUMENTS ARE INTENDED TO SHOW THE MINIMUM NUMBER OF SPRINKLER HEADS.</p> <p>1.4. DESIGN SPRINKLER HEAD AND FIRE HOSE LAYOUT IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS.</p> <p>1.6. PROVIDE FIRE PROTECTION SIGN OFF LETTER STAMPED BY SPRINKLER ENGINEER OF RECORD STATING THAT INSTALLATION IS IN ACCORDANCE WITH ALL REQUIRED CODES APPLICABLE TO THE INSTALLATION.</p> <p>1.7. SUBMIT SHOP DRAWINGS AND HYDRAULIC CALCULATION COMPLETE WITH SPRINKLER ENGINEER'S STAMP TO CONSULTANT AND ALL AUTHORITIES FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE ALL SPRINKLER HEADS, MECHANICAL GROOVED COUPLINGS, VALVES, SENSORS, FIRE HOSE CABINETS, FIRE EXTINGUISHERS AND ALL OTHER EQUIPMENT INCLUDED IN FIRE PROTECTION SCOPE OF WORK.</p> <p>1.8. VERIFY AVAILABLE WATER FLOW AND PRESSURE OF SYSTEM. INCLUDE FOR MUNICIPAL MAIN WATER FLOW AND PRESSURE TESTS AT NEAREST FIRE HYDRANT. PROVIDE TEST RESULTS AS PART OF SHOP DRAWINGS PROCESS.</p> <p>1.9. ALL SPRINKLER SYSTEM COMPONENTS SHALL BE UL/C LISTED AND FM APPROVED, SUITABLE FOR FIRE PROTECTION SYSTEMS. ALL SYSTEM PIPES, VALVES, FITTINGS, JOINTS, DEVICES, AND ACCESSORIES SHALL BE SUITABLE FOR THE MAXIMUM SYSTEM THEY WILL BE SUBJECTED TO INCLUDING A 25% FACTOR OF SAFETY.</p> <p>1.10. HIRE BASE BUILDING FIRE PROTECTION CONTRACTOR TO PERFORM ALL FIRE PROTECTION WORK. INCLUDE THIS COST IN TENDER AMOUNT.</p> <p>1.11. ALL SPRINKLER HEADS SHALL BE CENTERED IN CEILING TILES AND IN LINED WITH CEILING COMPONENTS INCLUDING LIGHTS AND DIFFUSERS. HEAD LAYOUT SHALL BE APPROVED BY ARCHITECT PRIOR TO INSTALLATION.</p> <p>1.12. ALL SPRINKLER PIPING SHALL BE RIGID STEEL PIPE.</p> <p>1.13. SPRINKLER PIPING 2" AND SMALLER SHALL BE SCHEDULE 40 BLACK CARBON STEEL, ASTM A53, GRADE B, COMPLETE WITH CLASS 125 CAST IRON SCREWED FITTINGS TO ANSI/ASME B16.4.</p> <p>1.14. SPRINKLER PIPING 2-1/2" AND LARGER SHALL BE SCHEDULE 40 BLACK CARBON STEEL, ASTM A52, GRADE B COMPLETE WITH BUTT WELDED JOINTS AND CARBON STEEL BUTT WELDED FITTINGS TO ASTM A234, GRADE WP8, LONG SWEEP PATTERN.</p> <p>1.15. DRY SPRINKLER PIPING SHALL BE GALVANIZED SCHEDULE 40 BLACK STEEL WITH JOINTS AS PER THE ABOVE. REPAIR DAMAGE TO GALVANIC PROCESS DURING INSTALLATION.</p> <p>1.16. IN LIEU OF THE ABOVE, PROVIDE VICTAULIC FIRELOCK FITTINGS AND VICTAULIC STYLE 605 RIGID COUPLING JOINTS. MECHANICAL GROOVED COUPLINGS BY ANOTHER MANUFACTURER ARE NOT ACCEPTABLE.</p> <p>1.17. ALL SPRINKLER FITTINGS AND JOINTS SHALL BE APPROVED FOR THE MAXIMUM SYSTEM PRESSURE THEY WILL BE SUBJECTED TO WITH A 25% FACTOR OF SAFETY.</p> <p>1.18. ALL SPRINKLER VALVES SHALL BE PROVIDED BY A SINGLE MANUFACTURER. VALVES SHALL BE INSTALLED SUCH THAT THE MANUFACTURERS NAME, PRESSURE RATING, LISTING, SHALL BE VISIBLE.</p> <p>1.19. SPRINKLER HEADS SHALL BE MANUFACTURED BY TYCO, VICTAULIC, VIKING OR RELIABLE. SUBMIT SAMPLES OF EACH STYLE OF SPRINKLER HEAD.</p> <p>1.19.1. RECESSED SPRINKLER HEADS SHALL BE COMPLETE WITH WHITE PAINTED COVER PLATE UNLESS OTHERWISE STATED.</p> <p>1.19.2. UPRIGHT SPRINKLER HEADS SHALL HAVE BRONZE OR BRIGHT CHROME FINISH.</p> <p>1.19.3. PENDANT TYPE SPRINKLER HEADS TO BE COMPLETE WITH CHROME PLATED SPRINKLER HEAD WITH CHROME PLATED ESCUTCHEON PLATE.</p> <p>1.19.4. SIDEWALL SPRINKLER HEADS SHALL BRONZE OR CHROME PLATED HEADS LISTED FOR SIDEWALL APPLICATION.</p> <p>1.19.5. UNLESS OTHERWISE SPECIFIED USE SPRINKLER HEADS LISTED TO TAC11605 RATED HEADS. WHERE SPRINKLER HEADS ARE SUBJECT TO HIGHER TEMPERATURES, PROVIDE PRESSURE REQUIREMENTS AS REQUIRED TO SUIT APPLICATION.</p> <p>1.20. PROVIDE FIRE EXTINGUISHERS IN ACCORDANCE WITH OBC, OFC AND NFPA 10.</p> <p>1.21. IN ALL TYPICAL SPACES PROVIDE ABC-550W/D, 3A10BC RATED MULTI-PURPOSE DRY-CHEMICAL FIRE EXTINGUISHER WITH WALL MOUNTING OR MOUNTING CABINET AS REQUIRED BY DRAWINGS.</p> <p>1.22. IN ALL BACTERIAL ROOMS PROVIDE CO-150WV HLB, CARBON DIOXIDE TYPE 180C RATED FIRE EXTINGUISHER WITH INSULATED HANDLE, HOSE AND HORN DISCHARGE ASSEMBLY WITH WALL MOUNTING BRACKETS.</p> <p>1.23. PROVIDE COMBINATION TEST AND DRAIN FITTINGS WITH ORIFICE SIZED ACCORDING TO INSTALLED SPRINKLER HEADS. TEST AND DRAIN FITTINGS SHALL BE UL/C LISTED AND FM APPROVED AND INSTALLED IN ACCESSIBLE AREA.</p>	<p><b>2. FIRE PUMP</b></p> <p>THE FOLLOWING ITEMS TO BE SUPPLIED BY THE FIRE PROTECTION CONTRACTOR.</p> <ul style="list-style-type: none"> <li>• FREELESS MODEL 8A6F70 HORIZONTAL SINGLE STAGE DOUBLE SUCTION U.L.C. AND F.M. APPROVED CENTRIFUGAL FIRE PUMP. RATES 150 U.S. G.P.M. @ 110 P.S.I. OF HEAD. SUCTION PRESSURE + 15 P.S.I.</li> <li>• FLEXIBLE COUPLING</li> <li>• CLARK MODEL JWBH-LFADCO-D (PRESSURE LIMITING DRIVER) DIESEL ENGINE OPERATING AT 231.3 H.P./1780 R.P.M. TACHOMETER AND METER FOR RECORDING OPERATING HOURS</li> <li>• OIL PRESSURE GAUGE</li> <li>• WATER TEMPERATURE GAUGE</li> <li>• WATER COOLED EXHAUST MANIFOLD</li> </ul> <p>THE DIESEL ENGINE SHALL BE MOUNTED ON A COMMON FABRICATED STEEL BASE, WITH PUMP, COUPLING AND COUPLING GUARD. THE FOLLOWING OPERATING ACCESSORIES ARE ALSO INCLUDED:</p> <ul style="list-style-type: none"> <li>• TWO (2) SETS OF 12 VOLT BATTERIES CIVIL RACK AND CABLES.</li> <li>• ONE (1) 4" EXHAUST SILENCER C/W FLEXIBLE CONNECTION, THE EXHAUST SILENCER SHALL EXHAUST THROUGH THE BUILDING ROOF.</li> <li>• ONE (1) 1/2" VENTURE FLOW METER.</li> <li>• ONE (1) RAW WATER PIPING.</li> <li>• ONE (1) 200 IMPERIAL GALLON DOUBLE WALLED FUEL TANK C/W LEVEL GAUGE, LOW LEVEL SUPERVISORY SINGLE AND SADDLES.</li> <li>• SUCTION AND DISCHARGE PRESSURE GAUGES.</li> <li>• AIR RELEASE VALVE.</li> <li>• ONE (1) ENGINE DRIVE FIRE PUMP CONTROLLER.</li> <li>• ONE (1) 6" X10" CONCENTRIC INCREASER.</li> <li>• ONE (1) 8" X8" SUCTION REDUCER.</li> <li>• ONE (1) 10" G.P.M. 1/20 P.S.I. JOCKEY PUMP C/W CONTROLLER (INCLUDING PIPE, VALVES AND FITTINGS).</li> </ul> <p>ALL ITEMS LISTED UNDER 8.0 FIRE PUMP SHALL INCLUDE ALL LABOR, EQUIPMENT, PIPING AND FITTINGS AND SHALL BE INSTALLED BY FIRE PROTECTION CONTRACTOR IN ACCORDING WITH N.F.P.A. #20 AND FACTORY MUTUAL DATA SHEETS.</p> <p>FIRE PROTECTION CONTRACTOR TO INCLUDE FOR COST OF SUFFICIENT DIESEL FUEL TO COMPLETE ALL TESTING REQUIRED TO OBTAIN FIRE PUMP ACCEPTANCE. FUEL TANK TO BE LEFT FULL UPON COMPLETION OF CONTRACT.</p>
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<p><b>3. SHEET METAL INSULATION</b></p> <p>3.1. FOR EXPOSED RECTANGULAR DUCTS PROVIDE PREFORMED BOARD TYPE INSULATION TO ASTM 0912, STANDARD SPECIFICATION FOR MINERAL FIBRE ROCK AND BOARD THERMAL INSULATION WITH A FACTORY APPLIED PREFORMED ALUMINUM FOL AND KRAFT PAPER FACING EQUAL TO KNAUF FIBER GLASS INSULATION BOARD WITH FSK FACING. MANSON INSULATION INC AC BOARD FSK, JOHNS MANVILLE INC TYPE 814 SPRINGGLAS OR OWENS CORNING 703, T04.</p> <p>3.2. FOR EXPOSED ROUND OR OVAL DUCTS PROVIDE ROLL FORM INSULATION TO ASTM C1383 STANDARD SPECIFICATION FOR PERPENDICULARLY ORIENTED FIBER ROLL AND SHEET THERMAL INSULATION FOR PIPES AND TANKS WITH A FACTORY APPLIED VAPOUR BARRIER FACING CONSISTING OF CUT STRIPS OF RIGID MINERAL BOARD INSULATION GUES TO AN ALUMINUM FOL AND KRAFT PAPER FACING ACCEPTABLE TO MULTIGLASS INSULATION TO MULTITEX MFG. GLASS-CELL FABRICATORS LTD. R-FLEX, OWENS CORNING PIPE AND TANK INSULATION, JOHNS MANVILLE INC PIPE AND TANK INSULATION.</p> <p>3.3. FOR CONCEALED RECTANGULAR OR OVAL DUCTS PROVIDE BLANKET TYPE ROLL FORM INSULATION TO ASTM STANDARD C553 STANDARD SPECIFICATION FOR MINERAL FIBRE BLANKET THERMAL INSULATION 24 KG/M<sup>3</sup> (1-1/2 LB./FT<sup>3</sup>) DENSITY WITH A FACTORY APPLIED VAPOUR BARRIER FACING EQUAL TO KNAUF FIBER GLASS BLANKET INSULATION AND MULTIPURPOSE FSK FACING. MANSON INSULATION INC ALLEY WRAP FSK, JOHNS MANVILLE INC DUCT WRAP TYPE 150 MICROLOUTE OR ISOFAB FACED FLEXIBLE FSK INSULATION.</p> <p>3.4. FOR DUCTS AND PIPES INSTALLED OUTSIDE OF THE BUILDING PROVIDE SHEET OR ROLL FORM OF C FREE CLOSED CELL SELF ADHERING ELASTOMERIC RUBBER INSULATION IN ACCORDANCE WITH REQUIREMENTS ASTM C534 STANDARD SPECIFICATION FOR PERFORMED FLEXIBLE ELASTOMERIC CELLULAR THERMAL INSULATION IN SHEET AND TUBULAR FORM WITH ALL REQUIRED INSTALLATION ACCESSORIES EQUAL TO ARMOCELL APARAPAR FSK AND WRAPPED IN ALUMINUM SHEETING WITH ALUMINUM BANDING WITH ALL JOINTS SEALED WITH WEATHERPROOF SEALANT.</p> <p>3.5. PROVIDE THE FOLLOWING INSULATION THICKNESS:</p> <p>3.5.1. OUTDOOR AIR INTAKE DUCTS, CASINGS, PLENUMS UP TO MIXING BOXES OR COILS - 1-1/2" (40MM)</p> <p>3.5.2. PRE-TREATED OUTDOOR AIR DUCTS, CASINGS, PLENUMS - 1-1/2" (40MM)</p> <p>3.5.3. SUPPLY AIR DUCTS - 2" (50MM)</p> <p>3.5.4. FINAL 10 FEET OF EXHAUST DUCTS WORK BEFORE BUILDING EXTERIOR - 1" (25MM)</p> <p>3.5.5. EXPOSED DUCT/WORK IN AREAS WHICH IT IS NOT SERVING - 1" (25MM)</p> <p>3.6. DUCT/WORK EXPOSED WITHIN THE SPACE IT SERVES DOES NOT REQUIRE EXTERNAL INSULATION.</p> <p>3.7. DUCT/WORK LINED WITH ACOUSTIC INSULATION CAN SUBTRACT THE THICKNESS OF ACOUSTIC INSULATION FROM THE REQUIRED EXTERNAL INSULATION TO DETERMINE FINAL EXTERNAL INSULATION.</p> <p>3.8. INSULATION SHALL BE APPLIED DIRECTLY TO THE DUCT AND NOT AROUND HANGERS AND SUPPORTS. PROVIDE RIGID BOARD INSULATION BELOW HANGERS WITH ALUMINUM SADDLE WEAR PLATE BETWEEN INSULATION AND CARRIERS.</p> <p>3.9. INSTALL ALL INSULATION IN ACCORDANCE WITH MANUFACTURER SPECIFICATIONS.</p> <p>3.10. ALL INSULATION SHALL BE CONTINUOUS AND BE EXTENDED THROUGH WALL AND FLOOR OPENINGS, SUPPLY SOUND PROOF AND FIRE PROOF PENETRATIONS TO SUIT.</p> <p>3.11. INSULATION APPLIED IN TWO LAYERS SHALL HAVE JOINTS STAGGERED.</p> <p>3.12. INSULATE OVER FLANGES WITH INSULATION TO MATCH PIPE INSULATION THICKNESS AND OUTSIDE DIAMETER OF FLANGE/COUPLING. FILL THE VOID BETWEEN THE FLANGE/COUPLING INSULATION AND THE PIPE INSULATION WITH THE SAME MATERIAL. ENSURE A CONTINUOUS VAPOUR SEAL ACROSS FULL INSTALLATION.</p> <p>3.13. PROVIDE ACOUSTIC DUCT LINING WHERE NOTED ON DRAWINGS AND AS A MINIMUM THE FIRST 10 FEET ON BOTH SUPPLY AND RETURN DUCTS DOWNSTREAM OF FAN/TERMINAL UNITS PLUS AT LEAST TWO CHANGES OF DIRECTION.</p> <p>3.14. ACOUSTIC DUCT LINING SHALL BE A MINIMUM OF 1" (25MM) THICK ACOUSTIC LINING MATERIAL MEETING NFPA 90A REQUIREMENTS AND FLAME AND SMOKE SPREAD DEVELOPMENT FIRE HAZARD RATINGS OF CANULC-S102 FLEXIBLE FOR ROUND DUCT, BOARD TYPE FOR RECTANGULAR DUCTS, CONSISTING OF A BONDED FIBERGLASS MAT COATED ON THE INSIDE (WIND) FACE WITH A BLACK FIBRE-RESISTANCE RATING. MATERIAL SHALL HAVE NOISE REDUCTION COEFFICIENT OF 70 OR HIGHER.</p> <p>3.15. INSUL Lining IN ACCORDANCE WITH ANSIS/AMCA HVAC DUCT CONSTRUCTION STANDARDS PLUS FOR ALL INSTALLATION REGARDLESS OF VELOCITY AT THE LEADING AND TRAILING EDGES OF DUCT LINER SECTION PROVIDE GALVANIZED STEEL NOISE CHANNELS AS PER ANSIS/AMCA STANDARDS.</p>	<p><b>1. CONTROLS</b></p> <p>1.1. PROVIDE ALL CONTROLS AS SHOWN ON THESE DRAWINGS.</p> <p>1.2. ALL CONTROLS WORK SHALL BE PROVIDED BY BASE BUILDING CONTROLS CONTRACTOR AND INCLUDED IN MECHANICAL SCOPE OF WORK AND TENDER.</p> <p>1.3. ALL CONTROLS WIRING SHALL BE PLENUM RATED.</p> <p>1.4. MECHANICAL CONTRACTOR SHALL PROVIDE ALL 120V AND LOW VOLTAGE WIRING AS REQUIRED TO COMPLETE CONTROLS SCOPE OF WORK. PROVIDE AT TRANSFORMERS AS REQUIRED TO PROVIDE LOW VOLTAGE CONTROL WIRING. WHERE CONTROLS WORK REQUIRED 120V WIRING, HIRE ELECTRICAL CONTRACTOR TO PERFORM ALL SAD WORK.</p> <p>1.5. INSULATION APPLIED IN TWO LAYERS SHALL HAVE JOINTS STAGGERED.</p> <p>1.6. WHERE THERMOSTATS HAVE OCCUPANT INTERACTION, THEY SHALL BE INSTALLED 4'-4" ABOVE FINISHED FLOOR.</p>
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<p><b>4. TESTING</b></p> <p>4.1. CARRY OUT NOT LESS THAN THE FOLLOWING TESTS:</p> <p>4.2. BALL TEST ALL SANITARY DRAINS.</p> <p>4.3. PERFORM WATER PRESSURE TESTS ON ALL DRAINAGE AND VENT SYSTEMS WHEN ROUGH-IN OF THE SYSTEM COMPLETED. SYSTEM SHALL BE FILLED WITH WATER FOR 2 HOURS WITHOUT NOTICEABLE LEAKS.</p> <p>4.4. PRESSURE TEST ALL PLUMBED SANITARY SYSTEM AT 150% OF SYSTEM PRESSURE FOR A MINIMUM OF 6HRS WITHOUT PRESSURE LOSS.</p> <p>4.5. PROVIDE ALL TESTING AND BALANCING OF EXISTING AND NEW HVAC SYSTEMS AND PROVIDE BALANCING REPORTS AND START UP REPORTS OF EQUIPMENT TO CONSULTANT.</p> <p>4.6. PROVIDE ALL ADDITIONAL TESTING AS REQUIRED BY LOCAL AUTHORITIES IN THEIR PRESENCE.</p> <p>4.7. PERFORM TESTS PRIOR TO CONCEALING SYSTEMS.</p> <p>4.8. REMOVE ALL COMPONENTS WHICH WILL NOT WITHSTAND TEST PRESSURE, AND REPLACE AFTER TESTS.</p> <p>4.9. FAILURE OF TEST WILL REQUIRE SYSTEMS TO BE REINSTALLED UNTIL SUCH TIME AS THE TEST IS PASSED. REPEAT TESTS AS MANY TIMES AS REQUIRED UNTIL SYSTEM PASSES. DO NOT CAULK OR COVER LEAKS. REMOVE AND REPLACE SYSTEMS AS NECESSARY.</p> <p><b>5. INSTALLATION</b></p> <p>5.1. CLEANING AND DISINFECT ALL DOMESTIC WATER SYSTEMS TO ACCEPTABLE LOCAL AUTHORITY STANDARDS. PROVIDE ALL TESTING OF DOMESTIC WATER SYSTEMS IN ACCORDANCE WITH AWWA STANDARD C651.86. PROVIDE TEST RECORDS TO OWNER. ARRANGE AND PAY FOR ALL WATER QUALITY TESTS BY INDEPENDENT TESTING LABORATORY.</p> <p>5.2. FLUSH ALL DRAINAGE SYSTEMS AFTER SYSTEM HAS BEEN INSTALLED. REMOVE ALL DEBRIS AND PROVIDE CAMERA SCOPE OF LINES TO VERIFY CONDITIONS.</p> <p>5.3. PROVIDE FINAL CONNECTION TO ALL FITCHEN EQUIPMENT INCLUDING ALL ISOLATION VALVES, HOSES, AND FLEXIBLE PIPES. ADHERE TO MANUFACTURER'S RECOMMENDED INSTALLATION REQUIREMENTS FOR SPECIFIC INSTALLATION REQUIREMENTS.</p> <p>5.4. PROVIDE ALL BACKFLOW PREVENTERS FOR KITCHEN EQUIPMENT IN ACCORDANCE WITH CSA STANDARDS.</p> <p>5.5. PROVIDE ALL TRAP SEAL PRIMERS TO SUIT NEW DRAINS IN ACCORDANCE WITH LOCAL PLUMBING CODE.</p>	<p>1.24. PROVIDE ADDITIONAL SPRINKLER HEADS OF EACH TYPE AS REQUIRED BY CODE, INSTALLED IN METAL CABINET IN SPRINKLER ROOM, OR AS DIRECTED BY OWNER. COMPLY WITH ALL TOOLS REQUIRED TO CHANGE OUT SPRINKLER HEADS.</p> <p>1.25. EACH SPRINKLER HEAD BRANCH LINE SHALL INCLUDE A 20MM (1") CAPPED CONNECTION FOR FUTURE SPRINKLER HEAD. DESIGN BRANCH LINES TO HANDLE THE GREATER OF 1 ADDITIONAL SPRINKLER HEAD PER BRANCH OR 10% ADDITIONAL SPRINKLER HEADS PER BRANCH.</p> <p>1.26. INSTALL SPRINKLER SYSTEM AS HIGH AS POSSIBLE AND COORDINATE INSTALLATION WITH ALL OTHER TRADES.</p> <p>1.27. SLOPE ALL HORIZONTAL SPRINKLER PIPING SO THAT IT CAN BE EASILY COMPLETELY DRAINED. PROVIDE CAPPED DRAINS AT ALL LOW POINTS.</p> <p>1.28. COORDINATE REQUIREMENT OF SPRINKLER SYSTEM FIRE ALARM CONNECTION WITH ELECTRICAL DIVISION AND FIRE ALARM CONTRACTOR. MECHANICAL CONTRACTOR SHALL TAKE LEAD ROLE IN COORDINATED ALL SUCH WORK.</p> <p>1.29. NO SPRINKLER WORK SHALL BE CONCEALED UNTIL SUCH TIME AS IT HAS BEEN APPROVED BY THE ENGINEER OF RECORD AND THE AUTHORITY HAVING JURISDICTION.</p> <p>1.30. TEST ALL SPRINKLER SYSTEMS TO NFPA 13 REQUIREMENTS.</p> <p>1.31. TEST ALL STANDPIPE AND FIRE HOSE SYSTEM TO NFPA 14 REQUIREMENTS.</p> <p>1.32. TEST ALL SYSTEM IN ACCORDANCE WITH OFC, LOCAL FIRE MARSHAL AND BUILDING OFFICIALS REQUIREMENTS.</p> <p>1.33. INSTALL ALL TEST AND DRAIN CONNECTION IN ACCORDANCE WITH NFPA 13 REQUIREMENTS. PIPING DRAIN TO NEAREST BUILDING SANITARY DRAINAGE SYSTEMS. DO NOT DRAIN TO OUTDOORS.</p> <p>1.34. PROVIDE GUARDS FOR SPRINKLER HEAD IN AREAS SUBJECT TO DAMAGE INCLUDING, BUT NOT LIMITED TO, ELEVATOR MACHINE ROOMS, STORAGE ROOMS, ELEVATOR SHAFTS, GARBAGE ROOMS, MECHANICAL ROOMS, LOW HEAD ROOM LOCATION, AND ANY OTHER LOCATION WHERE SPRINKLER HEAD COULD BE DAMAGED.</p> <p>1.35. PROVIDE PROTECTION OF SPRINKLER HEADS FOR FULL DURATION OF CONSTRUCTION. REPLACE AT NO ADDITIONAL COST ANY SPRINKLER HEAD THAT IS DAMAGED, ALTERED, PAINTED, OR OTHERWISE AFFECTED.</p> <p>1.36. PROVIDE NFPA SIGN-OFF LETTER AT THE COMPLETION OF PROJECT.</p> <p>1.37. REMOVE AND REPAIR/REPLACE ANY SYSTEM COMPONENT WHICH DOES NOT PASS INSPECTION/TESTING.</p> <p>1.38. REMOVE AND REINSTALL ANY SPRINKLER COMPONENT NOT SUITABLE FOR TEST PRESSURES.</p> <p>1.39. PROVIDE AS BUILT DRAWINGS IN CAD AND PDF FORMAT AT THE COMPLETION OF PROJECT.</p>	<p><b>1. INSULATION</b></p> <p>1.1. PROVIDE ALL LABOUR AND MATERIAL REQUIRED TO INSULATE ALL MECHANICAL SYSTEMS AS SPECIFIED WITH THIS SECTION AND AS NOTED ON DRAWINGS.</p> <p>1.2. UNLESS OTHERWISE SPECIFIED, INSULATION THERMAL PERFORMANCE IS TO MEET OR EXCEED THE MORE STRINGENT REQUIREMENTS OF THE LATEST EDITIONS OF THE NATIONAL ENERGY CODE OF CANADA FOR BUILDINGS AND ASHRAE 90.1.</p> <p>1.3. ALL SYSTEM SUBJECT TO CONDENSATION (INCLUDING COLD AND DUAL TEMPERATURE) SHALL BE INSULATED COMPLETELY WITH VAPOUR BARRIER. VAPOUR BARRIER SHALL BE INSTALLED OVER ALL SYSTEM COMPONENTS INCLUDING VALVES, VAPOUR BARRIER SHALL BE COMPLETE AND CONTINUOUS INTS ENTIRETY. ANY DAMAGE TO VAPOUR BARRIER SHALL REQUIRE FULL REMOVAL AND REPLACEMENT. DO NOT PATCH NEW VAPOUR BARRIERS INSTALLED AS PART OF THIS CONTRACT.</p> <p>1.4. INSULATION SHALL ONLY BE APPLIED ONCE SYSTEMS HAVE BEEN TESTED AND REVIEWED BY ENGINEER AND AUTHORITY HAVING JURISDICTION.</p> <p>1.5. INSTALL INSULATION ON PIPES AND DUCTS WHICH ARE CLEAN AND DRY, AND WITH ENVIRONMENTAL CONDITIONS AS REQUIRED BY THE INSULATION MANUFACTURER.</p> <p>1.6. STORE ALL INSULATION MATERIAL ON SITE IN A DRY STORAGE AREA AND ENVIRONMENTAL CONDITIONS AS REQUIRED BY THE INSULATION MANUFACTURER.</p> <p>1.7. ALL INSULATION OF MECHANICAL SYSTEMS SHALL BE APPLIED BY A SINGLE INSULATION CONTRACTOR.</p> <p>1.8. ALL INSULATION SHALL HAVE FLAME AND SMOKE SPREAD RATINGS OF 2550 AND AS REQUIRED BY THE LOCAL BUILDING CODE AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION AND AS PER CANULC-S114 AND CANULC-S101.</p> <p>1.9. ACCEPTABLE INSULATION MANUFACTURERS ARE: JOHNS MANVILLE, OWENS CORNING, MANSON INSULATION, AND KNAUF OR AS LISTED BELOW.</p> <p>1.10. ALL PIPE/DUCT LABELS SHALL BE APPLIED OUTSIDE OF INSULATION USING STENCILS OR WITH PIPE WRAP LABELS INSTALLED IN SUCH A WAY AS TO BE VISIBLE FROM THE INSULATION.</p> <p>1.11. ALL INSULATION BUTT JOINTS SHALL BE FIRMLY CONNECTED JOINED AND INSTALLED IN SUCH A WAY AS TO NOT SEPARATE OVER TIME.</p> <p><b>2. PIPE INSULATION</b></p> <p>2.1. FOR SYSTEMS UP TO 250 (1021 C) PROVIDE BELFORM INSULATION LTD KOOLEPHEN-K-BLOCK INSULATED PIPE SUPPORT INSERTS, A MINIMUM OF 5' (1500MM) LONG, PRE-MOULDDED, RIGID, SECTIONAL PHENOLIC FOAM INSULATION (MATCHING THICKNESS OF ADJACENT INSULATION) WITH REINFORCED FOL AND KRAFT PAPER VAPOUR JACKET AND A 180 DEGREE CHARTIVE GALVANIZED STEEL SADDLE.</p> <p>2.2. FOR ABOVE GROUND PIPE PROVIDE PREFORMED MINERAL FIBRE RIGID SECTIONAL SLEEVE TYPE INSULATION TO ASTM STANDARD 0.541, STANDARD SPECIFICATION FOR MINERAL FIBRE PIPE INSULATION, WITH A FACTORY APPLIED VAPOUR BARRIER JACKET EQUAL TO JOHN MANVILLE INC MICROLOK 4K-1 PLUS, KNAUF FIBER GLASS FIBRE INSULATION WITH ASI-SSSI, JACKET, MANSON INSULATION INC ALLEY V WRAP FSK, JOHNS MANVILLE INC PIPE INSULATION.</p> <p>2.3. FOR ALL VALVES AND ACCESSORIES IN PIPING SYSTEMS PROVIDE BLANKET MINERAL FIBRE TYPE ROLL INSULATION TO ASTM C553, STANDARD SPECIFICATION FOR MINERAL FIBRE BLANKET THERMAL INSULATION FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS, 24 KG/M<sup>3</sup> (1-1/2 LB./FT<sup>3</sup>) DENSITY WITH A FACTORY APPLIED VAPOUR BARRIER FACING.</p> <p>2.4. PROVIDE THE FOLLOWING INSULATION THICKNESS:</p> <p>2.4.1. DOMESTIC COLD WATER PIPING UP TO AND INCLUDING 4" (100MM) - 1" (25MM) WITH VAPOUR BARRIER</p> <p>2.4.2. DOMESTIC COLD WATER PIPING LARGER THAN 4" (100 MM) - 1-1/2" WITH VAPOUR BARRIER</p> <p>2.4.3. DOMESTIC HOT WATER AND RECIRC PIPING UP TO AND INCLUDING 1-1/2" (40MM) - 1" (25MM)</p>
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RTU SCHEDULE																						
ITEM	QTY	MAKE	MODEL NUMBER	SERVICE	UNIT SIZE(TON)	SUPPLY FAN			EXTERNAL DIMENSIONS(FT)			HEATING (MBH)	COOLING (MBH)	HEATING EAT(F)	HEATING LAT(F)	OPERATING WEIGHT MAX(LB)	EER	IEER/SEER	POWER(V/Hz/PH)	MCA	MOP	REMARKS
						AIR FLOW (CFM)	E.S.P(IN H2O)	HEIGHT	WIDTH	LENGHT												
RTU-1	1	TRANE	DHC102HWRHA	SECOND FL.	8.5	3400	1.00	3.91	4.44	7.39	200	94.36	70	114.4	1307	11.8	15.5	575/60/3	23.0	25.0		
RTU-2	1	TRANE	DHC102HWRHA	GROUND FL.	10	3700	1.00	4.24	5.27	8.31	250	109.15	70	120.9	1683	11.8	15.5	575/60/3	23.0	30.0		

NOTES: - PROVIDE FACTORY SUPPLIED 24" ROOF CURB AND ALL REQUIRED MISCELLANEOUS SUPPORTS. RTU TO BE INSTALLED LEVEL TO FLOOR LEVEL BELOW.  
- PROVIDE FACTORY INSTALLED 20A GFCI ALL WIRING TO BE FIELD INSTALLED FROM INDEPENDENT 120V POWER SOURCE. OUTLET TO REMAIN OPERATIONAL WHEN POWER TO RTU IS SHUT OFF.  
- PROVIDE 2" MERV 13 FILTERS, WEATHERPROOF DISCONNECT, BAROMETRIC RELIEF DAMPER, DUAL ENTHALPY ECONOMIZER AND DIGITAL PROGRAMMABLE 7-DAY THERMOSTAT.

EXHAUST FAN SCHEDULE														
ITEM	QTY	LOCATION	MANUFACTURER	MODEL	TYPE	CAPACITY (CFM)	EXTERNAL STATIC PRESSURE(IN.H2O)	MOTOR SIZE (HP)	RPM	POWER SUPPLY				REMARKS
										VOLTS	PHASE	Hz	WEIGHT (LB)	
EF-1	1	ROOF	GREENHECK	GB-180-7	DOWNBLAST	3000	0.25	0.75	3461	115	1	60	97	CW 18" ROOF CURB , TYPE 1 & 3 STARTER , MOTORIZED DAMPER
EF-2	1	ROOF	COOK	70C15DL	DOWNBLAST	50	0.25	0.05	1401	115	1	60	20	-
EF-3	1	ROOF	COOK	90C15DH	DOWNBLAST	300	0.25	0.13	1305	115	1	60	23	-

ELECTRIC HEATER SCHEDULE												
HEATER	MANUFACTURER	MODEL	STYLE	CAPACITY		AIRFLOW		ELECTRICAL WEIGHT		MOUNTING	REMARKS	
				(MBH)	(KW)	(CFM)	(L/S)	POWER (V/PHz)	LBS			KG
BBH-1	OUELLET	OFM1002	BASEBOARD HEATER	3.4	1.0	-	-	120/1/60	11	4.8	WALL	REMOTE THERMOSTAT
BBH-2	OUELLET	OFM2008	BASEBOARD HEATER	6.8	2.0	-	-	208/1/60	15	6.8	WALL	REMOTE THERMOSTAT
BBH-3	OUELLET	OFM0502	BASEBOARD HEATER	1.7	0.5	-	-	120/1/60	7.3	3.3	WALL	REMOTE THERMOSTAT

NOTE:  
1. REFER TO ARCHITECTURAL DRAWINGS FOR UNIT FINISH, MOUNTING AND COLOR REQUIREMENTS IF SHOWN.  
2. PROVIDE ALL SUPPORTS TO HANG/SUSPEND/MOUNT UNIT AS REQUIRED.  
3. ACCEPTABLE ALTERNATIVE MANUFACTURERS: STELPRO, CHOMALOX  
4. ALL REMOTE THERMOSTATS SHALL BE LOW VOLTAGE AND UNITS SHALL BE COMPLETE WITH FACTORY SUPPLIED TRANSFORMER.

DIRECT GAS-FIRED MUA SCHEDULE																
HEATER	LOCATION	MANUFACTURER	MODEL	CAPACITY (CFM)	EXTERNAL STATIC PRESSURE (IN.H2O)	OUTPUT		ELECTRICAL		MOTOR		FLA	DIMENSIONS (L"XW"XHT)	WEIGHT		REMARKS
						(MBH)	(KW)	POWER (V/PHz)	(HP)	(KW)	LBS			KG		
MUA-1	ROOF	CAMBRIDGE AIR SOLUTIONS	SA250	1200	0.22	250	230	115/1/60	3/4	0.55	12.3	90X21X21	285	129.2		

-ALL MOUNTING HARDWARE BY OTHERS- HEATER WIDTH=21", - RECOMMENDED ROOF OPENING: 81/2" L X 16" W,- 10'-15" AFF RECOMMENDED DISCHARGE HEIGHT.

GAS FIRED UNIT HEATER SCHEDULE																
HEATER	LOCATION	MANUFACTURER	MODEL	INPUT		OUTPUT		THERMAL EFFICIENCY (%)	SUPPLY FAN				ELECTRICAL	WEIGHT		REMARKS
				(MBH)	(KW)	(MBH)	(KW)		CAPACITY (CFM)	MOTOR (HP)	(KW)	POWER (V/PHz)		LBS	KG	
UH-1	WAREHOUSE	MODINE	HDS100SS0111FBAN	100	29.3	82	24.3	82	1490	703	1/6	0.11	115/1/60	125	56	

NOTE: UNIT HEATER TO BE COMPLETED WITH:  
1. DISCONNECT SWITCH 2. 8" COMBUSTION AIR 3. VIBRATION ISOLATION HANGERS 4. 60 DEGREE DISCHARGE NOZZLE  
5. THERMOSTAT 6. COMBUSTION AIR INDUCER

AIR TERMINAL SCHEDULE								
ITEM #	MANUFACTURER	TYPE	MODEL NO.	SIZE	MOUNTING	FINISH	FRAME/BORDER	REMARKS
A	EH PRICE	SQUARE PLAQUE DIFFUSER	SPD	24"X24"	T-BAR	WHITE POWDER COAT	TYPE-31-BAR	
B	EH PRICE	EGG GRATE RETURN	80	AS INDICATED	T-BAR	WHITE POWDER COAT	N/A	
C	EH PRICE	ROUND CONE DIFFUSER	RCD	3'Ø	SUSPENDED	WHITE POWDER COAT	N/A	
D	EH PRICE	LINEAR SLOT DIFFUSER	SDS	2 SLOT,60"	T-BAR	WHITE POWDER COAT	-	

- VERIFY QUANTITY AND ADDITIONAL SIZE INFORMATION ON DRAWINGS.  
- ALL FINISHES AND MOUNTINGS SHALL BE COORDINATE WITH ARCHITECTURAL DRAWINGS.

COMMERCIAL GAS WATER HEATER SCHEDULE											
ITEM #	LOCATION	MANUFACTURER	MODEL NO.	RECOVERY@90° F RISE GPH	MBH	VOLUME (US GAL)	DIAMETER (IN)	POWER (V/PHz)	HEIGHT (IN)	DRY WEIGHT (LBS)	REMARKS
HWT-1	MECHANICAL ROOM	AO SMITH	BTX-80	95	76.0	80	27	120/1/60	71.5	225	

INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE SHUT-OFF VALVE.

PUMPS SCHEDULE																			
TAG	SERVICE	LOCATION	MANUFACTURER	STYLE	MODEL	FLUID	FLOW		HEAD		MOTOR		VARIABLE FLOW	VFD	PRESSURE RATING		CONTROLS	REMARKS	
							(USGPM)	(L/S)	(FT)	(KPA)	RPM	POWER (HP)			(KW)	(Y/N)			(PSI)
RP-1	DOMESTIC HOT WATER RECIRC.	MECHANICAL ROOM	BELL & GOSSETT	INLINE	ECOCIRC 20-18	WATER	1.5	0.09	10	29.89	3680	0.1	0.04	Y	Y	145	1000	TIMER	STAINLESS STEEL ALLOY

NOTE:  
1. PROVIDE VIBRATION ISOLATION ON ALL PUMPS/SYSTEM TO MITIGATE VIBRATION/ NOISE TRANSMISSION.  
2. ADJUST PUMP HEAD DESIGN TO SUIT INSTALLED CONDITIONS.  
3. ALL VFD PUMPS SHALL BE PROVIDED LOOSE AND INSTALLED ON SITE IN PROXIMITY TO PUMP.

EXPANSION TANK SCHEDULE																						
TAG	SERVICE	LOCATION	MANUFACTURER	STYLE	MODEL	ACCEPTABLE VOLUME		TOTAL VOLUME		MIN PRESSURE AT TANK		MAX PRESSURE AT TANK		TANK PRESSURE RATING		SIZE				WEIGHT (DRY)		REMARKS
						(US GAL)	(L)	(US GAL)	(L)	(PSI)	(KPA)	(PSI)	(KPA)	(PSI)	(KPA)	DIAMETER (IN)	HEIGHT (MM)	(LBS)	(KG)			
ET-1	OFFICE WASHROOMS	MECHANICAL ROOM	ARMTOL	THERMXTROL	ST-12	3.2	12.1	4.4	16.7	35	241	70	483	150	1034	11	279	15	381	9	4.1	

NOTE:  
1. FINAL SYSTEM SET POINT SHALL DETERMINE AND CALIBRATED AT THE TIME OF SYSTEM START UP AND COMMISSIONING.  
2. TANK VOLUMES LISTED ABOVE ARE A MINIMUM. ALTERNATE TANKS PROVIDE SHALL MEET OR EXCEED THESE VALUES.  
3. FLOOR MOUNTED TANKS SHALL BE ON 4" HOUSE KEEPING PAD.  
4. PROVIDE ALL REQUIRED STEEL SUPPORTS FOR SUSPENDED TANKS AND SUPPORT FROM BUILDING STRUCTURE.  
5. INSTALL TANK TO ALLOW FOR EASE OF REPLACEMENT OF BLADDER IF APPLICABLE.

PLUMBING FIXTURE CONNECTION SCHEDULE								
ITEM #	QTY	FIXTURE	INDIRECT WASTE	DIRECT WASTE	VENT	COLD WATER	HOT WATER	REMARKS
WC-1	6	WATER CLOSET	-	3"	2"	1/2"	-	
LAV-1	6	LAVATORY	-	1 1/2"	1 1/2"	1/2"	1/2"	
SH-1	1	SHOWER	-	1 1/2"	1 1/2"	1/2"	1/2"	
HS-1	1	HAND SINK	-	1 1/2"	1 1/2"	1/2"	1/2"	
DW-1	1	DISHWASHER	1 1/2"	-	1 1/2"	-	1/2"	
EW-1	1	EMERGENCY EYE WASH STATION	-	1 1/2"	1 1/2"	1/2"	1/2"	

NOTE: THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR SUPPLYING AND INSTALLING BACKFLOW PREVENTORS FOR POTABLE WATER SUPPLY TO ALL WHERE REQUIRED BY LOCAL MUNICIPALITY, MUNICIPAL INSPECTOR AND/OR EQUIPMENT SUPPLIER.  
PROVIDE CHROM ANGLE STOP VALVE @ EACH CONNECTION TO EQUIPMENT.  
VERIFY PLUMBING FIXTURES AND EQUIPMENTS WITH OWNER AND SUPPLIER.

NEW PLUMBING FIXTURE SCHEDULE		
ITEM #	FIXTURE	DESCRIPTION
WC-1	WATER CLOSET	FLOOR MOUNT TOILET BOWL, ELONGATED PRESSURE ASSIST BOWL
LAV-1	LAVATORY	GLACIER BAY RECTANGULAR VESSEL SINK WITH SINGLE HOLE DRILLING IN WHITE
HS-1	HAND SINK	STAINLESS STEEL SINK, COMPLETE WITH PULL DOWN FAUCET, ANGLE SUPPLY AND P-TRAP
SH-1	SHOWER	CHROME ROUNDED THERMOSTATIC SHOWER FAUCET WITH HAND SHOWER
DW-1	DISHWASHER	BOSCH 100 SERIES SHE3AR75UC DISHWASHER
EW-1	EMERGENCY EYEWASH STATION	WALL MOUNTED STAINLESS STEEL BOWL WITH STAY OPEN BALL VALVE AND DUAL SPRAY HEADS TO BE ACTIVATED BY A PUSH HANDLE

VERIFY PLUMBING FIXTURES AND EQUIPMENTS WITH OWNER AND SUPPLIER.

NOISSUED FOR	DATE
1 50% REVIEW	2024-05-29
2 FINAL REVIEW	2024-07-08

# FARHEATER ENGINEERING INC.

15 WERTHEIM COURT, SUITE 511  
RICHMOND HILL, ONTARIO, L4B 3H7  
CONTACT@FARHEATER.COM  
WWW.FARHEATER.COM  
TELL: 437-999-2424

**STAMP:**

**PROJECT NAME:**  
**WAREHOUSE AND OFFICE HEADQUARTERS**

**PROJECT ADDRESS:**  
**45 BLOWERS CRES, AJAX, ON, L1Z 0N4**

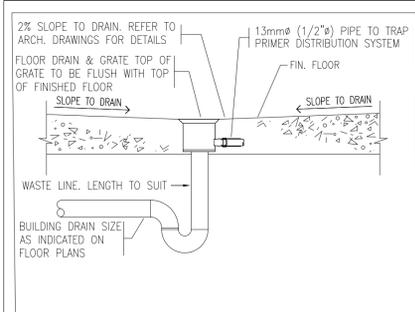
**NORTH:**

<b>DRAWN BY:</b> H.L	<b>DATE:</b> 2024-05-14
<b>CHECKED BY:</b> F.M	<b>SCALE:</b> N.T.S.

**DRAWING TITLE:**

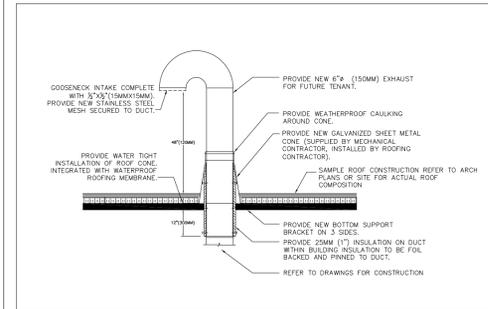
## MECHANICAL SCHEDULE

<b>PROJECT NUMBER:</b>  FH2024029	<b>DRAWING NUMBER:</b>  M-003
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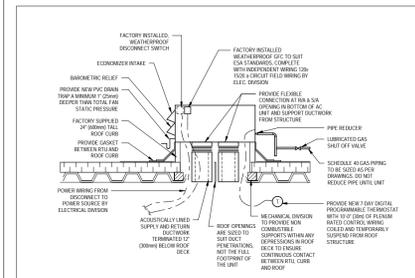
1 TYPICAL FLOOR DRAIN DETAIL

M-004 N.T.S.



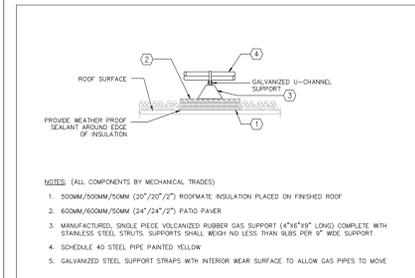
2 SANITARY EXHAUST GOOSENECK

M-004 N.T.S.



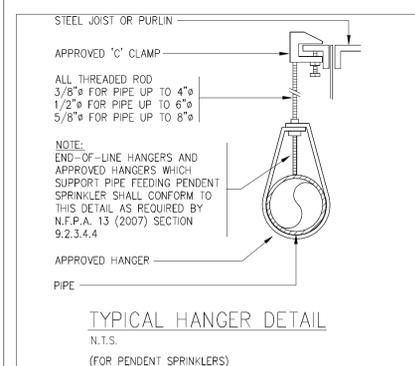
3 ROOF TOP UNIT DETAIL

M-004 N.T.S.



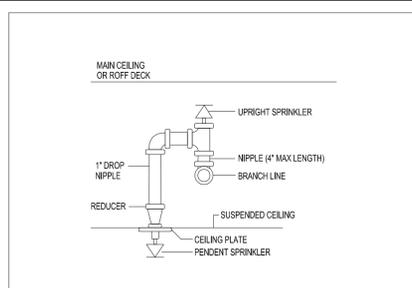
4 SUPPORT FOR GAS PIPING ON ROOF

M-004 N.T.S.



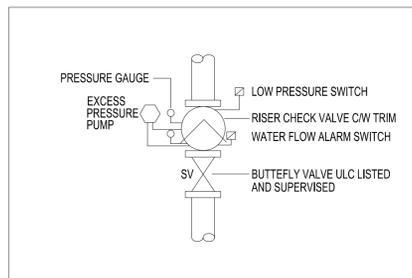
5 BEAM CLAMP HANGER DETAIL (INSTALLED TO NFPA 13)

M-004 N.T.S.



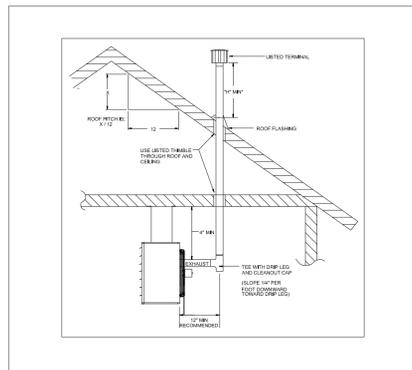
6 SPRINKLER ABOVE AND BELOW CEILING DETAIL (INSTALLED TO NFPA 13)

M-004 N.T.S.



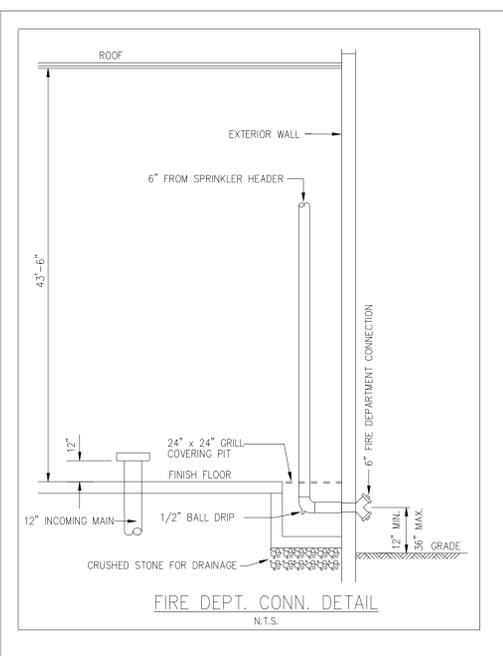
7 ALARM VALVE DETAIL

M-004 N.T.S.



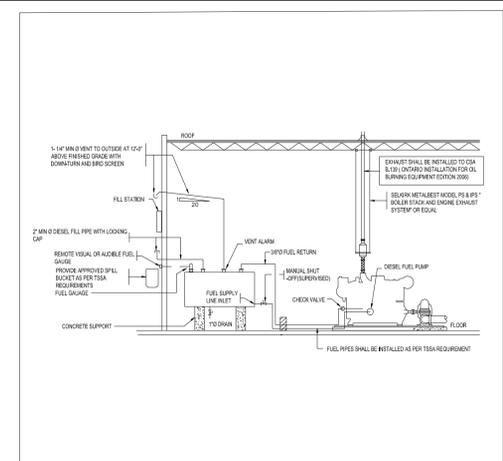
8 GAS FIRED UNIT HEATER DETAIL

M-004 N.T.S.



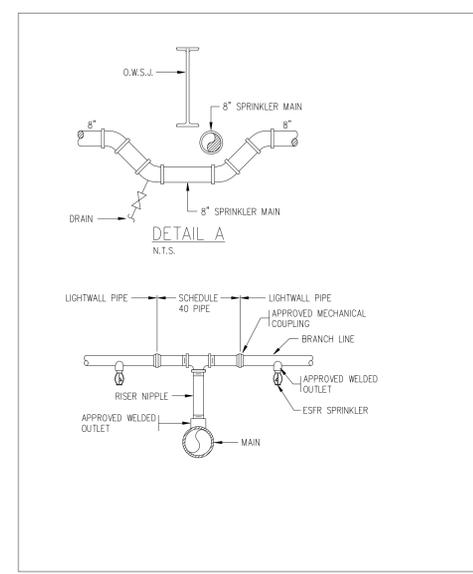
9 FIRE DEPT. CONN. DETAIL

M-004 N.T.S.



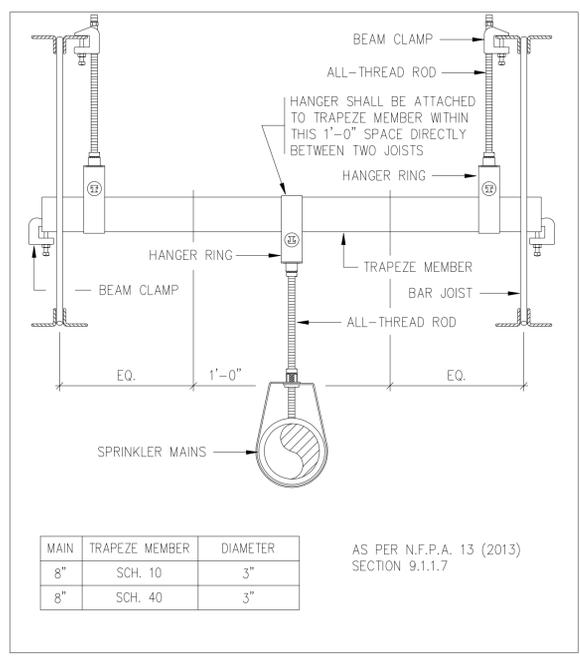
10 FUEL AND DIESEL FIRE PUMP SCHEMATIC

M-004 N.T.S.



11 TYPICAL LINE RISER DETAIL

M-004 N.T.S.



12 TYPICAL TRAPEZE HANGER DETAIL

M-004 N.T.S.

NOISSUED BY	DATE
1 50% REVIEW	2024-05-29
2 FINAL REVIEW	2024-07-08

# FARHEATER ENGINEERING INC.

15 WERTHEIM COURT, SUITE 511  
 RICHMOND HILL, ONTARIO, L4B 3H7  
 CONTACT@FARHEATER.COM  
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**STAMP:**

**PROJECT NAME:**  
 WAREHOUSE AND OFFICE HEADQUARTERS

**PROJECT ADDRESS:**  
 45 BLOWERS CRES, AJAX, ON, L1Z 0N4

**NORTH:**

<b>DRAWN BY:</b> H.L	<b>DATE:</b> 2024-05-14
<b>CHECKED BY:</b> F.M	<b>SCALE:</b> N.T.S.

**DRAWING TITLE:**  
 MECHANICAL DETAILS

<b>PROJECT NUMBER:</b> FH2024029	<b>DRAWING NUMBER:</b> M-004
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NOISSUED FOR	DATE
1 50% REVIEW	2024-05-29
2 FINAL REVIEW	2024-07-08

# FARHEATER ENGINEERING INC.

15 WERTHEIM COURT, SUITE 511  
 RICHMOND HILL, ONTARIO, L4B 3H7  
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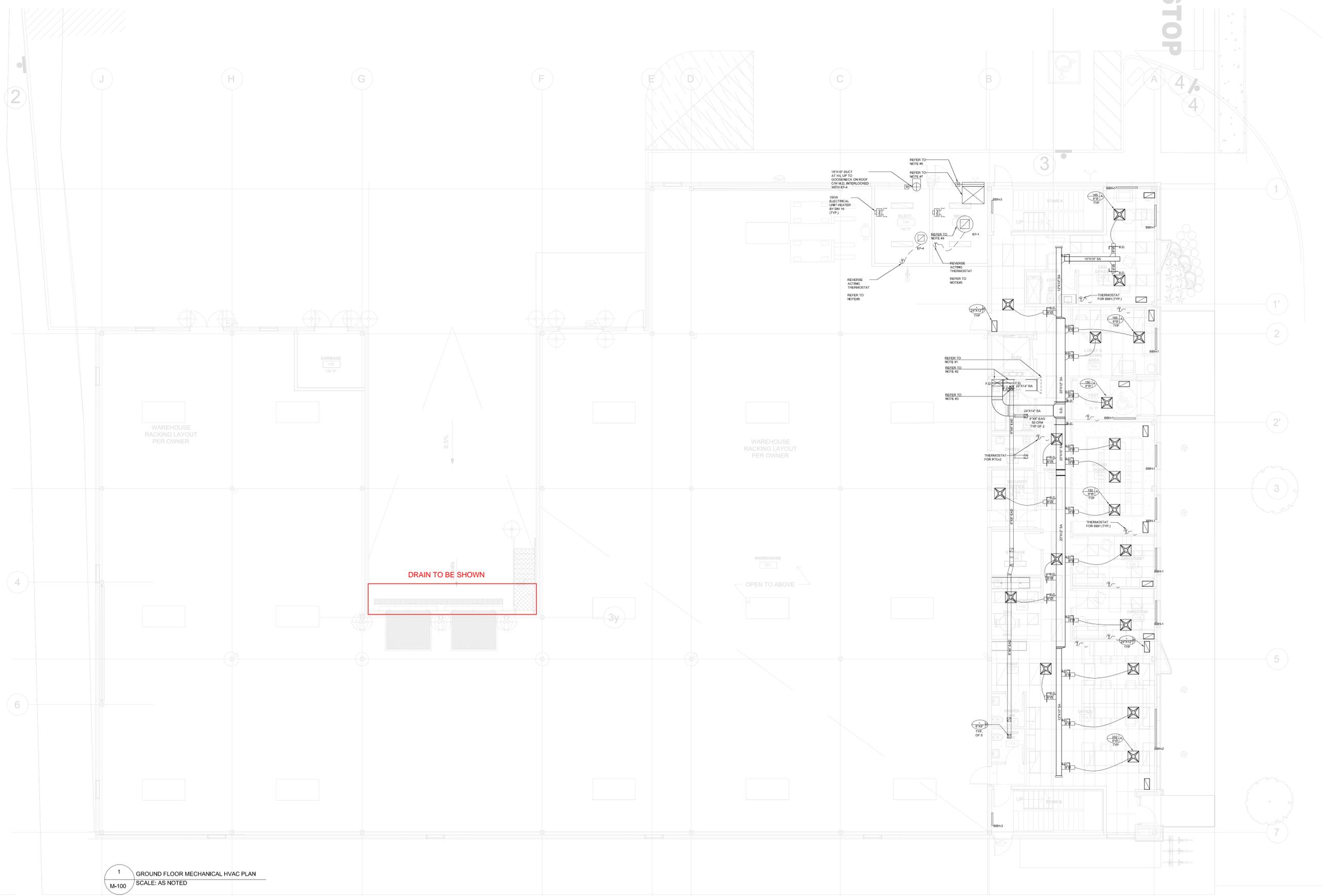
**DRAWN BY:** H.L. **DATE:** 2024-05-14

**CHECKED BY:** F.M. **SCALE:** 1/8"=1'-0"

**DRAWING TITLE:**

**GROUND FLOOR MECHANICAL HVAC PLAN**

**PROJECT NUMBER:** FH2024029 **DRAWING NUMBER:** M-100



1 GROUND FLOOR MECHANICAL HVAC PLAN  
 M-100 SCALE: AS NOTED

**KEYED NOTES (REFER TO PLAN ABOVE) :**

- PROVIDE OPEN END RETURN DUCT WITH MESH SCREEN AND BALANCING DAMPER.
- PROVIDE 24"x14" SUPPLY & RETURN DUCTS FROM RTU-2 ON ROOF. RUN DUCT ADJACENT TO THE WALL, PENETRATE WITH FIRE DAMPERS.
- PROVIDE 8"x8" EAD TO EF-3 ON ROOF C/W GOOSE NECK.
- PROVIDE 20"x20" EAD UP THROUGH ROOF TO EF-1 TO SERVE THE MECHANICAL/ELECTRICAL ROOM
- MOTORIZED OUTDOOR AIR DAMPER OPEN 30% FOR COMBUSTION AIR WHEN FIRE PUMP IS ACTIVATED. REVERSE ACTING THERMOSTAT WILL ACTIVATE EXHAUST FAN AND OPEN OUTDOOR AIR MOTORIZED DAMPER 100%.
- TAMCO SERIES 3400 C/W 3000 SERIES DAMPERS 48"x38" COMBUSTION INTAKE LOUVRE C/W MOTORIZED DAMPER (2 S19) AT 12'-0" A.F.F. INTERLOCK WITH DIESEL PUMP.
- 48"x38" FRESH AIR DUCT CONNECT TO LOUVER AND DOWN TO 12" A.F.F. C/W 1" THERMAL INSULATION. BOTTOM OF DUCT TO BE OPEN ENDED WITH WIRE MESH.
- 14"x14" EXHAUST DUCT UP TO THROUGH ROOF TO EXHAUST FAN "EF-4"

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DRAWN BY: H.L DATE: 2024-05-14

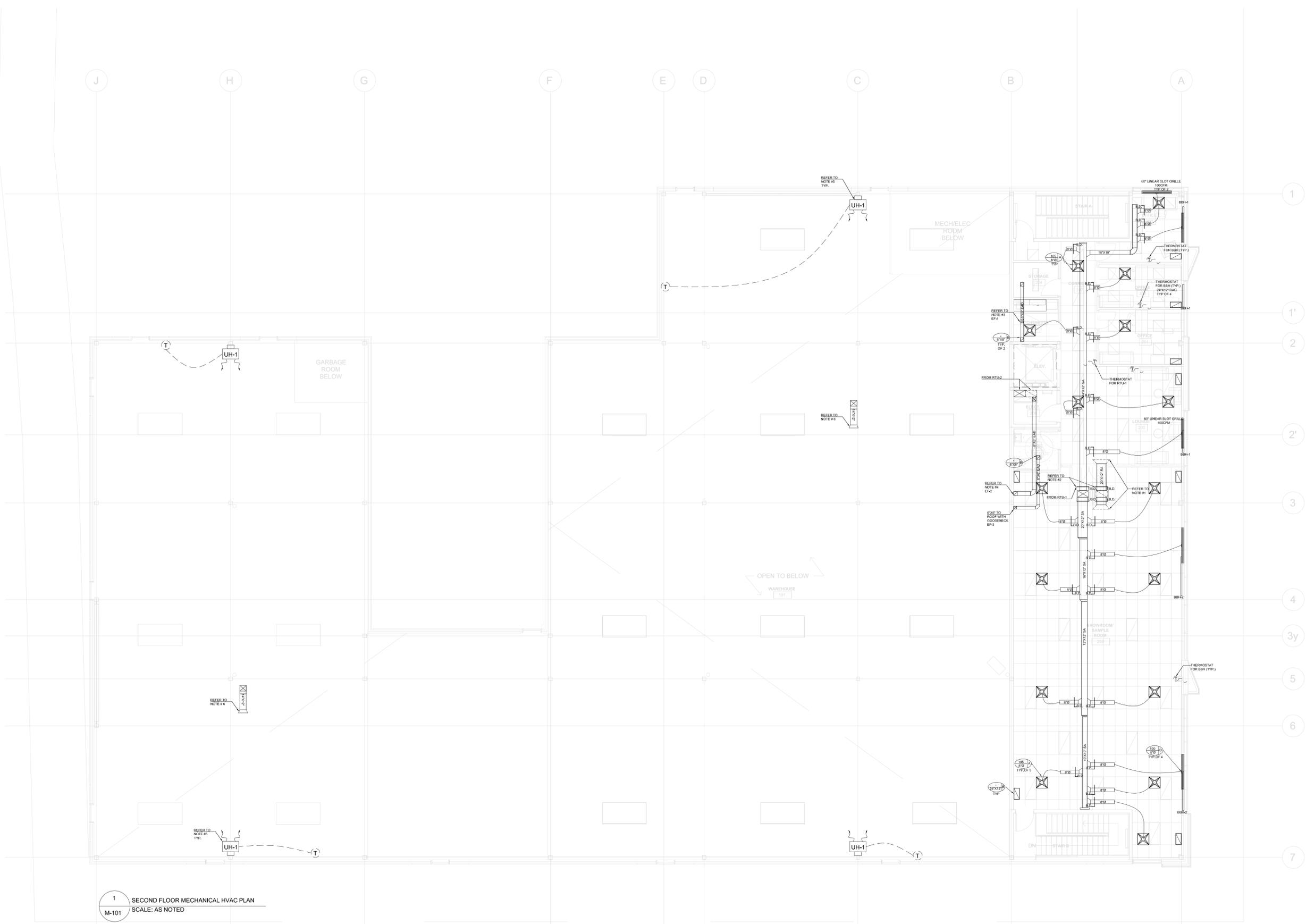
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DRAWING TITLE:

**SECOND FLOOR MECHANICAL HVAC PLAN**

PROJECT NUMBER: DRAWING NUMBER:

FH2024029 M-101



1 SECOND FLOOR MECHANICAL HVAC PLAN  
 M-101 SCALE: AS NOTED

- KEYED NOTES (REFER TO PLAN ABOVE) :**
1. PROVIDE OPEN END RETURN DUCT WITH MESH SCREEN AND BALANCING DAMPER.
  2. PROVIDE 24"x14" SUPPLY & RETURN DUCTS FROM RTU-1 ON ROOF, PROVIDE 1" THICK ACOUSTIC LINING INSULATION FROM RTU TO FIRST DIFFUSER.
  3. PROVIDE 6"x6" EAD TO EF-1 ON ROOF CW GOOSE NECK.
  4. PROVIDE 6"x6" EAD TO EF-2 ON ROOF CW GOOSE NECK.
  5. PROVIDE GAS UNIT HEATER, WALL MOUNTED ON BRACKET AT 12' FROM FLOOR - VENT TO ROOF, (TYPICAL).
  6. PROVIDE OPEN END MAKE UP AIR DUCT WITH MESH SCREEN.

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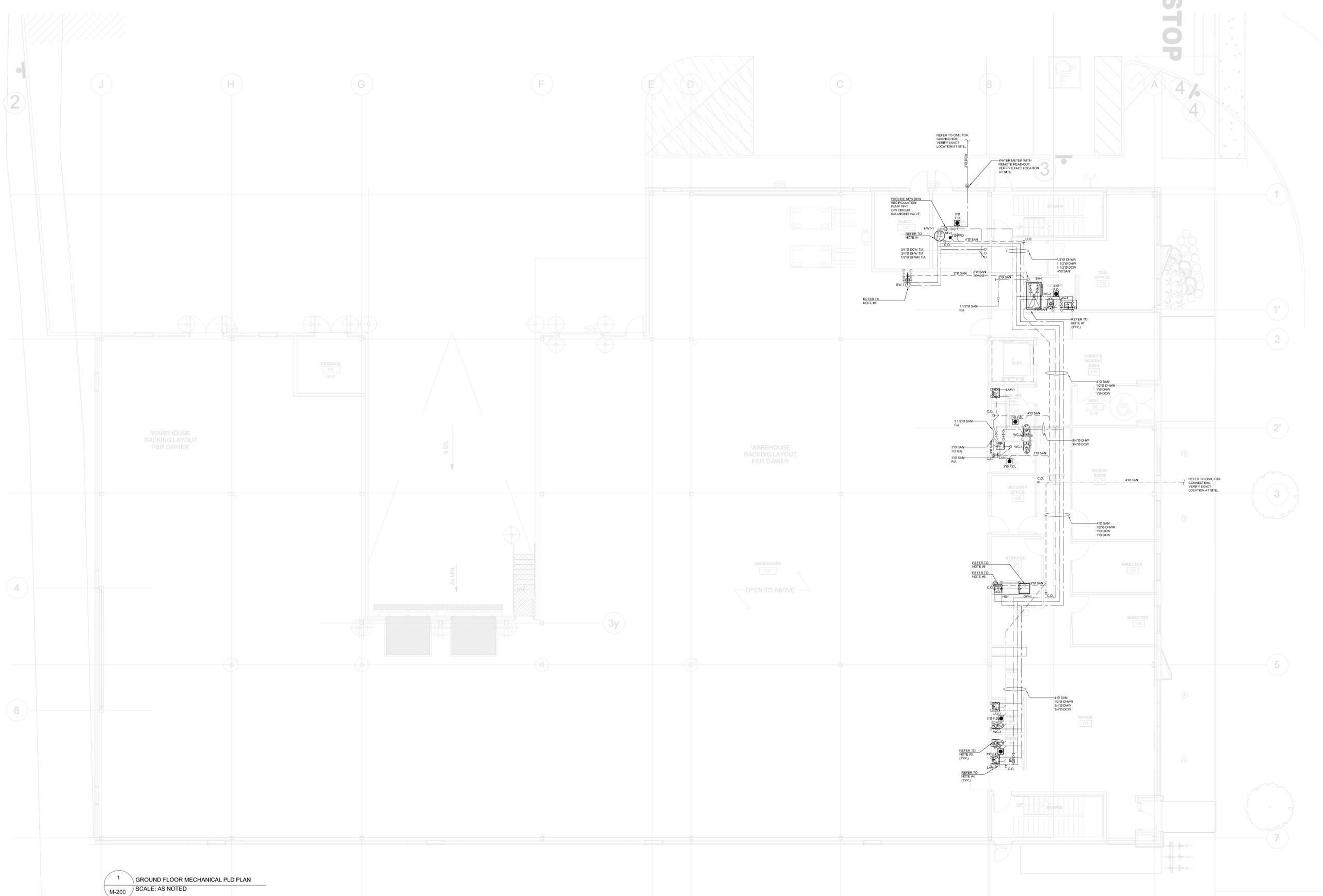
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**SCALE:** 1/8"=1'-0"

**DRAWING TITLE:**

**GROUND FLOOR MECHANICAL PLD PLAN**

**PROJECT NUMBER:**  
**DRAWING NUMBER:**

FH2024029 M-200



1 GROUND FLOOR MECHANICAL PLD PLAN  
 M-200 SCALE: AS NOTED

**KEYED NOTES (REFER TO PLAN ABOVE) :**

1. PROVIDE NEW DOMESTIC WATER HEATER TO SERVE GROUND FLOOR & SECOND FLOOR
2. PROVIDE PROVIDE NEW DHW RECIRCULATION PUMP RP-1 C/W CIRCUIT BALANCING VALVE.
3. PROVIDE NEW 1/2" DCW TO SERVE NEW WC-1. 2" VENT LINE UP FROM WATER CLOSET AND 3" SANITARY DRAIN DOWN FROM WATER CLOSET. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)
4. PROVIDE NEW 1/2" DCW/DHW TO SERVE NEW LAV-1. 1 1/2" VENT LINE UP FROM LAVATORY. 1 1/2" SANITARY DRAIN DOWN FROM LAVATORY. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)
5. PROVIDE NEW 1/2" DCW/DHW TO SERVE NEW HS-1. 1 1/2" VENT LINE UP FROM HAND SINK. 1 1/2" SANITARY DRAIN DOWN FROM HAND SINK. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)
6. PROVIDE NEW 1/2" DHW TO SERVE NEW DS-1. 1 1/2" VENT LINE UP FROM DISHWASHER. 1 1/2" SANITARY DRAIN DOWN FROM DISHWASHER. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)
7. PROVIDE NEW 1/2" DCW/DHW TO SERVE NEW SH-1. 1 1/2" VENT LINE UP FROM SHOWER. 1 1/2" SANITARY DRAIN DOWN FROM SHOWER. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)
8. PROVIDE NEW 1/2" DCW/DHW TO SERVE NEW EW-1. 1 1/2" VENT LINE UP FROM EMERGENCY EYE WASH STATION. 1 1/2" SANITARY DRAIN DOWN FROM EMERGENCY EYE WASH STATION. (VERIFY EXACT LOCATION AT SITE.)

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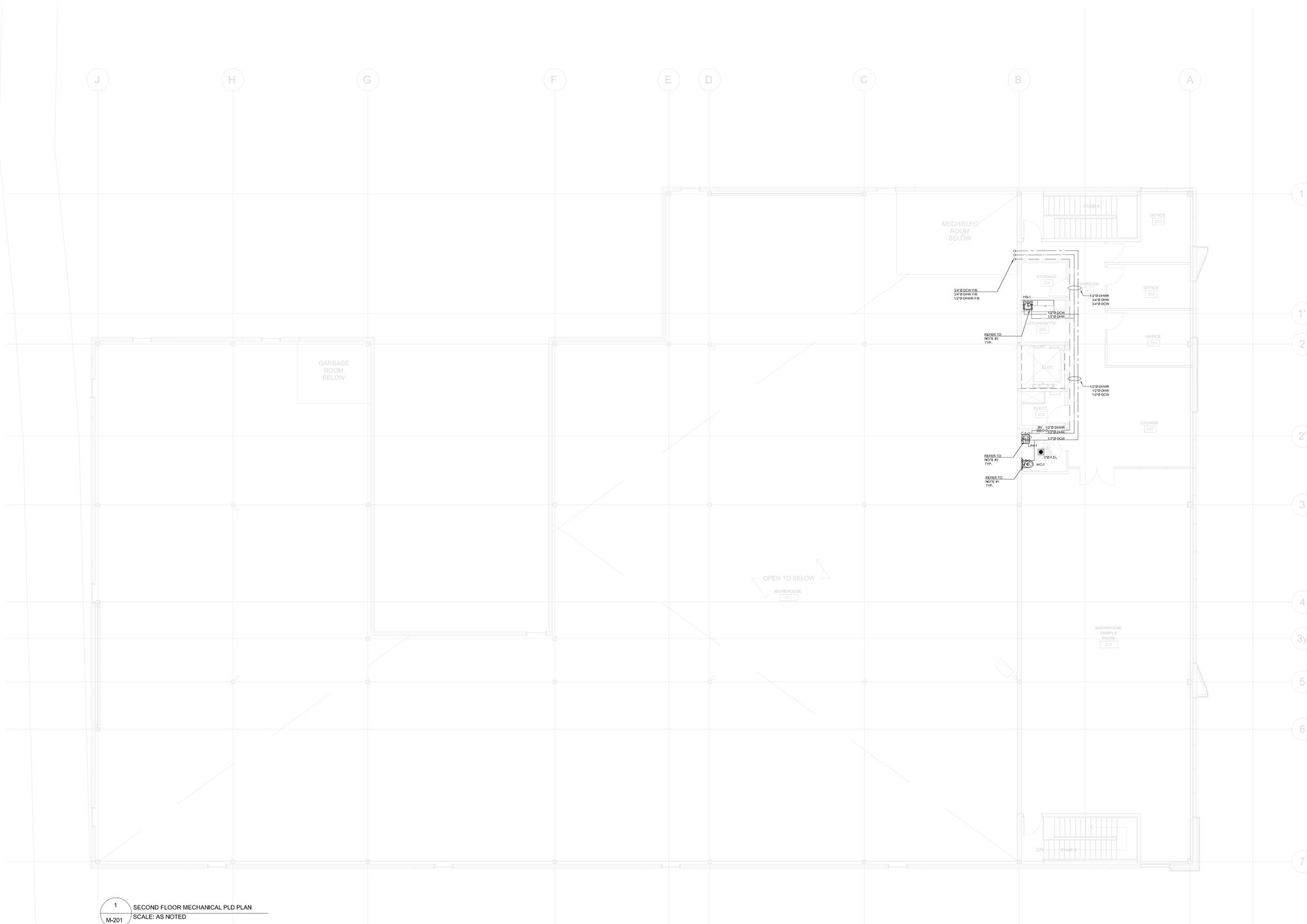
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CHECKED BY: F.M	SCALE: 1/8"=1'-0"

DRAWING TITLE:

SECOND FLOOR  
 MECHANICAL PLD PLAN

PROJECT NUMBER:	DRAWING NUMBER:
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FH2024029	M-201
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1 SECOND FLOOR MECHANICAL PLD PLAN  
 M-201 SCALE: AS NOTED

- KEYED NOTES (REFER TO PLAN ABOVE) :**
- PROVIDE NEW 1/2" DCW TO SERVE NEW WC-1. 2" VENT LINE UP FROM WATER CLOSET AND 3" SANITARY DRAIN DOWN FROM WATER CLOSET. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)
  - PROVIDE NEW 1/2"Ø DCW/DHW TO SERVE NEW LAV-1. 1 1/2"Ø VENT LINE UP FROM LAVATORY. 1 1/2"Ø SANITARY DRAIN DOWN FROM LAVATORY. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)
  - PROVIDE NEW 1/2"Ø DCW/DHW TO SERVE NEW HS-1. 1 1/2"Ø VENT LINE UP FROM HAND SINK. 1 1/2"Ø SANITARY DRAIN DOWN FROM HAND SINK. (VERIFY EXACT LOCATION AT SITE.) (TYPICAL)

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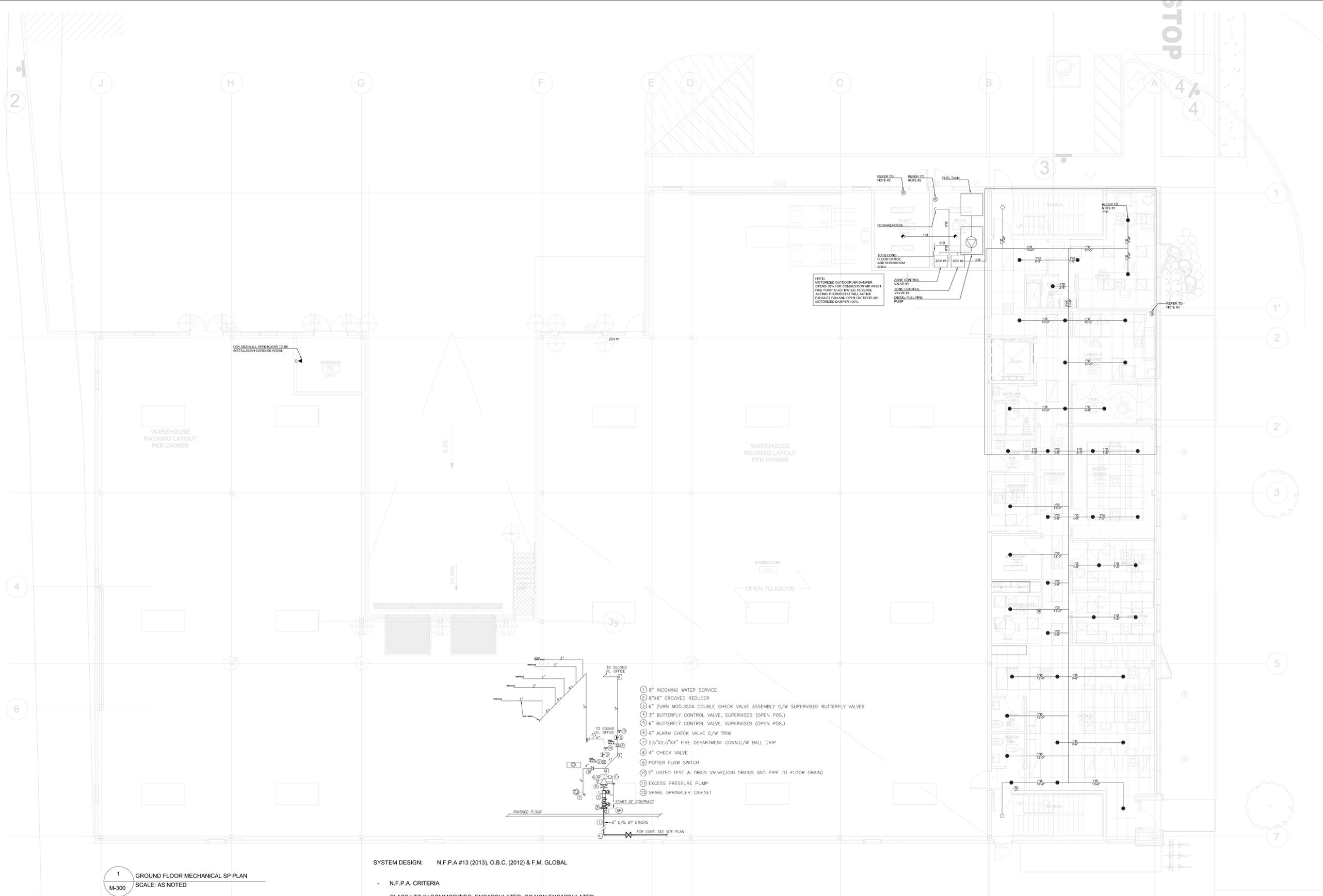
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**DATE:** 2024-05-14

**CHECKED BY:** F.M  
**SCALE:** 1/8"=1'-0"

**DRAWING TITLE:**

**GROUND FLOOR MECHANICAL SP PLAN**

**PROJECT NUMBER:** FH2024029  
**DRAWING NUMBER:** M-300



1 GROUND FLOOR MECHANICAL SP PLAN  
 M-300 SCALE: AS NOTED

NOISSUED FOR	DATE
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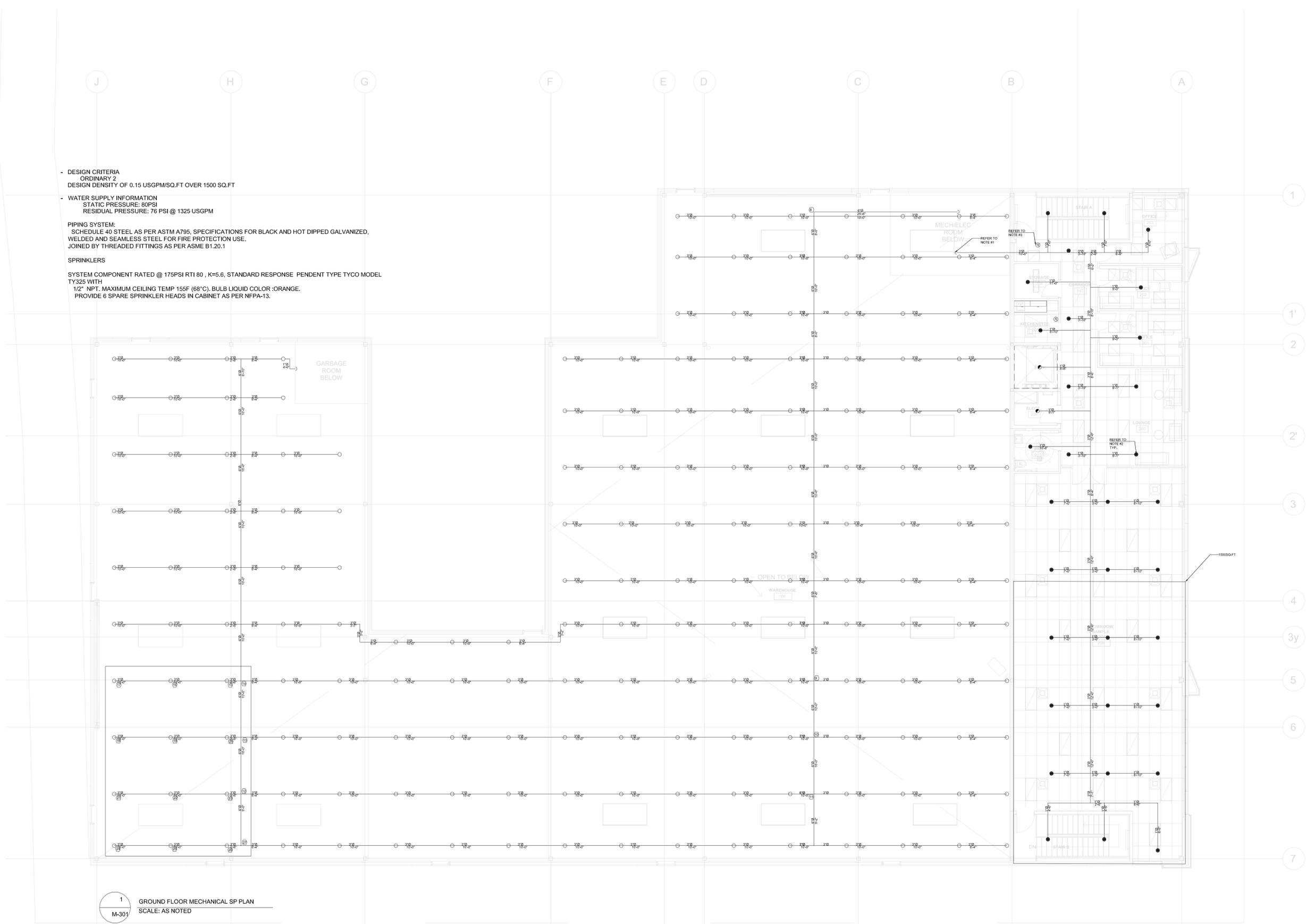
**NORTH:**

**DRAWN BY:** H.L. **DATE:** 2024-05-14

**CHECKED BY:** F.M. **SCALE:** 1/8"=1'-0"

**DRAWING TITLE:**  
 SECOND FLOOR MECHANICAL SP PLAN

**PROJECT NUMBER:** FH2024029 **DRAWING NUMBER:** M-301



1 GROUND FLOOR MECHANICAL SP PLAN  
 M-301 SCALE: AS NOTED

- KEYED NOTES (REFER TO PLAN ABOVE) :**
1. PROVIDE NEW 3"Ø SPRINKLER LINE TO SERVE THE OFFICE AND SHOWROOM AREA.
  2. PROVIDE NEW CONCEALED SPRINKLER HEAD.(TYPICAL.)
  3. PROVIDE NEW COLUMNWALL MOUNTED FIRE EXTINGUISHER TYPE ABC-5LB 3A:40BC (TYPICAL.).

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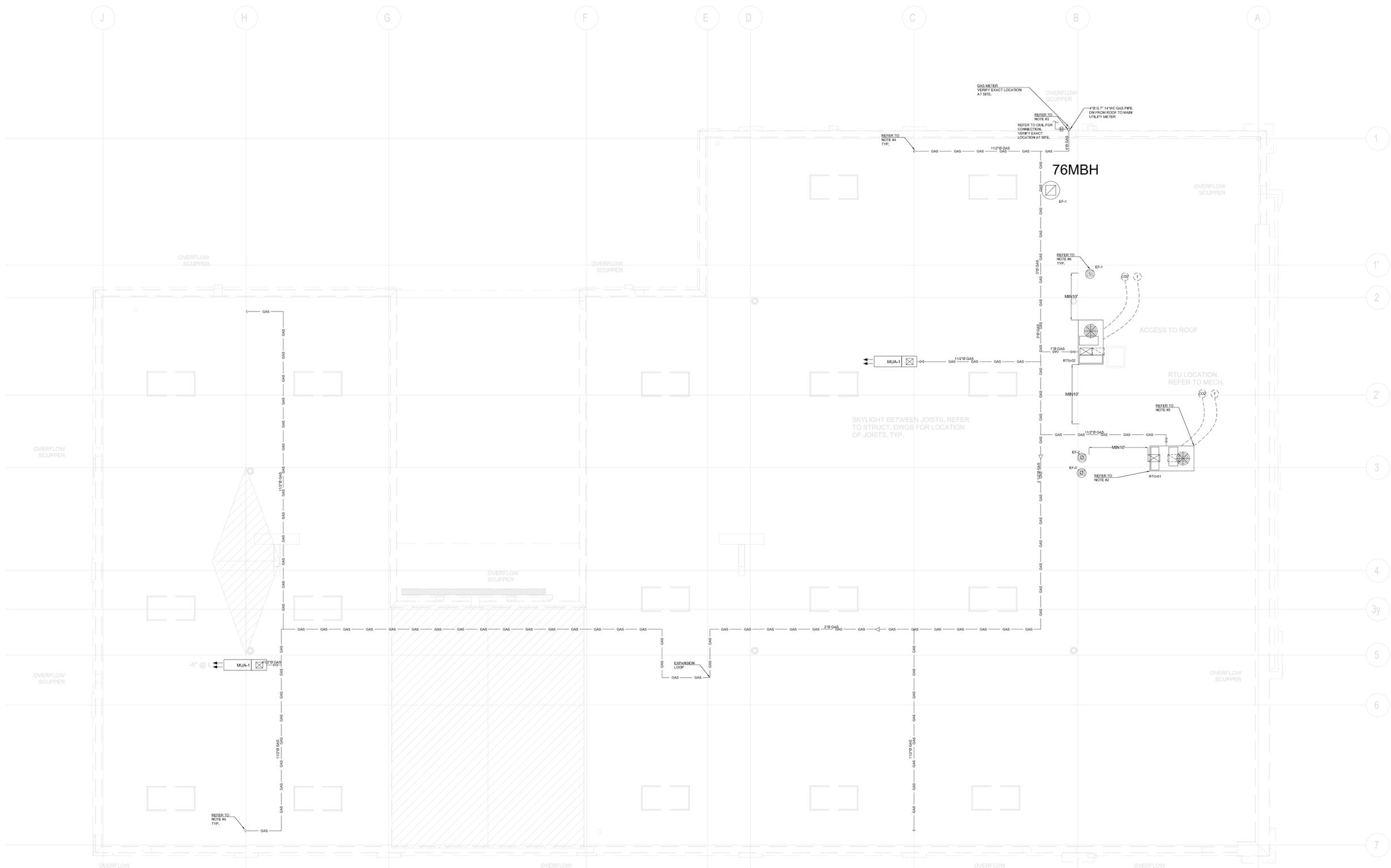
**CHECKED BY:** F.M  
**SCALE:** 1/8"=1'-0"

**DRAWING TITLE:**

**MECHANICAL ROOF PLAN**

**PROJECT NUMBER:**  
**DRAWING NUMBER:**

FH2024029 M-400



**1** MECHANICAL ROOF PLAN  
 M-400 SCALE: AS NOTED

**KEYED NOTES (REFER TO PLAN ABOVE) :**

- SUPPLY & RETURN DUCT DOWN SAHLL BE INSULATED WITH 3" THICK FIBER GLASS AND ALUMINUM CLADDING.
- PROVIDE ROOF CURB AND ROOF FLASHING.(TYPICAL).
- PROVIDE 4" GAS PIPE @ 7" W.C. FROM GAS METER AND RUN ON ROOF.
- PROVIDE 1 1/2" GAS PIPE DOWN TO SERVE GAS FIRED UNIT HEATER.(TYPICAL).
- PROVIDE AND INSTALL NEW CO2 SENSOR LOCATED NEXT TO RTU PROGRAMMABLE THERMOSTATS. TO BE TIED INTO RTU VARIABLE FRESH AIR INLET DAMPER TO PROVIDE DEMAND CONTROL VENTILATION.
- NEW 6" SAN EXHAUST DUCT 36" ABOVE ROOF C/W GOOSENECK. (TYPICAL).