PERFORM ALL mechanical work detailed on these drawings to provide a complete and fully functional operating SPECIFIED WORK described or indicated on drawings does not delegate function to any specified subcontractor or identify absolute contractual limits between mechanical or subcontractors. ENGINEERS FINAL INSPECTION is imperative. Prior to installation of all ceilings, this contractor shall contact and the landlord to perform a final inspection. When ceiling tiles have been installed it will be necessary for the contractor to remove portions for inspection.

THE MOST RIGOROUS OF THIS SPECIFICATION AND BASE BUILDING STANDARDS shall form the basis for this construction. Comply with landlord's requirements for system shutdown and connection. CODES AND BYLAWS shall be strictly adhered to. Obtain necessary permits, approvals and inspections from the authorities having jurisdiction. PERMITS AND FEES required by the authorities having jurisdiction shall be obtained and paid for by this

contractor. Include all applicable taxes. Arrange for the inspection of work by all inspection authorities having jurisdiction over the work of this division. All changes and alterations required by such authorities shall be EXISTING SITE CONDITIONS affecting the work of this trade shall be reviewed prior to tender submission. Failure to do so shall not relieve contractor of full contract responsibility.

CUTTING, PATCHING AND CORE DRILLING required by this trade shall be paid for by this contractor. X-Ray concrete structure in accordance with Owner/Landlord structural engineer's requirements. Provide details of new openings through structural components for engineer's approval. Incur all related costs for structural approval. FIRE STOP shall be ULC listed for the required separation and provided at all pipe penetrations through rated assemblies. Repair/Provide all spay fire proofing required to maintain original ratings. PREMIUM TIME COSTS shall be included for work outside of normal working hours.

FLASHING AND COUNTER FLASHING for exterior penetrations or water-proofed floors shall be provided under this contract. Flash all mechanical parts passing through, or built into a roof, outside wall or waterproof floor. Use prefabricated aluminum or pvc flashings for roof, and membrane or copper for walls and floors. Ensure all openings are weather, water and fire proof, using an approved flexible sealant. SHOP DRAWINGS shall be complete with contractors reviewed stamp. Submit 6 copies. Allow one (1) week for

EQUIPMENT SUBSTITUTIONS after award of contract will not be considered without written explanation and consultant's written authorization. The quality and performance characteristics of substituted product shall be equivalent to the specified product. All substitute products shall be approved by consultants. Any additional costs incurred by all trades for substituted equipment installation must be incurred by this contract. CONTROL WIRING AND DEVICES shall be provided under this contract. Control work shall be completed by Owner's/Landlord's approved contractor and paid for under this contract. PROVIDE A COMPLETE and fully functioning system operating in accordance with the sequence of operations. All load side wiring and electrical devices shall be provided including wiring, starters, disconnects, VFD's etc. Verify and coordinate voltage and phase with the electrical contractor prior to ordering equipment. ACCESS DOORS shall be provided for all inaccessible mechanical equipment and services requiring inspection or service. Finish shall suit architect/designers requirements. Access doors shall be recessed as required to suit wall finish (eq. tile.). Provide fire rated access doors in fire rated partitions.

ONE YEAR WRITTEN WARRANTY shall be provided for the complete mechanical installation from date of

CAD AS-BUILT DRAWINGS shall be completed utilizing AutoCAD. Record accurately installed work on white prints

ARCHITECT/DESIGNER APPROVAL of air terminal, thermostat, and access door locations must be obtained prior

transferring to AutoCAD. Submit both copies. Keep one up to date set on site. OPERATING AND MAINTENANCE MANUALS containing approved shop drawings, air and water balancing reports, equipment data sheets, written warranty, operating instructions and maintenance procedures shall be submitted to consultant for review. Manuals shall be separated with dividers in appropriate sections. Make all corrections requested by consultant and resubmit for review. CHANGE NOTICE QUOTATIONS shall be submitted complete with cost breakdown of labour and materials. Failure

to provide will result in rejection. All Mechanical Change Notices shall be priced in accordance with "MECHANICAL

CONTRACTORS ASSOCIATION" (MCA). Labour units not marked up to reflect site conditions strictly for labour and for material cost use "ALL PRICER" less discount of 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 weekly, Remove upon construction completion. BASE BUILDING HVAC components removed i.e. light troffers, diffusers, vav boxes etc. shall be turned over to

COMPLY WITH THE GENERAL contractors construction schedule.

During the process of the work each contractor shall keep his work tidy. The premises shall at all times be free from rubbish and surplus materials, clean daily.

Division 15 is entirely financially responsible for all damage to property or adjacent property, arising of the work of this contractor, whether caused by himself or any persons engaged on his work. Division 15 contractors are responsibe to ensure that their employees and sub-trades use only safe practices and conditions, observe all safety regulations, security regulations and fire safety rules.

Use only new materials, capitals and code approved in accordance with all laws, regulations and authorities Before proceeding with <u>any</u> changes, submit for approval by the engineers and owner. All material and equipment (exhaust fans, pipe, insulation, meters, etc.) to meet or exceed base building standards and have landlord's/tenant's approval before ordering.

Provide name plates on all mechanical equipment showing voltage, designation, CRU# and use. Numbers and letters to be 3/8" (10mm) high, white lettering on black laminated plastic. Identify all valves with tags. Provide a framed list of valves, indicating their location and use, supply to

Tender price to be as specified, show alternative equipment and itemized cost savings with tender documents.

Fabricate ductwork from galvanized sheet metal with a minimum coating of {1.83 grams/m2} [0.60 oz/sq.ft.] (G60coating) unless other materials are specifically named. Duct installation shall conform to the following: Ductwork shall be smooth on the inside and free of obstructions, vibration and rattle. Fabricate ductwork, except as described in the next item, according to the following classifications: Class 1: All ducting subject to positive or negative static pressure of {250 Pa} [1 in w.g.] or less with

maximum velocities of {13 m/s} [2500 fpm] shall be constructed in accordance with SMACNA construction standards for {250 Pa} [1 in w.g.] duct. Class 2: All ducting subject to positive or negative static pressure of more than {250 Pa} [1 in w.g.] up to {500 Pa} [2 in w.g.] with maximum velocity of {13 m/s} [2500 fpm] shall be constructed in accordance with SMACNA construction standards for {500 Pa} [2 in w.g.] duct.

Class 3: All ducting subject to positive or negative static pressure of greater than {500 Pa} [2 in w.g.] up to {750 Pa} [3 in w.g.] with maximum velocity of {20 m/s} [4000 fpm] shall be constructed in accordance with SMACNA construction standards for {750 Pa} [3 in w.g.] duct. Class 4: All ducting subject to positive pressure greater than {750 Pa} [3" w.g.] up to {1000 Pa} [4 in w.g.] with maximum velocity of {20 m/s} [4000 fpm] shall be constructed in accordance with SMACNA construction

standards for {1000 Pa} [4 in w.g.] duct. Class 6: All ducting subject to positive pressure greater than {1000 Pa} [4 in w.g.] up to {1500 Pa} [6 in w.q.] with maximum velocity of {20 m/s} [4000 fpm] shall be constructed in accordance with SMACNA construction standards for {1500 Pa} [6 in w.g.] duct.

DUCTWORK AND HANGERS shall be fabricated in accordance with the latest SMACNA standards as a minimum. FLEXIBLE DUCTWORK shall be Flexmaster Triple Loc or equal insulated, spiral wound aluminum. Secure to rigid duct using gear clamps. At the inlet of each VAV terminal control unit, provide a minimum of 3 diameters of straight flex duct. Maximum length 1200 mm [4 ft.—0 in.]. Flexible ducts serving diffusers shall be installed as one continuous peice and shall not exceed 10'-0" lengths.

Rate fire dampers to match the rating of the separation crossed. Provide only ULC labeled dampers, install as specified in NFPA/CUA 90a. Provide access doors as required. .1 Provide curtain or parallel blade type dampers to maintain fire rating integrity of membrane being pierced. Minimum rating to be 1-1/2 hours with $\{1000C\}$ [2120F] fusible link. Provide multiple dampers

FIRE DAMPER shall be out of stream ULC labeled. Provide fire dampers as required in new and existing

ductwork c/w access doors. Provide fire dampers and fire flaps where required by local authority and codes.

.2 Provide fire dampers equivalent to the following Ruskin models as follows, to suit application:

DIBD-2, Style B or C Normal duct application (2 hrs.) DIBD-20 Style G Behind grilles (2 hrs.) In doors (2 hrs.) In fire walls (4 hrs.) Behind outlets in fire rated floor (roof) and ceiling assemblies Combination fire and balancing damper (2 hrs.)

.3 Select dampers with air flow resistance not exceeding {13 Pa} [0.05 in. w.g.] at design flow rates. FLEXIBLE DUCT CONNECTIONS shall be durodyne neoprene and installed between all air handling equipment and AIR TRANSFER OPENINGS indicated without duct shall be this contractor's responsibility to advise and confirm

BALANCING AND VOLUME CONTROL DAMPERS shall be provided in new or existing ductwork to provide a complete and balanced system. Balancina contractor shall be a member of AABC or NEBC. Submit balancing report in triplicate to the consultant and the landlord indicating terminal design and measured flow rates. When required. balancing work shall be completed by Owner's/Landlord's approved contractor and paid for under this contract. Provide six (6) additional hours of balancing work. This work shall be performed after the tenant has moved in,

as may be required for comfort balancing. Provide new sheaves, belt and all labour required to balance all Air Handlers, Rooftop Units, Fans as required All kitchen related exhaust ductwork to be 16 gauge all welded black carbon steel, or 18 gauge stainless steel. To conform to NFPA 96. (Galvanized not acceptable). Fireproofing of kitchen exhaust ductwork where required shall be by Division 15. Verify with local authorities FAN SHEAVES, BELTS AND PULLEYS shall be adjusted or replaced as required to obtain design air quantities. Coordinate this work with Owner/Landlord.

All new dampers must be Tamco series 9000 or equal.

All mechanical equipment weights & openings are to be reviewed by a structural engineer, for framing support and building safety. Division 15 to arrange and pay for this structural review and/or action. Submit drawings for review by base building Engineer.

Provide labour, materials, products, equipment and services required to complete the demolition work specified Refer to Drawings for extent of demolition work. The drawings indicate the approximate locations of services as far as these are known.

Removal and storage of salvageable items as directed by this specification section and the Owner of their Meet the requirements and recommendations of all Municipal, Provincial and Federal Bylaws and Ordinances. Execute this work in accordance with the latest edition of the following codes and standards. CAN/CSA-S350-M1980 - Code of Practice for Safety in Demolition of Structures.

Ontario Buildina Code. Occupational Health and Safety Act. Regulations for Construction Projects. Regulations under fire Marshals Act.

Dispose, off site, of all debris in accordance with the jurisdictional authorities.

Removal from site and disposal of debris shall be carried out in accordance with the requirements of the local jurisdictional authorities. Arrange and pay for all permits, notices and inspections necessary for the proper execution and completion of All materials which have not been designated for salvage from the demolition shall become the property of the Contractor. Remove all material and debris from the site as quickly as possible and dispose of legally. Burning of debris or selling of materials on the site will not be permitted.

Conform to requirements of municipality's Works Department regarding disposal of waste materials. Materials prohibited from municipality waste management facilities shall be removed from site and disposed of through recycling companies specializing in recyclable materials. At the end of each work shift, leave work in a safe condition.

Patch fire rated partitions and floors to maintain rating upon removal of mechanical services originally spanning Demolish work into sections of practical size for removal without alteration or damage to existing building. Store materials only in areas designated by the Owner and as permitted by the local jurisdictional authorities. Materials and debris shall not be stacked in building to the extent that overloading of any part of the Confer with the Owner concerning schedule, dust and noise control prior to commencing work in or adjacent to

existing facilities where such work might affect either those facilities or their occupants. Execute work with least possible interference or disturbance to occupants, public and normal use of premises. Provide temporary means to maintain security when security has been reduced by Division 15. Only elevators, dumbwaiters, conveyors or escalators assigned for Contractor's use may be used for moving men and material within building. Protect walls of passenger elevators, to approval of Owner prior to use. Accept liability for damage, safety of equipment and overloading of existing equipment. Provide temporary dust screens, barriers, warning signs in locations where renovations and alternation work is

adjacent to areas which will be operative during work. Protect all mechanical systems, indicated to remain, from damage. Provide and maintain ready access to fire fighting equipment at all times.

Provide and maintain proper and suitable fire extinguishers throughout the duration of the work. The drawings indicate the approximate locations of services as far as these are known. Should any mechanical or electrical service line be broken, or disrupted by operations specified under this contract, repair service lines, and make good all damage due to the disruption or break, at no expense to the Owner. Notify the Owner immediately whenever any service line is broken or damaged. Accept liability for costs incurred by the Owner in repairing and cleaning equipment, etc., resulting from failure to comply with the above requirements.

Use only those existing entrances and stairs designated by the Owner for access to and egress from the existing buildings and various floors where work of this contract is to be carried out. No traffic through other areas of the building will be permitted without the prior consent of the Owner. Keep stairs and corridors clear and open as required by Fire Marshall for exit purposes in case of fire, and as required for use by the Owner's personnel.

Arrange and pay for the disconnection, capping and for plugging of gas, water, sewer, storm and other services to the building to be demolished. In each case the utility company involved shall be notified in advance and its approval obtained before commencing that portion of the work. Disconnect and cap services at the locations indicated by the Consultant. Arrange, schedule and perform work with minimum disturbance to existing facilities and services.

Submit a complete schedule of service interruptions and changeovers with approximate dates, required durations

If service interruptions are required by the Owner during the night or on weekends, etc., premium time shall be

and times of day, for approval before proceeding. Notify Owner in writing at least 72 hours in advance of planned interruption to existing services. Interruption of service must occur at the times and for the duration stipulated by the Owner. Keep service interruption duration to an absolute minimum. Carry out all preparatory work, measurements, etc., without interruption of existing services.

included at the Contract Price. No extra charges will be allowed at a later date for failure to include same. Provide all required supports on outside of ductwork, installation shall be to the requirements of applicable codes. All support must be from building structure and not from other equipment, piping or ductwork.

Provide all labour, materials, products, equipment and services to supply and install the natural gas piping system indicated on the Drawings and specified in this Section of the Specifications. Install natural gas system only with fitters certified to Ontario Gas Utilization Regulations TSSA and CGA If necessary, arrange and pay for a gas service to the building, including regulating station gas meter, and associated accessories.

Provide all equipment and materials required for the building natural gas distribution systems in accordance

with the requirements of the current version of The Ontario Gas Utilization Regulations and TSSA.

GENERAL MECHANICAL SPECIFICATIONS:

Provide complete natural gas system, to CGA and TSSA requirements. Provide pressure reducing, regulating and relief valving required for compatibility between equipment and building

natural gas distribution system. Provide gas pressure reducing station(s) where noted on Drawings and where required to reduce building Distribution system pressures to appliance operating pressure ranges.

Pressure regulators shall be spring-loaded self-operated design and shall be tight closing with replaceable orifices and discs and concealed accessible manual adjustment. Valve bodies shall be cast iron rated for \$1034 kPa} [150 psig] gas pressure and all valve materials shall be epoxy painted to resist corrosive ambient

Provide gas pressure relief stations downstream of all pressure reducing stations. Provide relief valves of spring-loaded design with throttling characteristics to reduce system pressure surges. Valve bodies shall be cast iron rated for {1034 kPa} [150 psig] gas pressure with replaceable orifices and discs and concealed accessible manual adjustment. All valve materials shall be epoxy painted to resist corrosive

Install natural gas service to meet CGA, TSSA and The Ontario Gas Utilization Regulations and all authorities Distribute gas within the building at {7.0 kPa} [1 psig].

Select pressure reducing valves to maintain downstream pressures within +5% range of setting. Submit sizing data for each valve with Shop Drawings. Select pressure relief valves for the maximum capacity of the pressure reducing station served plus not less than 25%. Submit sizing data for each valve with Shop Drawings. Pipe all relief vents individually to outdoors. Size piping for a maximum pressure drop of 10% of the pressure reducing valve setpoint gauge pressure with a 25% capacity safety factor.

Provide upstream and downstream isolating valves and pressure gauges complete with gauge cocks at all pressure reducing stations. Connect relief valves so that they cannot be isolated from the appliances which Connect gas piping to all gas fired equipment.

Contact the local Gas Service Provider to determine If a Gas/Gas Meter upgrade is required.

<u>Plumbing systems</u> SCOPE OF WORK

Paint gas service piping solid yellow in its entirety.

Provide all hot and cold water systems with complete connections from the water meter to all plumbing fixtures and equipment requiring water connections.

Provide all soil, waste, vent systems inside the building to five feet (5'-0") past foundation walls. Provide all plumbing fixtures including all required trim and supports. Rough—in and provide final connection to all equipment.

Provide all final plumbing connections to heating and air conditioning equipment including condensate drains. Provide all gas piping to all appliances requiring gas. Paint all gas piping yellow in its entirety. Provide all required fire extinguishers.

Pressure test all piping systems in accordance with local & provincial codes for leaks, before insulation is added. Submit report to the owner and a copy to the engineer. Provide all trenching and backfilling required for Division 15 work. Water: co-ordinate and furnish all labour and/or materials, all in accordance with the requirements of the local

water company and/or landlord. Provide all required venting to conform to local codes and with authorities having jurisdiction. Sewer connections shall be by Division 15 and shall be made in strict accordance with the requirements of the local governing authority.

Prime all traps as required to meet code requirements and requirements of local authorities.

Provide and install all piping as required for a complete installation whether indicated or not and in accordance Conform to manufacturer's recommendations.

Provide and install vent piping as per local code requirements.

For underground installations, provide suitable bedding, coverage and slope to ease drainage. Install temporary caps or closures on the end of all pipes, conduits etc.; to prevent debris entering during

Separate dissimilar metals by means of gaskets, di-electric unions or couplings that prevent electrolytic action. (e.g. Brass between copper and steel). Suspend all pipes, in the ceiling space, as high as possible. Coordinate all work with other sub-trades so as not to interfere with ductwork, etc. Support all suspended hub drains from below. Slope hot water & cold water piping to low points for drainage of the system c/w drain valves. Provide accessible shut-off valves on hot and cold water supplies to each piece of equipment, including kitchen equipment. (provide back flow preventor on all equipment as stated on equipment schedule.)

Pipe sleeves passing through walls, floors and ceilings to be schedule 40, black steel, packed for water tightness and sound transmission with fireproof, smoke proof, flexible sealant. Install polished chrome escutcheon plates on all pipes, which are visible to staff or public personal. HANGERS AND SUPPORTS

Supports and clevis type hangers shall be on outside of insulation, installation shall be to the requirements of applicable codes. All support must be from building structure and not from other equipment, piping or ductwork. EXISTING SANITARY DRAIN locations and invert elevations shall be verified on site prior to commencement of work. PIPING MATERIALS:

Pipe Size {65mm} [2-1/2"] & Smaller	Pipe Size {75mm} [3"] & Larger
DWV copper pipe with drainage fittings and 95/5 tin/antimony solder joints.	CSA Class 4000 cast iron soil pipe and fittings, with mechanical joints.
Profile pvc sewer pipe with solvent welded fittings	CSA Class 4000 cast iron soil pipe and fittings, with mechanical joints or IPEX Ring—Tite SDR35, CSA certified to B182.2 PVC gasketted sewer pipe.
DWV copper pipe with drainage fittings, 95/5 tin /antimony solder joints.	CSA Class 4000 cast iron soil pipe and fittings with mechanical joints.
not applicable	CSA Class 4000 cast iron soil pipe and fittings, with mechanical joints or IPEX Ring—Tite SDR35, CSA certified to B182.2 PVC gasketted sewer pipe.
DWV copper pipe with drainage fittings, 95/5 tin /antimony solder joints.	CSA Class 4000 cast iron soil pipe and fittings with mechanical joints.
Type L copper pipe with wrought copper fittings and 95/5 tin/antimony solder joints.	CSA Class 4000 cast iron soil pipe and fittings, with mechanical joints or IPEX Ring—Tite SDR35, CSA certified to B182.2 PVC gasketted sewer pipe.
	DWV copper pipe with drainage fittings and 95/5 tin/antimony solder joints. Profile pvc sewer pipe with solvent welded fittings DWV copper pipe with drainage fittings, 95/5 tin /antimony solder joints. not applicable DWV copper pipe with drainage fittings, 95/5 tin /antimony solder joints. Type L copper pipe with wrought copper

DOMESTIC WATER: Domestic hot water and recirculation — all sizes: .1 Type L hard copper pipe, wrought copper fittings with 95/5 tin/antimony solder joints.

Domestic cold water and domestic chilled water all sizes. .1 Type L hard copper pipe, wrought copper fittings with 95/5 tin/antimony solder joints. Provide Type K soft copper pipe without joints below ground.

For working pressures up to {2100 kPa} [300 psig], Victaulic style 606 couplings with Grade E flush seal Vic Plus gasket, and grooved copper piping systems may be used in accessible areas for domestic water. Provide Victaulic installation instructions on site.

Provide ASTM domestic water valves to the following Kitz figure numbers:

.1 {50 mm} [2"] and smaller — soldered {1400 kPa} [200 psi] w.o.g. Fig. 44. .2 $\{65 \text{ mm}\}\ [2-1/2]$ and larger - flanged $\{1400 \text{ kPa}\}\ [200 \text{ psi}]$ w.o.g. Fig. 75.

.1 {50 mm} [2"] and smaller — soldered {2070 kPa} [300 psi] w.o.g. Fig. 10 with suitable

.2 $\{65 \text{ mm}\}\ [2-1/2"]$ and larger - flanged $\{1400 \text{ kPa}\}\ [200 \text{ psi}]$ w.o.g. Fig. 76. Standard Check Valves:

.2 Give notification immediately of any apparent difficulties or discrepancies.

.1 {50 mm} [2"] and smaller — soldered {2070 kPa} [300 psi] w.o.g. Fig. 23. .2 $\{65 \text{ mm}\}\ [2-1/2"]$ and larger - flanged $\{1400 \text{ kPa}\}\ [200 \text{ psi}]$ w.o.g. Fig. 78.

VERIFICATION OF INVERTS .1 Verify all field service conditions (pipe size, direction of flow) immediately after award of Contract to ensure that drainage runs can meet the inverts of the site services.

.3 No extra will be paid at a later date for rerouting of drains because site inverts cannot be met. TESTING Carry out not less than the following tests:

.1 Ball test drains. .2 Perform water tests on all soil, waste, vent and rainwater systems when rough-in of the system, or section thereof including fittings, branches, cleanouts and traps except fixture traps is completed. When the system or section is filled, shut off the water, and allow to stand for one hour. There shall be no loss by leakage during this time.

.3 Pressure test domestic cold water, domestic hot water, and recirculation lines with water at 150% of maximum operating pressure, for 6 hours without loss of pressure. Conduct additional tests required by the authorities having jurisdiction.

If tests are required by an authority having jurisdiction, perform tests in the presence of each governing authority's authorized inspector, and obtain certification. Certify tests not required by the authorities having jurisdiction.

Perform tests before piping, drains or vents are covered or concealed. Remove all components which will not withstand test pressure, and replace after tests.

Eliminate leaks, or remove and refit defective parts. Caulking of threaded or welded joints will not be Repeat tests as often as necessary to obtain certification. Set all fixtures and fill all traps with water after tests have been completed.

CLEANING AND FLUSHING SEWERS On completion of construction of drains, flush all drains until the deposits of earth and other foreign material have been removed. CLEANING, FLUSHING AND DISINFECTING WATER PIPING

Sterilize all potable water lines to meet local municipal requirements.

Be responsible for care and cleaning of the piping system during and after construction. Plug all open ends during construction to prevent the entrance of foreign materials. Flush all systems with clean, potable water to remove scale and sediment immediately upon filling.

After completing satisfactory hydrostatic tests of the complete system, and flushing mains as outlined above, disinfect the mains in accordance with AWWA Standard C651-86. Repeat the flushing and disinfecting operation until the test results are satisfactory. Ensure by operation of isolating valves or the installation of check valves, that the disinfecting solution does not flow back into street mains or other sections of piping in use. Arrange and pay for water quality tests to be performed by a recognized independent testing laboratory. Obtain certificates confirming safety of potable water supply.

CONNECTIONS TO OWNER'S EQUIPMENT Rough in and connect to Owner's equipment. Do not rough in prior to receipt of final approved layout CONNECTIONS TO KITCHEN EQUIPMENT

Provide rough—in and make all final connections to the kitchen area equipment as shown on Drawings. Do not begin rough-in work until supplied with a final set of dimensioned rough-in drawings from the All final connections shall include shut off valves on hot and cold water supplies and the installation of all vacuum breakers, check valves, backflow preventors, and other plumbing specialities to meet authorities having jurisdiction.

Final connections to dishwasher shall include a pressure reducing valve, strainer, pressure gauge downstream and shock absorber upstream of pressure reducing valve. PLUMBING FIXTURES including domestic hot water heaters shall be new, of first quality, in perfect condition and installed in best workmanlike manner. Verify plumbing fixture quantities and locations with Architect's/Designer's drawings. Reuse of domestic water heater is not permitted. TRAP SEAL PRIMER must be provided on all new Floor Drains, Funnel Floor Drains and Hub Drains. EXPOSED PIPING AND FITTINGS within washrooms shall be chrome plated. Provide chrome plated escutcheons on all

piping passing through finished surfaces and millwork. STAINLESS STEEL WATER HAMMER ARRESTORS equal to Zurn Shoktrol shall be provided on all lines serving groups of fixtures, quick closing valves and flush valves.

PIPING INSULATION

PROVIDE ALL LABOUR, materials, products, equipment and services to supply and install thermal insulation, vapour barriers and finishes for mechanical work as indicated on the drawings and specified in this section of MAINTAIN AMBIENT temperatures and conditions required by manufacturers of adhesives, mastics and insulating

INSULATION MATERIALS must be manufactured at facilities certified and registered with an approved Registrar to conform to ISO 9000 quality standard. ALL INSULATION pertaining to Division 15 shall be carried out by one firm specializing in insulation work. Do not mix similar products of multiple manufacturers ACCEPTABLE INSULATION MANUFACTURERS are Owens Corning Canada, Johns Manville, Manson Insulation Inc. Knauf Fiber Glass and Certainteed. PROVIDE INSULATION AND COVERS in strict accordance with authorities governing combustibility and fireproofing of materials and in accordance with manufacturer's recommendations.

PROVIDE NON-COMBUSTIBLE insulation, jackets and finishes having a Flame Spread/Smoke Developed rating of 25/50 or less, meeting CAN/ULC S-102 requirements. ATTAIN A COMPLETE and continuous vapour barrier over insulation applied to cold and dual temperature piping, sheet metal and equipment. Use either factory applied vapour barrier jacket of field applied Reinforced Foil Flame Resistant Kraft vapour barrier jacket. Apply to piping, fittings, valves and inline components, sheet metal and fittings and equipment. Seal longitudinal and circumferential laps with Childers CP82 or Bakor 230—39 adhesive. If vapour barrier jacket is not lapped, seal joints with self—adhering 4" wide plain aluminum foil tape, or adhere 4" wide aluminum foil tape with Childers CP82 or Bakor 230-39 adhesive. Jacketing with self-adhesive laps and self-adhesive barrier tape will be an acceptable alternative closure system. PROVIDE INSULATION MATERIALS with a minimum thermal conductivity of 0.24BTU.in/(hr. sq.ft°F) at 100°F mean

ON HOT PIPING applications, hold insulation in place with flare type staples (outward clinch). ON COLD PIPING APPLICATIONS, apply vapour barrier jacket over insulation and seal longitudinal and circumferential laps with Childers CP82 or Bakelite 230-39 adhesive. Seal all pipe terminations, including fittings, wall penetrations and pipe supports with vapour barrier mastic. For chilled water systems provide vapour seal pipe terminations every four pipe sections.

PROVIDE ON ALL BARRIER FREE LAVATORY APPLICATIONS, a seamless P-Trap insulation kit furnished with seamless riser tube covers, supply angle stop covers, seamless drain tailpiece cover and angle stop wheel APPLY PIPE INSULATION over 1-1/2" thickness in two layers with joints staggered.

INSULATE FITTINGS with fabricated mitered or preformed sections of specified insulation. INSULATE OVER FLANGES and mechanical couplings with specified insulation and thickness, sized to suit flange diameters. Fill spaces between insulation and adjoining pipe insulation with similar material. INSULATE VALVES AND INLINE COMPONENTS with flexible insulation density (3/4 lbs./cu.ft.) compressed not more than 50% of original thickness. Build up to specified thickness with approved asbestos free finishing cement. DO NOT INSULATE TERMINAL unit automatic control valves installed in hot piping. Do not insulate terminal unit automatic control valves which are installed in cold piping and which are located over condensate drain pans. UNDER ALL HANGERS used on chilled water and domestic cold water, provide an insert between support shield

and piping for piping 1-1/2"ø or larger.

PROVIDE THE FOLLOWING PIPE INSULATION type as indicated in the pipe Insulation table below.

INSULATION THICKNESS VAPOUR DOMESTIC COLD WATER 4" and less DOMESTIC HOT WATER 2" and less 2-1/2" and larger P-1 1-1/2" No HORIZONTAL STORM AND SANITARY DRAINAGE all pipe sizes HORIZONTAL CONDENSATE DRAINS 1/2" Yes all pipe sizes HEAT TRACED PIPE FOR FREEZE PROTECTION 3" and less P-1 1-1/2" No 4" and above

SHEET METAL INSULATION

PROVIDE INSULATION with a minimum thermal resistance of 0.25 BTU.in/hr. sq.ft *F at 75*F mean temperature. APPLY VAPOUR BARRIER over insulation on cold temperature ductwork. CIRCULAR SILENCERS AND ACOUSTIC PLENUMS need not be externally insulated.

'TYPE P1' Owens Corning 850 Pipe Insulation, Johns Manville Micro-Lok Ap-T PLUS Fiberglas Pipe Insulation,

Manson Fiberglas Pipe Insulation or Knauf Pipe Insulation with factory applied all purpose vapour barrier jacket

MECHANICAL LEGEND

PIPI	NG LEGEND	PLUMBING	ABBREVIATIONS
─	GATE VALVE	BFP	BACKFLOW PREVENTER
	GLOBE VALVE	со	CLEAN OUT
—ф—	BALL VALVE	CTE	CONNECT TO EXISTING
_ <u></u>	CHECK VALVE	CW	DOMESTIC COLD WATER
\	ELECTRIC 2-WAY CONTROL VALVE	DHW	DOMESTIC HOT WATER
Ç	PNEUMATIC CONTROL VALVE	FD	FLOOR DRAIN
─── ₩──	PRESSURE REDUCING VALVE	FE	FIRE EXTINGUISHER
	SOLENOID VALVE	FFD	FUNNEL FLOOR DRAIN
\$	PNEUMATIC 3-WAY CONTROL VALVE	FHC	FIRE HOSE CABINET
<u></u> —₩—	3-WAY VALVE	НВ	HOSE BIBB
——⋈ ^s	SUPERVISED VALVE	HD	HUB DRAIN
▶ —	RELIEF VALVE	HWT	DOMESTIC WATER HEATER
	ALARM CHECK VALVE	L	LAVATORY
———CBV	CIRCUIT BALANCING VALVE	М	WATER METER
	ELECTRIC 3-WAY CONTROL VALVE	NFHB	NON FREEZE HOSE BIB
O co	FLOOR CLEANOUT	S	SINK
co	CEILING OR WALL CLEANOUT	WC	WATER CLOSET
─────────────────────── NFWH	NON-FREEZE WALL HYDRANT		
	BACKFLOW PREVENTER	HVAC A	BREVIATIONS

٦١ ٥٥	CEILING ON WALL CELANOOT	l wc
NFWH	NON-FREEZE WALL HYDRANT	
	BACKFLOW PREVENTER	HVAC
—₩ нв	HOSE BIBB	AD
— I	UNION	AP
	FLEXIBLE CONNECTOR	BBH
Ø.	PRESSURE GAUGE WITH GAUGE COCK	BD
P	THERMOMETER	BDD
<u> </u>	STRAINER	CD
FS	WATER FLOW SWITCH	DG
PS	PRESSURE SENSOR	EA
	PUMP	EF
O FD	FLOOR DRAIN	ET
⊚ FFD	FUNNEL FLOOR DRAIN	OA
O AD	AREA DRAIN	FD
© RD	ROOF DRAIN	FFH
M	WATER METER	MD
- Ū-	RUNNING TRAP WITH CLEANOUT	NC
© HD	HUB DRAIN	NO
] wha	WATER HAMMER ARRESTOR	RA
		SA
PIPI	NG LEGEND	SD

		FFH	FORCE FLOW HEATER
		MD	MOTORIZED DAMPER
EANOUT		NC	NORMALLY CLOSED
		NO	NORMALLY OPEN
)R		RA	RETURN AIR
		SA	SUPPLY AIR
		SD	SPLITTER DAMPER
		UC	UNDER CUT DOOR
		UH	UNIT HEATER
		TAD	TRANSFER DUCT
		MAU	MAKE-UP AIR UNIT
		AFF	ABOVE FINISHED FLOOR
		DN	DOWN
· · · · · · · · · · · · · · · · · · ·	-		<u> </u>

ACCESS DOOR

ACCESS PANEL

BASEBOARD HEATER

BALANCING DAMPER

BACKDRAFT DAMPER

CONDENSATE

DOOR GRILLE

EXHAUST AIR

EXHAUST FAN

OUTSIDE AIR

FIRE DAMPER

EXPANSION TANK

DOMESTIC HOT WATER DOMESTIC HOT WATER RECIRCULATION SANITARY ABOVE GRADE OR FLOOR SANITARY BELOW FLOOR SANITARY UNDER GROUND ——CD— CONDENSATE DRAIN — F — LOW PRESSURE NATURAL GAS —— G —— ——HG —— HIGH PRESSURE NATURAL GAS $\times \times \times$ **NEW PIPING** EXISTING PIPING TO REMAIN GAS METER

DOMESTIC COLD WATER

MECHANICAL DRAWING LIST

FIRE EXTINGUISHER

FIRE EXTINGUISHER

IN RECESSED CABINET

FEC 🔯

Ø FE

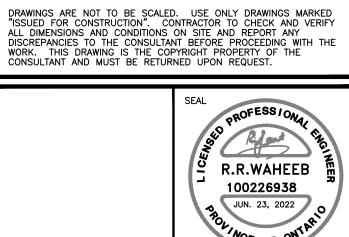
MECHANICAL SPECIFICATION & LEGEND AND DRAWING LIST

GROUND FLOOR - PLUMBING LAYOUTS

MECHANICAL SCHEDULES AND DETAILS

JUN. 08, 2022 ISSUED FOR COORDINATION A JUN. 23, 2022 ISSUED FOR BUILDING PERMIT

ISSUES and REVISIONS



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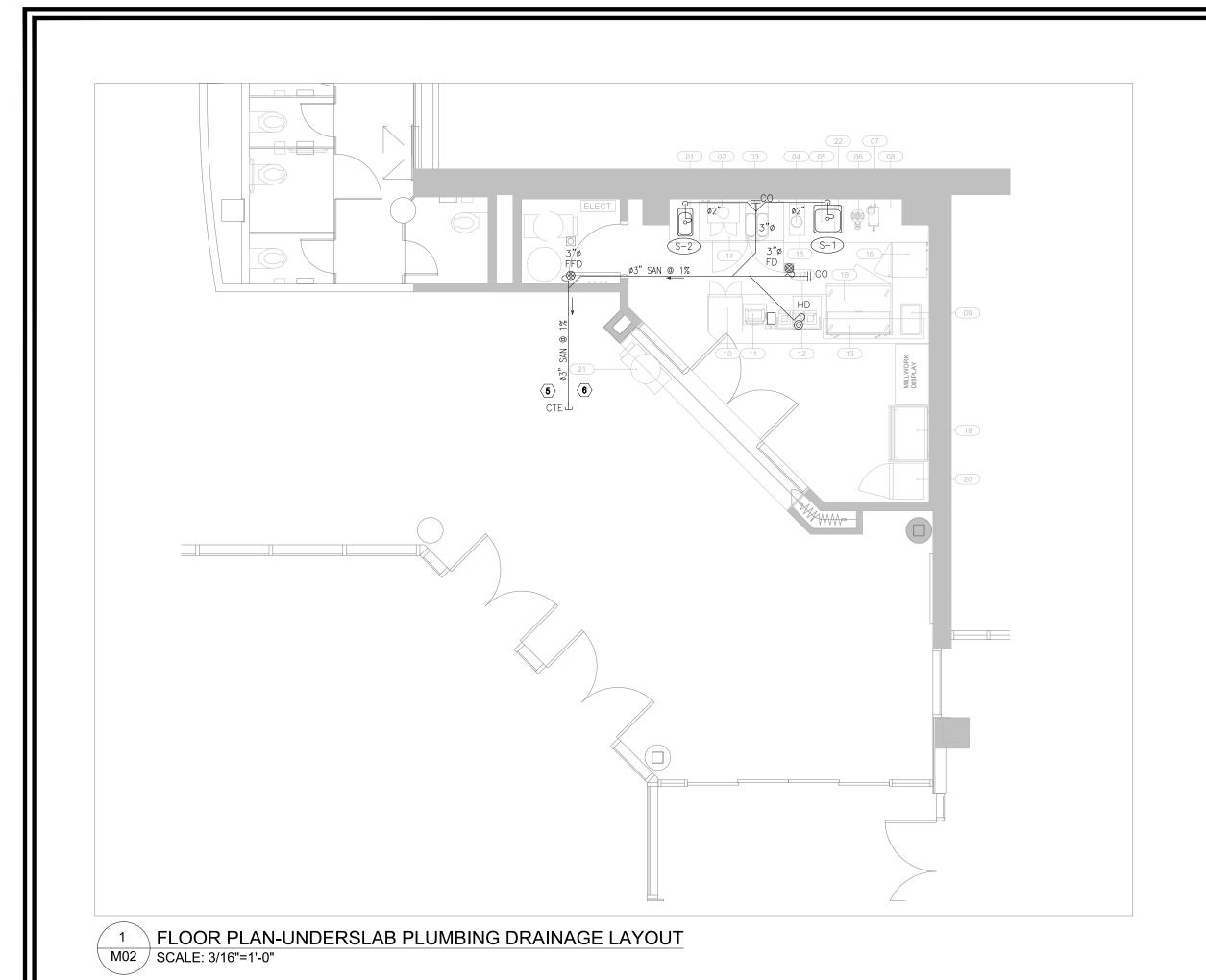
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Burlingto	millenn@mill-eng.co			
DESIGNED R	.W	DRAWN R. '	w	APPROVED R.W
SCALE	N.T.S		DATE J	UN 2022

ONTARIO TECH/DURHAM COLLEGE CAMPUS RECREATION & WELLNESS CENTRE "SMOOTHIE BAR" G/FL 21 AVENUE OF CHAMPIONS OSHAWA ON L1G 8G3

MECHANICAL SPECIFICATION, **LEGEND AND NOTES**

22-017



2 FLOOR PLAN-PLUMBING LAYOUT M02 SCALE: 3/16"=1'-0"

PLUMBING PLAN NOTES

- APPROXIMATE LOCATION OF EXISTING Ø3/4" VALVED & CAPPED DOMESTIC COLD WATER LINE IN CEILING SPACE. CONNECT NEW LINE TO EXISTING COMPLETE WITH BACKFLOW PREVENTOR (BY TENANT, 'WATTS' LF007 SERIES, DOUBLE CHECK VALVE ASSEMBLY. INSTALL IT PER CSA B64-10 AND LOCATED AT 5' FROM FINISH LEVEL) AND MAKE GOOD. EXACT LOCATION OF EXISTING LINE TO BE DETERMINED ON SITE PRIOR TO COMMENCING WITH THE WORK.
- $\langle \mathbf{2} \rangle$ Ø1/2" HOT AND COLD WATER LINES DOWN IN WALL TO SERVE SINK.
- (3) Ø1/2" COLD WATER LINE SERVES ICE CUBE UNIT C/W BFP LOCATED AT 5' FROM FINISH LEVEL(DCVA MODEL LF 007 SERIES/LEAD FREE) . DOMESTIC ELECTRIC HOT WATER HEATER, REFER TO SCHEDULE & DETAIL ON DRAWING M3.0 COMPLETE WITH BRASS TEMP/PRESSURE RELIEF VALVE, SHUT OFF VALVES AND ANODE RODS. PLUMBER TO PROVIDE PRESSURE RELIEF PIPE TO HUB DRAIN. E.W.H. SHALL BE MOUNTED ON 10" HIGH PLATFORM PROVIDED BY G.C. SET DISCHARGE TEMPERATURE @ 120°F
- 6 CONNECT THE NEW SANITARY/VENT PIPES FROM THE FLOOR DRAINS TO THE EXISTING SANITARY SYSTEM ALONG WITH BUILDING VENT SYSTEM
- APPROXIMATE LOCATION OF EXISTING BUILDING SANITARY LINE.
 CONTRACTOR TO VERIFY ON SITE THE EXACT EXISTING LOCATION AND
 CONNECT THE NEW 3"Ø SANITARY AND NEW 2"Ø VENT TO BUILDING
 SYSTEMS.

GENERAL NOTES

TEMPERATURE @ 120°F.

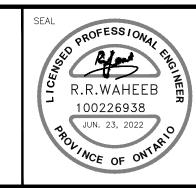
- FIRESTOP AND SEAL ALL DUCTWORK AND PIPING WALL/CEILING/FLOOR PENETRATIONS THROUGH FIRE RATED ASSEMBLIES.
- THIS CONTRACTOR IS TO CHECK AND VERIFY EXACT SIZE, LOCATION AND STATUS OF EXISTING SERVICES IN FIELD AND REPORT ANY DISCREPANCIES TO ENGINEER BEFORE COMMENCING WITH THE WORK.
- 5. REVISE ANY 3"Ø TO 4"Ø @ 1.0% SLOPE IF THERE IS A PROBLEM FOR INVERT OF SANITARY
- 6. ALL EQUIPMENT WITH WATER CONNECTIONS TO BE INSTALLED WITH SILICONE SEAL BETWEEN

- 3. ALL SANITARY DRAINS AND VENTING FOR SAME TO BE INSTALLED AS PER LATEST PLUMBING CODE REQUIREMENTS AND LOCAL AUTHORITY HAVING JURISDICTION.
- 4. ALL SANITARY VENT PIPING TO CONNECT TO DRAINAGE VENT CONNECTION BEING PROVIDED. EXACT LOCATION AND SIZE OF EXISTING VENT PIPING TO BE DETERMINED ON SITE.
- EQUIPMENT AND WALL AND/OR FLOOR. ALL SILICONE SEALS TO BE BY GENERAL CONTRACTOR AFTER EQUIPMENT IN FINAL LOCATION. THIS TO BE CONFIRMED WITH EQUIPMENT SUPPLIER.

Α	JUN. 23,	2022	ISSUED	FOR	BUILDING	PERMIT	-
"ISSU ALL [DISCE WORK	INGS ARE NO ED FOR CONS DIMENSIONS AI REPANCIES TO THIS DRAW ULTANT AND I	STRUCTION ND CONDI THE CON ING IS TI	I". CONTF ITIONS ON ISULTANT HE COPYR	RACTOR SITE A BEFOR IGHT P	R TO CHEC AND REPOR E PROCEED ROPERTY (K AND VEI RT ANY DING WITH DF THE	RIF
			9	SEAL	ROFES	SION.	

ISSUES and REVISIONS

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Burlington, Ontario L7L 5H9

designed R.W	drawn R. '	W	APPROVED R.W
SCALE 2/16"-1' 0		DATE	

3/16"=1'-0" JUN 2022 ONTARIO TECH/DURHAM

COLLEGE CAMPUS RECREATION & WELLNESS CENTRE "SMOOTHIE BAR" G/FL 21 AVENUE OF CHAMPIONS OSHAWA ON L1G 8G3

> GROUND FLOOR -PLUMBING LAYOUTS

22-017M02

22-017

ELECTRIC WATER HEATER SCHEDULE

T40	STORAGE CAPACITY HEATER POWER SUPPLY HANDESCHURER		POWER SUPPLY		MANUFACTURED MODEL		MANUFACTURED MODEL SHIPPING		SHIPPING WEIGHT	DEMARKO				
TAG	U.S. GAL	KW	٧	V PH	HZ	UNIT SIZE	MANUFACTURER MODEL		MANUFACTURER MODEL		MANUFACTURER MODEL		LBS	REMARKS
EWH-1 NOTES:	20	2.5	110	1	60	22"ø x 23" H	A.O. SMITH	DEL-20	73					

1- TEMPERATURE SET: 120°F.

2- INSTALL IT PER MANUFACTURER'S RECOMMENDATIONS.

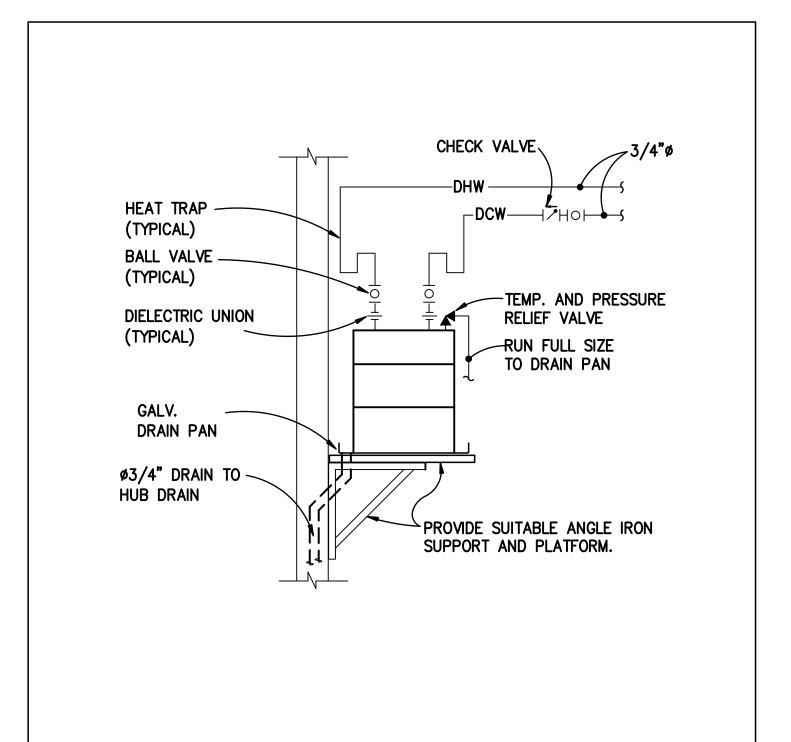
3- UNIT'S DRAIN TO BE INDIRECTLY CONNECTED WITH HUB DRAIN IN SAME UTILITY ROOM.

4- CSA CERTIFIED AND ASME RATED FOR RELIEF VALVE. 5- ANODE ROD MAX. CORROSION PROTECTION, TANK INTERIOR IS COATED WITH GLASS.

MBING FITTINGS				
DESIGNATION		ZURN	SMITH	WATTS
(FLOOR DRAIN) FINISHED WITH SEDIMENT BUCKET IN PREPARATION AREA ONLY	=	ZN-415-B-M-P	2010 (A05-B-P050)	FD-100-C-A5-6-7
(FUNNEL FLOOR DRAIN) WITH SEDIMENT BUCKET AND OPEN THROAT	=	ZN-211-BF	2010A-3580NB	FD-100-C-EG
(FLOOR HUB)	=	-	2005-3580-P050	FD-100-C-DD
(CLEANOUT) FINISHED CARPET STACK	= =	ZN-1602 ZN-1603	4020 4020Y	CO-200-RC-1-6-34G CO-200-RC-1-6-34G-CF CO-460-RD
	DESIGNATION (FLOOR DRAIN) FINISHED WITH SEDIMENT BUCKET IN PREPARATION AREA ONLY (FUNNEL FLOOR DRAIN) WITH SEDIMENT BUCKET AND OPEN THROAT (FLOOR HUB) (CLEANOUT) FINISHED	DESIGNATION (FLOOR DRAIN) FINISHED = WITH SEDIMENT BUCKET IN PREPARATION AREA ONLY (FUNNEL FLOOR DRAIN) = WITH SEDIMENT BUCKET AND OPEN THROAT (FLOOR HUB) =	DESIGNATION ZURN (FLOOR DRAIN) FINISHED = ZN-415-B-M-P WITH SEDIMENT BUCKET IN PREPARATION AREA ONLY (FUNNEL FLOOR DRAIN) = ZN-211-BF WITH SEDIMENT BUCKET AND OPEN THROAT (FLOOR HUB) = - (CLEANOUT) FINISHED = ZN-1602	DESIGNATION ZURN SMITH (FLOOR DRAIN) FINISHED WITH SEDIMENT BUCKET IN PREPARATION AREA ONLY (FUNNEL FLOOR DRAIN) WITH SEDIMENT BUCKET AND OPEN THROAT (FLOOR HUB) = ZN-211-BF 2010A-3580NB 2010A-3580-P050 (CLEANOUT) FINISHED = ZN-1602 4020

1- SMITH, WATTS OR ZURN ARE ACCEPTABLE. ALL FLOOR DRAINS TO BE TRAP SEALED & PRIMED. 2- CONNECT THE VENT FROM EACH NEW UNIT TO THE EXISTING VENTING SYSTEM PER OBC CODE.

3— EACH PLUMBING FIXTURE SHALL BE LOW WATER CONSUMPTION IN ACCORDANCE TO ONTARIO BUILDING CODE. PROVIDE ALL REQUIRED FITTINGS, TRAPS, VALVES, FAUCETS AND ESCUTCHEONS TO COMPLETE EACH FIXTURE INSTALLATION. SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BEFORE ORDERING ANY FIXTURE. PROVIDE TRAP SEAL PRIMER FOR EACH FLOOR DRAIN. PROVIDE VENT RIZERS THRU ROOF AND COORDINATE ROUTING ON SITE. PROVIDE FIRE SEAL AROUND EACH PIPE AT EACH RATED FLOOR AND WALL.



MOUNTING DETAIL OF ELECTRIC HOT WATER TANK

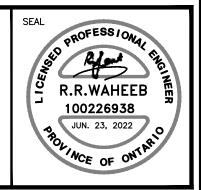
PLUMBING FIXTURE / CONNECTION SCHEDULE

SYMBOL	DESCRIPTION	MODEL/SPECIFICATION	HW	CW	WASTE	VENT
"HS-1"		20 GAUGE TYPE STAINLESS STEEL TYPE 304, FAUCET IS BRASS-NICKEL PLATED AND ALL ACCESSORIES. 1GPM/3.8LPM ADVANCE TABCO/DI-1-10, C/W: K-52 FAUCET, 3" DRAIN BASKET DRAIN/DI-1-25 & 2" DRAIN WITH STRAINER	12MM (1/2")	12MM (1/2")	32MM (1-1/4")	32MM (1-1/4")
"S-1"	SINGLE BOWL SINK	18 GAUGE TYPE STAINLESS STEEL TYPE 304, FAUCET IS BRASS-NICKEL PLATED AND ALL ACCESSORIES. ADVANCE TABCO/DI-1-2012, C/W: K-50 FAUCET, 4" DRAIN	12MM (1/2")	12MM (1/2")	40MM (1-1/2")	32MM (1-1/4")

- PROVIDE ISOLATING VALVE ON, HOT AND COLD WATER LINES TO EACH PIECE OF PLUMBING FIXTURE. (TYPICAL UNLESS NOTED OTHERWISE) - WRAP ALL EXPOSED HOT WATER AND DRAIN PIPING AT HANDICAPPED LAVATORY

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APPROVED R.W R.W SCALE JUN 2022 N.T.S.

ONTARIO TECH/DURHAM COLLEGE CAMPUS RECREATION & WELLNESS CENTRE "SMOOTHIE BAR" G/FL 21 AVENUE OF CHAMPIONS OSHAWA ON L1G 8G3

MECHANICAL SCHEDULES & TYPICAL DETAILS

M3.0 22-017

M3.0