

## GENERAL TENDER NOTES

### GENERAL MECHANICAL NOTES:

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE GOVERNING AUTHORITIES AND LOCAL BY-LAWS.  
CONFORM TO BASE BUILDING STANDARDS AND SPECIFICATIONS.

CONFORM TO LANDLORD/TENANT LEASE AGREEMENT, IF APPLICABLE.

BALANCING AND TESTING OF AIR SYSTEM SHALL BE PERFORMED BY A TESTING AND BALANCING CONTRACTOR  
APPROVAL FROM BUILDING INSPECTION DEPARTMENT TO ENGINEER AND LANDLORD.

SUBMIT AS-BUILT RECORD DRAWINGS AND FINAL UNCONDITIONAL CERTIFICATE OF APPROVAL FROM BUILDING INSPECTION DEPARTMENT TO ENGINEER AND LANDLORD.

ALL EXISTING EQUIPMENT NOTED TO BE REMOVED AND NOT RE-USED IN THIS CONTRACT SHALL BE OFFERED TO THE LANDLORD BEFORE REMOVAL FROM SITE.  
CHECK AND VERIFY LOCATIONS OF EXISTING MECHANICAL AND ELECTRICAL INTERFERENCES IN CEILING SPACE BELOW IN ALL AREAS REQUIRING CORE DRILLING THROUGH EXISTING FLOOR SLAB FOR PLUMBING SERVICES, ETC. ALLOW FOR ALL NECESSARY RADIOGRAPHY TO LOCATE HIDDEN ELECTRICAL SERVICES, STRUCTURAL REINFORCING, ETC. CO-ORDINATE THIS WORK WITH LANDLORD AND/OR TENANT CO-ORDINATOR FOR LOCATIONS, TIME, AND DURATION OF WORK AND ADHERE TO THE LANDLORDS REQUIREMENTS. SUBMIT CORE DRILLING PLAN TO THE BASE BUILDING STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF WORK.

PROVIDE SLEEVES FOR ALL NEW PIPING THROUGH EXISTING SLAB, WALLS, ETC. PACK AND SEAL WITH AN APPROVED FIRE RESISTANT INSULATION TO 1" FROM END SIDE OF OPENING ON BOTH SIDES OF FLOOR OR WALL. SEAL REMAINING PORTION WITH AN APPROVED FIRE STOP SUBSTANCE.

ALL SHUTDOWNS OF ANY PORTION OF EXISTING BASE BUILDING SYSTEM SHALL BE PERFORMED BY THE LANDLORD'S BUILDING OPERATIONS STAFF AND/OR CO-ORDINATED WITH THE LANDLORD FOR THE TIME AND DURATION OF INTERRUPTIONS AND ADHERE TO THE LANDLORDS INSTRUCTIONS IN THIS REGARD.

AQ STANDARDS FOR SEALANTS. MVR 8 FILTER CHANGE PER MONTH.

INCLUDE FOR CUTTING, PATCHING AND FINISHING OF ALL DRYWALL CEILING WHERE REQUIRED AND INCLUDING FOR AFTER HOURS WORK IN FLOORS BELOW.

ALL PIPING FITTINGS, FITTINGS AND COILS TO BE RATED FOR THE MEASURED SYSTEM WORKING PRESSURES, REGARDLESS OF THE SPECIFICATIONS HEREIN. PLEASE INCLUDE FOR ASME 300 CLASS SELECTIONS IN TENDER SUBMISSION. LOWER RATED FITTINGS MAY BE PERMISSIBLE FOLLOWING FIELD TESTING AND VERIFICATION OF THE APPLICABLE SYSTEM.

ALL CHILLED/ CONDENSER WATER PIPING SYSTEMS TO BE SCHEDULE 40 BLACK STEEL. ALL DOMESTIC WATER PIPING TO BE TYPE 1 COPPER. PLASTIC PLUMBING CONNECTIONS ARE NOT PERMITTED. THESE REQUIREMENTS SUPERSEDE ANY CONTRACTORY SPECIFICATIONS PROVIDED WITHIN HIS PACKAGE.

ALL LOW VOLTAGE WIRING AND CONNECTION FOR ANY AND ALL EQUIPMENT TO BE CARRIED UNDER MECHANICAL CONTRACT.

## SHOP DRAWING SUBMISSION

ALL SHOP DRAWING SUBMISSIONS ARE TO BE COMPLETE WITH HH ANGUS COVER SHEET, AND EMAILED TO SHOPDRAWINGS@HHANGUS.COM

SHOP DRAWING COVER SHEET WILL BE PROVIDED WITH FC DOCUMENTS, OTHERWISE PLEASE REQUEST THROUGH HHIA ANGUS MECHANICAL DESIGNER.

## TEAM COORDINATION

FOR ALL QUESTIONS RELATED TO THESE DRAWINGS OR THIS PROJECT, PLEASE CONTACT THE ASSIGNED MECHANICAL DESIGNER:

EMAIL: STEVE.SANTINHOSS@HHANGUS.COM  
OFFICE TEL: 416-443-8200

## EQUIPMENT LIST

**FFD-1** ZURN ZN-211-BE-P FUNNEL FLOOR DRAIN, DURA-COATED CAST IRON BODY WITH BOTTOM OUTLET, ADJUSTABLE "TYPE BE" POLISHED NICKEL BRONZE ROUND STRAINER WITH 4" ROUND FUNNEL, 1/2" TRAP PRIMER CONNECTION.

**TP-1** TRAP PRIMER  
P.P.P. INC MODEL PR-500 AUTOMATIC TRAP SEAL PRIMER VALVE, CAST BRASS BODY, SERVING INDIVIDUAL OR REMOTE AREA DRAINS WITH 1/2" CONNECTIONS WITH STRAINER AND INTEGRAL BACK FLOW PREVENTER & VACUUM BREAKER.

**CWF-1** QUANTUM UNDERCOUNTER MOUNTED 1000 DRINKING WATER SYSTEM. COLD WATER SUPPLY ONLY (0.5 GAL/MIN WITH A CAPACITY OF 750 GALLONS WITH COUNTERMOUNTED GOOSENECK FAUCET, REMOTE CHILLING PACKAGE TO BE HIGH EFFICIENCY STAINLESS STEEL. GASS 5 GALLON WATER CHILLER MODEL: R5 USING REFRIGERANT R-134A, 5.0 GALLONS OF CHILLED WATER PER HOUR, 1/5 H.P. @ 3.6 AMPS, 115V/60HZ, DISTRIBUTED BY DANAMARK WATER TREATMENT PRODUCTS(905-792-2353), PROVIDE 1/2" VALVED C.W. CONNECTION UNDER COUNTER FOR THIS SYSTEM. CO-ORDINATE LOCATION OF FAUCET WITH MILLWORK INSTALLER & ARCHITECT.

**AC-1 & CU-1 SPLIT SYSTEM HEAT PUMP**

**AC-1** TO BE MITSUBISHI WALL MOUNTED DUCTLESS AC UNIT MODEL PKA-A18H46 1.5 TON UNIT, 18,000 BTUH RATED COOLING CAPACITY, ECM FAN MOTOR, 208-230/60/1, 40 W, 13 MCA, 0.35 FLA. UNIT WEIGHT IS 29lbs. INCLUDE FOR AND INSTALL SAUERMANN DELTA PACK CONDENSATE PUMP.

**CU-1** TO BE MITSUBISHI ROOFTOP CONDENSER MODEL PUZ-A18NH46 (-BS), 18,000 BTUH RATED COOLING CAPACITY, ECM FAN MOTOR, 208-230/60/1, 40 W, 13 MCA, 0.35 FLA. BREAKER SIZE 25 AMP MOP# 20 AMP. UNIT WEIGHT IS 89lbs. INCLUDE FOR AND INSTALL ECOFOOT MINI FRAME AN-H305. INCLUDE FOR AND INSTALL CONCRETE BLOCK WALL MOUNT KIT.

**OUTDOOR C/W FACTORY INSTALLED ULTRA LOW AMBIENT COOLING FOR - 40 DEG CLOCALLY MODIFIED ULTRA LOW AMBIENT CONTROLS ARE NOT ACCEPTABLE.**

SUPPLY, INSTALL, TEST AND COMMISSION ALL INTERCONNECTING REFRIGERATION PIPEWORK BETWEEN THE OUTDOOR AND INDOOR UNITS.  
ALL PIPEWORK TO BE CARRIED OUT IN REFRIGERANT QUALITY ACR COPPER TUBING AND COMPLETE WITH THE APPROPRIATE HEADERS AND JOINTS. ALL PIPEWORK MUST BE SUITABLE FOR R410A.

**AC-2 & CU-2 AC UNIT & CONDENSER UNIT**

**AC-2** TO BE MITSUBISHI CEILING MOUNTED HEAT PUMP MODEL PEAD-A18H46, 18,000 BTUH RATED COOLING CAPACITY, 19,000 BTUH/RATED HEATING CAPACITY, ECM FAN MOTOR, 1200cfm @ 0.2" S.P. 208-230/60/1, 96 W, 2.0 MCA, 0.74 FLA. UNIT WEIGHT IS 62 lbs. INCLUDE FOR AND INSTALL SAUERMANN DELTA PACK CONDENSATE PUMP.

**CU-2** TO BE MITSUBISHI CONDENSER MODEL PUZ-A18NH46 (-BS), 18,000 BTUH RATED COOLING CAPACITY, 19,000 BTUH/RATED HEATING CAPACITY, ECM FAN MOTOR, 208-230/60/1, 40 W, 13 MCA, 0.35 FLA. BREAKER SIZE 15 AMP. INCLUDE FOR CONCRETE BLOCK WALL MOUNT KIT. UNIT WEIGHT IS 62 lbs.

**OUTDOOR C/W FACTORY INSTALLED ULTRA LOW AMBIENT COOLING FOR - 40 DEG CLOCALLY MODIFIED ULTRA LOW AMBIENT CONTROLS ARE NOT ACCEPTABLE.**

SUPPLY, INSTALL, TEST AND COMMISSION ALL INTERCONNECTING REFRIGERATION PIPEWORK BETWEEN THE OUTDOOR AND INDOOR UNITS.

ALL PIPEWORK TO BE CARRIED OUT IN REFRIGERANT QUALITY ACR COPPER TUBING AND COMPLETE WITH THE APPROPRIATE HEADERS AND JOINTS. ALL PIPEWORK MUST BE SUITABLE FOR R410A.

**EF-1** EXHAUST FAN

GREENHECK, MODEL #CSP-A200, 120/1/60, SONES 0.8, 900 RPM, 225 CFM @ 0.125 S.P. SPEED CONTROL, HANGING VIBRATION ISOLATOR, C/W BACK DRAFT DAMPER.  
PROVIDE ELECTRONIC TIME SWITCH, WALL MOUNTED, "INTERMATIC" MODEL #ET1105C OR EQUAL, 120/1/60. COORDINATE WITH INTERIOR DESIGNER FOR INSTALLATION LOCATION.  
FAN DISCONNECT AND FAN SPEED CONTROL SHALL BE INSTALLED BY DIV.26. MOUNT DISCONNECT ON SIDE OF FAN AND SPEED CONTROL AT SWITCH HEIGHT AS SHOWN ON DWG. BALANCE EXHAUST FANS TO AIR QUANTITY INDICATED ON PLAN VIA SPEED CONTROLLER MOUNTED ON SIDE OF FAN. SPEED CONTROLLER TO BE INSTALLED BY DIV-26. INCLUDE SEPARATE FAN DISCONNECT SWITCH. PROVIDE REVERSE ACTING THERMOSTAT SET TO 75F.

**EF-2** EXHAUST FAN

GREENHECK, MODEL #CSP-A300, 120/1/60, SONES 5.5, 1350 RPM, 324 CFM @ 0.625 S.P. SPEED CONTROL, HANGING VIBRATION ISOLATOR, C/W BACK DRAFT DAMPER.  
PROVIDE ELECTRONIC TIME SWITCH, WALL MOUNTED, "INTERMATIC" MODEL #ET1105C OR EQUAL, 120/1/60. COORDINATE WITH INTERIOR DESIGNER FOR INSTALLATION LOCATION.  
FAN DISCONNECT AND FAN SPEED CONTROL SHALL BE INSTALLED BY DIV.26. MOUNT DISCONNECT ON SIDE OF FAN AND SPEED CONTROL AT SWITCH HEIGHT AS SHOWN ON DWG. BALANCE EXHAUST FANS TO AIR QUANTITY INDICATED ON PLAN VIA SPEED CONTROLLER MOUNTED ON SIDE OF FAN. SPEED CONTROLLER TO BE INSTALLED BY DIV-26. INCLUDE SEPARATE FAN DISCONNECT SWITCH. PROVIDE REVERSE ACTING THERMOSTAT SET TO 75F.

**EF-3 - ROOF MOUNTED EXHAUST FAN**

SHALL BE EQUAL TO GREENHECK G-DIRECT DRIVE CENTRIFUGAL ROOF EXHAUSTER MODEL G-08S-D 12" x 18" ROOF CURB, GALVANIZED BROSCHRE, 308 CFM, 1550 RPM, 0.5 W.G. TOTAL STATIC PRESSURE, 4415 TS, 7.6 SONES, 0.062 BHP, BELT DRIVE, 1/20 HP, 115/1/60, WEIGHT 38 lbs. BALANCE EXHAUST FANS TO AIR QUANTITY INDICATED ON PLAN VIA SPEED CONTROLLER MOUNTED ON SIDE OF FAN. SPEED CONTROLLER TO BE INSTALLED BY DIV-26. INCLUDE SEPARATE FAN DISCONNECT SWITCH. INSTALL UNIT IN STRICT ACCORDANCE TO MANUFACTURER'S INSTRUCTIONS. INTERLOCK EXHAUST FAN WITH OCCUPANCY SENSORS, TO BE COMPLETED BY DIV-26. PROVIDE 7 DAY PROGRAMMABLE TIMER SET TO RUN ONLY DURING BUSINESS HOURS.

**HWT-1 HOT WATER TANK**

EQUAL TO AO SMITH, DURA-POWER MODEL DEL-20, 20 GALLONS, WITH ONE 208/1/60 3000 W ELEMENT, COMPLETE WITH CONTACTOR, THERMOSTAT, PRESSURE RELIEF VALVE, DRIP PAN, AND DRAIN. PIPE PRESSURE RELIEF TO FUNNEL FLOOR DRAIN. PROVIDE ACCESSIBLE ISOLATION VALVES ON BOTH SUPPLY AND RETURN WITHIN 12" OF HOT WATER TANK, C/W LEAK DETECTION SYSTEM (MDS).

## EQUIPMENT LIST

**S-1** SINGLE BOWL SINK - UNDER COUNTER  
FRANKE KITCHEN SYSTEMS PS2X10-21 SINK - SINGLE COMPARTMENT SINK, KITCHEN SINK, WITH OVERALL DIMENSION 597 MM (23-1/2") LONG, 495 MM (19-1/2") WIDE, 254 MM (10") HIGH, CONSTRUCTED FROM 16 GAUGE STAINLESS STEEL. BOWL DIMENSIONS ARE 533 MM (21") LONG, LEFT BOWL IS 432 MM (17") WIDE AND RIGHT BOWL IS 432 MM (17") WIDE, 254 MM (10") DEEP, DIAMOND FINISH, ROUND DRAIN COVER, 886 MM (27") MINIMUM CABINET SIZE.

**LAWLER 570-86820 MIXING VALVE - POINT OF USE AND MASTER CONTROLLED FIXTURES, THERMOSTATIC MASTER WATER MIXING CONTROL VALVE, LEAD FREE BRASS BODY CONSTRUCTION, NICKEL PLATED FINISH, 1.9 - 30 LPM (0.5 - 8 GPM) RANGE FOR FLOWRATE, TO ADJUST THE MIXED OUTLET TEMPERATURE OF THE VALVE, REMOVE THE CAP TO GAIN ACCESS TO THE ADJUSTING SPINDLE. THE SPINDLE SHOULD BE ROTATED-CLOCKWISE TO REDUCE THE TEMPERATURE, COUNTER-CLOCKWISE TO INCREASE THE TEMPERATURE UNTIL THE DESIRED SET POINT IS REACHED, 11 LPM (3 GPM) TEMPERED FLOWRATE @ 5 PSI PRESSURE DROP, APPROVED CERTIFIED TO CSA B125.3 FOR ASSE 1070 APPLICATIONS, 3/8" MNPT (9.5 MM) INLET, 95-115 F OUTLET WATER TEMPERATURE RANGE, 3/8" MNPT (9.5 MM) OUTLET, INTERNAL CHECKS, OFFERS CHOICE OF TEMPERATURE SETTINGS FROM 95° THROUGH 115 °F, 125 PSI MAX HYDROSTATIC PRESSURE, ±20% PRESSURE VARIATION, 40-80 °F, 10 T, 180 T MAX, ±5 °F, PROTECTS AGAINST SCALDING AND CHILLING, 7 GPM FLOWRATE @ 45 PSI MCGUIRE LH165 SUPPLY - LEAD FREE, SHALL BE CONSTRUCTED FROM CAST BRASS VALVE, WITH CHROME-PLATED FINISH, LAVATORY SUPPLY, 10 MM (3/8") I.P.S. INLET, 10 MM (3/8") O.D. OUTLET.**

**MCGUIRE 8B120B P-TRAP - HEAVY CAST BRASS, ADJUSTABLE P-TRAP, 292 MM (11-1/2") LENGTH, WITH CLEANOUT PLUG, STEEL BOX FLANGE, NEOPRENE GASKET, SEAMLESS TUBULAR BRASS BEND, SPLINETS**

**FRANKE COMMERCIAL WSS6713-2 SINK - SINGLE COMPARTMENT SINK, 203 MM (8") CENTERSET, SERVICE SINK, WITH OVERALL DIMENSION 508 MM (20") LONG, 483 MM (19") WIDE, 435 MM (20") DEEP, CONSTRUCTED FROM 14 GAUGE TYPE 304 STAINLESS STEEL. BOWL DIMENSIONS ARE 432 MM (17") LONG, 406 MM (16") WIDE, 330 MM (13") DEEP, POLISHED TO #4 SATIN FINISH, WITH 305 MM (12") HIGH BACKSPASH, RADIUS COVERED BOWL CORNERS, LESS OVERLEAF, CENTER WASTE LOCATION, 89 MM (3-1/2") CRUMB CUP STRAINER, CODES AND COMPLIANCES: ASME A112.18.3 COMPLIANT, CSA B45.4 COMPLIANT, CHICAGO FAUCETS 897-RFC FAUCET - WALL-HUNG, MANUAL, TWO HANDLES, MOP SINK FAUCET, ROUGH CHROME PLATED FINISH, 194 - 213 MM (7-5/8" TO 8-3/8") ADJUSTABLE CENTERSET, ROUND ROUGH CAST IRON CONSTRUCTION, ADJUSTABLE SUPPLY ARMS, 1/4 TURN CERAMIC CARTRIDGE, NO FLOW RESTRICTOR, THREADED HOSE END, SPOUT WITH PAUL HOOK, 146 MM (5-3/4") SPOUT REACH, 273 MM (10-3/4") HIGH, TOP BRACE, 60 MM (2-3/8") LEVER HANDLE WITH INDEKED BUTTONS, ATMOSPHERIC VACUUM BREAKER IS NOT INTENDED FOR CONTINUOUS PRESSURE APPLICATIONS.**

**AMERICAN STANDARD VORMAX GLENWALL ELONGATED #282107 LOW CONSUMPTION TOILET, 3447.01, VITREOUS CHINA, ELONGATED BOWL, WALL HUNG, SIPHON JET FLUSH ACTION, 4.8 L (1.28 US GAL) PER FLUSH, CLEANCURVE RIM ELIMINATES DIRT AND BUILDUP ON RIM & EVERELEAN SURFACE INHIBITS GROWTH OF STAIN, COLOUR AND BACTERIA. TWO (2) PIECE, VORMAX FLUSHING TECHNOLOGY, SIPHON JET FLUSH ACTION, CLEANCURVE RIM ELIMINATES DIRT AND BUILDUP ON RIM & EVERELEAN SURFACE INHIBITS GROWTH OF STAIN, COLOUR AND BACTERIA. LEFT HAND TRIPLEVER, ELONGATED BOWL, 52 MM (2-1/16") FULLY GLAZED INTERNAL TRAPWAY, TOILET SEAT NOT INCLUDED.**

**CENTROD #R205T000 TOILET SEAT, EXTRA HEAVY DUTY, FOR ELONGATED BOWL, OPEN FRONT, SOLID PLASTIC, WITH COVER, STAINLESS STEEL CHECK HINGES, METAL FLAT WASHERS, STAINLESS STEEL POSTS AND NUTS, MCGUIRE #RH1728V TOILET SUPPLY, CHROME PLATED FINISH POLISHED BRASS, COMMERCIAL DUTY 1/4 TURN BALL VALVE ANGLE STOPS, 13 MM (1/2") I.D. INLET X 127 MM (5") LONG ROBB HORIZONTAL INTEGRAL COPPER/PLAST TUBE NIPPLES, COMBINATION UP, LOOSE KEY HANDLES, ESCUTCHEON AND FLEXIBLE COPPER RISERS. WAITS #SCA-101-M11 SINGLE HORIZONTAL ADJUSTABLE TOILET CARRIER, MOUNTED ON CONCRETE FLOOR, ALL EXPOSED COATED CAST IRON FITTINGS, ADJUSTABLE ABS SILENT WIPER WITH INTEGRAL TEST CAP AND NEOPRENE BOWL GASKET, WASTED PLATED HARDWARE, CHROME CAP NUTS, TULING FRAME, 102 MM (4") NO HUB WASTE, 51 MM (2") NO HUB VENT, 158.8 KG (350 LBS) STATIC LOAD, 305 MM (12") FINISHED METAL STUD WALL TO BACK OF PIPE SPACE. CHAMPION M-TR SERIES #M-HUB 16-40 DRAIN COVER, COUPLING, NO-HUB, TYPE 300, AISI STAINLESS STEEL BAND, TYPE 300 AISI STAINLESS STEEL EYELETS, ELASTOMERIC COMPOUND GASKET MEETING THE REQUIREMENTS OF ASTM G-964, TYPE 300 AISI STAINLESS STEEL SHIELD, TESTED TO MAINTAIN 4.3 PSI OF WATER PRESSURE AT 60 INCH LEAD, TORQUE BOLT TIGHTNESS, TESTED AND CERTIFIED TO ASTM STANDARD 1460-2012 AND CSA STANDAD B602-2010 AND LISTED WITH IAPMO. ALL MODELS ARE LISTED TO THE NATIONAL PLUMBING CODE OF CANADIAN STANDARD (S) AND BEAR THE CUPIC MARK OF CONFORMITY. NON CONSTANT TEMPERATURE RATING IS 140F.**

**WALL HUNG TOILET - VITREOUS CHINA - TANK TYPE**

**AMERICAN STANDARD VORMAX GLENWALL ELONGATED #282107 LOW CONSUMPTION TOILET, 3447.01, VITREOUS CHINA, ELONGATED BOWL, WALL HUNG, SIPHON JET FLUSH ACTION, 4.8 L (1.28 US GAL) PER FLUSH, CLEANCURVE RIM ELIMINATES DIRT AND BUILDUP ON RIM & EVERELEAN SURFACE INHIBITS GROWTH OF STAIN, COLOUR AND BACTERIA. TWO (2) PIECE, VORMAX FLUSHING TECHNOLOGY, SIPHON JET FLUSH ACTION, CLEANCURVE RIM ELIMINATES DIRT AND BUILDUP ON RIM & EVERELEAN SURFACE INHIBITS GROWTH OF STAIN, COLOUR AND BACTERIA. LEFT HAND TRIPLEVER, ELONGATED BOWL, 52 MM (2-1/16") FULLY GLAZED INTERNAL TRAPWAY, TOILET SEAT NOT INCLUDED.**

**CENTROD #R205T000 TOILET SEAT, EXTRA HEAVY DUTY, FOR ELONGATED BOWL, OPEN FRONT, SOLID PLASTIC, WITH COVER, STAINLESS STEEL CHECK HINGES, METAL FLAT WASHERS, STAINLESS STEEL POSTS AND NUTS, MCGUIRE #RH1728V TOILET SUPPLY, CHROME PLATED FINISH POLISHED BRASS, COMMERCIAL DUTY 1/4 TURN BALL VALVE ANGLE STOPS, 13 MM (1/2") I.D. INLET X 127 MM (5") LONG ROBB HORIZONTAL INTEGRAL COPPER/PLAST TUBE NIPPLES, COMBINATION UP, LOOSE KEY HANDLES, ESCUTCHEON AND FLEXIBLE COPPER RISERS. WAITS #SCA-101-M11 SINGLE HORIZONTAL ADJUSTABLE TOILET CARRIER, MOUNTED ON CONCRETE FLOOR, ALL EXPOSED COATED CAST IRON FITTINGS, ADJUSTABLE ABS SILENT WIPER WITH INTEGRAL TEST CAP AND NEOPRENE BOWL GASKET, WASTED PLATED HARDWARE, CHROME CAP NUTS, TULING FRAME, 102 MM (4") NO HUB WASTE, 51 MM (2") NO HUB VENT, 158.8 KG (350 LBS) STATIC LOAD, 305 MM (12") FINISHED METAL STUD WALL TO BACK OF PIPE SPACE. CHAMPION M-TR SERIES #M-HUB 16-40 DRAIN COVER, COUPLING, NO-HUB, TYPE 300, AISI STAINLESS STEEL BAND, TYPE 300 AISI STAINLESS STEEL EYELETS, ELASTOMERIC COMPOUND GASKET MEETING THE REQUIREMENTS OF ASTM G-964, TYPE 300 AISI STAINLESS STEEL SHIELD, TESTED TO MAINTAIN 4.3 PSI OF WATER PRESSURE AT 60 INCH LEAD, TORQUE BOLT TIGHTNESS, TESTED AND CERTIFIED TO ASTM STANDARD 1460-2012 AND CSA STANDAD B602-2010 AND LISTED WITH IAPMO. ALL MODELS ARE LISTED TO THE NATIONAL PLUMBING CODE OF CANADIAN STANDARD (S) AND BEAR THE CUPIC MARK OF CONFORMITY. NON CONSTANT TEMPERATURE RATING IS 140F.**

**WALL HUNG TOILET - VITREOUS CHINA - TANK TYPE**

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**CENTROD #R205T000 TOILET SEAT, EXTRA HEAVY DUTY, FOR ELONGATED BOWL, OPEN FRONT, SOLID PLASTIC, WITH COVER, STAINLESS STEEL CHECK HINGES, METAL FLAT WASHERS, STAINLESS STEEL POSTS AND NUTS, MCGUIRE #RH1728V TOILET SUPPLY, CHROME PLATED FINISH POLISHED BRASS, COMMERCIAL DUTY 1/4 TURN BALL VALVE ANGLE STOPS, 13 MM (1/2") I.D. INLET X 127 MM (5") LONG ROBB HORIZONTAL INTEGRAL COPPER/PLAST TUBE NIPPLES, COMBINATION UP, LOOSE KEY HANDLES, ESCUTCHEON AND FLEXIBLE COPPER RISERS. WAITS #SCA-101-M11 SINGLE HORIZONTAL ADJUSTABLE TOILET CARRIER, MOUNTED ON CONCRETE FLOOR, ALL EXPOSED COATED CAST IRON FITTINGS, ADJUSTABLE ABS SILENT WIPER WITH INTEGRAL TEST CAP AND NEOPRENE BOWL GASKET, WASTED PLATED HARDWARE, CHROME CAP NUTS, TULING FRAME, 102 MM (4") NO HUB WASTE, 51 MM (2") NO HUB VENT, 158.8 KG (350 LBS) STATIC LOAD, 305 MM (12") FINISHED METAL STUD WALL TO BACK OF PIPE SPACE. CHAMPION M-TR SERIES #M-HUB 16-40 DRAIN COVER, COUPLING, NO-HUB, TYPE 300, AISI STAINLESS STEEL BAND, TYPE 300 AISI STAINLESS STEEL EYELETS, ELASTOMERIC COMPOUND GASKET MEETING THE REQUIREMENTS OF ASTM G-964, TYPE 300 AISI STAINLESS STEEL SHIELD, TESTED TO MAINTAIN 4.3 PSI OF WATER PRESSURE AT 60 INCH LEAD, TORQUE BOLT TIGHTNESS, TESTED AND CERTIFIED TO ASTM STANDARD 1460-2012 AND CSA STANDAD B602-2010 AND LISTED WITH IAPMO. ALL MODELS ARE LISTED TO THE NATIONAL PLUMBING CODE OF CANADIAN STANDARD (S) AND BEAR THE CUPIC MARK OF CONFORMITY. NON CONSTANT TEMPERATURE RATING IS 140F.**

**WALL HUNG BASIN - HARDWOOD FINISH**

AMERICAN STANDARD 0955001EC.020 0059020EC.020 BASIN - MURRO, WALL-HUNG LAVATORY, VITREOUS CHINA, EVERELEAN® ANTIMICROBIAL SURFACE, WHITE FINISH, SINGLE HOLE CENTERSET, REAR OVERFLOW, FAUCET LEDGE WITH RECESSED SELF-DRAINING DECK, FC CONCEALED ARM OR WALL SUPPORT, VITREOUS CHINA SHROUD/NEE CONTACT GUARD WITH EVERELEAN (0059020EC) SOAP DISPENSER, WHEN INSTALLED WITH A BELOW DECK ELECTRONICS FAUCET WHICH HAS THE CONTROL BOX, THE ACCESSORIES WILL NOT FIT UNDER THE SHROUD AND WILL NEED TO BE INSTALLED OUTSIDE THE SHROUD. OVERALL DIMENSIONS: 545 MM (21-7/16") LONG, 540 MM (21-1/4") WIDE, 152 MM (6") HIGH, BOWL DIMENSIONS: 343 MM (13-1/2") LONG, 394MM (15-1/2") WIDE, 127 MM (5") DEEP.

**SLOAN EF2-200-CP-0-SPM-MU-RH-HP-FC FAUCET - BASYS(S), COUNTER MOUNTED, AUTOMATIC NO-TOUCH, HARDWOOD LESS PLUG ADAPTER, LAVATORY FAUCET, POLISHED CHROME FINISH, SINGLE HOLE CENTERSET, METAL, FLEXIBLE SUPPLY HOSES WITH 10 MM (3/8") COMPRESSION CONNECTIONS, 1.9 LPM (0.5 GPM) MAXIMUM FLOWRATE, MULTI-LAMINAR SPRAY OUTLET, FIXED SPOUT, 153 MM (6") SPOUT REACH, 254 MM (10") HIGH, DOUBLE INFRARED SENSORS WITH AUTOMATIC SETTING FEATURE, SOLENOID HOUSED IN REMOVABLE CARRIER THAT INCLUDES SUPPLY STRAINER, ABOVE DECK INDIVIDUAL DIAGNOSTIC INDICATORS FOR BATTERY LIFE, SOLENOID CONDITION, AND POWER-UP MODE, MIXING VALVE ORDERED SEPARATELY, SLOAN TRANSFORMER RECOMMENDED, VANDAL-RESISTANT SPRAY INSERT, KEY HOUSED INSIDE FAUCET BODY, INTEGRAL ABOVE DECK WATER SUPPLY SHUT OFF, LINE PURGE MODE.**

**SLOAN SL-EAF-70-A FAUCET AND FLUSH VALVE POWER KIT - FOR FAUCET**  
LAWLER 570-86820 MIXING VALVE - POINT OF USE AND MASTER CONTROLLED FIXTURES, THERMOSTATIC MASTER WATER MIXING CONTROL VALVE, LEAD FREE BRASS BODY CONSTRUCTION, NICKEL PLATED FINISH, 1.9 - 30 LPM (0.5 - 8 GPM) RANGE FOR FLOWRATE, TO ADJUST THE MIXED OUTLET TEMPERATURE OF THE VALVE, REMOVE THE CAP TO GAIN ACCESS TO THE ADJUSTING SPINDLE. THE SPINDLE SHOULD BE ROTATED-CLOCKWISE TO REDUCE THE TEMPERATURE, COUNTER-CLOCKWISE TO INCREASE THE TEMPERATURE UNTIL THE DESIRED SET POINT IS REACHED, 11 LPM (3 GPM) TEMPERED FLOWRATE @ 5 PSI PRESSURE DROP, THE TEMPERATURE IS ADJUSTED WITH THE HELP OF SPINDLE, 4-7/8" ( 124 MM) HEIGHT, ASSE 1070 APPROVED CERTIFIED TO CSA B125.3 FOR ASSE 1070 APPLICATIONS, 3/8" MNPT (9.5 MM) INLET, 95-115 F OUTLET WATER TEMPERATURE RANGE, 3/8" MNPT (9.5 MM) OUTLET, INTERNAL CHECKS, OFFERS CHOICE OF TEMPERATURE SETTINGS FROM 95° THROUGH 115 °F, 125 PSI MAX HYDROSTATIC PRESSURE, ±20% PRESSURE VARIATION, 40-80 °F, 10 T, 180 T MAX, ±5 °F, PROTECTS AGAINST SCALDING AND CHILLING, 7 GPM FLOWRATE @ 45 PSI MCGUIRE 155A FIXTURE DRAIN - STRAIGHT DRAIN, CAST BRASS, CHROME-PLATED FINISH, OPEN GRID PO PLUG, 7/32" (5.5 MM) Ø HOLES SIZE, 17 GAUGE 32 MM (1-1/4") Ø TAILPIECE DIAMETER, 17 GAUGE 152 MM (6") LONG, BRASS LOCKOUT, HEAVY RUBBER BASIN WASHER FIBER FRICTION WASHER, ASME A112.18.3 COMPLIANT

**MCGUIRE LBV170 SUPPLY - LEAD FREE, SHALL BE CONSTRUCTED FROM POLISHED BRASS, WITH CHROME-PLATED FINISH, LAVATORY SUPPLY, 12 MM (1/2") I.P.S. INLET, 10 MM (3/8") O.D. OUTLET.**

**MCGUIRE 8B120B P-TRAP - HEAVY CAST BRASS, 292 MM (11-1/2") DISTANCE, WITH CLEANOUT PLUG, STEEL BOX FLANGE, NEOPRENE GASKET, SPLINETS, 17 GAUGE SEAMLESS TUBULAR WALL BEND, ASME A112.18.3 COMPLIANT**

**WAITS CA-41-CA-481 CARRIER - LAVATORY CARRIER, FLOOR MOUNTED CONCEALED ARM LAVATORY CARRIER, FOR CONCEALED ARM CARRIER, EPOXY COATED CAST IRON CONCEALED ARMS, INTERNAL HELPER FEET, FOOT SUPPORT SHOULD BE SECURELY ANCHORED TO FLOOR WITH 1/2" BOLTS AND ANCHORS BY OTHERS, HEAVY GAUGE STEEL UPRIGHTS, LEVELING SCREWS AND BASIN LOCKING DEVICE, UPPER THE ROD, AND PLATED HARDWARE, WALL MOUNTED STEEL SUPPORT PLATE WITH PLATED HARDWARE.**

**FLOOR DRAIN/SHOWER DRAIN**  
ZURN ZKN-415-A-P FLOOR DRAIN, DURA-COATED CASE IRON BODY WITH BOTTOM OUTLET, COMBINATION INVERTIBLE MEMBRANE CLAMP AND ADJUSTABLE COLLAR WITH SEEPAGE HOLES, AND "TYPE A" HEAVY DUTY POLISHED NICKEL BRONZE ROUND STRAINER, 1/2" TRAP PRIMER CONNECTION.

**FLOOR DRAIN/SHOWER DRAIN**  
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## MECHANICAL LEGEND

|  |  |
|--|--|
|  | NEW ACOUSTICALLY LINED DUCTWORK  |
|  | NEW THERMALLY INSULATED DUCTWORK   |
|  | NEW ROUND RIGID DUCTWORK   |
|  | NEW FLEXIBLE DUCTWORK  |
|  | NEW SQUARE PLAQUE SUPPLY AIR DIFFUSER<br>E.H.PRICE "SPD" OR EQUAL, 24"x24"<br>INLET SIZE TO SUIT AIRFLOW |
|  | NEW ROUND PLAQUE SUPPLY AIR DIFFUSER<br>E.H.PRICE "RPD" OR   |



AIR DISTRIBUTION – GENERAL

23 31 01

- 2.5.1.B. COPPER PIPING:
2.5.1.B.A. ADJUSTABLE CLEVIS TO MSS SP-58, TYPE 1, COPPER PLATED.
2.5.2. SUSPENDED HOT STEEL OR COPPER PIPING HAVING HORIZONTAL MOVEMENT IN EXCESS OF 25 MM (1 IN) OR HOT STEEL PIPING WITH HANGER ROD 300 MM (12 IN) OR LESS:
2.5.2.A. TRAPEZE OR YOKE STYLE PIPE ROLLER TO MSS SP-58, TYPE 43.
3. EXECUTION
3.1. HANGER INSTALLATION
3.1.1. SUPPORT PIPING AND CONDUIT DIRECTLY FROM OR ON STRUCTURAL BUILDING ELEMENTS. DO NOT SUPPORT PIPE OR CONDUIT DIRECTLY FROM OTHER SERVICES EXCEPT AS DESCRIBED BELOW.
3.1.2. THE HANGER ROD SIZE AND SPACING IN THE FOLLOWING ARTICLES IS BASED ON SUPPORTING A SINGLE PIPE DIRECTLY FROM THE STRUCTURE.
3.1.3. INSTALL HANGERS FOR CAST IRON SOIL PIPE WITH HANGER SPACING AND HANGER ROD DIAMETER IN ACCORDANCE WITH TABLE 3.
3.1.3.A. IN ADDITION, PROVIDE A HANGER AT OR ADJACENT TO EACH HUB OR JOINT.
3.1.4. HANGER SPACING AND HANGER ROD DIAMETER FOR STEEL OR COPPER FLEXIBLE JOINT ROLL GROOVE PIPE TO BE AS SHOWN IN TABLE ABOVE FOR APPROPRIATE PIPE MATERIAL WITH NOT LESS THAN ONE HANGER BETWEEN JOINTS AND WITH ANCHORS AND GUIDES LOCATED TO MAINTAIN PIPING TRUE TO LINE AND GRADE.
3.1.5. IN STEEL FRAMED CONSTRUCTION, SUPPORT PIPING FROM STRUCTURAL MEMBERS. WHERE STRUCTURAL MEMBERS ARE NOT SUITABLY LOCATED FOR UPPER HANGER ATTACHMENTS AND INSERTS OF ADEQUATE CAPACITY CAN NOT BE INSTALLED IN FLOOR SLABS OVER, PROVIDE SUPPLEMENTARY STEEL FRAMING MEMBERS;
3.1.6. OFFSET HANGERS SO THAT RODS ARE VERTICAL IN OPERATING POSITION.
3.1.7. PROVIDE HANGER WITHIN 300 MM (12 IN) OF EACH HORIZONTAL ELBOW AND TE.
3.2. SADDLES AND SHIELDS
3.2.1. ON COLD INSULATED PIPING, PROVIDE INSULATION SHIELDS BETWEEN INSULATION AND PIPE SUPPORT.
3.2.2. ON HOT INSULATED PIPING, WELD PROTECTIVE SADDLES TO PIPE AT PIPE SUPPORT LOCATIONS.
3.2.3. NO SADDLES OR SHIELDS ARE REQUIRED ON UN-INSULATED PIPING.
3.3. LOAD NUT RETENTION REQUIREMENTS
3.3.1. ADHERE FASTENING NUTS, INCLUDING TOP AND BOTTOM LOAD NUTS, AND CLEVIS BOLT NUTS, TO THREADED RODS OR FITTINGS WITH LOCITITE 266.
3.4. SET-UP AFTER INSTALLATION
3.4.1. ADJUST HANGERS TO EQUALIZE HANGER LOADS, TO SUPPORT PIPING TRUE TO LINE AND GRADE, AND TO MINIMIZE LOADS TRANSFERRED THROUGH CONNECTIONS TO EQUIPMENT AND OUTLETS.

WELDING
20 05 24

- 1. GENERAL
1.1. SCOPE
1.1.1. WELD OR BRAZE PIPE AND FITTINGS FOR WORK OF DIVISION 20.
1.1.2. IN THIS SECTION, THE TERM WELD, WELDER, WELDING OR SIMILAR WORD OR PHRASE IS AN EXPRESSION WHICH INCLUDES BOTH WELDING OR BRAZING.
1.2. REGISTRATION AND INSPECTION
1.2.1. BEFORE COMMENCING WORK, MAKE ARRANGEMENTS AND PAY FOR REGISTRATION AND INSPECTION BY TECHNICAL STANDARDS & SAFETY AUTHORITY (TSSA), FOR THE FOLLOWING PRESSURE PIPING SYSTEMS:
1.2.1.A. SERVICE WATER PIPING FOR BUILDING HOT WATER HEATING SYSTEMS, AT DESIGN TEMPERATURES ABOVE 121 C (250 F) OR AT DESIGN PRESSURES ABOVE 1070 KPA (160 PSIG).
1.2.1.B. CHILLED WATER, COOLING WATER, AND PROCESS WATER SYSTEMS, FOR LIQUIDS NO MORE HAZARDOUS THAN WATER, AT DESIGN TEMPERATURES ABOVE 65 C (150 F) OR DESIGN PRESSURES ABOVE 1717 KPA (250PSIG).
1.3. APPLICABLE STANDARDS:
1.3.1. O.R.C. 220/01 MADE UNDER THE TSSA ACT
1.3.2. CSA B52 MECHANICAL REFRIGERATION CODE
1.3.3. PIPING STANDARDS TO:
1.3.3.A. ASME B31.9 CODE FOR BUILDING SERVICE PIPING.

FLEXIBLE DUCTWORK
23 31 16

- 1. GENERAL
1.2. SCOPE
1.2.1. PROVIDE FLEXIBLE DUCTWORK AS SHOWN.
1.3. REFERENCE STANDARDS
1.3.1. CONFORM TO:
1.3.1.A. ULC S110M-1986 – FIRE TESTS FOR AIR DUCTS.
1.3.1.B. ULC 181-1981 – FACTORY MADE AIR DUCTS AND CONNECTIONS.
1.3.1.C. NFPA 90A – INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS.
1.3.1.D. NFPA 90B – INSTALLATION OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS.
1.3.1.E. SMACNA – FLEXIBLE DUCT INSTALLATION STANDARDS
2. PRODUCTS
2.1. FLEXIBLE DUCTWORK
2.1.1. GENERAL REQUIREMENTS:
2.1.1.A. FACTORY FABRICATED,
2.1.1.B. PRESSURE DROP COEFFICIENTS AS LISTED BELOW BASED ON SHEET METAL DUCT PRESSURE DROP COEFFICIENT OF 1.00, FLAME SPREAD RATING NOT TO EXCEED 25 AND SMOKE DEVELOPED RATING NOT TO EXCEED 50.
2.1.1.C. METALLIC UN-INSULATED FLEXIBLE DUCTWORK
2.2.1. CONSTRUCTION:
2.2.1.A. SPIRAL WOUND FLEXIBLE ALUMINUM,
2.2.1.B. MINIMUM WORKING PRESSURE: 2.5 KPA (10 IN WG),
2.2.1.C. MAXIMUM PRESSURE DROP COEFFICIENT [3],
2.2.1.D. LEAKAGE RATE: IN ACCORDANCE WITH SMACNA
2.2.1.E. LEAKAGE RATE: IN ACCORDANCE WITH SMACNA
2.3. METALLIC INSULATED FLEXIBLE DUCTWORK
2.3.1. CONSTRUCTION:
2.3.1.A. SPIRAL WOUND FLEXIBLE ALUMINUM WITH FACTORY APPLIED FLEXIBLE GLASS FIBRE THERMAL INSULATION WITH VAPOUR BARRIER AND VINYL OR ALUMINUM JACKET,
2.3.1.B. MINIMUM WORKING PRESSURE: 2.5 KPA (10 IN WG),
2.3.1.C. MAXIMUM PRESSURE DROP COEFFICIENT 3,
2.3.1.D. LEAKAGE RATE: IN ACCORDANCE WITH SMACNA
3. EXECUTION
3.1. DUCT INSTALLATION
3.1.1. MAXIMUM LENGTH OF FLEXIBLE DUCT FEEDING CEILING OUTLET: 2 M (6 FT)
3.1.2. PROVIDE FLEXIBLE DUCT AND MAKE CONNECTIONS TO SUPPLY DIFFUSERS AND GRILLES (AND INDUCTION UNITS) AS SHOWN, DO NOT USE FLEXIBLE DUCT CONNECTORS ON RETURN OR EXHAUST AIR GRILLES UNLESS SHOWN.
3.1.3. USE SEALING COMPOUND AND TAPE AT CONNECTION POINTS BETWEEN SHEET METAL AND FLEXIBLE DUCT. MAKE A FURTHER MECHANICAL CONNECTION USING SHEET METAL SCREWS.
3.1.4. CENTRE-LINE RADIUS OF BENDS IN FLEXIBLE DUCTWORK TO BE GREATER THAN ONE DUCT DIAMETER.
3.1.5. DO NOT INSTALL FLEXIBLE DUCTWORK THROUGH FLOORS, PARTITIONS OR MASONRY WALLS.

DUCTWORK
23 31 13

- 1. GENERAL
1.1. SCOPE
1.1.1. PROVIDE METAL AND PVC DUCTWORK SYSTEMS AS SHOWN.
1.2. APPLICABLE CODES AND STANDARDS
1.2.1. CONFORM TO:
1.2.1.A. NFPA 90A – INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS.
1.2.1.B. NFPA 90B – INSTALLATION OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS.
1.2.1.C. NFPA 96 VENTILATION CONTROL AND FIRE PROTECTION OF COMMERCIAL COOKING OPERATIONS
1.2.2. LETTER AND NUMBER DESIGNATIONS, SHOWN AS 2R3-16” ETC., ARE TAKEN FROM ASHRAE DUCT FITTING DATA BASE. (DFDB)
1.2.3. CONSTRUCTION DETAILS:
1.2.3.A. SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE. (SMACNA HVAC)
1.2.4. MATERIALS:
1.2.4.A. ASTM A525 SPECIFICATION FOR GENERAL REQUIREMENTS FOR STEEL

- SHEET, ZINC COATING (HOT DIPPED GALVANIZED)
1.2.4.B. ASTM A480 SPECIFICATION FOR GENERAL REQUIREMENTS FOR FLAT ROLLED PLATE, SHEET, AND STRIP
1.2.4.C. ASTM A521 SPECIFICATION FOR STEEL SHEET AND STRIP CARBON HOT ROLLED DRAWING QUALITY
1.2.4.D. ASTM D1784 STANDARD SPECIFICATION FOR RIGID POLY (VINYL CHLORIDE) (PVC) COMPOUNDS AND CHLORINATED POLY (VINYL CHLORIDE) (CPVC) COMPOUNDS.
1.2.4.E. ASTM D1927 SPECIFICATION FOR RIGID POLY (VINYL CHLORIDE) PLASTIC SHEET (WITHDRAWN 1994)
3. SHOP DRAWINGS AND APPLICATION DETAILS
3.3.1. SUBMIT MANUFACTURER’S CATALOGUE LITERATURE FOR:
1.3.1.A. PROPRIETARY JOINTS,
1.3.1.B. HARDWARE.
3.3.2. SUBMIT FIELD/FABRICATION DRAWINGS AT 1:50 (¼ INCH=1 FOOT) OR LARGER SCALE, WITH PIPING, DUCTWORK, AND FITTINGS IN DOUBLE LINE FORMAT, TO SHOW:
1.3.2.A. ARRANGEMENTS IN CONGESTED AREAS,
1.3.2.B. WHERE INSTALLATION PROPOSED DEVIATES SUBSTANTIALLY FROM LAYOUT SHOWN, AND
1.3.2.C. WHERE INSTALLATION REQUIRES JOINTS FOR FIELD ASSEMBLY IN WELDED DUCT CONSTRUCTION.
3.3.3. FOR GREATER CLARITY, DO NOT SUBMIT FIELD/FABRICATION DRAWINGS FOR OTHER AREAS OF THE WORK:
3.3.4. SUBMIT SCHEDULES AND DETAILS TO SHOW:
1.3.4.A. FABRICATION DETAILS OF
1.3.4.A.A. CONNECTIONS TO RISERS IN DUCT SHAFTS
1.3.4.A.B. BALANCING DAMPER CONSTRUCTION,
1.3.4.A.C. FITTINGS WHERE GEOMETRY CONTEMPLATED IS DIFFERENT FROM THAT SPECIFIED.
1.3.4.A. IN CHART FORM
1.3.4.A.A. DUCT SYSTEM PRESSURE CLASS,
1.3.4.A.B. DUCT SHEET GAUGES,
1.3.4.A.C. JOINT TYPES AND APPLICATION CRITERIA,
1.3.4.A.D. LOCATION CRITERIA AND DIMENSIONS FOR BRACING, STIFFENERS AND BALANCING DAMPERS
1.3.4.A.E. DUCT LEAKAGE CLASS, AND
3.4. RECORD DRAWINGS
3.4.1. AS WORK PROGRESSES, MARK-UP FIELD DRAWINGS AND SUBMIT AS PART OF RECORD OF AS-BUILT CONDITIONS.
1.5. QUALIFICATIONS
1.5.1. DUCTWORK SYSTEMS TO BE PROVIDED BY FIRM HAVING AN ESTABLISHED REPUTATION IN THIS FIELD.

ACOUSTIC LINING (DUCTWORK)
23 32 48

- 1. GENERAL
1.1. SCOPE
1.1.1. PROVIDE ACOUSTIC LINING OF DUCTWORK.
2. PRODUCTS
2.1. DUCT LINER – GLASS FIBER
2.1.1. FIBROUS GLASS DUCT LINER DENSITY 24 KG/M3 (1.5 LB/CU FT) WITH ONE SIDE COATED WITH ACRYLIC COATING AND FLEXIBLE GLASS CLOTH REINFORCEMENT.
2.1.2. FLAME SPREAD RATING NOT TO EXCEED 25, SMOKE DEVELOPMENT RATING NOT TO EXCEED 50.
2.1.3. FOR RECTANGULAR DUCTWORK USE 25 MM (1 IN) RIGID LINER,
2.1.4. FOR PLENUMS AND CASINGS USE 50 MM (2 IN) OF FIBROUS GLASS RIGID BOARD DUCT LINER.
2.1.5. FOR ROUND OR OVAL DUCTWORK AND CURVED SURFACES USE 25 MM (1 IN) OF FIBROUS GLASS BLANKET LINER.
2.2. ADHESIVE
2.2.1. FLAME SPREAD RATING NOT TO EXCEED 25, SMOKE DEVELOPED RATING NOT TO EXCEED 50,
2.2.2. TEMPERATURE RANGE– 40?C TO 82?C (– 40?F TO 180?F),
2.2.3. MEET REQUIREMENTS OF NFPA 90A.
2.3. FASTENERS
2.3.1. 2.0 MM (1/16 IN) DIAMETER WELD PINS,
2.3.2. LENGTH SELECTED TO SUIT THICKNESS OF INSULATION,
2.3.3. 32 MM (1 ¼ IN) SQUARE NYLON RETAINING CLIPS.
2.4. SEALER AND TAPE
2.4.1. ARMSTRONG WB ARMAFLEX FINISH, MANVILLE SUPERSEAL COATING, AND
2.4.2. POLYVINYL TREATED OPEN WEAVE FIBREGLASS MEMBRANE 50MM (2 IN) WIDE.
3. EXECUTION
3.1. INSTALLATION
3.1.1. DUCT SIZE INDICATED TO BE SIZE AS MEASURED INSIDE LINER
3.1.2. FASTEN LINER TO INTERIOR SHEET METAL SURFACE OF DUCT WITH 100% COVERAGE OF ADHESIVE, AND INSTALL WELD PINS AT 1 PIN PER 0.5M2 (5 SQ FT) BUT NOT LESS THAN 1 ROW ON EACH DUCT SIDE.
3.1.3. POSITION AND ADHERE SHEETS TO OVERLAP PREVIOUSLY INSTALLED SHEETS BY 4 MM (1/8 IN). AFTER BONDING OF SHEETS SPREAD BUT JOINTS AND BRUSH APPLY ADHESIVE TO BOTH BUTT EDGES AND APPLY PRESSURE TO JOIN.
3.1.4. APPLY TAPE TO JOINTS, EXPOSED EDGES, WELD PINS AND CLIP PENETRATIONS AND DAMAGED AREAS OF LINER.
3.1.5. BED TAPE TO SEALER AND APPLY 2 COATS OF SEALER OVER TAPE. OVER ACOUSTIC INSULATION IN ROUND OR OVAL DUCTWORK WHERE AIR VELOCITY EXCEEDS 10 M/SEC (2000 FPM)) APPLY PERFORATED METAL LINER AND SECURE WITH WELD PINS AND SPEED WASHERS.

DUCT ACCESSORIES
23 33 05

- 1. GENERAL
1.1. SCOPE
1.1.1. PROVIDE DUCT ACCESSORIES AS SHOWN.
1.2. SHOP DRAWINGS
1.2.1. SUBMIT PRODUCT DATA SHEETS FOR:
1.2.1.A. FLEXIBLE CONNECTIONS
1.2.1.B. SEALANTS
1.2.1.C. TAPES
1.2.1.D. DUCT ACCESS DOORS AND HARDWARE
1.2.1.E. INSTRUMENT TEST PORTS
2. PRODUCTS
2.1. FLEXIBLE CONNECTIONS
2.1.1. NEOPRENE:
2.1.1.A. GALVANIZED 0.66 MM (24 GA) SHEET METAL FRAME, WITH FABRIC CLENCHED WITH DOUBLE LOCKED SEAMS,
2.1.1.B. FIRE RESISTANT, SELF-EXTINGUISHING, NEOPRENE COATED GLASS FABRIC,
2.1.1.C. OPERATING TEMPERATURE: –40?C TO 90?C (–40?F TO 194?F),
2.1.1.D. DENSITY: 0.653 KG/M2 (0.13 LB/SQ FT) IN CONVENTIONAL SYSTEMS. COATED, INSULATED:
2.1.2. VINYL FLAME RESISTANT, 0.56 MM (0.022 IN) THICK VINYL COATED FABRIC ENVELOPE, ENCLOSING 32MM (1 ¼ IN),12KG/M3 (0.75 LB/CU FT) FIBREGLASS INSULATION.
2.1.2.B. OPERATING TEMPERATURE: 82?C (180?F) CONTINUOUS AND 93?C (200?F) INTERMITTENT,
2.1.3. INSTALLED:
2.1.3.A. IN CONNECTIONS FOR INSULATED DUCT SYSTEMS,
2.1.3.B. IN CIRCULAR DUCT CONNECTIONS SUBJECT TO NEGATIVE PRESSURE WITH DIAMETER LESS THAN 250MM (10IN), AND
2.1.3.C. IN RECTANGULAR DUCT CONNECTIONS SUBJECT TO NEGATIVE PRESSURE WITH SMALLEST SIDE LESS THAN 300MM (12 IN)
2.2. SEALANT
2.2.1. WATER BASED POLYMER EMULSION TYPE FLAME RESISTANT DUCT SEALING COMPOUND.
2.2.2. OPERATING TEMPERATURE RANGE: –29?C TO 93?C (–20?F TO 200?F).
2.3. TAPE
2.3.1. POLYVINYL TREATED OPEN WEAVE GLASS FIBRE TAPE, 50MM (2”) WIDE.
2.4. DUCT ACCESS DOORS
2.4.1. CONSTRUCTION – UNINSULATED DUCT OR PLENUM:
2.4.1.A. SHOP OR FIELD FABRICATED FROM SAME MATERIAL AS DUCT, ONE SHEET METAL THICKNESS HEAVIER BUT NOT LESS THAN 0.6MM (26GA.) THICK,
2.4.1.B. WITH GASKETED SHEET METAL ANGLE FRAME.
2.4.2. CONSTRUCTION – INSULATED DUCT OR PLENUM:
2.4.2.A. SHOP FABRICATED AS DOUBLE WALL INSULATED SANDWICH, OF SAME MATERIAL AS DUCT, ONE SHEET METAL THICKNESS HEAVIER BUT NOT LESS THAN 0.6MM (26GA) THICK,
2.4.2.B. WITH GASKETED SHEET METAL ANGLE FRAME AND 25 MM (1”) THICK RIGID GLASS FIBRE INSULATION.

GRILLES, REGISTERS AND DIFFUSERS
23 37 13

- 1. SCOPE
1.1. PROVIDE GRILLES, REGISTERS, AND DIFFUSERS AS SHOWN.
1.2. SHOP DRAWINGS
1.2.1. SUBMIT MANUFACTURER’S DATA SHEETS WITH EQUIPMENT MODEL NUMBERS, PERFORMANCE AND DESIGN DATA, OUTLINE DIMENSIONS, SUPPORT RECOMMENDATIONS AND CONNECTION DETAILS.
2. PRODUCTS
2.1. GENERAL
2.1.1. GRILLES, REGISTERS AND DIFFUSERS:
2.1.1.A. PRODUCT OF ONE MANUFACTURER WHERE SAME MODEL OR TYPE IDENTIFICATION IS USED.
2.1.1.B. STANDARD CATALOGUE PRODUCTS SELECTED TO MEET CAPACITY, THROW, AND NOISE LEVEL.
2.1.1.C. PRIME COATED, STAMPED OR COLD ROLLED STEEL MATERIAL WITH MITRED CORNERS AND EXPOSED JOINTS WELDED AND GROUND SMOOTH.
2.1.1.D. EXTRUDED SATIN FINISH, CLEAR ANODIZED ALUMINUM MATERIAL WITH MITRED CORNERS AND MECHANICAL FASTENERS.
2.1.1.E. FRAMES WITH FULL PERIMETER GASKETS, PLASTER STOPS WHERE SET INTO PLASTER OR GYPSUM BOARD, AND CONCEALED FASTENERS.
2.2. TYPE DESIGNATIONS
2.2.1. DIFFUSER, REGISTER AND GRILLE SCHEDULE IDENTIFIES MODEL OR TYPE IDENTIFIERS USED ON FLOOR PLANS WITH MODEL NUMBERS TAKEN FROM LISTED MANUFACTURER’S CATALOGUE.
2.2.2. WHERE SEVERAL MANUFACTURER’S MODEL NUMBERS ARE GIVEN, THESE ARE ACCEPTABLE ALTERNATIVES.
2.2.3. WHERE ONLY ONE MANUFACTURER’S MODEL NUMBER IS GIVEN, PROVIDE DESIGNATED ITEM.
2.3. SUPPLY REGISTERS
2.3.1. DOUBLE DEFLECTION STYLE WITH FACE BARS VERTICAL AND REAR BARS HORIZONTAL.
2.3.2. PERIMETER BORDER WITH GASKET,
2.3.3. OF STEEL OR ALUMINUM MATERIAL.
2.4. RETURN AND EXHAUST GRILLES
2.4.1. SINGLE DEFLECTION TYPE, WITH HORIZONTAL FACE BARS, 20 MAXIMUM TURN UP,
2.4.2. PERIMETER BORDER WITH GASKET,
2.4.3. OF STEEL OR ALUMINUM MATERIAL.
2.5. DIFFUSERS
2.5.1. CIRCULAR OR SQUARE MULTIPLE CONE OR SQUARE PLAQUE FACE TYPE, WITH ADJUSTABLE PATTERN CONTROL.
2.5.2. OF STEEL OR ALUMINUM MATERIAL.
2.6. LINEAR GRILLES
2.6.1. ALUMINUM BAR CORE TYPE WITH MARGIN AS INDICATED, PATTERN ADJUSTMENT, PLASTER FRAMES, SEALING STRIPS, END CAPS, MITRED CORNERS AND ALIGNMENT KEY STRIPS FOR MULTIPLE SECTIONS.
2.6.2. CAPABLE OF SUPPORTING [90KG][200LB] POINT LOADS WHERE INSTALLED AS FLOOR GRILLES.
3. EXECUTION
3.1. LAYOUT
3.1.1. DRAWINGS SHOWING POSITION OF AIR DISTRIBUTION OUTLETS ARE ESSENTIALLY DIAGRAMMATIC. COORDINATE EXACT LOCATION OF DIFFUSERS WITH OTHER ELEMENTS IN CEILING AND SHOW ON REFLECTED CEILING DRAWINGS AND SELECT TRIM TO SUIT CEILING MATERIALS LISTED IN FINISH SCHEDULES.

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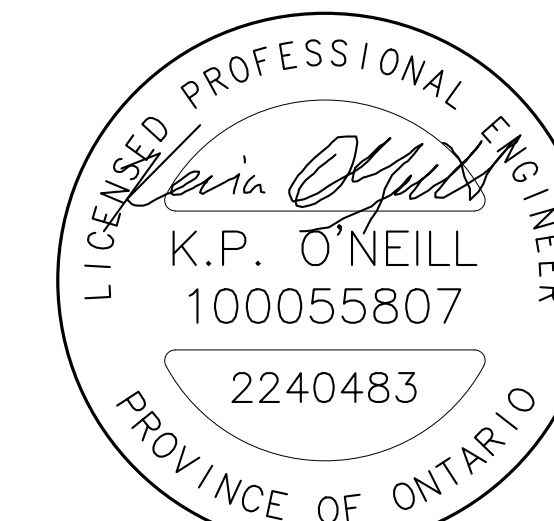


Table with 4 columns: ID, Date, Description, Status. Includes entries for permit tender, 100% coordination, and 90% review.



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Project Address: 2460 Brock Road Pickering, ON L1X 0J1
Project number: 2240483
Drawing Title: MECHANICAL SPECIFICATIONS PAGE 2 OF 4
Drawing Scale: NTS
Drawing Number: M-1.2
True North

- 3.2. SPECIAL INSTALLATIONS
- 3.2.1. GRILLES, REGISTERS AND DIFFUSERS PENETRATING FIRE WALLS AND FIRE PARTITIONS, TO HAVE STEEL SLEEVES SECURED TO STRUCTURE IN ACCORDANCE WITH NFPA 90A-1985.
- 3.3. INSTALLATION OF GRILLES AND REGISTERS
- 3.3.1. INSTALL SUPPLY REGISTERS WITH FACE BARS VERTICAL AND EXHAUST AND RETURN REGISTERS WITH FACE BARS HORIZONTAL.
- 3.3.2. 2 INSTALL REGISTERS AND GRILLES WITH OVAL HEAD CADMIUM PLATED SCREWS IN COUNTERSUNK HOLES WHERE FASTENINGS ARE VISIBLE.
- 3.4. INSTALLATION OF DIFFUSERS
- 3.4.1. DIFFUSERS TO BE INSTALLED WITH CONCEALED FASTENINGS.
- 3.4.2. ROUND, SQUARE AND RECTANGULAR DIFFUSERS TO BE PROVIDED WITH EQUALIZING DEFLECTORS, MOUNTED IN NECK, ACCESSIBLE FROM DIFFUSER FACE, WITH BLADES ORIENTED AT RIGHT ANGLES TO DIRECTION FROM WHICH AIR IS FLOWING.
- 3.4.3. EXCEPT FOR LAST DIFFUSER ON BRANCH, EACH DIFFUSER INSTALLED IN UNDERSIDE OF SUPPLY DUCT TO HAVE EXTRACT VOLUME CONTROL DAMPER

**DUCTWORK INSULATION**  
**23 37 16**

1. GENERAL
- 1.1. SCOPE
- 1.1.1. INSULATE AND FINISH DUCTS, CASING, AND PLENUMS;
- 1.1.2. PROVIDE INSULATION, SEALER COATINGS, FINISHES, AND MECHANICAL PROTECTION
- 1.1.3. INSULATION IS NOT REQUIRED ON FACTORY INSULATED AND/OR AND ACOUSTICALLY LINED DUCTWORK EXCEPT AS OTHERWISE SHOWN.
- 1.2. QUALITY
- 1.2.1. MANUFACTURERS AND PRODUCTS ARE LISTED IN THIS SECTION TO ESTABLISH QUALITY AND MANUFACTURING STANDARDS. PRODUCTS FROM OTHER MANUFACTURERS WITH EXPLICITLY SIMILAR CHARACTERISTICS MAY BE ACCEPTABLE BUT MUST BE SUBMITTED AS AN ALTERNATIVE PRODUCT SUBMISSION.
- 1.3. QUALIFICATIONS
- 1.3.1. PROVIDE INSULATION AND COVERING BY RECOGNIZED SPECIALIST APPLICATOR WITH AN ESTABLISHED REPUTATION FOR THIS TYPE OF WORK.
- STANDARD OF ACCEPTANCE: CUSTOM INSULATION SYSTEMS, GUARANTEED INSULATION LTD, WHITE & GREER CO LTD, DEWPOINT INSULATION SYSTEMS.
- 1.4. SAMPLE BORDS
- 1.4.1. SUBMIT SAMPLE ASSEMBLY OF EACH TYPE OF INSULATION AND COVERING.
- 1.5. MATERIAL TEST CRITERIA
- 1.5.1. INSULATION, ADHESIVES, COATINGS, FINISHES, SEALERS, AND TAPES:
- 1.5.1.A. MAXIMUM FLAME SPREAD RATING OF 25 TO CAN/ULC-S102.
- 1.5.1.B. MAXIMUM SMOKE DEVELOPED RATING OF 50 TO CAN/ULC-S102.
- 1.5.1.B.A. EXCEPTION: VAPOR BARRIER MASTICS INSTALLED OUTSIDE OF BUILDING.
- 1.6. APPLICABLE CODES AND STANDARDS
- 1.6.1. MATERIAL AND METHOD OF APPLICATION TO COMPLY WITH OR BE TESTED IN ACCORDANCE WITH FOLLOWING STANDARDS:
- 1.6.1.A. THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL INSULATION STANDARD, EXCLUDING SECTION 12
- 1.6.1.B. NFPA 90-A INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS
- 1.6.1.C. ASHRAE/IES 90.1 ENERGY STANDARD FOR BUILDINGS EXCEPT LOW-RISE RESIDENTIAL BUILDINGS
- 1.6.1.D. NFPA 255 TEST OF SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS
- 1.6.1.E. CAN/ULC-S102 STANDARD METHOD OF TEST FOR SURFACE BURNING CHARACTERISTICS OF FLOORING, FLOOR COVERING, AND MISCELLANEOUS MATERIALS AND ASSEMBLIES

2. PRODUCTS
- 2.1. ADHESIVES, FASTENERS, AND TAPE
- 2.1.1. CONTACT BOND CEMENT:
- 2.1.1.1. FOR QUICK SETTING FOR METAL SURFACES.
- 2.1.2. WATERPROOF VAPOUR RETARDER:
- 2.1.2.A. FOR FLEXIBLE ELASTOMERIC CLOSED CELL FOAM:
- 2.1.3. LAP SEAL ADHESIVE:
- 2.1.3.A. FOR JOINTS AND LAP SEALING OF VAPOUR BARRIERS.
- 2.1.4. CONTACT ADHESIVE:
- 2.1.4.A. FOR FIBROUS INSULATION.
- 2.1.5. VAPOUR BARRIER TAPE:
- 2.1.5.A. COLOUR MATCHED AND FOIL FACED
- 2.1.5.B. UL 181A LISTED.
- 2.1.6. WELD PINS, STUDS AND CLIPS
- 2.1.7. STAPLES
- 2.1.7.A. MONEL, FLARE TYPE, MINIMUM SIZE 12 MM (1/2 IN).
- 2.1.8. THE WIRE
- 2.1.8.A. 1.6 MM (16 GA) STAINLESS STEEL WITH TWISTED ENDS.
- 2.1.9. CAULKING
- 2.1.9.A. FAST-DRYING COLOUR MATCHED FLEXIBLE BUTYL ELASTOMER BASED VAPOUR BARRIER SEALANT.
- 2.2. COATINGS AND MEMBRANES
- 2.2.1. REINFORCING MEMBRANE:
- 2.2.1.A. SYNTHETIC FIBRE:
- 2.2.1.A.A. LENO WEAVE,
- 2.2.1.A.B. INDOOR AND OUTDOOR USE.
- 2.2.1.B. GLASS-FIBRE FABRIC:
- 2.2.1.B.A. INDOOR USE.
- 2.2.1.C. GLASS-FIBRE FABRIC FOR USE WITH ELASTOMERIC CLOSED CELL FOAM:
- 2.2.1.C.A. INDOOR USE.
- 2.2.2. BREATHER COATING - INDOORS:
- 2.2.2.A. FOR BREATHER COATINGS AND LAGGING ADHESIVE,
- 2.2.2.B. WHITE IN COLOUR.
- 2.2.2.C. FOR INSULATION EXCEPT ELASTOMERIC CLOSED CELL FOAM.
- 2.2.2.D. FOR USE WITH ELASTOMERIC CLOSED CELL FOAM.
- 2.3. INSULATION CEMENT
- 2.3.1. HYDRAULIC-SETTING FINISHING TYPE.
- 2.4. FIELD APPLIED FINISHES
- 2.4.1. PVC (POLYVINYL CHLORIDE) FINISH JACKET:
- 2.4.1.A. MINIMUM 20 MIL THICKNESS WITH PERMEABILITY NOT MORE THAN 0.09 PERMS,
- 2.4.1.B. FLEXIBLE FLAT-SHEET,
- 2.4.1.C. PRESSURE SENSITIVE, COLOUR MATCHING VINYL TAPE.
- 2.4.2. FINISH JACKET:
- 2.4.2.A. ULC LISTED PLAIN WEAVE COTTON FABRIC AT 220 G/M2 (6 OZ/SQ YD), TREATED WITH FIRE RETARDANT LAGGING ADHESIVE, OR RE-WETABLE FIBERGLASS LAGGING FABRIC WITH WATER ACTIVATED SELF-ADHESIVE.
- 2.4.2.C. SUITABLE FOR FIELD PAINTING.

- 2.4.3. METAL FINISH JACKET:
- 2.4.3.A. EQUIPMENT:
- 2.4.3.A.A. STUCCO EMBOSSED ALUMINUM NOT LESS THAN 0.45 MM (0.016 IN) THICK SHEET OR,
- 2.4.3.A.B. CORRUGATED STAINLESS STEEL NOT LESS THAN 0.25 MM (0.010 IN) THICK SHEET.
- 2.4.3.B. FITTINGS:
- 2.4.3.B.A. CUSTOM MADE SWAGED RING OR LOBSTER BACK COVERS ON BENDS AND DIE SHAPED FITTING COVERS OVER FITTING, VALVES, STRAINERS, FLANGES, AND GROOVED COUPLINGS.
- 2.4.3.C. BANDS:
- 2.4.3.C.A. 12 MM (1/2 IN) WIDE STAINLESS STEEL WITH MECHANICAL FASTENERS.
- 2.4.3.D. PROTECTIVE FINISH FOR ELASTOMERIC CELLULAR FOAM INSULATION.

- 2.5. DUCTWORK INSULATION
- 2.5.1. TYPE D-1 GLASS FIBRE BLANKET:
- 2.5.1.A. TO ASTM C1290
- 2.5.1.B. SERVICE TEMPERATURE: UP TO 121°C (250 F)
- 2.5.1.C. FLEXIBLE BLANKET,
- 2.5.1.D. FSK JACKET OF KRAFT BONDED TO ALUMINUM FOIL REINFORCED WITH GLASS FIBRE YARN, MAXIMUM 0.02 PERMS TO ASTM E96 PROCEDURE A.
- 2.5.1.E. NONCOMBUSTIBLE,
- 2.5.1.F. THERMAL PERFORMANCE: R = 0.74 M2 °C/W @ 24 C (4.2 BTU FT2 F/BTU @ 75 F)
- 2.5.1.G. DENSITY: 12 KG/M3 (0.75 PCF)
- 2.5.1.H. VAPOR TRANSMISSION : MAXIMUM 0.02 PERMS
- 2.5.2. TYPE D-2 GLASS FIBRE BOARD :
- 2.5.2.A. TO ASTM C612,
- 2.5.2.B. SERVICE TEMPERATURE: UP TO JACKET SURFACE TEMPERATURE (AIR CONTACT) UP TO 66 C (150 F) AND UN-JACKETED SURFACE TEMPERATURE (EQUIPMENT CONTACT) UP TO 232 C (450 F).
- 2.5.2.C. RIGID FOR FLAT SURFACES OR,
- 2.5.2.D. SCORED BOARD FOR CURVED SURFACES 250 MM (10 IN) DIA AND OVER,
- 2.5.2.E. JACKET OF KRAFT BONDED TO ALUMINUM FOIL REINFORCED WITH GLASS FIBRE YARN,
- 2.5.2.F. THERMAL PERFORMANCE: 0.033 W/M/C @ 24 C (0.23 BTU/HR/IN/SQ FT/F @ 75 F).
- 2.5.2.G. VAPOR TRANSMISSION: MAXIMUM 0.02 PERMS
- 2.5.2.H. DENSITY: 48 KG/M3 (3.0 LB/CU FT),
- 2.5.2.I. SUITABLE FOR JACKET SURFACE TEMPERATURE (AIR CONTACT) UP TO 66 C (150 F) AND UN-JACKETED SURFACE TEMPERATURE (EQUIPMENT CONTACT) UP TO 232 C (450 F).
- 2.5.3. TYPE D-3 FLEXIBLE ELASTOMERIC CLOSED CELL FOAM:
- 2.5.3.A. TO ASTM C534,
- 2.5.3.B. SERVICE TEMPERATURE: UP TO 82 C (180 F).
- 2.5.3.C. SHEET SELF-ADHERING, ROLL TYPE,
- 2.5.3.D. THERMAL PERFORMANCE: 0.04 W/M/C @ 24 C (0.28 BTU/HR/IN/SQ FT/F @ 75 F).
- 2.5.3.E. MANUFACTURER SPECIFIC SEALER/ADHESIVE.
- 2.5.4. TYPE D-4 LOW TEMPERATURE PHENOLIC BOARD:
- 2.5.4.A. TO ASTM C1126 (GR.1),
- 2.5.4.B. SERVICE TEMPERATURE: -73°C TO +121 °C (-100°F TO 250°F).
- 2.5.4.C. RIGID FOR FLAT SURFACES,
- 2.5.4.D. MEETING 25/50 FLAME SPREAD/SMOKE DEVELOPMENT WHEN TESTED TO ASTM E84,
- 2.5.4.E. THERMAL PERFORMANCE: 0.021 W/M/C @ 10°C (0.145 BTU/HR/IN/SQ FT/F @ 50°F),
- 2.5.4.F. DENSITY: 37 KG/M3 (2.3 IB/CUFT).

3. EXECUTION
- 3.1. INSULATION LIMITS
- 3.1.1. EXTERNALLY INSULATE AIR HANDLING SYSTEM COMPONENTS:
- 3.1.1.A. CONDITIONED AIR WITH COOLING COILS : SUPPLY UNIT CASINGS AND PLENUMS, AND FREE STANDING SUPPLY FANS FOR BOTH RECIRCULATING AND NON RECIRCULATING TYPE SYSTEMS,
- 3.1.1.B. CONDITIONED AIR WITH HEATING ONLY: SUPPLY UNIT CASING AND PLENUMS, FREE-STANDING SUPPLY FANS, AND SUPPLY AIR DUCTS AND PLENUMS UP TO THE SPACE SERVED BUT NOT IN THE SPACE ITSELF,
- 3.1.1.C. CONDITIONED AIR SUPPLY DUCTS INCLUDING DOWNSTREAM OF REHEAT COILS,
- 3.1.1.D. UN-CONDITIONED SUPPLY AIR DUCTS AND PLENUMS THAT PASS THROUGH UNHEATED ROOMS OR SPACES,
- 3.1.1.E. THE FIRST 300 MM (12 IN) LENGTH OF ACOUSTICALLY LINED DUCTWORK,
- 3.1.1.F. RETURN AIR DUCTS AND PLENUMS IN UNHEATED SPACES,
- 3.1.1.G. EXHAUST AIR DUCTS AND PLENUMS IN UNHEATED SPACES,
- 3.1.1.H. EXHAUST AIR DUCTS BETWEEN EXHAUST AIR DAMPER AND POINT OF DISCHARGE TO OUTSIDE OF BUILDING,
- 3.1.1.I. OUTSIDE AIR INTAKE DUCTS AND PLENUMS;
- 3.1.1.I.A. FOR NON-RECIRCULATING TYPE VENTILATION SYSTEMS WITHOUT COOLING COILS, TERMINATE PLENUM OR CASING INSULATION 300 MM (12 IN) DOWNSTREAM OF FINAL HEATING COIL,
- 3.1.1.J. MIXED AIR PLENUMS AND DUCTS;
- 3.1.1.J.A. FOR RECIRCULATING TYPE VENTILATION SYSTEMS WITHOUT COOLING COILS, TERMINATE OUTSIDE AIR INTAKE INSULATION 300 MM (12 IN) DOWNSTREAM OF MIXING PLENUM,
- 3.1.1.K. SHEET METAL BLANK-OFF PLATES BEHIND UNUSED SECTIONS OF AIR INTAKE LOUVRES.
- 3.1.2. EXTERNALLY INSULATE DUCTWORK LOCATED OUTDOORS:
- 3.1.2.A. SUPPLY DUCTS,
- 3.1.2.B. CONDITIONED SUPPLY DUCTS.
- 3.1.2.C. RETURN DUCTS,
- 3.1.2.D. EXHAUST DUCTS,
- 3.1.2.D.A. EXCLUDING FAN DISCHARGE DUCT,
- 3.1.2.E. KITCHEN EXHAUST DUCTS WITH MORE THAN 3 M (10 FT) LENGTH OF DUCT ON ROOF.
- 3.1.2.E.A. EXCLUDING FAN DISCHARGE DUCT.
- 3.1.3. EXTERNAL INSULATION IS NOT REQUIRED ON:
- 3.1.3.A. CASINGS, DUCTS OR PLENUMS WHICH HAVE BEEN LINED WITH ACOUSTIC INSULATION, EXCEPT AS DESCRIBED ABOVE,
- 3.1.3.B. FREE STANDING UNCONDITIONED SUPPLY FANS, SUPPLY DUCTS AND PLENUMS,
- 3.1.3.C. PORTIONS OF INTAKE DUCTS OR PLENUMS, UNIT CASINGS AND CONDITIONED AIR PLENUMS WHICH ARE OF DOUBLE WALL INSULATED CONSTRUCTION.
- 3.1.3.D. PRE-INSULATED FLEXIBLE DUCTS.
- 3.1.3.E. FACTORY INSULATED AIR HANDLING UNITS.
- 3.2. GENERAL REQUIREMENTS
- 3.2.1. INSULATE DUCTWORK IN ACCORDANCE WITH TABLE 1 AT THE END OF THIS SECTION.
- 3.2.2. STORE AND USE ADHESIVES, MASTICS, AND INSULATION CEMENTS AT AMBIENT TEMPERATURES AND CONDITIONS RECOMMENDED BY PRODUCT MANUFACTURERS.
- 3.2.3. SURFACES TO BE CLEAN AND DRY BEFORE APPLICATION OF INSULATION. APPLY INSULATION AFTER PRESSURE AND LEAKAGE TESTING IS COMPLETED AND ACCEPTED.
- 3.2.4. PLACE INSULATION WITH JOINTS STAGGERED AND TIGHTLY BUTTED, WITH NO VISIBLE GAPS.
- 3.2.5. NEATLY FINISH INSULATION AT SUPPORTS, PROTRUSIONS, AND INTERRUPTIONS.
- 3.2.6. SEAL EXPOSED INSULATION WITH REINFORCED VAPOUR BARRIER OR BREATHER COATING/MASTIC AS SHOWN.
- 3.2.7. FINISH DUCTWORK WITH FIELD INSTALLED FINISH JACKETS AS SHOWN.

TABLE 1 : DUCTWORK AND PLENUM INSULATION TYPE AND THICKNESS MM (IN)

| NOMINAL SURFACE TEMPERATURE | EQUIPMENT DESCRIPTION  | INSULATION TYPE | INSULATION THICKNESS |
|-----------------------------|--|-----------------|----------------------|
| 5°C TO 65°C (40°F TO 150°F) | SUPPLY UNIT CASINGS AND PLENUMS  | D-2             | 25 (1)               |
|                             | FREE STANDING SUPPLY FANS RECTANGULAR, EXPOSED RECTANGULAR, CONCEALED    |                 |                      |
|                             | RECTANGULAR, CONCEALED ROUND AND OVAL, EXPOSED ROUND AND OVAL, CONCEALED | D-1             | 38 (1-1/2) NOTE (1)  |

TABLE 2: DUCTWORK AND PLENUM INSULATION TYPE AND THICKNESS MM (IN)

| NOMINAL SURFACE TEMPERATURE        | EQUIPMENT DESCRIPTION  | INSULATION TYPE | INSULATION THICKNESS   |
|------------------------------------|--|-----------------|------------------------|
| AMBIENT TO 65°C (AMBIENT TO 150°F) | PLENUMS AND CASINGS - AIR INTAKE                               | D2              | TWO LAYERS EACH 50 (2) |
|                                    |  | D4              | 75 (3)                 |
|                                    | PLENUMS AND CASINGS - EXHAUST                                  | D2              | 50 (2)                 |
|                                    |  | D4              | 38 (1-1/2)             |
|                                    | RECTANGULAR - OUTDOOR - SUPPLY                                 | D2              | 50 (2)                 |
|                                    | RECTANGULAR - OUTDOOR - RETURN RECTANGULAR - OUTDOOR - EXHAUST | D2              | 38 (1-1/2)             |
|                                    | ROUND - OUTDOOR  | D3              | TWO LAYERS EACH 25 (1) |
|                                    | DRAIN PANS D3 20 (3/4)   | D3              | 20 (3/4)               |

NOTE (1) : THICKNESS IS "OUT OF BOX" BEFORE INSTALLATION

**PLUMBING GENERAL**  
**22 05 01**

1. GENERAL
- 1.1. SCOPE
- 1.1.1. PROVIDE LABOUR, MATERIALS AND EQUIPMENT FOR INSTALLATION, TESTING AND PUTTING INTO OPERATION PLUMBING AND DRAINAGE SYSTEMS.
- 1.2. QUALIFIED TRADESMEN
- 1.2.1. WORK TO BE DONE BY QUALIFIED AND RECOGNIZED FIRM WITH AN ESTABLISHED REPUTATION IN THIS FIELD USING TRADESMEN HOLDING CERTIFICATES OF COMPETENCY.
- 1.3. APPLICABLE CODES AND STANDARDS
- 1.3.1. ONTARIO BUILDING CODE
- 1.3.2. REGULATIONS OF PROVINCE CITY, OR LOCAL AUTHORITY HAVING JURISDICTION.
- 1.3.3. AWWA C651, DISINFECTING WATER MAINS.
- 1.3.4. CSA B149.1 NATURAL GAS AND PROPANE INSTALLATION CODE
- 1.4. QUALIFICATIONS
- 1.4.1. CONTRACTORS PERFORMING WORK ON NATURAL GAS OR PROPANE SYSTEMS TO BE LICENSED AS A GAS AND PROPANE INSTALLER UNDER O.REG. 215/01, BY THE TECHNICAL STANDARDS AND SAFETY AUTHORITY.
2. PRODUCTS
- 2.1. WATER SERVICE METER
- 2.1.1. COMPOUND TYPE, TO APPROVAL OF AUTHORITIES.
- 2.1.2. SUITABLE FOR FUTURE INSTALLATION OF REMOTE READER. PROVIDE CONDUIT FOR FUTURE WIRING FROM METER TO REMOTE READER.
- 2.1.3. PAY CALIBRATION AND TRANSPORTATION CHARGES IN CONNECTION WITH METER. WATER METER TO READ IN CUBIC METERS (M3) AND GALLONS PER MINUTE.
3. INSTALLATION
- 3.1. PIPING
- 3.1.1. PIPING SYSTEM ROUTING IS SHOWN DIAGRAMMATICALLY. LOCATE MAINS, RISERS AND RUNOUTS CONCEALED BEHIND FURNINGS OR ABOVE CEILINGS EXCEPT IN MECHANICAL EQUIPMENT ROOMS AND ACCESS SPACES WHERE PIPING IS TO BE EXPOSED.
- 3.1.2. DETERMINE AREAS WITHOUT CEILINGS FROM ARCHITECTURAL DRAWINGS AND ROOM FINISH SCHEDULES, AND IN THESE AREAS KEEP PIPING AS HIGH AS POSSIBLE.
- 3.1.3. ANCHOR, GUIDE AND SUPPORT VERTICAL AND HORIZONTAL RUNS OF PIPING TO RESIST DEAD LOAD AND ABSORB THRUST.
- 3.2. WATER SERVICE
- 3.2.1. INSTALL WATER METER IN ACCORDANCE WITH LOCAL AUTHORITY STANDARDS AND PROVIDE THREE-VALVE BY-PASS ARRANGEMENT WITH STRAINER ON STREET SIDE AND DRAIN VALVE ON BUILDING SIDE OF METER.
- 3.2.2. MOUNT METER:
- 3.2.2.A. 150 MM (6") CLEAR OF FLOOR,
- 3.2.2.B. MOUNT VALVES IN UPRIGHT POSITION,
- 3.2.2.C. LOCATE BY-PASS TO PROVIDE 500 MM (20 IN) CLEAR ABOVE TOP OF METER,
- 3.2.2.D. LOCATE ASSEMBLY SO THAT METER IS AT LEAST 600 MM (24 IN) FROM BACK WALL AND WITH 1050MM (42 IN) CLEAR IN FRONT.
- 3.2.3. METER BY-PASS LINE:
- 3.2.3.A. SAME SIZE AS INCOMING LINE FOR TURBINE OR PROTECTUS METER,
- 3.2.3.B. ONE PIPE SIZE SMALLER THAN INCOMING LINE FOR COMPOUND METER,
- 3.3. DOMESTIC COLD WATER SYSTEM DISTRIBUTION
- 3.3.1. EXTEND EXISTING DOMESTIC COLD WATER SYSTEM WITH
- 3.3.1.A. DISTRIBUTION PIPE AND FITTINGS,
- 3.3.1.B. VALVES,
- 3.3.1.C. PREMISES BACKFLOW ISOLATION,
- 3.3.1.D. ZONE OR EQUIPMENT BACKFLOW PROTECTION.
- 3.3.2. MINIMUM WATER PRESSURE AT STREET LEVEL: APPROXIMATELY 500 KPA (70 PSI)
- 3.3.3. PROVIDE VALVED CONNECTIONS FROM SUPPLY SYSTEM, TO FIXTURES AND OTHER EQUIPMENT REQUIRING COLD WATER.
- 3.4. DOMESTIC HOT WATER SYSTEM DISTRIBUTION
- 3.4.1. PROVIDE DOMESTIC HOT WATER SYSTEM WITH
- 3.4.1.A. DISTRIBUTION PIPE AND FITTINGS
- 3.4.1.B. VALVES
- 3.4.1.C. ZONE OR EQUIPMENT BACKFLOW PROTECTION.
- 3.4.2. PROVIDE COLD WATER CONNECTIONS TO HOT WATER TANK, WITH SHUT-OFF AND CHECK VALVE ON SUPPLY AND VALVED DRAIN AT BOTTOM OF TANK. DRILL CHECK VALVE DISC WITH 1.6 MM (1/16 IN) HOLE IN ITS CENTRE.
- 3.4.3. PROVIDE VALVED CONNECTIONS FROM HOT WATER SUPPLY SYSTEM TO FIXTURES AND OTHER EQUIPMENT REQUIRING HOT WATER.

**DOMESTIC WATER HEATERS**  
**22 33 13**

1. GENERAL
- 1.1. SCOPE
- 1.1.1. PROVIDE DOMESTIC HOT WATER HEATERS AS SHOWN
- 1.2. SHOP DRAWINGS
- 1.2.1. SUBMIT SHOP DRAWINGS FOR EACH HEATER WITH MODEL NUMBER, OUTLINE DIMENSIONS, FUEL OR POWER REQUIREMENTS, INLET AND OUTLET CONNECTION DETAILS AND CAPACITY.
- 1.3. APPLICABLE CODES AND STANDARDS
- 1.3.1. CSA C22.2 NO. 110 CONSTRUCTION AND TEST OF ELECTRIC STORAGE-TANK WATER HEATERS
- 1.3.2. CSA C191 PERFORMANCE OF ELECTRIC STORAGE TANK WATER HEATERS FOR HOUSEHOLD SERVICE

- 3.5. DRAINAGE
- 3.5.1. PROVIDE WASTE AND VENT CONNECTIONS TO PLUMBING FIXTURES AND EQUIPMENT.
- 3.5.2. FITTINGS:
- 3.5.2.A. DO NOT USE DOUBLE HUBS, STRAIGHT CROSSES, DOUBLE T'S, OR DOUBLE T'S IN SOIL OR WASTE PIPE BELOW ANY FIXTURE.
- 3.5.2.B. DO NOT USE BRANCH FITTINGS OTHER THAN FULL "Y" OR "Y" AND AN EIGHTH BEND, ON SOIL OR WASTE PIPE RUNNING IN HORIZONTAL DIRECTION.
- 3.5.2.C. DO NOT USE QUARTER BEND PLACED ON ITS SIDE.
- 3.5.2.D. DO NOT USE INVERTED JOINTS BELOW FIXTURES.
- 3.5.2.E. DO NOT INSTALL CLEANOUTS ABOVE FOOD PREPARATION OR PATIENT TREATMENT AREAS. IN THESE AREAS CARRY RODDING CONNECTION UP TO FLOOR CLEANOUT FITTED WITH ADJUSTABLE GASKETTED ACCESS COVER AND PLUG, WITH CLEANOUT BODY CAST IN FLOOR SLAB ABOVE.
- 3.5.2.F. DRAINAGE FITTINGS TO MATCH CONNECTED PIPING FOR QUALITY AND WALL THICKNESS.
- 3.6. FLUSHING AND CLEANING - BUILDING WATER DISTRIBUTION PIPING
- 3.6.1. CONDUCT FIRST FILL AND PRESSURE TESTING OF BUILDING DISTRIBUTION PIPING ONLY AFTER COMPLETION OF FLUSHING AND DISINFECTION OF WATER SERVICE PIPE.
- 3.6.2. COMPLETE PIPING PRESSURE TESTS PRIOR TO FLUSHING AND CLEANING OPERATIONS.
- 3.6.3. FLUSH WATER DISTRIBUTION PIPING THROUGH AVAILABLE OUTLETS WITH SUFFICIENT FLOW TO PRODUCE VELOCITY OF 1.5 M/S, WITHIN PIPE FOR 10 MINUTES, OR UNTIL FOREIGN MATERIALS HAVE BEEN REMOVED AND FLUSHED WATER IS CLEAR.
- 3.6.3.A. DRAIN DOWN SYSTEM TO REMOVE FLUSHING WATER,
- 3.6.3.B. INTRODUCE CHLORINE CLOSE TO POINT OF RE-FILLING TO SYSTEM, AND EVENLY ADD TO WATER AS SYSTEM IS RE-FILLING, TO PROVIDE AN INITIAL CONCENTRATION OF 50 MG/L.
- 3.6.3.C. OPERATE VALVES, HYDRANTS, AND APPURTENANCES WHILE MAIN CONTAINS CHLORINE SOLUTION.
- 3.6.3.D. FLUSH LINE TO REMOVE CHLORINE SOLUTION AFTER 24 HOURS CONTACT TIME.
- 3.6.3.E. ARRANGE AND PAY FOR LABORATORY TESTING OF WATER SAMPLES TAKEN FROM NEWLY DISINFECTED MAIN.
- 3.6.3.F. WHERE SAMPLES DO NOT MEET LABORATORY TEST STANDARD FOR POTABLE WATER, DISINFECTION PROCEDURE AND TESTING IS TO BE REPEATED UNTIL SATISFACTORY RESULTS ARE ACHIEVED.

**PLUMBING INSULATION**  
**22 14 19**

1. GENERAL
- 1.1. SCOPE
- 1.1.1. INSULATE AND FINISH PIPING, VALVES, FITTINGS, AND PIPELINE ACCESSORIES.
- 1.1.1.A. PROVIDE INSULATION, COATINGS, FINISHES, AND MECHANICAL PROTECTION
- 1.1.2. PROVIDE FIRE RATED INSULATION ON PIPING AS SHOWN, INCLUDING FIRE PROTECTION STANDPIPES.
- 1.1.2.A. COORDINATE WITH THE CONTRACTOR UNDER DIVISION 21 FOR LOCATION AND EXTENT OF STANDPIPES TO BE PROTECTED.
- 1.2. RELATED WORK
- 1.2.1. THE FOLLOWING WORK IS SPECIFIED IN OTHER SECTION OF DIVISION 20:
- 1.2.1.A. SUPPLY OF INSULATION SHELDOS FOR COLD AND DUAL TEMPERATURE PIPING;
- 1.2.2. PROVISION OF WELDED SADDLES FOR HOT PIPING.
- 1.2.3. INSULATION OF UNDERGROUND PIPING: SECTION 20 07 21.
- 1.3. QUALITY
- 1.3.1. MANUFACTURERS AND PRODUCTS ARE LISTED IN THIS SECTION TO ESTABLISH QUALITY AND MANUFACTURING STANDARDS. PRODUCTS FROM OTHER MANUFACTURERS WITH EXPLICITLY SIMILAR CHARACTERISTICS MAY BE ACCEPTABLE BUT MUST BE SUBMITTED AS AN ALTERNATIVE PRODUCT SUBMISSION.
- 1.4. QUALIFICATIONS
- 1.4.1. PROVIDE INSULATION AND COVERING BY RECOGNIZED SPECIALIST APPLICATOR WITH AN ESTABLISHED REPUTATION FOR THIS TYPE OF WORK.
- 1.5. 1.5.MATERIAL TEST CRITERIA
- 1.5.1. INSULATION, ADHESIVES, COATINGS, FINISHES, SEALERS, AND TAPES:
- 1.5.1.A. MAXIMUM FLAME SPREAD RATING OF 25 TO CAN/ULC-S102,
- 1.5.2. MAXIMUM SMOKE DEVELOPED RATING OF 50 TO CAN/ULC-S102.
- 1.5.2.A. EXCEPTION: VAPOR BARRIER MASTICS INSTALLED OUTSIDE OF BUILDING.
- 1.6. APPLICABLE CODES AND STANDARDS
- 1.6.1. MATERIAL AND METHOD OF APPLICATION TO COMPLY WITH OR BE TESTED IN ACCORDANCE WITH FOLLOWING STANDARDS:
- 1.6.1.A. THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) NATIONAL INSULATION STANDARD, EXCLUDING SECTION 12
- 1.6.1.B. NFPA 90-A INSTALLATION OF AIR-CONDITIONING AND VENTILATING SYSTEMS
- 1.6.1.C. ASHRAE/IES 90.1 ENERGY STANDARD FOR BUILDINGS EXCEPT LOW-RISE RESIDENTIAL BUILDINGS
- 1.6.1.D. NFPA 255 TEST OF SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS
- 1.6.1.E. CAN/ULC-S102 STANDARD METHOD OF TEST FOR SURFACE BURNING CHARACTERISTICS OF FLOORING, FLOOR COVERING, AND MISCELLANEOUS MATERIALS AND ASSEMBLIES
2. PRODUCTS
- 2.1. GENERAL
- 2.1.1. NEW DOMESTIC HOT, COLD, HOT WATER RE-CIRCULATING LINES, HORIZONTAL SANITARY DRAINS AND VALVES AND FITTINGS, CONDENSER WATER PIPING AND VALVES AND FITTINGS AND CONDENSATE DRAIN PIPING AND FITTINGS FOR FIRST 15 FT. FROM SOIL DRAIN PAN TO BE INSULATED WITH 1 IN STANDARD MOULDED SECTIONAL RIGID GLASS FIBRE PIPE INSULATION WITH VAPOUR BARRIER JACKET HAVING MOISTURE TRANSMISSION OF .02 PERM.
- 2.1.2. NEW INDUCTION UNIT VALVES, PIPING & FITTINGS TO BE INSULATED WITH 5/8" ARMAFLEX INSULATION.
- 2.1.3. RECOVER EXPOSED INSULATED PIPING WITH PVC JACKETING.
- 2.1.4. ACCEPTABLE MANUFACTURERS OF INSULATION AND VAPOUR BARRIER-MANSON INSULATION INC. FIBERGLAS CANADA KNAUF FIBER GLASS MANVILLE CANADA INC.
- 2.1.5. ACCEPTABLE MANUFACTURERS OF PVC JACKETING: ACHIL INSULATIONS LTD.

2. PRODUCTS
- 2.1. GENERAL
- 2.1.1. DESIGN CONDITIONS:
- 2.1.1.A. DESIGN PRESSURE: [860 KPA (125 PSI)] [1035 KPA (150 PSI)]
- 2.1.1.B. DESIGN TEMPERATURE: 60°C (180°F).
- 2.1.2. PIPING CONNECTIONS:
- 2.1.2.A. UP TO NPS 3: THREADED
- 2.1.2.B. NPS 3 AND OVER: FLANGED.
- 2.1.3. FITTINGS, ALL HEATERS:
- 2.1.3.A. REPLACEABLE MAGNESIUM ANODE,
- 2.1.3.B. 50 MM (2 IN) MINERAL WOOL INSULATION,
- 2.1.3.C. ENAMELLED STEEL JACKET,
- 2.1.3.D. HOSE THREADED DRAIN VALVE,
- 2.1.3.E. ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE
- 2.2. ELECTRIC HOT WATER HEATERS
- 2.2.1. CONFORM TO CSA C22.2 NO. 110 AND CSA C191
- 2.2.2. FACTORY ASSEMBLED AND TESTED, GLASS LINED STEEL TANK UNITS, WITH:
- 2.2.2.A. COPPER SHEATHED IMMERSION ELEMENTS ARRANGED FOR FLIP-FLOP OPERATION
- 2.2.2.B. CLOSE TOLERANCE POSITIVE SNAP ACTION THERMOSTATS
- 2.2.2.C. MANUAL RESET HIGH TEMPERATURE LIMIT SWITCH.
- 2.2.2.D. BUILT-IN AND FACTORY PRE-WIRED CONTROLS INCLUDING CONTACTORS.

3. EXECUTION
- 3.1. INSTALLATION
- 3.1.1. PROVIDE SUPPORTING STRUCTURAL STEEL FOR HORIZONTAL MOUNTED TANKS AND FOR INSTANTANEOUS HEATERS. SET ANCHOR BOLTS THROUGH FEET OF VERTICAL TANKS.
- 3.1.2. ISOLATE TANKS FROM GROUND, FOR HORIZONTAL TANKS PROVIDE DIELECTRIC PADS BETWEEN TANK AND SADDLES, AND FOR VERTICAL TANKS WITH LEGS, PROVIDE DIELECTRIC PADS UNDER FEET, AND ISOLATION WASHERS AND SLEEVES AT EACH ANCHOR BOLT.
- 3.1.3. CONNECT UP TO COLD WATER SUPPLY LINES AND DOMESTIC HOT WATER DISTRIBUTION PIPING WITH 300MM (12 IN) LONG, LINE SIZE FLEXIBLE CONNECTIONS.
- 3.1.4. INSTRUMENTS WITH EXTERNAL ELECTRIC WIRING TO BE ISOLATED FROM HEATERS AND TANKS WITH DIELECTRIC BUSHINGS OR DIELECTRIC UNIONS
- 3.1.5. PROVIDE TEMPERATURE AND PRESSURE RELIEF VALVE FOR WATER SIDE OF EACH HEATER PIPED TO NEAREST FUNNEL OR HUB DRAIN.
- 3.1.6. PROVIDE VALVED DRAIN FROM EACH TANK PIPED TO NEAREST FUNNEL OR HUB DRAIN.
- 3.1.7. AT EACH HOT WATER HEATER REQUIRING ELECTRIC POWER PROVIDE SUITABLY SIZED FUSED DISCONNECT SWITCH AND WIRE FROM SWITCH TO HEATER.

**PLUMBING SPECIALTIES & ACCESSORIES**  
**22 05 23**

1. GENERAL
- 1.1. SCOPE
- 1.1.1. PROVIDE PLUMBING SPECIALTIES AND ACCESSORIES.
- 1.2. PRODUCT DATA
- 1.2.1. SUBMIT PRODUCT DATA SHEETS FOR:
- 1.2.1.A. FLOOR DRAINS, CLEANOUTS, WATER HAMMER ARRESTERS, BACK FLOW PREVENTERS, BACK WATER VALVES, STRAINERS AND TRAPS.
- 1.3. APPLICABLE CODES AND STANDARDS
- 1.3.1. CSA-B125 PLUMBING FITTINGS.
- 1.3.2. CSA B.64.1.1 VACUUM BREAKERS, ATMOSPHERIC TYPE
- 1.3.3. CSA B.64.4 BACKFLOW PREVENTERS, REDUCED PRESSURE PRINCIPLE TYPE
- 1.3.4. CSA B64.10 MANUAL FOR THE SELECTION AND INSTALLATION OF BACKFLOW PREVENTION DEVICES/MANUAL FOR THE MAINTENANCE AND FIELD TESTING OF BACKFLOW PREVENTION DEVICES
- 1.3.5. CSA B79 FLOOR, AREA, AND SHOWER DRAINS AND CLEANOUTS FOR RESIDENTIAL CONSTRUCTION
- 1.3.6. PLUMBING AND DRAINAGE INSTITUTE (PDI) STANDARD PDI-WH201.WATER HAMMER ARRESTERS
- 1.3.7. PDI-G101 TESTING AND RATING PROCEDURE FOR GREASE INTERCEPTORS WITH APPENDIX OF SIZING AND INSTALLATION DATA.
2. PRODUCTS
- 2.1. GENERAL
- 2.1.1. FLOOR, AREA, COMBINATION AND ROOF DRAINS AND CLEANOUTS TO CONFORM TO CSA B79 AND TO BE PRODUCTS OF ONE MANUFACTURER.
- STANDARD OF ACCEPTANCE: JAY R. SMITH, MIFAB, ZURN
- 2.2. FLOOR DRAINS
- 2.2.1. CONSTRUCTION:
- 2.2.1.A. CAST IRON BODY
- 2.2.1.B. INTEGRAL DOUBLE DRAINAGE OPENINGS, FLASHING RING AND CLAMPING DEVICE.
- 2.2.1.C. POLISHED NICKEL BRONZE ADJUSTABLE STRAINER.
- 2.2.1.D. INTEGRAL FLANGE TO RECEIVE THE FLOOR FINISH.
- 2.2.1.E. ADJUSTABLE GALVANIZED DUCTILE IRON TRACTOR GRATES IN MECHANICAL EQUIPMENT ROOMS AND FAN ROOMS.
- 2.3. COMBINATION DRAINS
- 2.3.1. AS SPECIFIED FOR FLOOR DRAINS WITH ADJUSTABLE NICKEL BRONZE STRAINER AND NICKEL BRONZE OVAL WASTE FUNNEL.
- 2.4. CLEANOUTS
- 2.4.1. IN FLOORS:
- 2.4.1.A. LINE SIZE FOR NPS 2, NPS 3 AND NPS 4 AND NPS 4 IN LARGER LINES.
- 2.4.1.B. SEAL AND TEST PLUG
- 2.4.1.C. CAST IRON BODY WITH CLAMP AND COLLAR,
- 2.4.1.D. IN UNFINISHED FLOOR AREAS,
- 2.4.1.D.A. CAST IRON FRAME HEAVY DUTY SCORRIATED CAST IRON ROUND OR SQUARE TRACTOR COVER AND INTERNAL PLUG, AND
- 2.4.1.E. IN FINISHED FLOOR AREAS,
- 2.4.1.E.A. NICKEL BRONZE FRAME AND ROUND OR SQUARE NICKEL BRONZE ADJUSTABLE ACCESS COVER,
- 2.4.1.E.B. RECESSED FOR TILE INFILL IN TILED AREAS,
- 2.4.1.E.C. DEEPLY RECESSED FOR CARPET INFILL IN CARPETED AREAS,
- 2.4.1.E.D. AREAS, AND WITH
- 2.4.1.E.E. EXTENDED FLANGE AROUND FRAME IN AREAS WITH MONOLITHIC FLOOR FINISHES.
- 2.4.2. IN EXPOSED AREAS, CEILING SPACES AND ACCESSIBLE PIPE CHASES,
- 2.4.2.A. CAST IRON CAULKING FERRULE WITH NEOPRENE JACKET AND PLUG SECURED TO BODY WITH CAP SCREWS.
- 2.5. WATER HAMMER ARRESTERS
- 2.5.1. STAINLESS STEEL CONSTRUCTION WITH PRECHARGED AIR CHAMBER OF NESTING BELLOWS.
- 2.5.2. SELECTED IN ACCORDANCE WITH PLUMBING AND DRAINAGE INSTITUTE STANDARD PDI-WH201.

**City of Pickering**  
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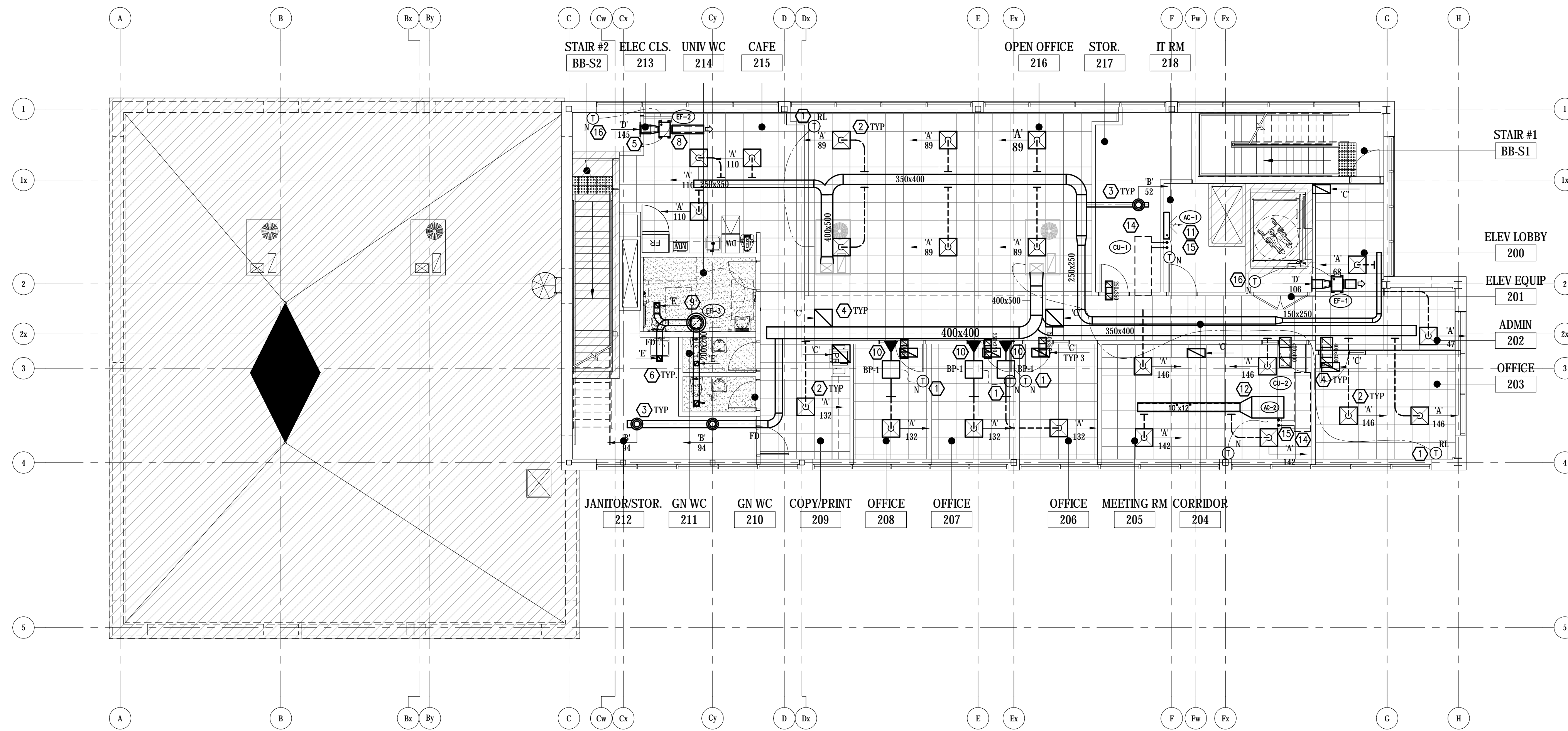
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| ISSUE | DATE   | DESCRIPTION                  |
|-------|--------|------------------------------|
| 03    | 240823 | ISSUED FOR PERMIT/TENDER     |
| 02    | 240816 | ISSUED FOR 100% COORDINATION |
| 01    | 240808 | ISSUED FOR 90% REVIEW        |
|       |        |                              |
|       |        |                              |







**GENERAL NOTES**

ALL RTU THERMOSTATS SHALL BE MOUNTED AT 47" A.F.F. WHERE PRACTICAL. CO-ORDINATE LOCATIONS OF ALL THERMOSTATS WITHIN SPACE WITH DESIGNER PRIOR TO INSTALLATION.

CONTROLS WORK TO BE CARRIED OUT BY LANDLORD'S PREFERRED CONTROLS CONTRACTOR. ALL NEW CONTROLS TO BE AS PER LANDLORDS EQUIPMENT SELECTION.

NEW SECTIONS OF ROUND RIGID S.A. DUCTWORK TO MATCH EXISTING FLEX. DUCT SIZE EXCEPT WHERE NOTED.

BRANCH RUNOUTS TO DIFFUSERS SHALL MATCH DIFFUSER INLET SIZE. BALANCE AIR QUANTITIES AS NOTED ON DRAWINGS.

ALL NEW H.P. DUCT JOINTS/FITTINGS UPSTREAM OF BY PASS BOXES SHALL HAVE DUCT SEALER APPLIED. DUCT CONNECTION TO NEW BY PASS BOXES SHALL MATCH BY PASS BOXES INLET SIZE. INCLUDE FOR PREMIUM TIME TO CARRY OUT MODIFICATIONS TO MEDIUM PRESSURE DUCTWORK.

BALANCE DIFFUSERS LOCATED IN DRYWALL CEILINGS PRIOR TO INSTALLATION OF CEILING FINISHES. PROVIDE ACCESS PANELS AT BALANCING DAMPERS.

ALL NEW RIGID SUPPLY AIR DUCTWORK TO BE COVERED WITH 1" EXTERNAL INSULATION.

NEW DUCTWORK FOR EXHAUST FANS TO BE LINED WITH 1" INTERNAL ACOUSTIC INSULATION.

MAXIMUM LENGTH OF FLEXIBLE DUCT IS 10'-0". USE RIGID ROUND DUCTWORK FOR SECTIONS ADJACENT CONNECTION TO BRANCH DUCT SO THAT MAXIMUM ALLOWED LENGTH IS NOT EXCEEDED.

NEW FLEXIBLE DUCTS TO BE COMPLETE WITH 1" FOIL FACE INSULATION AND WHERE NEW CONNECTION TO BRANCH DUCT IS REQUIRED 'SPIN-ON' DUCT COLLARS WITH BALANCING DAMPERS SHALL BE PROVIDED.

SERVICES ABOVE RETURN AIR GRILLES TO BE PAINTED FLAT BLACK.

DURING CONSTRUCTION, COVER OPEN ENDS OR REGISTERS OF ACTIVE RETURN AND EXHAUST AIR DUCTS WITH FILTER MEDIA SECURED BY METAL BAND PULLED TIGHT AROUND DUCT BY MEANS OF SCREWS. MAINTAIN THIS MEDIA UNTIL PLASTERING, DRYWALL & OTHER FINISHING OPERATIONS ARE COMPLETED.

EXHAUST FAN SWITCHING AND POWER WIRING TO BE PROVIDED BY ELECTRICAL CONTRACTOR. EXCEPT WHERE NOTED.

REFER TO MECHANICAL DRAWINGS FOR EQUIPMENT SPECIFICATIONS.

**HVAC DRAWING NOTES**

- 1 RELOCATED EXISTING THERMOSTAT. THERMOSTATS SHALL BE MOUNTED AT 47" AFF WHERE PRACTICAL.
- 2 PROVIDE NEW SQUARE DIFFUSER ('A') AND ASSOCIATED ACOUSTICAL FLEX DUCTWORK. (TYPICAL)
- 3 PROVIDE NEW ROUND CONE DIFFUSER ('B') AND ASSOCIATED ACOUSTICAL FLEX DUCTWORK. (TYPICAL)
- 4 PROVIDE NEW RETURN GRILLE ('C'). (TYPICAL)
- 5 PROVIDE NEW EXHAUST GRILLE 'D'.
- 6 PROVIDE NEW WASHROOM EXHAUST GRILLE 'E'. (TYPICAL)
- 7 NEW TRANSFER AIR DUCT. REFER TO DETAIL 1/M-1.5. (TYPICAL)
- 8 NEW EXHAUST FAN TO BE INSTALLED COMPLETE WITH ALL ASSOCIATED DUCTWORK, CONTROLS AND ACCESSORIES. SEE DETAIL 2/M-1.5. SWITCH LOCATION TO BE COORDINATED WITH INTERIOR DESIGNER AND INSTALLATION TO BE COMPLETED BY ELECTRICAL. SWITCH PROVIDED BY MECHANICAL.
- 9 NEW MUSHROOM ROOFTOP EXHAUST FAN TO BE INSTALLED COMPLETE WITH ALL ASSOCIATED DUCTWORK, PENETRATION, CURB, CONTROLS AND ACCESSORIES. SEE DETAIL 2/M-1.5. EXHAUST FAN TO RUN ON A SCHEDULE. CONSULT WITH CLIENT.
- 10 CONTRACTOR TO PROVIDE NEW EH PRICE EHC1 2503 ELECTRIC COOLING/HEATING BYPASS BOX (EHC1) C/W ATTENUATOR, THERMOSTAT, TRANSFORMER AND ALL DUCTWORK SHOWN ON DRAWING. BYPASS BOX AND ATTENUATOR TO BE COMPLETE WITH 25MM FF1 DUCT LINING. 150MM INCH BOX. CONTROLS TO BE PROVIDED AND FIELD MOUNTED BY CONTROLS CONTRACTOR. 250MM INLET DUCTWORK TO BE RIGID ROUND. CONTRACTOR TO PLACE NEW THERMOSTATS AS CLOSE AS POSSIBLE TO WINDOW. FINAL LOCATION TO BE DETERMINED BY CLIENT AND ARCHITECT.
- 11 NEW WALL MOUNTED DUCTLESS AC UNIT (AC-1) C/W PROGRAMMABLE THERMOSTAT. FINAL THERMOSTAT LOCATION TO BE DETERMINED BY CLIENT PREVIOUS TO INSTALL. CONDENSER UNIT (CU-1) LOCATION ON THE ROOF TO BE VERIFIED ON SITE AND APPROVED BY LANDLORD.
- 12 NEW DUCTED AC UNIT (AC-2) C/W PROGRAMMABLE THERMOSTAT. FINAL THERMOSTAT LOCATION TO BE DETERMINED BY CLIENT PREVIOUS TO INSTALL. CONDENSER UNIT (CU-2) LOCATION ON THE ROOF TO BE VERIFIED ON SITE AND APPROVED BY LANDLORD.
- 13 NOT IN USE
- 14 NEW ROOF MOUNTED CONDENSER UNIT.
- 15 REFRIGERANT LINES DOWN THRU ROOF.
- 16 PROVIDE LINE VOLTAGE THERMOSTAT TO ENERGIZE EXHAUST FAN ON TEMPERATURE RISE. 120V LINE VOLTAGE THERMOSTAT SUPPLIED BY DIVISION 23 INSTALLED BY ELECTRICAL DIVISION 26.

**NOTE:**  
PRIOR TO TENANT MOVE IN DATE A THIRD PARTY COMMISSIONING AGENT SHALL VERIFY PROPER OPERATION OF RTU'S. COMMISSIONING AGENT TO SUBMIT REPORT TO LANDLORD & HH ANGUS

**ACOUSTIC FLEXIBLE DUCTWORK SPECIFICATION**  
ALL NEW DUCTWORK ON DRAWING SHALL BE PEPPERTREEAIR SOLUTIONS INC. SERIES CEH - TYPE HPB, GREENGUARD CERTIFIED INSULATION, CAN/ULC-S-110 LISTED, BLACK ANTISTAT LOW DENSITY VAPOR BARRIER, CLASS 1 AIR DUCT CONNECTOR, FLAME SPREAD RATING <25/50. AS DISTRIBUTED BY PEPPERTREEAIR SOLUTIONS INC. ph: 905-771-8898.

REFER TO DRAWING M-1.0 FOR EXISTING RTU SCHEDULE

CONTRACTOR TO PROVIDE NEW BALANCING DAMPERS ON ALL SUPPLY RIDGID AND FLEX DUCTS SERVING NEW DIFFUSERS.

CONTRACTOR TO PROVIDE A COMFORT BALANCE 30 DAYS AFTER FLOOR OCCUPANCY.

**City of Pickering**  
2460 Brock Road,  
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Client Name  
City of Pickering

Project Name  
CoP Interior Fit-Out

Project Address  
2460 Brock Road  
Pickering, ON L1X 0J1

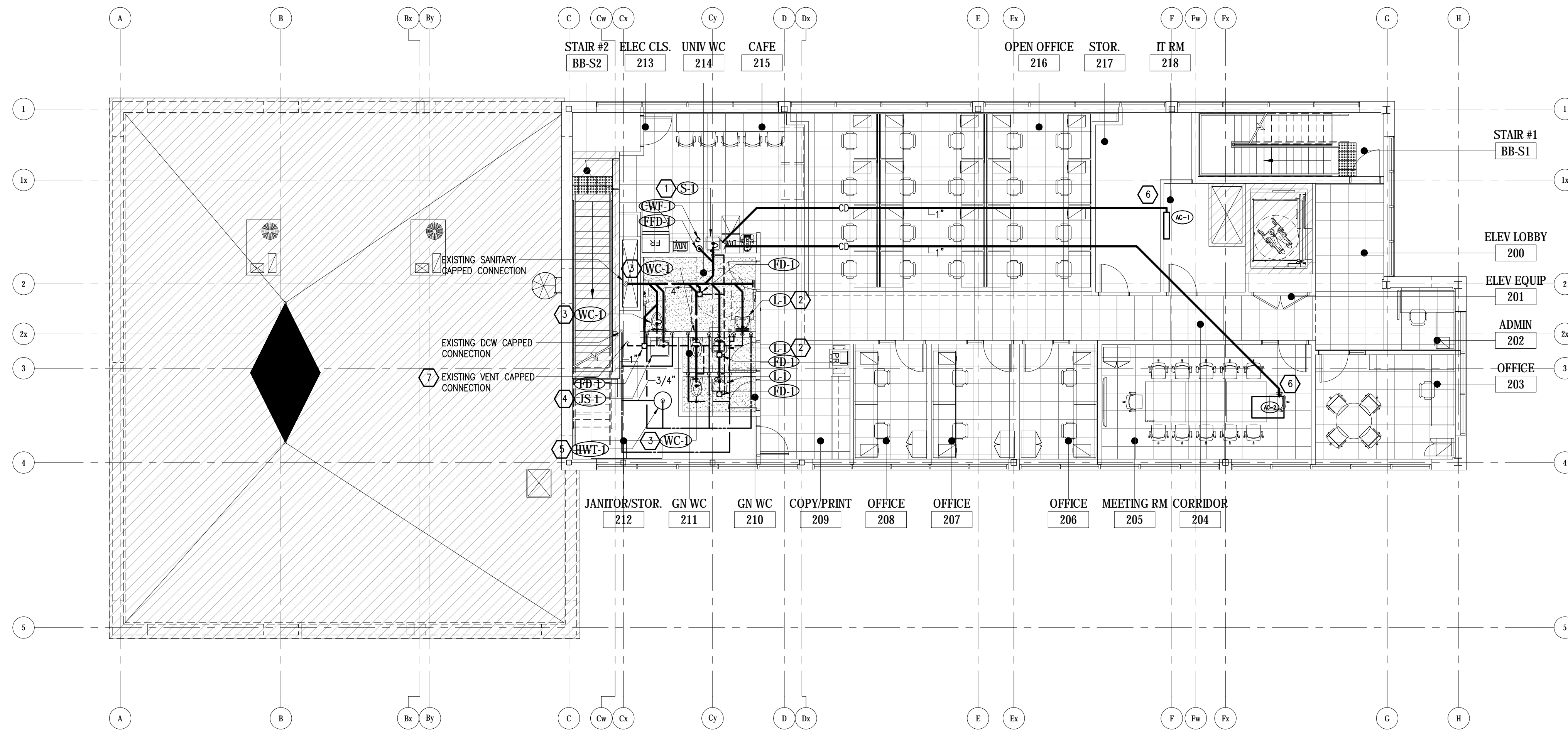
Project number  
2240483

Drawing Title  
**HVAC LAYOUT  
2ND FLOOR**

Drawing Scale  
1:100

Drawing Number





**PLUMBING NOTE**  
 THIS CONTRACTOR SHALL INCLUDE FOR INSTALLATION OF WATER DISPENSER AND COFFEE MAKERS (2). THIS CONTRACTOR SHALL MEET ON SITE WITH WATER DISPENSER AND COFFEE MAKER VENDORS AND ASSIST IN THE INSTALLATION OF BOTH WATER DISPENSER & COFFEE MAKERS THROUGH THE PROVISION OF 1/4" SOFT COPPER TUBING & PLUMBING FITTINGS FOR CONNECTION TO WATER DISPENSER AND COFFEE MAKERS AS DIRECTED BY WATER DISPENSER & COFFEE MAKER VENDORS. COORDINATE THIS INSTALLATION WITH THE GENERAL CONTRACTOR.

**GENERAL NOTES**  
 1. ALL WORK TO CONFORM TO BASE BUILDING STANDARDS & SPECIFICATIONS.

- DRAWING NOTES**
- 1 3/4" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW SINK S-1, 2" WASTE DOWN THROUGH FLOOR. TIE INTO EXISTING CAPPED CONNECTION ON LEVEL BELOW. PROVIDE 1/2" VALVED HW. & 1-1/2" DRAIN CONNECTIONS UNDER COUNTER FOR DISHWASHERS. INSTALL DISHWASHERS AND REFRIGERATORS. ALLOW SUFFICIENT CLEARANCE FOR SINK DRAIN TRAP ACCESS.
  - 2 1/2" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW LAVATORY L-1, 1 1/4" WASTE DOWN THROUGH FLOOR.
  - 3 1/2" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW WATER CLOSET WC-1, 3" WASTE DOWN THROUGH FLOOR.
  - 4 1/2" HW. & 1/2" CW, & VENT DN. IN WALL TO NEW JANITORS SINK JS-1, 3" WASTE DOWN THROUGH FLOOR.
  - 5 FOR ALL NEW HOT WATER TANK CONTRACTOR TO PROVIDE TACO LEAKBREAKER OR EQUAL. HOT WATER TANK LEAK DETECTION SYSTEM. SYSTEM TO BE PURCHASED WITH LEAKBREAKER VALVE, MODULE, WATER SENSOR, POWER CORD, BATTERIES AND HARDWARE.
  - 6 PROVIDE NEW MITSUBISHI CONDENSATE PUMP AND RUN NEW 1" CONDENSATE DRAIN TO NEW FFD IN KITCHEN AREA.
  - 7 CONTRACTOR TO PROVIDE AS A SEPARATE PRICE TO RUN EXISTING VENT UP TO ROOF.

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| ISSUE | △ YYMMDD | DESCRIPTION                  |

**iN STUDIO**  
 354 Davenport Road, Suite 200  
 Toronto, Ontario, Canada M5R 1K6  
 T: (416) 413-0063  
 email: info@instudiocreative.com

Client Name: City of Pickering

Project Name: CoP Interior Fit-Out

Project Address: 2460 Brock Road, Pickering, ON L1X 0J1

Project number: 2240483

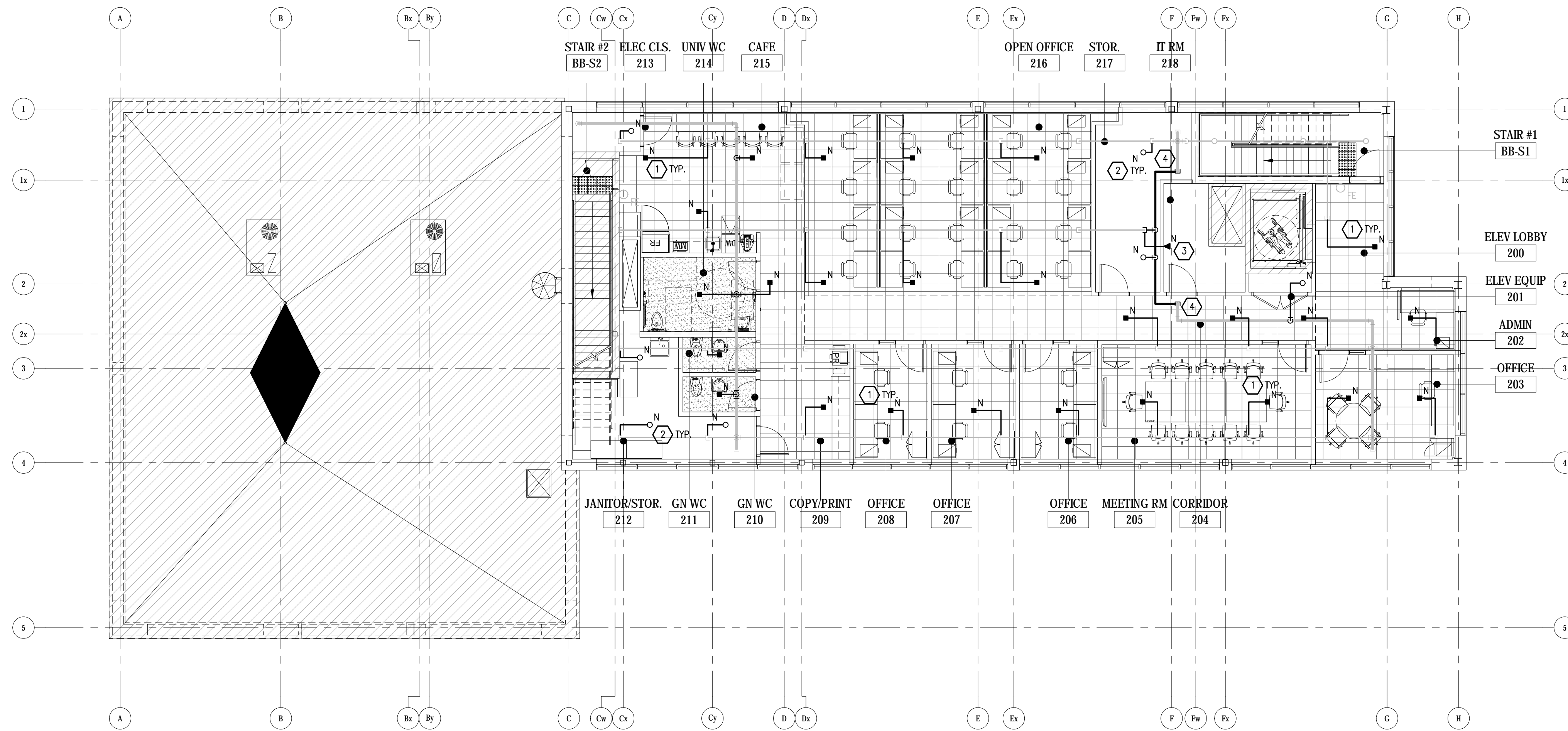
Drawing Title: **PLUMBING LAYOUT 2ND FLOOR**

Drawing Scale: 1:100

Drawing Number: **M-3.0**

True North





**GENERAL NOTES**

1. PROVIDE 1" VALVED AND CAPPED INSPECTOR'S TEST CONNECTION WITH HOSE END IN ALL SPRINKLER ZONES FOR INITIAL FLUSHING OUT OF THE SYSTEM AND REMOTE TESTING FOR ALARM DEVICES. PROVIDE ONE HOSE OF SUITABLE LENGTH. PROVIDE EACH SYSTEM WITH CHECK VALVE AND SHUT OFF VALVE IN CEILING SPACE TO FACILITATE DRAINING OF EACH SYSTEM.
2. PROVIDE AUXILIARY DRAINS AS PER LAST ISSUE OF NFPA 13.
3. ADVISE AND ARRANGE WITH FIRE DEPARTMENT THE DATES OF TESTING ALARM DEVICES. COORDINATE THIS WORK WITH TRADES UNDER ELECTRICAL DIVISION. ENSURE ALL ALARM DEVICES ARE WORKING PRIOR TO CONTACTING FIRE DEPARTMENT.
4. EXAMINE ARCHITECTURAL REFLECTED CEILING PLAN TO COORDINATE SPRINKLER HEAD LAYOUT & LOCATIONS.
5. ALL SYSTEMS SHALL BE HYDRAULICALLY SIZED. ALL PIPES SIZING SHALL BE BASED ON CONTRACTOR'S OWN HYDRAULIC CALCULATIONS AT NO ADDITIONAL COST TO THE OWNER. PROVIDE ADDITIONAL HEADS AS REQUIRED TO MEET NFPA 13.
6. PROVIDE FOR THE SUPPLY & INSTALLATION OF ADDITIONAL 10 SPRINKLERS HEADS INCLUDING PIPING.
7. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS. THE CONTRACTOR SHALL CONTACT THE ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT.
8. EXISTING SPRINKLER BRANCH PIPING / DROPS SHALL BE REWORKED AS REQUIRED TO SUIT NEW SPRINKLER HEAD LAYOUT. UNUSED OR REDUNDANT BRANCH PIPING TO BE REMOVED & PLUGGED AS REQUIRED.

**SPRINKLER HEAD DISCHARGE DENSITIES**

| HAZARD CLASSIFICATIONS   | DESIGN DENSITY (U.S. gpm/ft <sup>2</sup> /sq) |
|--|---|
| LIGHT HAZARD OFFICE  | 0.1   |
| ORDINARY HAZARD (GROUP 1) MECHANICAL SERVICE AREAS COMMUNICATION ROOMS | 0.15  |

**GENERAL NOTES**

1. ALL WORK TO CONFORM TO BASE BUILDING STANDARDS & SPECIFICATIONS.
2. NEW SPRINKLER HEADS SHALL BE EQUAL TO NEW BASE BUILDING STANDARD.
3. NO EXISTING HEADS SHALL BE REUSED/RELOCATED.

**DRAWING NOTES**

1. NEW CONCEALED TYPE QUICK RESPONSE SPRINKLER HEAD, CONNECT TO EXISTING SPRINKLER BRANCH WITH MINIMUM 1" BRANCH PIPE. (TYPICAL)
2. NEW UPRIGHT TYPE QUICK RESPONSE SPRINKLER HEAD, CONNECT TO EXISTING SPRINKLER MAIN WITH MINIMUM 1" BRANCH PIPE. (TYPICAL)
3. NEW SIDEWALL TYPE QUICK RESPONSE SPRINKLER HEAD, CONNECT TO EXISTING SPRINKLER MAIN WITH MINIMUM 1" BRANCH PIPE.
4. CONTRACTOR TO RE-ROUTE EXISTING SPRINKLER MAIN TO AVOID IT ROOM. WORK TO BE CAPTURED AS A UNIT PRICE/OPTIONAL PRICE.

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| NO.   | DATE   | DESCRIPTION                  |
|-------|--------|------------------------------|
| 03    | 240823 | ISSUED FOR PERMIT/TENDER     |
| 02    | 240816 | ISSUED FOR 100% COORDINATION |
| 01    | 240808 | ISSUED FOR 90% REVIEW        |
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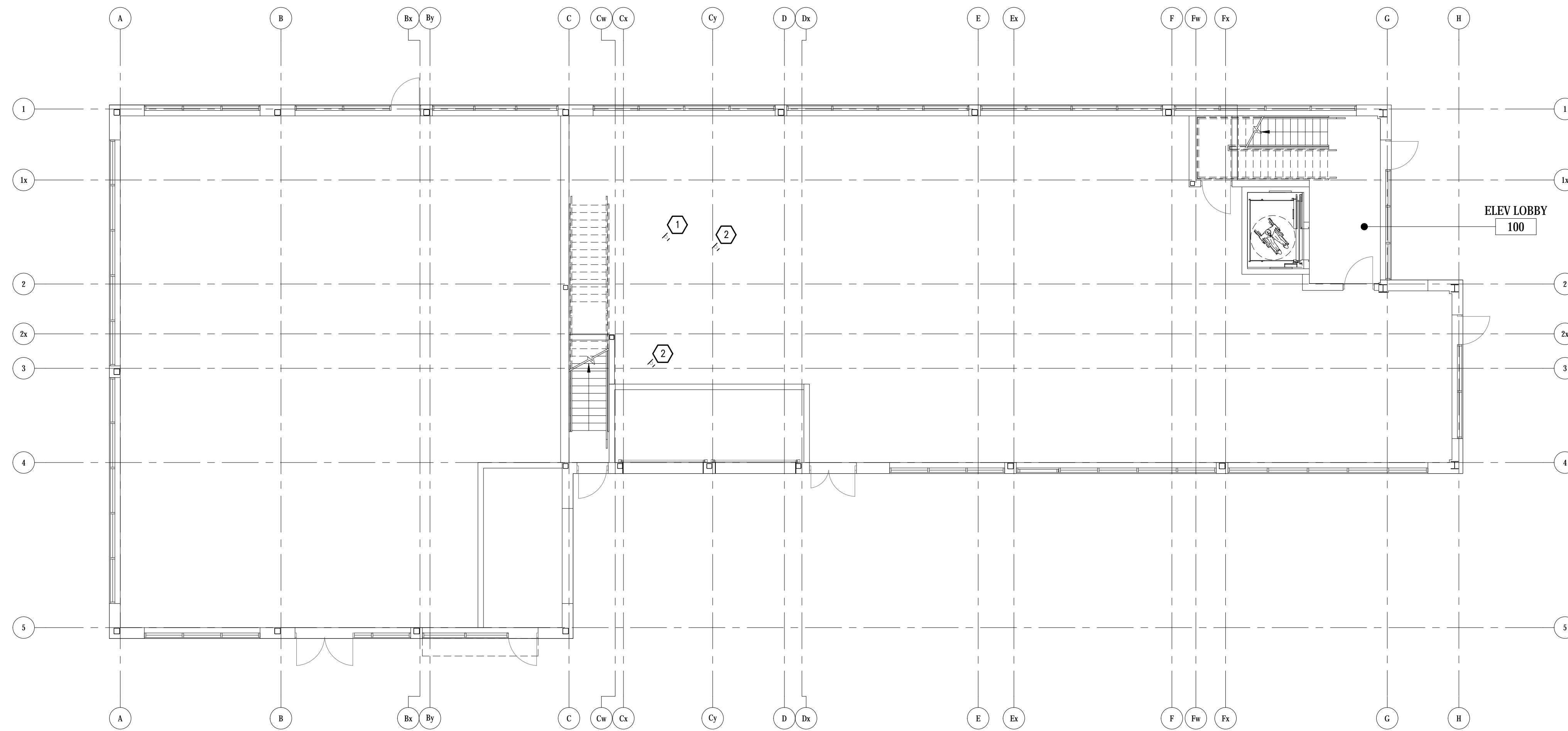
Drawing Title: **SPRINKLERL LAYOUT  
2ND FLOOR**

Drawing Scale: 1:100

Drawing Number







**DEMOLITION NOTES**

- ① CONTRACTOR TO CUT BACK AND CAP EXISTING VENT PIPING DOWN TO LEVEL BELOW. (TYPICAL)
- ② CONTRACTOR TO CUT BACK AND CAP EXISTING SANITARY ROUGH IN DOWN TO LEVEL BELOW. (TYPICAL)

**GENERAL NOTES**

ALL EQUIPMENT/MATERIALS REMOVED UNLESS NOTED OTHERWISE SHALL BE DISPOSED OF BY THIS CONTRACTOR.  
 WORK WITHIN CEILING SPACE OF FLOOR BELOW TO BE DONE AFTER NORMAL WORKING HOURS. ARRANGEMENT FOR ACCESS TO BE MADE WITH LANDLORD.

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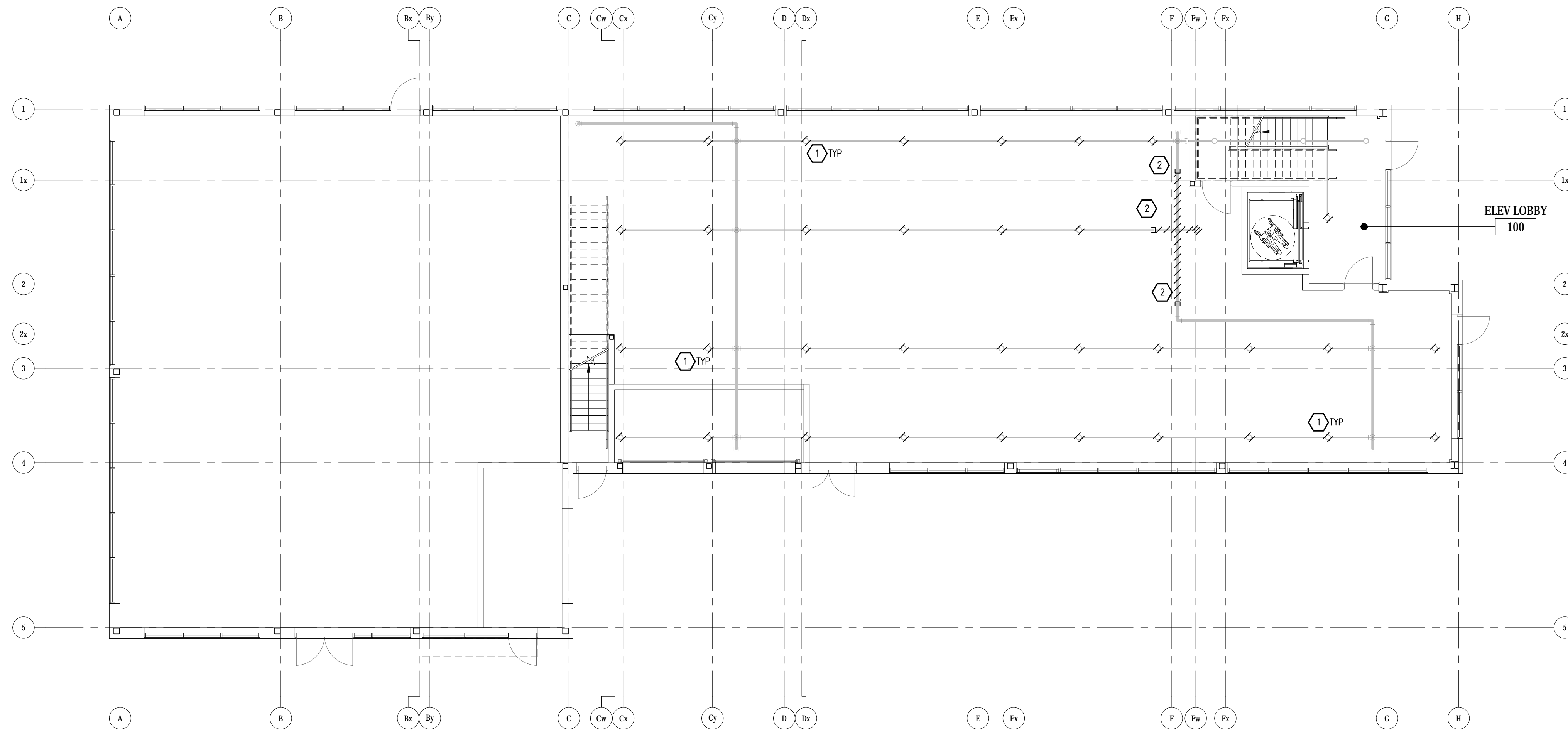
Project Address: 2460 Brock Road  
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Project number: 2240483

Drawing Title: **PLUMBING DEMOLITION  
 2ND FLOOR**

Drawing Scale: 1:100  
 Drawing Number





**DEMOLITION NOTES**

- ① CONTRACTOR TO REMOVE EXISTING SPRINKLER HEAD AND CUT BACK AND CAP EXISTING RETURN BEND BACK TO SPRINKLER BRANCHLINE. (TYPICAL)
- ② CONTRACTOR TO CUT BACK AND CAP EXISTING SPRINKLER BRANCH LINE AND SPRINKLER MAIN PIPING. CONTRACTOR TO CAPTURE COST AS A UNIT PRICE/OPTIONAL PRICE.

**GENERAL NOTES**

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 Drawing Number:

