

GROUND FLOOR PLAN - CLEARANCE DIMENSIONS

24-005885

75 UNIVERSITY AVE W.

THE CITY OF **DINING HALL** BUILDING INSPECTION Waterloo

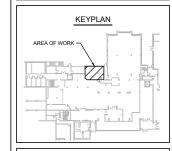
NOTE: THIS DEPARTMENT MUST BE NOTIFIED OF, AND APPROVE ALL CHANGES FROM THESE PLANS. ALL CONSTRUCTION TO CONFORM TO THE ONTARIO BUILDING CODE. THE BUILDER ASSUMES FULL LIABILITY FOR ERRORS AND OMISSIONS. THESE DRAWINGS MUST BE KEPT ON SITE UNTIL FINAL INSPECTION HAS BEEN COMPLETED.

2024-05-15

LARGE BUILDINGS: TO BOOK AN INSPECTION CALL THE INSPECTION REQUEST LINE AT 519-747-8789.



KINGSTON: 1471 John Counter Blvd. Unit 301 Kingston, ON K7M 8S8 P 613.900.0845 KITCHENER: 210-137 Glasgow Street, Office #141 Kitchener, ON N2G 4X8 P 519.472.7640 W www.callidus.ca E info@callidus.ca



		REVISIONS	
	NO.	ISSUED FOR	DATE
	00	CLEARANCE DIMENSIONS	24.05.01
	01		
	02		
	03		
- 11			





	DESIGN	BCD	DRAWN	BCD
	CHECKED	JRG	REVIEWED	JRG
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PROJECT WILFRID LAURIER UNIVERSITY DISH ROOM-DH1-13 RENOVATIONS

ADDRESS

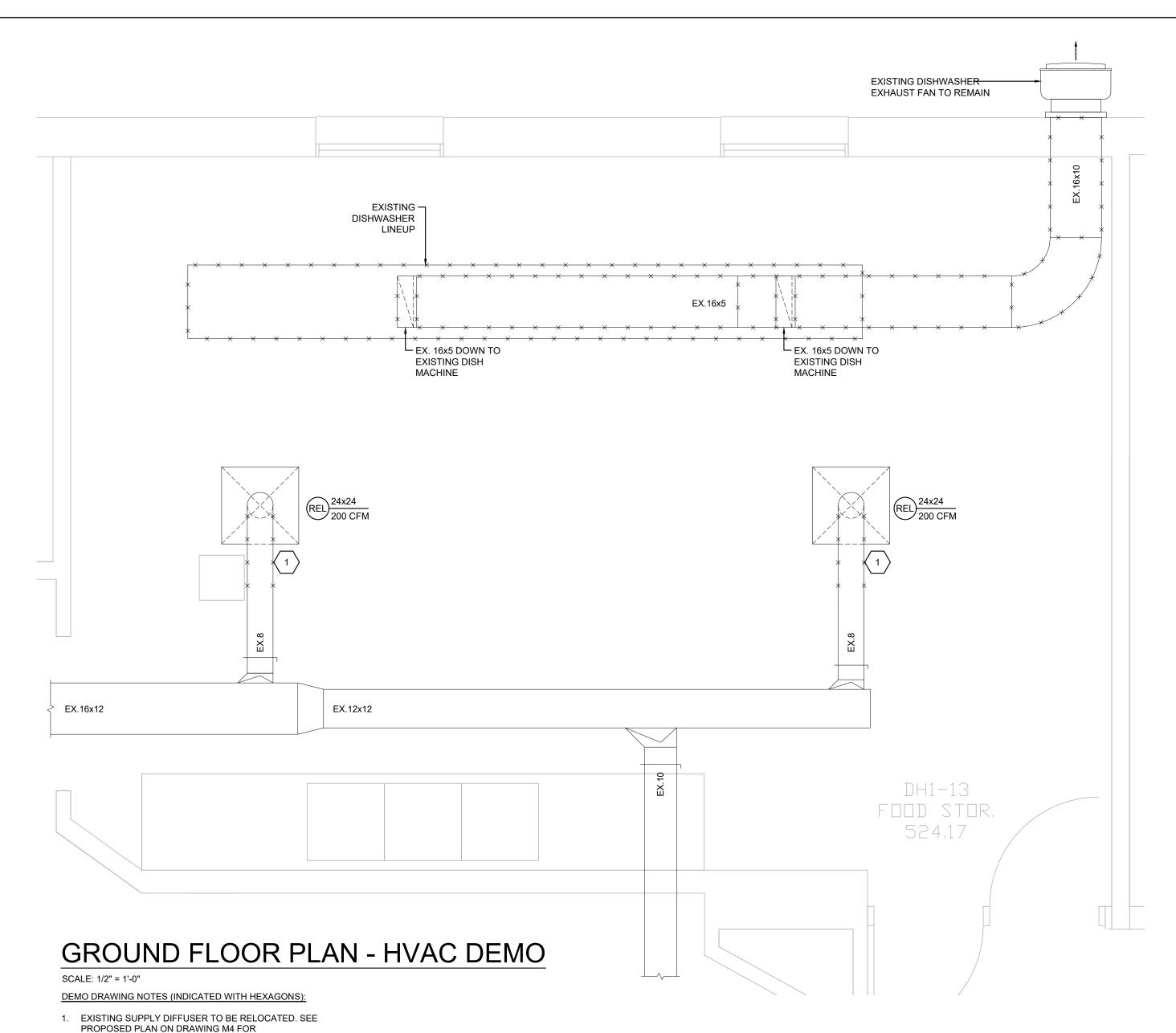
75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

> PROJECT NO. CE-5716

DRAWING TITLE SK.PARTIAL BASEMENT/GROUND FLOOR PLAN

DRAWING NUMBER

SK.A1 OF 1



MODIFICATIONS.

EXHAUST FAN.

2. REMOVE ALL EXISTING DISHWASHER EXHAUST

DUCTWORK BACK TO EXISTING WALL MOUNTED

	DIFFUSER SCHEDULE										
DWG REF	MANUF.	MODEL	FINISH	REMARKS							
S1	PRICE	SCD	WHITE	SQUARE CONE DIFFUSER, STEEL CONSTRUCTION, 3 CONES REMOVABLE FROM THE DIFFUSER FACE.							
R1	PRICE	80	WHITE	EGG CRATE GRILLLE, EXTRUDED ALUMINUM CONSTRUCTION, C/W VOLUME DAMPER.							
E1	PRICE	630	WHITE	SINGLE DEFLECTION, LOUVERED RETURN GRILLE, ALUMINUM CONSTRUCTION.							

GENERAL NOTE: MOUNTING FRAME TO SUIT CEILING TYPES. SEE ARCHITECTURAL REFLECTED CEILING PLAN DRAWINGS FOR CEILING TYPES. PROVIDE INTEGRAL FIRE STOP FLAPS WHERE FIRE DAMPERS ARE INDICATED ON DRAWINGS.

APPROVED MANUFACTURERS: PRICE, METALAIRE, NAILOR, TITUS, KREUGER

PLUMBING F	PLUMBING FIXTURE SCHEDULE								
DWG REF	DESCRIPTION	НОТ	COLD	DRAIN					
FFD	FLOOR DRAIN- EPOXY COATED CAST IRON FLOOR DRAIN WITH ANCHOR FLANGE, REVERSIBLE CLAMPING COLLAR WITH PRIMARY AND SECONDARY WEEPHOLES, ADJUSTABLE CAST IRON (STANDARD) HUB FUNNEL, AND NO HUB (STANDARD) OUTLET. WATTS DRAINAGE - MODEL: FD-100-DD			3"					
HD	HUB DRAIN- EPOXY COATED CAST IRON FLOOR DRAIN WITH ANCHOR FLANGE, WEEPHOLES, ADJUSTABLE NICKEL BRONZE (STANDARD) HUB FUNNEL, AND NO HUB (STANDARD) OUTLET. WATTS DRAINAGE-MODEL: FD-200-DD			3"					

GENERAL NOTES: (APPLICABLE TO ALL DRAWINGS)

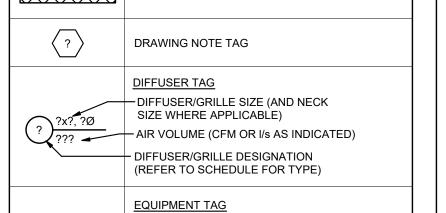
- THESE DRAWINGS ARE AN INTEGRAL PART OF THE SPECIFICATIONS WHICH ACCOMPANY THEM.
- ALL MATERIALS AND WORKMANSHIP SHALL BE NEW UNLESS NOTED OTHERWISE, FREE OF DEFECTS, AND COMPLY WITH ALL APPLICABLE STANDARDS.
- ALL DIMENSIONS ARE IN INCHES UNLESS NOTED OTHERWISE
- INSTALL DUCTWORK / PIPING TIGHT TO UNDERSIDE OF STRUCTURE UNLESS NOTED
 OTHERWISE
- DO NOT SCALE DRAWINGS. OBTAIN ALL DIMENSIONS FROM EXISTING ARCHITECTURAL PLANS, SITE INSPECTIONS, AND MANUFACTURER'S SHOP DRAWINGS.
- ALL MATERIALS WITHIN RETURN AIR PLENUMS SHALL HAVE A FLAME—SPREAD RATING NOT MORE THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION NOT MORE THAN 50.
- OPENINGS IN EXTERIOR WALLS AND ROOF ARE TO BE PROPERLY FLASHED AND MADE WEATHERPROOF.
- ALL NECESSARY CUTTING / PATCHING FOR MECHANICAL WORK SHALL BE PROVIDED BY APPROPRIATE TRADE(S) AT CONTRACTOR'S EXPENSE UNLESS NOTED OTHERWISE
- MAKE GOOD ALL BUILDING COMPONENTS DAMAGED BY WORK OF THIS TRADE TO THE CONSULTANT SATISFACTION.
- PROVIDE ALL SLEEVES, INSERTS AND HANGERS REQUIRED FOR THE WORK. TREAT ALL SLEEVES OR HOLES PIERCING ACOUSTICAL SEPARATIONS FOR INSTALLATIONS OF THIS DIVISION TO MAINTAIN ACOUSTICAL RATING. ALL GAPS SHALL BE PACKED WITH ACOUSTICAL INSULATION AND SEALED AT BOTH ENDS WITH ACOUSTICAL CAULKING. PATCH ALL OPENINGS AROUND INSTALLATIONS OF THIS DIVISION PIERCING FIRE OR SMOKE SEPARATIONS WITH AN APPROVED WATERTIGHT SMOKE AND FIRE STOP SEALANT.
- INSTALL ALL EQUIPMENT & ASSOCIATED DUCTWORK, PIPING, APPURTENANCES TO PROVIDE MAINTENANCE ACCESS. ALLOW FOR ALL ACCESS DOORS REQUIRED FOR EQUIPMENT INSTALLATIONS & SERVICE. ENSURE PROPER ACCESS DOOR SIZE, TYPE AND FIRE RATING.
- COORDINATE ALL WORK WITH OTHER TRADES AND SUPPLIERS/MANUFACTURERS TO AVOID INTERFERENCES AND CONFLICTS BETWEEN SERVICES. PLAN WORK WELL IN ADVANCE TO ELIMINATE INSTALLATION AND COORDINATE DIFFICULTIES. COOPERATE WITH OTHER TRADES ON SITE TO RESOLVE INTERFERENCES TO SATISFACTORILY COMPLETE THE PROJECT.
- THIS TRADE IS RESPONSIBLE FOR ALL EXCAVATION / BACKFILL REQUIRED TO INSTALL SERVICES SHOWN ON THESE DRAWINGS
- BACKFLOW PREVENTORS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CSA STANDARD B64
- DEBRIS WILL BE KEPT TO A MINIMUM. ON COMPLETION OF CONSTRUCTION AND PRIOR TO THE FINAL INSPECTION AND ACCEPTANCE BY THE OWNER, SITE SHALL BE CLEANED AND ALL SCRAP MATERIALS RESULTING FROM THE WORK SHALL BE REMOVED.
- PRIOR TO THE FINAL INSPECTION, ALL EQUIPMENT SHALL BE CLEANED. ALL CONSTRUCTION DUST AND DIRT SHALL BE REMOVED FROM INSTALLED EQUIPMENT AT THE END OF THE JOB.
- EXISTING INSTALLATIONS SHOWN FOR GENERAL REFERENCE ONLY. ATTEND SITE
 TO ASSESS WORK PRIOR TO BID SUBMISSION. INCLUDE ALL COSTS TO MODIFY AND
 / OR EXTEND NEW WORK AS REQUIRED TO MEET DESIGN INTENT. VERIFY ALL
 EXISTING DUCT / PIPE SIZES & CLEARANCES ON SITE.
- SCHEDULE AND PHASE WORK TO REDUCE INTERFERENCE AND DOWNTIME OF EXISTING SYSTEMS. NOTIFY OWNER'S REPRESENTATIVE OF ALL DOWNTIME PRIOR TO PROCEEDING WITH WORK.
- REMOVE EXISTING CEILING TILES AS REQUIRED TO PERFORM WORK. SAFELY
 STORE TILES FOR REINSTALLATION AFTER WORK & INSPECTIONS ARE COMPLETE.
 EXISTING DAMAGED TILES MUST BE IDENTIFIED & REPORTED TO OWNER'S
 REPRESENTATIVE BEFORE REMOVAL. REPLACE ANY DAMAGED TILES TO MATCH
 EXISTING.
- MEASURE & DOCUMENT EXISTING AIRFLOWS AT GRILLES / REGISTERS / DIFFUSERS TO BE RE-BALANCED. FINAL BALANCING REPORT MUST INCLUDE AS-FOUND AND FINAL AIRFLOW MEASUREMENTS.
- WHERE REPLACEMENT EQUIPMENT EXPOSES PREVIOUSLY UNFINISHED SURFACES, FINISH TO MATCH ADJACENT ASSEMBLIES.
- ALLOW FOR SCOPING OF EXISTING CONCEALED DRAINAGE PIPING TO VERIFY LOCATION & ROUTING.

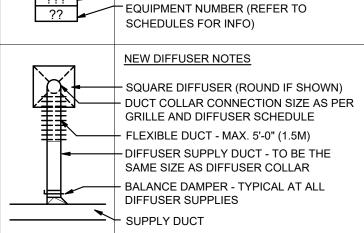
GENERAL DEMOLITION NOTES: (APPLICABLE TO ALL DRAWINGS)

- ALL EXISTING EQUIPMENT TO REMAIN UNLESS IDENTIFIED OTHERWISE ON THE DRAWINGS, GENERAL NOTES OR SPECIFICATIONS.
- EXTENTS OF DEMOLITION SHOWN ARE APPROXIMATE AND THIS TRADE IS RESPONSIBLE FOR ALL DEMOLITION REQUIRED TO MEET DESIGN INTENT.
- REMOVE ALL UNUSED, ABANDONED OR REDUNDANT PIPING, HANGERS, &
 ACCESSORIES BACK TO SOURCE & CAP.
- COORDINATE WITH FACILITY MAINTENANCE DEPARTMENT FOR DISPOSAL OF REMOVED DEVICES. DISPOSE OF ALL UNWANTED DEVICES AS REQUIRED AS PER FACILITY STANDARDS.

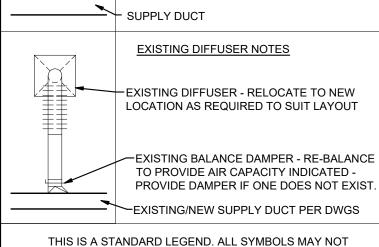
	PIPING LEGEND
ITEM	DESCRIPTION
	NEW ITEM
	EXISTING ITEM TO REMAIN
— x —x—	EXISTING ITEM TO BE REMOVED
	BELOW FLOOR PIPING
——	POTABLE (DOMESTIC) COLD WATER (DCW)
	POTABLE (DOMESTIC) HOT WATER (DHW)
—SAN—	SANITARY DRAIN
─ ₩─	GATE VALVE
— Б—	BALL VALVE
	BACKFLOW PREVENTER
DCVA	DOUBLE CHECK VALVE ASSEMBLY
RP	REDUCED PRESSURE ASSEMBLY
o	ELBOW TURNED UP
	ELBOW TURNED DOWN
E	PIPE CAP
	PIPE SINGLE LINE CUTOFF
— □co	FLOOR CLEAN OUT
FD ⊘C	FLOOR DRAIN; FFD: FUNNEL FLOOR DRAIN; HD: HUB DRAIN
•	NEW CONNECTION TO EXISTING
	NDARD LEGEND. ALL SYMBOLS MAY NOT 'BE USED ON DRAWINGS.

	DUCTWORK LEGEND
SYMBOL	DESCRIPTION
	NEW ITEM
	EXISTING ITEM TO REMAIN
× × ×	EXISTING ITEM TO BE REMOVED
REL	EXISTING ITEM TO BE RELOCATED
ER	EXISTING ITEM IN RELOCATED POSITION
EX	EXISTING ITEM TO REMAIN
}	DUCTWORK SHOWN DOUBLE LINE
	BALANCING DAMPER
BDD BDD	BACKDRAFT DAMPER
•	NEW CONNECTION TO EXISTING
\boxtimes	SUPPLY AIR GRILLE
	RETURN AIR GRILLE
	SIDEWALL GRILLE C/W BALANCE DAMPER TYPICAL AT ALL SIDEWALL GRILLES
	EXTERNALLY INSULATED DUCT

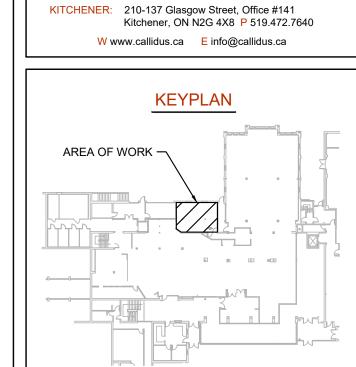




EQUIPMENT TYPE



NECESSARILY BE USED ON DRAWINGS.

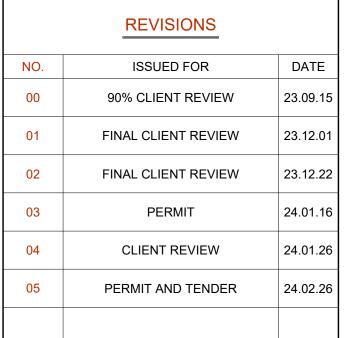


LONDON: 1385 North Routledge Park, Unit 9

KINGSTON: 1471 John Counter Blvd. Unit 301

London, ON N6H 5N5 P 519.472.7640

Kingston, ON K7M 8S8 P 613.900.0845





PROJECT

WILFRID LAURIER

UNIVERSITY DISH ROOM

DESIGN BCD DRAWN BCD
CHECKED JRG REVIEWED JRG

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

ADDRESS

PROJECT NO.

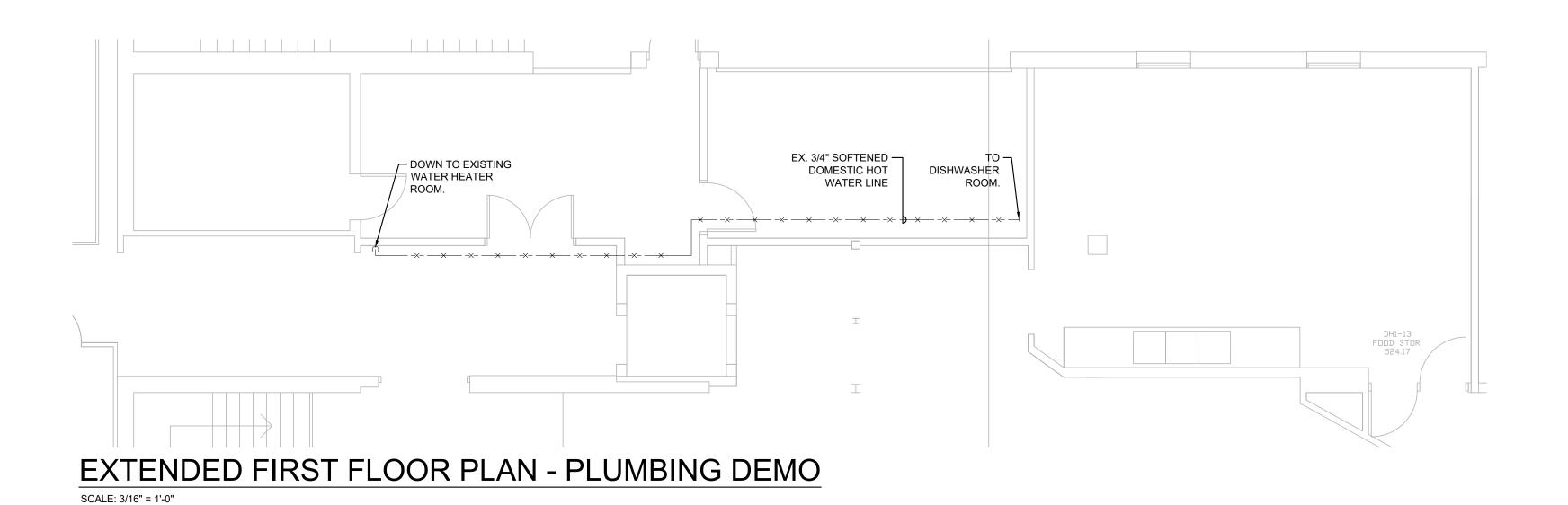
CE-5716

DRAWING TITLE

MECHANICAL SCHEDULES, LEGENDS & GROUND FLOOR PLAN - HVAC DEMO

DRAWING NUMBER

M1 of 6



EX. BOILERS IN — EX. HOT -BASEMENT * WATER HEATERS EX. 3/4" DHW FROM — DISHWASHER ROOM. BASEMENT FLOOR PLAN -

PLUMBING DEMO

SCALE: 3/16" = 1'-0"

DISCONNECT FROM EXISTING HOSE REEL AND VALVE AND CAP EXISTING DISHWASHER TO EX. 3/4" BE REMOVED EXISTING CONDENSATE TO REMAIN EX. GREASE INTERCEPTOR TO EX.4" — ---- EX.SAN -----EX.CO EX. 3 COMP SINK EX.FD TO REMAIN DH1-13 EX.3" — FOOD STOR 524,17 GROUND FLOOR PLAN - PLUMBING DEMO

DEMO DRAWING NOTES (INDICATED WITH HEXAGONS):

SCALE: 1/2" = 1'-0"

1. REMOVE EXISTING BACKFLOW PREVENTORS AND HOSE REEL BEHIND THE EXISTING DISH MACHINE AND RETURN THEM TO THE FACILITY TEAM.

2. REMOVE EXISTING TWO COMPARTMENT SINK AND HAND OVER TO FACILITY. CAP EXISTING SANITARY PIPING IN WALL OR FLUSH WITH FLOOR AFTER REMOVAL OF PLUMBING FIXTURE. EXISTING DOMESTIC WATER PIPING TO BE REMOVED BACK TO MAIN AND CAPPED

3. REMOVE EXISTING DEDICATED 3/4" DOMESTIC HOT WATER LINE TO THE DISHWASHER BACK TO THE MAIN BRANCH OFF THE WATER TANKS.

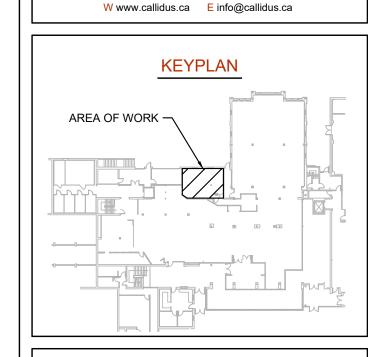
4. REMOVE EXISTING FLOOR DRAIN. TEMPORARILY CAP EXISTING LINE FOR USE WITH NEW DISHWASHER LINEUP. SEE DRAWING M3 FOR REQUIRED MODIFICATIONS.

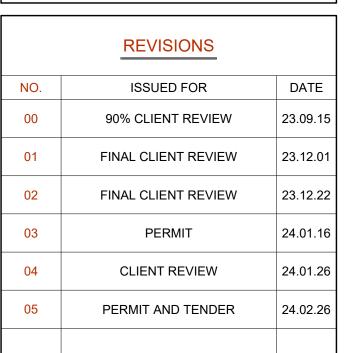
5. TRACE AND CONFIRM ROUTING ON SITE PRIOR TO

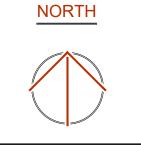
6. REMOVE EXISTING 3/4" DHW LINE FROM HERE TO EXISTING CONNECTION AT DISHWASHER.

CallidusEngineering 1385 North Routledge Park, Unit 9 London, ON N6H 5N5 P 519.472.7640 KINGSTON: 1471 John Counter Blvd. Unit 301 Kingston, ON K7M 8S8 P 613.900.0845 KITCHENER: 210-137 Glasgow Street, Office #141

Kitchener, ON N2G 4X8 P 519.472.7640









BCD DRAWN JRG REVIEWED

> PROJECT WILFRID LAURIER

UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

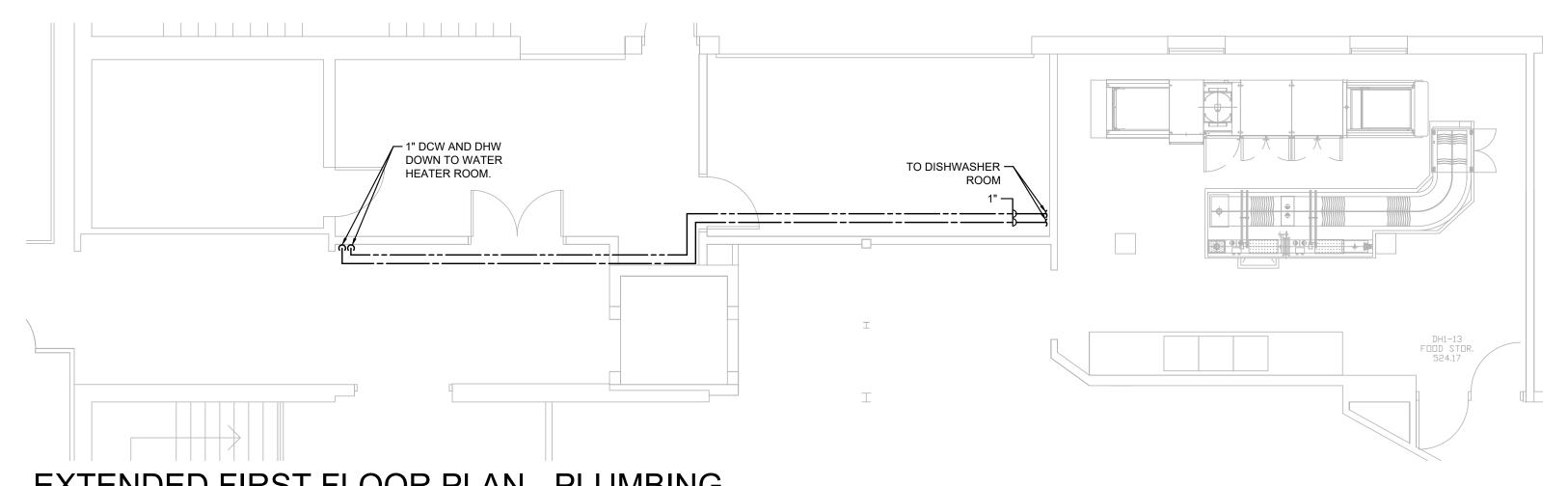
CE-5716

DRAWING TITLE

PARTIAL BASEMENT/GROUND FLOOR PLAN - PLUMBING DEMO

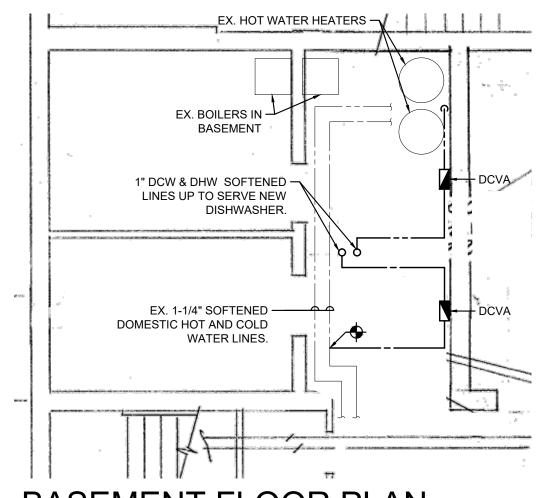
DRAWING NUMBER

M2 OF 6



EXTENDED FIRST FLOOR PLAN - PLUMBING

SCALE: 3/16" = 1'-0"



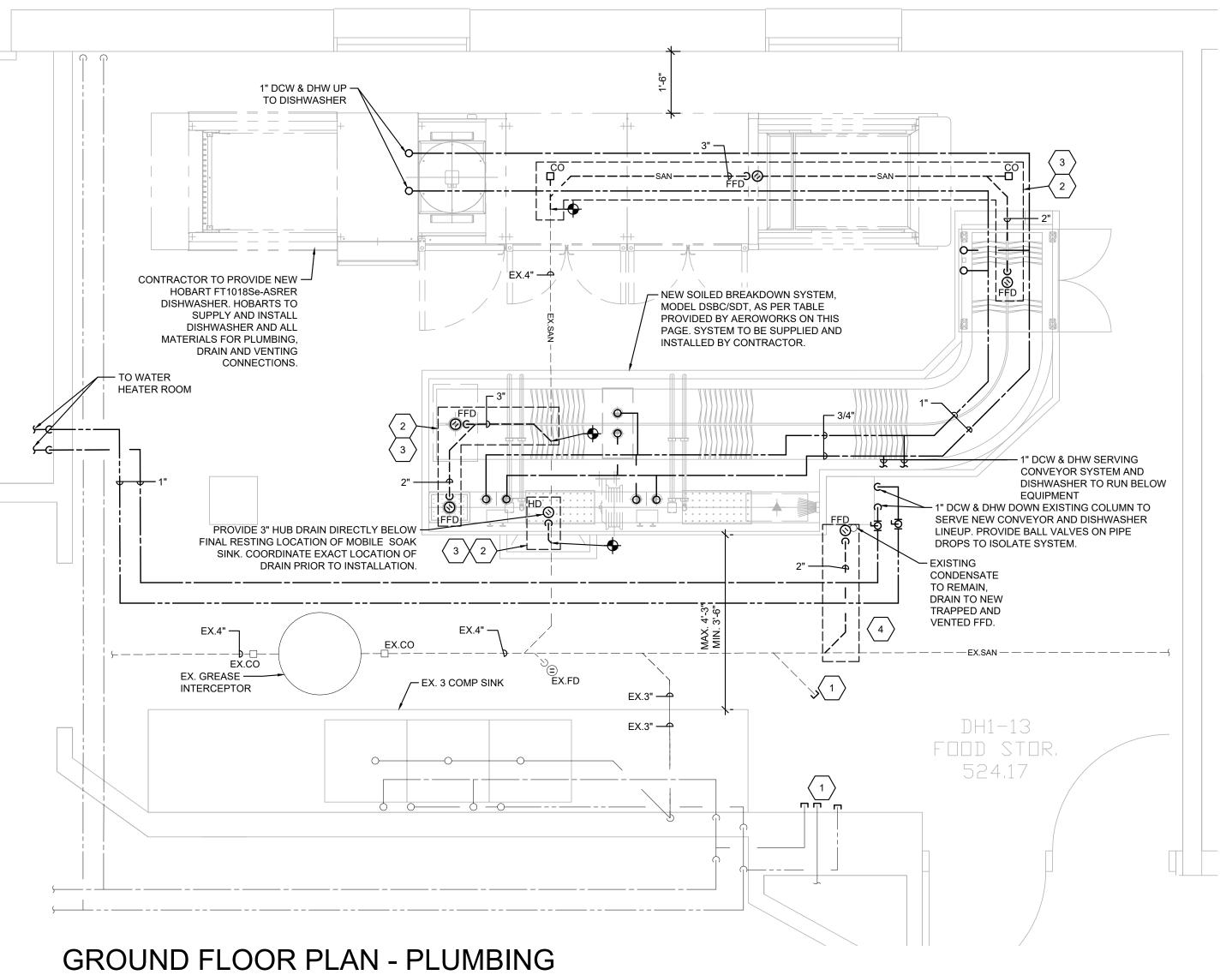
BASEMENT FLOOR PLAN -

PLUMBING

SCALE: 3/16" = 1'-0"

SOILED BREAKDOWN SYSTEM EQUIPMENT										
EQUIPMENT	MODEL NUMBER	QTY	DCW (ID)	DHW (ID)	SAN (ID)					
SOILED DISH TABLE	SDT	1	1/2" (QTY. 2)	1/2" (QTY. 2)	1 1/2"					
DOUBLE SLAT BELT ACCUMULATION CONVEYOR	DSBC:		1/2" AT DRIVE CABINET	1/2" AT DRIVE CABINET	1-1/2" AT DRIVE CABINET 1-1/2" AT TAIL TANK					
HOSE CLEAN UP STATION	HRA-30	1	1/2"	1/2"						
MOBILE SOAK SINK SS2323		1								
S/S TABLE	S/S TABLE	1								





SCALE: 1/2" = 1'-0"

DRAWING NOTES (INDICATED WITH HEXAGONS):

- CAP EXISTING SANITARY PIPING IN WALL OR FLUSH WITH FLOOR.
- 2. TRENCH FLOOR AS REQUIRED TO CONNECT DRAINS TO PROPOSED DISHWASHER AND CONVEYOR
- 3. SANITARY CONNECTIONS TO PROPOSED DISHWASHER AND CONVEYOR SYSTEMS TO BE TRAPPED AND VENTED. VENTS TO RUN UNDER SLAB TO RISE TIGHT TO WALL OR COLUMN.
- 4. TRENCH FLOOR AS REQUIRED TO CONNECT TO EXISTING CONDENSATE LINE FROM ABOVE. TRAP AND VENT AS REQUIRED BY CODE.

COMBUSTIBLE PIPING MATERIALS SHALL COMPLY WITH OBC 3.1.5.16.

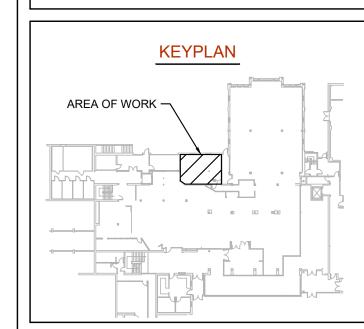
ALL MATERIALS WITHIN A FLOOR OR ROOF ASSEMBLY USED AS A RETURN AIR PLENUM SHALL HAVE A FLAME-SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION OF NOT MORE THAN 50. EXPOSED WOOD AND WOOD FRAMING IS NOT PERMITTED WITHIN A RETURN AIR PLENUM AS PER OBC 3.6.4.3.

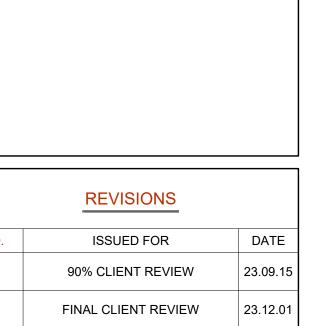
REVIEW ALL PROPOSED FIRE STOPPING SYSTEMS WITH THE BUILDING INSPECTOR ON SITE PRIOR TO ANY INSTALLATIONS.

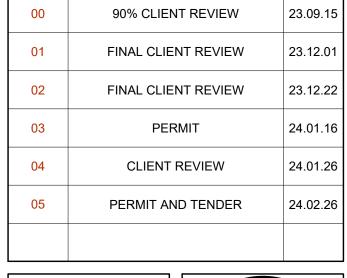
ALL PLUMBING FIXTURES MUST BE CSA APPROVED TO THE APPLICABLE TEST STANDARD LISTED IN OBC 7.2.2.2. SUBMIT CSA APPROVAL DOCUMENTATION TO THE BUILDING INSPECTOR UPON REQUEST.



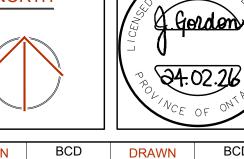
KINGSTON: 1471 John Counter Blvd. Unit 301 Kingston, ON K7M 8S8 P 613.900.0845 KITCHENER: 210-137 Glasgow Street, Office #141 Kitchener, ON N2G 4X8 P 519.472.7640











JRG REVIEWED CHECKED

PROJECT

WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

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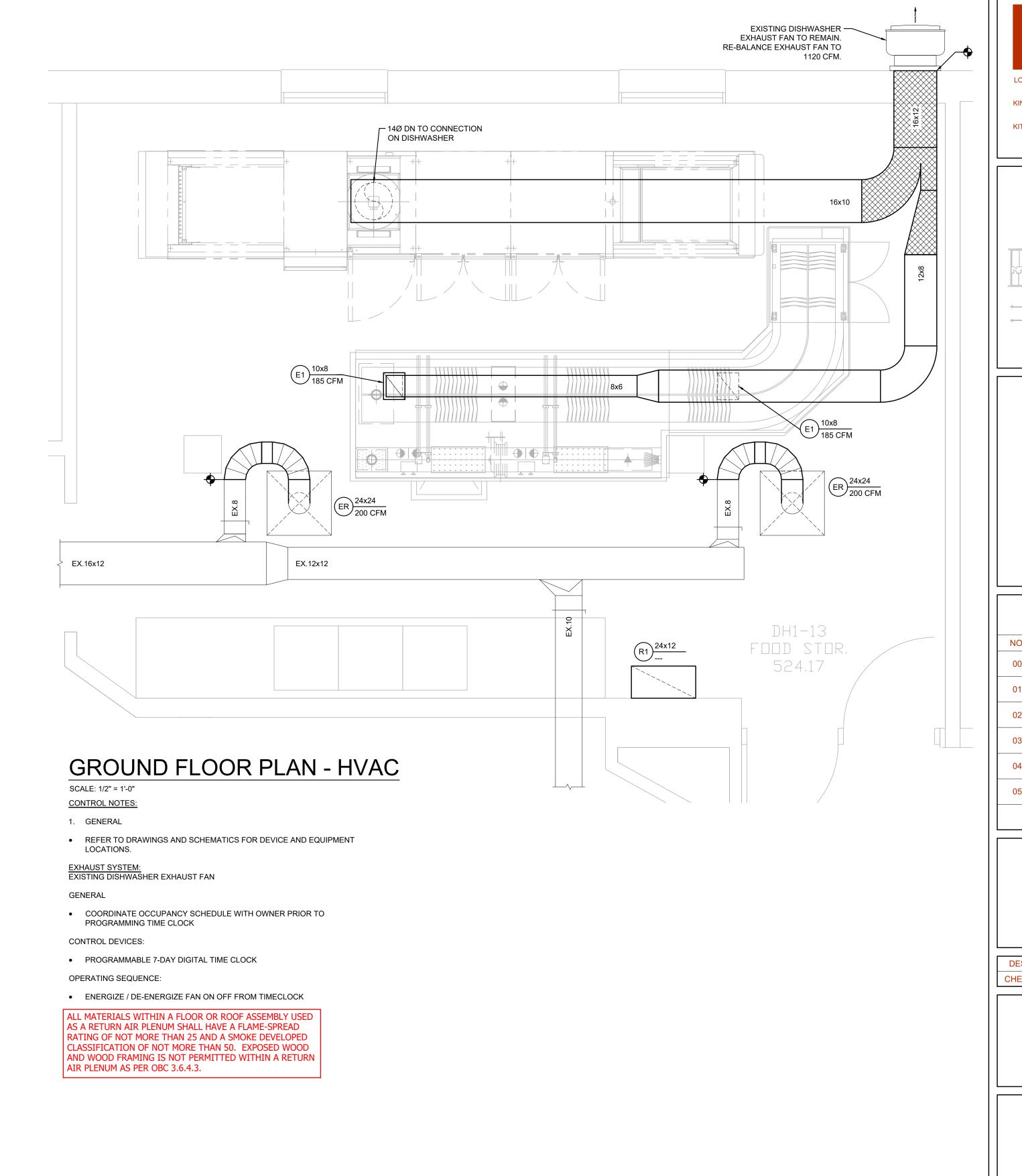
CE-5716

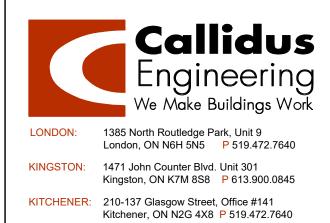
DRAWING TITLE

PARTIAL BASEMENT/GROUND FLOOR PLAN - PROPOSED **PLUMBING**

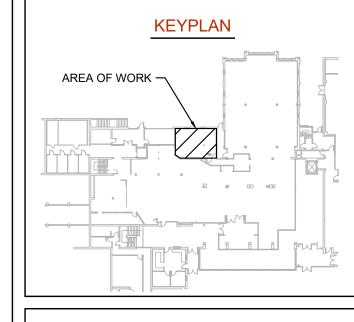
DRAWING NUMBER

M3 of 6





W www.callidus.ca E info@callidus.ca



	REVISIONS										
NO.	NO. ISSUED FOR										
00	90% CLIENT REVIEW	23.09.15									
01	FINAL CLIENT REVIEW	23.12.01									
02	FINAL CLIENT REVIEW	23.12.22									
03	PERMIT	24.01.16									
04	CLIENT REVIEW	24.01.26									
05	PERMIT AND TENDER	24.02.26									





DESIGN	BCD	DRAWN	
CHECKED	JRG	REVIEWED	

PROJECT

WILFRID LAURIER
UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

CE-5716

DRAWING TITLE

PARTIAL GROUND FLOOR PLAN - PROPOSED HVAC

DRAWING NUMBER

M4 of 6

MECHANICAL GENERAL REQUIREMENTS:

1.1. <u>GENERAL:</u>

- 1.1.1. MAKE SITE VISIT(S) AS NECESSARY BEFORE BID CLOSING TO ESTABLISH AND VERIFY AL EXISTING CONDITIONS, MAKE ALLOWANCE FOR ANY NEW OR EXISTING SERVICE AND EQUIPMENT RELOCATIONS NECESSARY TO COMPLETE THE WORK AND INCLUDE IN THE BID PRICE. EXTRAS WILL NOT BE ALLOWED FOR FAILURE TO PROPERLY EVALUATE
- 1.1.2. THE DRAWINGS SHOW THE GENERAL INTENT OF THE WORK, NOT THE DETAILS OF INSTALLATION. CO-ORDINATE THE ROUTING AND INSTALLATION OF ALL MECHANICAL SERVICES WITH ALL EXISTING CONDITIONS, STRUCTURE AND THE WORK OF ALL OTHER TRADES. PROVIDE INSTALLATION DRAWINGS AS REQUIRED.
- 1.1.3. DO NOT SCALE MECHANICAL DRAWINGS. TAKE FIELD DIMENSIONS PRIOR TO ANY
- 1.2. <u>DESCRIPTION:</u> PROVIDE WORK IN ACCORDANCE WITH FULL INTENT AND MEANING OF DRAWINGS AND SPECIFICATIONS. THE WORD "PROVIDE" WHERE USED IN THE CONTRACT DOCUMENTS, IS TO BE INTERPRETED AS "SUPPLY AND INSTALL" ALONG WITH ALL ASSOCIATED HARDWARE AND
- 1.3. WORKMANSHIP: PROVIDE ALL NEW MATERIALS AND EQUIPMENT WITH THE APPROPRIATE LISTING (I.E. CSA, ULC, CETL, ETC.) ALL WORKMANSHIP BY THIS TRADE SHALL BE FIRST CLASS CONFORMING TO INDUSTRY STANDARD PRACTICES FOR SAFETY, ACCESSIBILITY, DURABILITY AND NEATNESS FOR ACCEPTANCE BY THE OWNER'S REPRESENTATIVES.
- 1.4. <u>SLEEVES, HANGERS, INSERTS:</u> PROVIDE ALL SLEEVES, INSERTS AND HANGERS REQUIRED FOR THE MECHANICAL WORK/ TREAT ALL SLEEVES OR HOLES PIERCING ACOUSTICAL SEPARATIONS FOR INSTALLATIONS OF THE DIVISION TO MAINTAIN ACOUSTICAL RATING. ALL GAPS SHALL BE PACKED WITH ACOUSTICAL INSULATION AND SEALED AT BOTH ENDS WITH ACOUSTICAL CAULKING. PATCH ALL OPENINGS AROUND INSTALLATIONS OF THIS DIVISION PIERCING FIRE OR SMOKE SEPARATIONS WITH AN APPROVED WATERTIGHT SMOKE AND FIRE STOP SEALANT.
- INTERPRETATION: DIVISION OF THE WORK AMONG SUPPLIERS OR VENDORS AND SUBCONTRACTORS IS SOLELY THE CONTRACTOR'S RESPONSIBILITY. NEITHER THE OWNER NOR CONSULTANT ASSUMES ANY RESPONSIBILITY TO ACT AS AN ARBITER TO ESTABLISH SUBCONTRACT TERMS BETWEEN SECTORS OR DISCIPLINES OF WORK.
- COORDINATION BETWEEN TRADES: CO-ORDINATE THE WORK OF THIS TRADE WITH ALL OTHER TRADES ON THE JOB SO THAT THE WORK MAY PROGRESS WITHOUT ANY DELAY. SCHEDULE AND PHASE DEMOLITION AND NEW WORK TO REDUCE INTERFERENCE AND DOWNTIME OF EXISTING SYSTEMS. NOTIFY OWNER'S REPRESENTATIVE OF ALL DOWNTIME PRIOR TO PROCEEDING WITH
- DISCREPANCY: IF A DISCREPANCY IS FOUND IN THE SPECIFICATION OR ON THE DRAWINGS, REQUEST CLARIFICATION PRIOR TO THE END OF THE QUESTION PERIOD SO THAT CLARIFICATION CAN BE PROVIDED IN WRITING
- 1.8. REGULATORY REQUIREMENTS: CONFORM TO GOVERNING MUNICIPAL AND PROVINCIAL CODES, RULES AND REGULATIONS AND/OR AUTHORITIES HAVING JURISDICTION.

1.9. CODES AND STANDARDS:

- 1.9.1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO BUILDING CODE, THE ONTARIO FIRE CODE AND ANY OTHER LOCAL REGULATIONS HAVING JURISDICTION OVER THE WORK OF THIS TRADE
- 1.9.2. WHERE A CODE OR STANDARD IS REFERENCED, THE LATEST VERSION OF THE CODE OR STANDARD REFERENCED IN THE APPLICABLE BUILDING CODE IS TO BE APPLIED.
- 1.10. SAFETY: COMPLY WITH ALL PROVINCIAL/FEDERAL AND/OR LOCAL SAFETY REGULATIONS. ICLUDING THE OCCUPATIONAL HEALTH AND SAFETY ACT. IN ADDITION, COMPLY WITH ALL OF THE OWNER'S HEALTH AND SAFETY REQUIREMENTS.
- 1.11. PERMITS AND FEES: OBTAIN ALL PERMITS REQUIRED FOR INSTALLATION OF MECHANICAL TRADES WORK, ARRANGE FOR INSPECTIONS TESTS THEREWITH AND PAY ALL COSTS FOR PERMITS, INSPECTIONS, AND ASSOCIATED FEES. THIS INCLUDES ANY TSSA INSPECTION AND/OR CERTIFICATION. OBTAIN PERMITS IMMEDIATELY AFTER NOTIFICATION OF AWARD OF CONTRACT.
- 1.12. TAXES: ENSURE THAT PROVINCIAL AND/OR FEDERAL TAXES ARE INCLUDED WHERE REQUIRED.
- 1.13. WARRANTY: PROVIDE A WRITTEN WARRANTY FOR ALL MATERIALS, EQUIPMENT AND LABOUR FOR A ONE-YEAR PERIOD TO BEGIN AT THE TIME OF SUBSTANTIAL COMPLETION. COMPLETE ALL WARRANTY REGISTRATION DOCUMENTATION ON BEHALF OF THE BUILDING OWNER. INCLUDE COPIES OF COMPLETED DOCUMENTATION IN OPERATIONS AND MAINTENANCE MANUALS.
- 1.14. <u>CERTIFICATION:</u> PROVIDE MANUFACTURER'S WRITTEN CERTIFICATION OF THE INSTALLATION AND OPERATION OF ALL SYSTEMS AND MAJOR EQUIPMENT.
- 1.15. EXISTING SERVICE:
- 1.15.1. DO NOT SHUT DOWN OR MAKE CONNECTIONS TO ANY EXISTING SERVICE WITHOUT WRITTEN PERMISSION OF THE OWNER
- 1.15.2. BE RESPONSIBLE FOR DEMOLITION AND REMOVAL OF MECHANICAL EQUIPMENT AND SERVICES DESIGNATED FOR REMOVAL ON DRAWINGS.
- 1.16. SITE PROTECTION AND CLEANLINESS: PROTECT ALL WORK AND MATERIALS, BEFORE AND AFTER RECTION, FROM WEATHER AND OTHER HAZARDS, AND KEEP IN A CLEAN AND ORDERLY MANNER. AVOID ACCUMULATION OF DEBRIS AS THE WORK PROGRESSES. ON COMPLETION OF THE CONSTRUCTION AND PRIOR TO THE FINAL INSPECTION AND ACCEPTANCE BY THE OWNER, CLEAN UP AND REMOVE FROM THE SITE ALL SCRAP MATERIALS RESULTING FROM THE WORK OF
- 1.17. <u>ADJUSTMENT AND OPERATION OF SYSTEMS:</u> WHEN WORK IS COMPLETE, ADJUST ALL EQUIPMENT ITEMS, OF VARIOUS SYSTEMS, FOR PROPER OPERATION WITHIN FRAMEWORK OF DESIGN INTENT, AND OPERATING CHARACTERISTICS AS PUBLISHED BY EQUIPMENT
- 1.18. <u>MISCELLANEOUS STEEL:</u> SUPPLY AND INSTALL MISCELLANEOUS STRUCTURAL SUPPORTS, PLATFORMS, AND BRACES, AS REQUIRED TO HANG OR SUPPORT ALL EQUIPMENT, PIPING, DUCTWORK AND SIMILAR ITEMS.
- 1.19. <u>EQUIPMENT INSTALLATION:</u> INSTALL AND START UP ALL ITEMS OF EQUIPMENT, DEVICES AND SYSTEMS IN ACCORDANCE WITH MOST RECENT MANUFACTURER'S PUBLISHED GUIDELINES AND RECOMMENDATIONS. CONTRACTOR IS RESPONSIBLE FOR ASCERTAINING MANUFACTURERS INSTALLATION GUIDELINES AND RECOMMENDATIONS. TOUCH-UP ALL SHOP PAINTED EQUIPMENT DAMAGED IN TRANSIT OR DURING INSTALLATION TO MATCH ORIGINAL SHOP FINISH.
- 1.20. <u>CUTTING AND PATCHING:</u> PROVIDE ALL CUTTING AND PATCHING REQUIRED FOR THE WORK OF THIS TRADE. ALL CUTTING AND PATCHING SHALL BE PERFORMED BY TRADE SPECIALIZING IN THE MATERIAL TO BE PATCHED. INCLUDE ALL COSTS FOR CUTTING AND PATCHING RELATED TO THE WORK OF THIS TRADE IN THE BID PRICE. WHERE PIPES AND DUCTS ARE SHOWN PASSING THROUGH EXISTING WALLS, FLOORS, AND ROOF, CUT AND PATCH THE NECESSARY OPENINGS. SHOULD CUTTING, REPAIRING, AND PATCHING OF PREVIOUSLY FINISHED WORK, OF OTHER TRADES, BE REQUIRED TO ALLOW INSTALLATION OF MECHANICAL WORK, PAY ALL COSTS FOR TRADE SECTION CONCERNED TO PERFORM WORK.
- 1.21. CHANGES IN THE WORK: CHANGES TO THE CONTRACT REQUIRING ADDITIONS TO OR DELETIONS FROM THE WORK OF THIS DIVISION SHALL BE CARRIED OUT UPON WRITTEN REQUEST OF THE CONSULTANT. EXTRAS TO THE CONTRACT OR CREDITS SHALL BE SUBMITTED WITH A COMPLETE COST BREAKDOWN AS FOLLOWS:
 - MATERIALS, QUANTITIES AND UNIT PRICES FOR ALL EQUIPMENT REQUIRED OR DELETED
- UNIT HOURS - TOTAL MATERIAL COST
- TOTAL HOURS
- HOURLY RATE (REFER TO SUPPLEMENTARY CONDITIONS AND GENERAL CONTRACT)
- TOTAL OVERHEAD AND PROFIT (REFER TO SUPPLEMENTARY CONDITIONS AND GENERAL
- 1.1. <u>COMPLETION:</u> PRIOR TO THE FINAL INSPECTION, CLEAN ALL MECHANICAL EQUIPMENT. CLEAN LL CONSTRUCTION DUST AND DIRT FROM INSTALLED EQUIPMENT AT THE END OF THE JOB. REPAIR ANY DAMAGE BY THE MECHANICAL TRADE TO EXISTING BUILDINGS OR EQUIPMENT, ETC TO THE CONSULTANTS SATISFACTION.

1.2. <u>SUBMITTALS:</u>

1.2.1. SHOP DRAWINGS:

- 1.2.1.1. SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT SUPPLIED BY MECHANICAL DIVISION. SUBMIT ELECTRONIC COPIES TO CONSULTANT FOR REVIEW.
- 1.2.1.2. SUBMIT UNITS OF MEASURE IN EITHER METRIC OR IMPERIAL THAT MATCH THOSE OF THE DRAWINGS
- 1.2.1.3. PROVIDE TITLE SHEET INCLUDING PROJECT NAME, SHOP DRAWING NAME (INCLUDING SPECIFICATION CLAUSE REFERENCE).
- 1.2.1.4. EACH SHOP DRAWING MUST BEAR STAMP AND SIGNATURE OF RESPONSIBLE OFFICIAL IN CONTRACTOR'S AND SUBCONTRACTOR'S ORGANIZATION, FOR EACH SUBMISSION, AS EVIDENCE THAT DRAWING HAS BEEN CHECKED AGAINST REQUIREMENTS AS CALLED FOR IN SPECIFICATIONS AND DRAWINGS.

1.2.2. <u>INTERFERENCE DRAWINGS:</u>

1.2.2.1. IN AREAS WHERE SPACE IS LIMITED AND MULTIPLE TRADES ARE INSTALLING SERVICES, COORDINATE INSTALLATION OF SERVICES. PREPARE INTERFERENCE DRAWINGS PRIOR TO CONSTRUCTION TO ENSURE INSTALLATION OF ALL SERVICES IS COORDINATED.

1.2.3. OPERATION AND MAINTENANCE INSTRUCTION MANUALS:

1.2.3.1. PROVIDE PDF COPIES OF COMPLETE OPERATION AND MAINTENANCE INSTRUCTIONS FOR EQUIPMENT FURNISHED UNDER THIS CONTRACT. MANUAL

TO BE ORGANIZED WITH BOOKMARKS IN A FORMAT TO MATCH THE

- PROVIDE PDF VERSION ON ELECTRONIC MEDIA
- 1.2.3.2. MANUALS SHALL INCLUDE THE FOLLOWING INFORMATION:)
- 1.2.3.3. CONTACT INFORMATION OF CONSULTANTS AND CONTRACTORS

SPECIFICATION SECTIONS. ONCE MANUAL IS REVIEWED AND ACCEPTED,

- 1.2.3.4. COMPLETE SET OF FINAL PROJECT SHOP DRAWINGS 1.2.3.5. CONTROL SHOP DRAWINGS AND OPERATING SEQUENCE, INCLUDING WIRING
- 1.2.3.6. WIRING DIAGRAM OF CONTROL PANELS

OF COMPONENTS

- 1.2.3.7. OPERATING INSTRUCTIONS, INCLUDING START-UP AND SHUT-DOWN
- 1.2.3.8. MAINTENANCE INSTRUCTIONS, INCLUDING PREVENTIVE MAINTENANCE
- INSTRUCTIONS FOR COMPONENTS OF EQUIPMENT 1.2.3.9. COMPLETE PARTS LIST OF ASSEMBLIES AND THEIR COMPONENT PARTS. SHOWING MANUFACTURER'S NAME, CATALOGUE NUMBER, AND NEAREST REPLACEMENT SOURCE
- 1.2.3.10. LIST OF RECOMMENDED SPARE PARTS AND QUANTITY OF EACH ITEM TO BE
- 1.2.3.11. FINAL TESTING AND BALANCING REPORT

1.2.3.12. MANUFACTURERS' WARRANTIES AND GUARANTEES 1.2.4. AS-BUILT DRAWINGS:

- 1.2.4.1. MAINTAIN AN ACCURATE RECORD OF DEVIATIONS AND CHANGES FROM CONTRACT DRAWINGS WITH RED LINE MARKINGS. TRANSFER AS-BUILT MARK-UPS TO DIGITAL DRAWING FORMAT. THIS PROCESS SHOULD BE COMPLETED BEFORE TESTING, BALANCING AND/OR COMMISSIONING. SUBMIT TO THE CONSULTANT WITH THE O&M MANUALS AT COMPLETION OF PROJECT.
- 1.2.4.2. FORMAT FILES TO MATCH EXACTLY THE LAYERING SYSTEM AND SYMBOLOGY OF THE CONSULTANT. BIND ALL EXTERNAL REFERENCES.
- 1.2.4.3. THE AS-BUILT DRAWINGS SHALL HAVE A VALUE OF \$5,000 UNLESS THE MECHANICAL CONTRACT VALUE IS LESS THAN \$100,000 WHICH SHALL HAVE A \$3,000 VALUE. ONCE AS-BUILT DRAWINGS HAVE BEEN COMPLETED, SUBMITTED AND REVIEWED. PAYMENT WILL BE RELEASED. THIS VALUE IS NOT INCLUDED IN THE AMOUNT REQUIRED BY THE CONSTRUCTION LIEN ACT.
- 1.2.4.4. THIS PROJECT UTILIZED THE FOLLOWING DIGITAL FORMAT(S): PDF
- 1.3. ACCESS DOORS: PROVIDE ACCESS DOOR OF AT LEAST 200 MM x 200 MM (8" X 8") IN SIZE AS REQUIRED IN WALLS AND CEILINGS TO ENSURE THAT ACCESS IS PROVIDED FOR ALL EQUIPMENT, VALVES OR APPURTENANCES. PROVIDE ACCESS DOORS COMPATIBLE WITH ADJACENT FINISHES AND WHERE APPLICABLE, WITH A FIRE RATING EQUAL TO THE SURFACES IN WHICH INSTALLED. WHERE ACCESS DOOR IS FIRE RATED. DOOR IS TO BE ULC LISTED. MINIMUM 18 GAUGE STEEL. PROVIDE HINGED DOORS WHERE ACCESS DOOR IS 450 MM X 450 MM (18"X18") OR LARGER. PROVIDE POSITIVE LATCHING SYSTEM.

1.4. FIRESTOPPING AND SMOKE SEAL

- 1.4.1. PROVIDE ULC LISTED FIRESTOP SYSTEM TO SEAL AROUND ALL MECHANICAL SERVICES WHICH PENETRATE PART OF A BUILDING ASSEMBLY REQUIRED TO HAVE A FIRE
- 1.4.2. SUBMIT DETAILED SHOP DRAWINGS TO THE CONSULTANT FOR REVIEW. INCLUDING:
- 1.4.3. -MANUFACTURER'S TECHNICAL PRODUCT DATA AND INSTALLATION INSTRUCTIONS FOR
- EACH SPECIFIC TYPE AND LOCATION OF PENETRATION 1.4.4. -CERTIFICATION THAT PROPOSED FIRESTOPPING MATERIALS AND ASSEMBLIES COMPLY
- 1.4.5. -ULC LISTINGS WITH COPIES OF ULC DATA SHEETS FOR EACH SPECIFIC TYPE AND

LOCATION OF PENETRATION

1.5. MATERIALS AND EQUIPMENT: 1.5.1. EQUALS AND ALTERNATES:

- 1.5.1.1. USE MATERIALS AND EQUIPMENT AS SPECIFIED HEREIN, OR SPECIFIED EQUIVALENT. DESIGN OF MECHANICAL SYSTEMS HAS BEEN BASED ON FIRST LISTED SUPPLIER AND MODEL NUMBER/SIZE STATED IN EQUIPMENT
- 1.5.1.2. SOME ITEMS OF EQUIPMENT, ONE OR MORE ADDITIONAL NAMES OF ACCEPTABLE EQUAL MANUFACTURERS MAY BE LISTED. THE DESIGN, LAYOUT. SPACE ALLOCATION CONNECTION DETAILS FTC. ARE BASED ON THE PRODUCTS NAMED FIRST IN THE DESCRIPTION AND/OR SCHEDULES. THE GENERAL APPROVAL INDICATED BY LISTING THE NAMES OF OTHER EQUAL MANUFACTURERS IS TO ESTABLISH THE QUALITY OF MANUFACTURE ONLY AND IS SUBJECT TO FINAL REVIEW OF SHOP DRAWINGS, PERFORMANCE DATA, TEST
- 1.5.1.3. SUPPLIERS WISHING TO SUBMIT OTHER ITEMS OF EQUIPMENT FOR APPROVAL AS AN EQUAL TO THOSE SPECIFIED MUST APPLY TO THE CONSULTANT AT LEAST 5 DAYS BEFORE BID CLOSING DATE. REQUESTS MUST BE ACCOMPANIED BY COMPLETE DESCRIPTION AND TECHNICAL DATA ON THE ITEMS PROPOSED. DEVIATIONS FROM THE SPECIFICATIONS MUST BE STATED IN WRITING AT TIME OF APPLICATION FOR APPROVAL.
- 1.5.1.4. ITEMS OF EQUIPMENT BY MANUFACTURERS, NOT NAMED IN THE SPECIFICATIONS, MAY BE OFFERED AS ALTERNATIVES. PROPOSALS MUST BE ACCOMPANIED BY FULL DESCRIPTIVE AND TECHNICAL DATA, TOGETHER WITH THE STATEMENT OF AMOUNT OF ADDITION OR DEDUCTION FROM THE BASE BID.
- 1.5.1.5. AFTER EXECUTION OF THE CONTRACT, SUBSTITUTION OF EQUIPMENT WILL NOT BE CONSIDERED.
- 1.5.1.6. WHERE EQUIPMENT OTHER THAN THE EQUIPMENT USED AS A BASIS FOR DESIGN, LAYOUT AND SPACE ALLOCATION IS USED, PRODUCE AND SUBMIT REVISED LAYOUTS OF EQUIPMENT. PIPES, DUCTS, ETC., IN THE AREAS AFFECTED. SUBMIT THESE DRAWINGS WITH THE SHOP DRAWINGS. FAILURE TO PRODUCE THESE DRAWINGS IS AN INDICATION BY THE CONTRACTOR THAT THEY ARE NOT REQUIRED AND THE ORIGINAL SPACE ALLOCATIONS ARE ADEQUATE FOR THE SUBSTITUTED EQUIPMENT.

TESTING AND BALANCING:

2.1. PRESSURE TESTS:

- 2.1.1. PROVIDE PRESSURE TESTS ON ALL PIPING INCLUDED IN THIS CONTRACT. FURNISH ALL PUMPS, COMPRESSORS, GAUGES AND CONNECTORS NECESSARY FOR TESTS.
- 2.1.2. CONDUCT HYDROSTATIC TESTS FOR A MINIMUM PERIOD OF 2 HOURS. DURING THIS TIME THE PRESSURE SHALL REMAIN CONSTANT.
- 2.1.3. CONDUCT FINAL TESTS ON NATURAL OR PROPANE GAS PIPING IN ACCORDANCE WITH
- REQUIREMENTS OF LOCAL UTILITY OR GOVERNING AUTHORITY.
- 2.1.4. FORWARD COPIES OF ALL FINAL TESTS ON ALL PRESSURE AND DRAINAGE PIPING TO

2.2. AIR BALANCING:

- 2.2.1. ASSUME RESPONSIBILITY FOR TESTING, BALANCING, AND PLACING ALL AIR HANDLING SYSTEMS IN OPERATION
- 2.2.2. RETAIN INDEPENDENT BALANCING FIRM TO BALANCE AIR HANDLING SYSTEMS.

WHEN EQUIPMENT IS OPERATING UNDER FULL LOAD CONDITIONS.

- 2.2.3. PROVIDE SHEAVES AND PULLEYS AND BELTS AS REQUIRED TO ACHIEVE AIR FLOWS INDICATED. CO-ORDINATE SUPPLY WITH EQUIPMENT MANUFACTURER.
- 2.2.4. ON COMPLETION OF TESTING AND BALANCING OF ALL SYSTEMS, SUBMIT TO CONSULTANT A PDF REPORT OF FINDINGS. INCLUDING COMPLETE DATA OF FAN PERFORMANCE, STATIC PRESSURES, AIR AND WATER FLOW RATES, FINAL READINGS AT
- 2.2.5. SUBMIT WITH EACH COPY OF REPORT, COMPLETE SETS OF DUCT LAYOUT PRINTS NEATLY MARKED IN RED INK, SHOWING ALL LOCATIONS AT WHICH TEST READINGS WERE TAKEN, AIR VOLUME, VELOCITY AND STATIC PRESSURE IN EACH SUPPLY AND RETURN DUCT, AND FINAL READING AT ALL OUTLETS. OBTAIN DUCT LAYOUT PRINTS FOR

ALL OUTLETS, AND AMPERE READINGS OF ALL MOTORS, TAKEN AT MOTOR TERMINALS

2.2.6. INSTALLATION TOLERANCES

MARK-UP PURPOSES FROM CONSULTANT.

- 2.2.6.1. AIR HANDLING SYSTEMS: ±5% OF DESIGN
- 2.2.6.2. AIR OUTLETS / INLETS: ±10% OF DESIGN

MECHANICAL INSULATION

- 3.1. WHERE INSULATION THICKNESS IS NOT IDENTIFIED, COMPLY WITH ASHRAE 90.1 REQUIREMENTS.
- 3.2. ALL PRODUCTS TO HAVE FLAME SPREAD RATING LESS THAN 25 AND SMOKE DEVELOPED CLASSIFICATION LESS THAN 50 IN COMPLIANCE WITH CAN/ULC-S102.
- 3.3. PROVIDE A CONTINUOUS VAPOUR BARRIER ON ALL COLD SYSTEMS.
- 3.4. <u>DEFINITIONS</u>

ONCEALED: INSULATED MECHANICAL SERVICES AND EQUIPMENT IN SUSPENDED CEILINGS AND NON ACCESSIBLE CHASES AND FURRED IN SPACES.

EXPOSED: NOT CONCEALED

- 3.5. <u>INSULATION TYPES:</u> 3.5.1. PGF - PREFORMED GLASS FIBRE: FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION CONFORMING TO CAN/ULC C-S702, WITH FACTORY APPLIED VAPOUR BARRIER JACKET
- TO ASTM C921 AND SELF-SEAL LAP JOINT. 3.5.2. <u>FGF - FLEXIBLE GLASS FIBRE:</u> ASTM C553 FLEXIBLE NON-COMBUSTIBLE BLANKET, WITH FACTORY APPLIED VAPOUR BARRIER JACKET TO ASTM E96/E96M. THERMAL
- CONDUCTIVITY TO ASTM C518.
- RGF RIGID GLASS FIBRE: ASTM C612 RIGID NON-COMBUSTIBLE BLANKET, WITH FACTORY APPLIED VAPOUR BARRIER JACKET TO ASTM E96/E96M. THERMAL CONDUCTIVITY TO ASTM C518.
- 3.5.4. <u>CF CELLULAR FOAM:</u> ASTM C534/C534M, FLEXIBLE, CELLULAR ELASTOMERIC, MOULDED OR SHEET WITH ANTIMICROBIAL COATING. USE WATERPROOF VAPOUR BARRIER ADHESIVE. EXPOSED INSULATION TO HAVE WHITE FINISH.

3.6. <u>PIPING:</u>

- 3.6.1. DO NOT INSULATE FLANGES OR UNIONS AT CONNECTION TO EQUIPMENT.
- 3.6.2. VALVE OPERATORS AND BALANCING VALVE TEST PORTS TO BE ACCESSIBLE WITHOUT REMOVAL OF INSULATION
- PIPE INSULATION INSERTS AND SHIELDS: PROVIDE RIGID INSERTS AND SHIELDS AT ALL HANGER SUPPORTS WHERE PIPING IS INSULATED. INSERT THICKNESS TO MATCH INSULATION THICKNESS. INSERT TO BE HYDROUS CALCIUM SILICATE RIGID PIPE INSULATION, INSERT AND SHIELD TO PROTECT BOTTOM HALF OF PIPE, SHIELD TO BE FABRICATED FROM GALVANIZED STEEL. SHIELD COLOUR TO MATCH COLOUR OF INSULATION FINISH. SHIELD AND INSERT LENGTH TO BE AS FOLLOWS:

NOMINAL PIPE SIZE INSERT LENGTH

MM (IN)	MM (IN)
40-65 (1-1/2 - 2-1/2)	250 (10)
80-150 (3-6)	300 (12)
200-250 (8-10)	400 (14)
>=300 (>=12)	550 (22)

- 3.6.4. PIPE INSULATION TYPE AND THICKNESS
 - 3.6.4.1. <u>PLUMBING</u> POTABLE (DOMESTIC) COLD WATER AND CITY
 - WATER (PGF): 25 MM (1") 3.6.4.1.2. POTABLE (DOMESTIC) HOT WATER (PGF):
 - <=32 MM (1-1/4") 25 MM (1")

>=40 MM (1-1/2") - 40 MM (1-1/2")

3.6.4.1.3. <u>STORM AND SANITARY DRAIN (PGF):</u> 25 MM (1")

3.6.5.1. COMPLETELY INSULATE THE FOLLOWING SYSTEMS:

-POTABLE (DOMESTIC) COLD WATER

WITHIN BUILDING.

-POTABLE (DOMESTIC) HOT WATER

3.6.5.2. SANITARY DRAIN: 3.6.5.2.1. INSULATE HORIZONTAL ABOVE FLOOR SANITARY DRAIN PIPING

3.6.5. <u>APPLICATION:</u>

- 3.7.1. EXHAUST AIR DUCTS: EXTERNALLY INSULATE AT LEAST 1,500 MM (5') FROM EXTERIOR
- / ROOF PENETRATIONS, AND OTHER DUCTS IDENTIFIED ON DRAWINGS. CONCEALED RECTANGULAR / ROUND DUCTWORK: FLEXIBLE DUCT INSULATION OF 12 KG/M3 (3/4 LB/CU.FT.) DENSITY, MINIMUM 40 MM (1-1/2") THICKNESS, MINIMUM R-VALVE OF

R-3.5 WITH REINFORCED FOIL FLAME RESISTANT KRAFT FACING.

3.8. SURFACE FINISHES

3.7. SHEET METAL:

BASED ON CAN/ULC-S102-M88 TESTING. PIPING SYSTEMS: 4.1. GENERAL:

4.1.1. EXPANSION AND CONTRACTION: INSTALL ALL PIPING SO AS TO BE FREE FROM STRAIN

AND DISTORTION DUE TO EXPANSION AND CONTRACTION AS GOVERNED BY

REQUIREMENTS OF ANSI B31.1, EXCEPT AS HEREINAFTER MODIFIED. ALLOW FOR

EXPOSED INTERIOR PIPING: FINISH EXPOSED INSULATED PIPING, VALVES AND

FITTINGS WITH PVC JACKETING. PVC MUST HAVE ATTAINED 25/50 FIRE RATING,

EXPANSION AND CONTRACTION BY OFFSETS, EXPANSION U-BENDS OR LOOPS. DO NOT USE EXPANSION JOINTS OF ANY TYPE UNLESS SPECIFICALLY INDICATED ON DRAWINGS.

4.1.2. PIPING SUBJECT TO FREEZING: 4.1.2.1. WHERE HORIZONTAL OR VERTICAL PIPING IS RUN ALONG AN OUTSIDE BUILDING WALL, AND CONCEALED IN A PIPE SPACE, CIRCULATION OF INTERIOR AIR SHALL BE MAINTAINED IN THE PIPE SPACE BY MEANS OF AN AIR GRILLE(S), LOCATED

AT THE TOP AND THE BOTTOM OF THE PIPE SPACE, FACING THE INTERIOR OF

4.1.2.2. WHERE HORIZONTAL PIPING IS RUN IN A CEILING SPACE UNDER UNINSULATED ROOF, THE INSULATED PIPE SHALL BE ENCASED IN SLAB INSULATION ON BOTH SIDES AND TOP AND CIRCUI ATION OF INTERIOR AIR SHALL BE MAINTAINED IN THE ENCASEMENT BY MEANS OF AIR GRILLES. LOCATED IN THE CEILING BELOW, FACING DOWN INTO THE INTERIOR OF THE BUILDING. THE SPACING OF

GRILLES SHALL NOT BE LESS THAN 300 MM (12") O.C. 4.1.3. LINES, GRADES AND SLOPES:

- 4.1.3.1. INSTALL LIQUID PIPING FREE OF POCKETS AND PITCH TO DRAIN, AT LOW POINTS IN PIPING, WITH VALVES OR TRAPS INSTALLED AS REQUIRED FOR
- DRAINAGE OF THE PIPING. 4.1.3.2. INSTALL PIPING TO FOLLOWING SLOPES:
- DRAINAGE PIPING: 1:50 ON DRAINS OF NPS 3 SIZE AND LESS AND 1:100 ON DRAINS OF NPS 4 AND LARGER.
- 4.1.3.4. POTABLE (DOMESTIC) WATER PIPING: PITCH TO LOW POINTS SO THAT ALL

PIPING MAY BE COMPLETELY DRAINED. 4.1.4. <u>UNIONS OR FLANGES - PROVIDE IN THE FOLLOWING LOCATIONS:</u>

- 4.1.4.1. FOR BY-PASSES AROUND EQUIPMENT, CONTROL VALVES, DEVICES IN PIPING SYSTEMS, AND ELSEWHERE INDICATED ON DRAWINGS.
- 4.1.4.2. AT CONNECTIONS TO EQUIPMENT (LOCATE BETWEEN SHUT-OFF VALVE AND
- 4.1.4.3. PROVIDE DIELECTRIC UNIONS, OR ISOLATING TYPE COMPANION FLANGES, AT ALL CONNECTIONS BETWEEN COPPER TUBING AND FERROUS PIPING.

4.1.8. <u>PIPE IDENTIFICATION:</u>

- 4.1.5.1. INSTALL SLEEVES WHERE PIPING PASSES THROUGH FOUNDATIONS, ABOVE GRADE FLOORS, AND WALLS. FABRICATE SLEEVES OF SCHEDULE 40 BLACK STEEL PIPE OR TYPE "K" COPPER TUBING.
- 4.1.5.2. SLEEVES FOR PIPING PASSING THROUGH ROOFS WILL BE SUPPLIED AND INSTALLED UNDER THIS DIVISION.
- 4.1.5.3. MAKE SLEEVES LARGE ENOUGH TO PASS FULL THICKNESS OF PIPE COVERING WHERE SAME IS USED, AND WITH SUFFICIENT CLEARANCE BETWEEN PIPE AND SLEEVE TO ALLOW FOR ANY LATERAL MOVEMENT OF PIPING DUE TO EXPANSION AND CONTRACTION.
- 4.1.5.4. FILL SLEEVES FOR FUTURE USE WITH LIME MORTAR.
- EUTCHEON PLATES: PROVIDE ESCUTCHEON PLATES ON BARE PIPING PASSING SH FINISHED WALLS OR FLOORS.
- 4.1.7. <u>VALVES:</u> PROVIDE DRAIN VALVES WITH HOSE THREAD OUTLET CONNECTION, OR VALVE WITH LONG NIPPLE ON OUTLET, AT ALL LOW POINTS OF EACH WATER SYSTEM, AND ABOVE ALL RISER OR BRANCH STOP VALVES, FOR PROPER DRAINAGE OF PIPING.

4.1.8.1. LABEL PIPING INSTALLED UNDER THIS DIVISION TO INDICATE CONTENT AND

DIRECTION OF FLOW. INCLUDE OPERATING PRESSURE OR VACUUM, AS

4.1.8.2. ALL LABELS SHALL BE OF SUFFICIENT WIDTH TO OVERLAP ITSELF

4.1.8.3. PROVIDE LABELS OF PLASTIC COATED TAPE, WITH SELF-ADHESIVE BACKING SURFACE. FOR INSTALLATION ON INSULATED PIPE, PROVIDE ADHESIVE SUITABLE FOR THIS APPLICATION. CONFORM WITH CAN/CGSB-24.3 AND/OR OWNER STANDARDS FOR PRIMARY LABEL COLOUR, AND WITH LEGEND AND DIRECTION ARROWS IN BLACK. PRINT LEGEND IN FULL WHEREVER FEASIBLE OR A RECOGNIZED ABBREVIATION OF SERVICE INVOLVED.

4.1.8.4. LOCATE LABELS AS FOLLOWS: AT EVERY END OF EVERY PIPE RUN, ADJACENT TO VALVE OR ITEM OF EQUIPMENT SERVICES. ON EACH EXPOSED PIPE PASSING THROUGH WALL, PARTITION OR FLOOR AT INTERVALS OF 15 M (50'-0") ALONG EVERY EXPOSED PIPE RUN EXCEEDING 15 M (50'-0") IN LENGTH. AT EVERY ACCESS POINT ON CONCEALED PIPING.

4.2. HANGERS AND SUPPORTS:

4.2.1. <u>GENERAL</u>:

COMPLY WITH OBC 3.1.5.16. 4.2.1.1. PIPE HANGERS & SUPPORTS TO CSA B214 & MSS SP-58.

- 4.2.1.2. SUPPORT OR SUSPEND ALL PIPING WITH NECESSARY HANGERS, STRUCTURAL SUPPORTS AND/OR BRACKETS AS REQUIRED, TO PREVENT SAGGING, WARPING
- 4.2.1.3. DO NOT ALLOW LOADS, OF ANY NATURE, TO BE TRANSMITTED THROUGH PIPING CONNECTIONS TO EQUIPMENT.
- 4.2.1.4. PROVIDE SUITABLY DAMPENED SPRING HANGERS FOR FIRST THREE SUPPORTS FROM EQUIPMENT CONNECTION ON PIPING SUBJECT TO EXCESSIVE
- 4.2.1.5. DO NOT HANG ANY PIPE, FROM ANOTHER PIPE OR FROM ROOF DECK, UNLESS SPECIFICALLY INDICATED ON DRAWINGS.
- 4.2.1.6. PROVIDE DIELECTRIC SEPARATION AS REQUIRED.

ADJUSTABLE RODS WITH LOCKNUTS.

4.2.2. <u>HANGERS:</u>

- 4.2.2.1. FOR ALL INSULATED PIPING UP TO NPS 4. CARRYING LIQUIDS AT TEMPERATURES 10.5°C (51°F) AND HIGHER, USE STANDARD WEIGHT CLEVIS
- 4.2.2.2. FOR INSULATED PIPING OF NPS 4 DIA. AND LARGER, CARRYING LIQUIDS AT TEMPERATURES 10.5°C (51°F) OR HIGHER, USE ADJUSTABLE ROLLER TYPE HANGERS WITH LOCKNUTS. SUPPORT ROLLERS AT BOTH ENDS WITH 2
- 4.2.2.3. FOR INSULATED PIPING CARRYING LIQUIDS AT A TEMPERATURE OF 10°C (50°F) OR LESS, USE ELONGATED CLEVIS TYPE HANGERS.
- 4.2.2.4. PROVIDE INSULATION PROTECTION BEARING PLATES AT ALL HANGERS AND SUPPORTS FOR ALL INSULATED PIPING.
- 4.2.2.5. FOR NON-INSULATED PIPING USE CLEVIS TYPE OF WROUGHT STEEL
- 4.2.2.6. FOR COPPER TUBING PROVIDE COPPER COATED HANGERS. 4.2.2.7. ATTACH HANGER RODS, TO BUILDING STRUCTURE, BY MEANS OF MALLEABLE

IRON BEAM CLAMPS OR CONCRETE INSERTS

- 4.2.3. HANGER SPACING 4.2.3.1. FOR HORIZONTAL RUNS OF PLUMBING AND DRAINAGE PIPING COMPLY WITH
 - HANGER SPACING REQUIREMENTS OF BUILDING CODE. 4.2.3.2. FOR HORIZONTAL RUNS OF BLACK OR GALVANIZED STEEL PIPE, OTHER THAN FOR PLUMBING SERVICE, COMPLY WITH MSS SP-58 TABLES 3 & 4.
- 4.2.4. FOR HORIZONTAL RUNS OF COPPER TUBING FOR SERVICES OTHER THAN PLUMBING, DO
- NOT EXCEED 1.8 M (6'.) BETWEEN HANGERS UNLESS SPECIFICALLY NOTED 4.2.5. FOR HORIZONTAL RUNS OF PIPING FABRICATED OF PVC FOR SERVICES OTHER THAN

4.2.6. IN A HORIZONTAL RUN, PEX TUBING SHALL BE SUPPORTED AT INTERVALS NOT EXCEEDING 800 MM (32"), UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER.

PLUMBING, DO NOT EXCEED 1.22 M (48")

4.3. MATERIALS OF CONSTRUCTION: 4.3.1. SANITARY AND INDIRECT DRAIN (INCLUDING VENTING):

4.3.2.1. ALL INDICATED PIPE SIZES ARE REPRESENTATIVE OF THE INSIDE DIAMETER OF

4.3.2.1.1. CAST IRON: TO CSA B70. MECHANICAL FITTINGS TO CSA B602.

- THE PIPE AND MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS. 4.3.2.1. REFERENCE STANDARDS:
 - COPPER, DWV: HARD DRAWN COPPER DRAINAGE TUBE CONFORMING TO ASTM B 306 WITH WROUGHT COPPER OR CAST

BRASS SOLDER JOINT DRAINAGE FITTINGS TO ASME B16.29 OR ASME

- 4.3.2.1.3. PVC, DWV: TO CAN/CSA-B182.1 OR B182.2. RUBBER RING GASKETS
- INTEGRAL WITH BELL OR SOLVENT WELD TO ASTM D2564. 4.3.2.1.4. PVC, SYSTEM 15: TO CSA B182.2. FLAME SPREAD RATING NOT GREATER THAN 25 PER CAN/ULC 102.2 WITH CERTIFICATION LABEL.
- 4.3.2.1.5. PVC, XFR: TO CSA B182.2. FLAME SPREAD RATING NOT GREATER
 THAN 25 & SMOKE DEVELOPED CLASSIFICATION NOT GREATER THAN 50 PER CAN/ULC 102.2 WITH CERTIFICATION LABEL.

4.3.2.1.6. POLYETHELYNE: TO CSA B137.1. BUTT FUSION FITTINGS TO ASTM

- 4.3.2.2. <u>APPLICATION:</u>
 - 4.3.2.2.1. BURIED SECTIONS WITHIN BUILDING AREA AND TO 1.5M (5'-0") OUTSIDE BUILDING

4.3.2.1.7. GALVANIZED STEEL: TO ASTM A52/A52M.

- 4.3.2.2.2. PIPING 200 MM (8") AND SMALLER:
- 4.3.2.2.3. CAST IRON SOIL PIPE AND FITTINGS OR 4.3.2.2.4. PVC DWV
- 4.3.2.2.5. PIPING CAST INTO CONCRETE RAFT SLAB SHALL BE PVC- SYSTEM 15
- 4.3.2.2.6. <u>ABOVE GRADE:</u> 4.3.2.2.6.1. PIPING 75 MM (3") AND SMALLER: DWV COPPER
- 4.3.2.2.6.2. <u>PIPING 100 MM (4") AND LARGER:</u> CAST IRON
- 4.3.2.2.6.3. <u>PIPING 150 MM (6") AND SMALLER:</u> PVC DWV 4.3.2.2.7. NON-COMBUSTIBLE BUILDINGS:
- 4.3.2.2.7.1. LOW-RISE, NON-PLENUM SPACES: PVC, SYSTEM 15

4.3.3. POTABLE (DOMESTIC) HOT AND COLD WATER:

4.3.3.1. ALL INDICATED PIPE SIZES ARE REPRESENTATIVE OF THE INSIDE DIAMETER OF THE PIPE AND MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS.

4.3.3.1. <u>REFERENCE STANDARDS:</u>

4.3.3.1.1. ALL MATERIALS TO BE NSF/ANSI 61 & 372 CERTIFIED.

4.3.3.1.2.1. PIPING - SEAMLESS WATER TUBE TO ASTM B88

4.3.3.1.2.2. <u>FITTINGS:</u>

- SOLDER JOINT FITTINGS TO ASME B16.18 (CAST) OR B16.22 (WROUGHT) OR
- COLD PRESS FITTINGS WITH EPDM SEALING ELEMENT TO ASME B16.18 OR ASME B16.22, INSTALLED USING PROPER TOOL, ACTUATOR, JAWS, AND RINGS AS INSTRUCTED BY THE PRESS FITTING MANUFACTURER.
- RATINGS: 93°C (200°F) AT 80 PSI (551 KPA), 82°C (180°F) AT 100 PSI (689 KPA). 50 MM (2") AND SMALLER - CAN/ULC-S102.2 LISTED TO A MAXIMUM OF 25 FLAME SPREAD / 50 SMOKE DEVELOPED

CAN/CSA-B137.5. PRESSURE AND TEMPERATURE

- 65 MM (2-1/2") AND LARGER CAN/ULC-S102.2 LISTED TO A MAXIMUM OF 25 FLAME SPREAD / 50 SMOKE DEVELOPED WITH RATED FIBERGLASS INSULATION.
- CAN/ULC-S115.

4.3.3.1.3.1. CROSSLINKED POLYETHYLENE PIPING TO

WITH NO LIMITATIONS ON SPACING.

4.3.3.1.3.2. SEAL PENETRATIONS AT FIRE SEPARATIONS PER

- 4.3.3.1.3.3. PIPING WITHIN A FIRE SEPARATION PER CAN/ULC-S101.
- 4.3.3.1.3.4. ALL FITTINGS BY TUBING MANUFACTURER.
- 4.3.3.1.3.5. 25 YEAR CSA SYSTEM WARRANTY (INCLUDING
- CONSEQUENTIAL) FROM INSTALLATION DATE.

4.3.3.1.4. PVC: TO CSA B137.3 OR CSA B137.2. MINIMUM PRESSURE RATING

1,100 KPA (160 PSI). 4.3.3.2. <u>APPLICATION</u>:

- 4.3.3.2.1. BURIED PIPING 75 MM (3") AND SMALLER:
 - 4.3.3.2.1.1. TYPE "K" SOFT ANNEALED COPPER TUBING WITH NO JOINTS PERMITTED BELOW GRADE. BEND TUBING USING APPROVED TUBE BENDER.
 - 4.3.3.2.1.2. USE TYPE "K" SOFT ANNEALED COPPER TUBING FOR TRAP SEAL PRIMER PIPING TO TRAPS INSTALLED IN
 - CONCRETE FLOORS. 4.3.3.2.1.3. PVC WITH NO JOINTS BELOW GRADE. COLD WATER

4.3.3.2.2. ABOVE GROUND PIPING 75 MM (3") AND SMALLER:

4.3.3.2.2.1. TYPE "L" HARD DRAWN COPPER TUBING. PROVIDE SOLDER TO THREADED ADAPTERS AT SCREWED

VALVES OR EQUIPMENT

4.3.3.2.2.2. PEX-A FOR 38 MM (1-1/2") AND SMALLER (ON COMPLETION OF INSTALLATION THE SYSTEM SHALL BE CHARGED WITH POTABLE WATER TO A PRESSURE WHICH MEETS LOCAL PLUMBING CODES. THE SYSTEM SHALL REMAIN AT THIS PRESSURE FOR A MINIMUM O 24 HOURS TO ENSURE SYSTEM INTEGRITY.) PROVIDE COPPER STUB-OUT ELBOWS AT EACH FIXTURE CONNECTION, STUB-OUT TO BE MANUFACTURED FROM SEAMLESS COPPER TUBING WITH A MACHINED ASTM

F-1807 PEX BARB CONNECTION AND SPIN SEALED

BE PERMITTED FOR USE IN INSTALLATION. FOLLOW

OUTLET. ONLY EXPANSION JOINTS AND FITTINGS WILL

MANUFACTURERS INSTRUCTIONS FOR INSTALLATION. 4.3.3.2.2.3. CPVC: BUILDINGS OF NON-COMBUSTIBLE CONSTRUCTION, HIGH-RISE BUILDINGS AND IN RETURN AIR PLENUMS. FIRESTOPPING SYSTEMS SHALL BE LISTED UNDER CAN/ULC S115 AND TESTED WITH A

PRESSURE DIFFERENTIAL OF 50 PA.

PLUMBING SYSTEM:

COMBUSTIBLE PIPING MATERIALS SHALL

5.1. REFERENCES STANDARDS

FOLLOWING:

5.1.1. CONFORM TO ALL APPLICABLE CODES INCLUDING, BUT NOT LIMITED TO, THE

5.2. <u>VENTING:</u> PLUMBING VENTING MAY NOT BE SHOWN ON DRAWINGS. PROVIDE A COMPLETE

5.1.1.1. <u>CSA-B64.10:</u> SELECTION AND INSTALLATION OF BACKFLOW PREVENTERS

PLUMBING VENTING SYSTEM FOR ALL PLUMBING FIXTURES SHOWN, IN ACCORDANCE WITH OBC

STERILIZATION TREATMENT BY TREATING THE WATER WITH 50 PPM OF CHLORINE AS

RECOMMENDED IN AWWA SPECIFICATION C-651. AFTER STERILIZATION PERIOD HAS

DOUBLE CHECK VALVE TYPE (DCVA): DOUBLE CHECK VALVE ASSEMBLY, TESTED AND

CERTIFIED UNDER ASSE STANDARD 1012 AND CSA B64.5, WITH BRASS OR CAST EPOXY

- 5.3. STERILIZATION OF POTABLE (DOMESTIC) WATER SYSTEMS:
- 5.3.1. FLUSH EACH SYSTEM, AFTER COMPLETION, BY ALLOWING FULL FLOW OF WATER THROUGH SYSTEM FOR A PERIOD OF FIFTEEN MINUTES, OR LONGER WHEN DIRECTED 5.3.2. AFTER FLUSHING OF THE SYSTEM IS COMPLETED, PROVIDE A 24 HOUR CONTACT

ELAPSED, FLUSH SYSTEM TO REDUCE CHLORINE CONTENT TO AN ACCEPTABLE LEVEL. 5.4. CONNECTIONS SERVICES:

5.5. BACKFLOW PREVENTERS:

WATER SERVICE: MAKE ARRANGEMENTS WITH LOCAL MUNICIPALITY FOR INSTALLATION OF WATER METER. PAY FOR COSTS LEVIED BY MUNICIPALITY FOR PROVISION, INSTALLATION AND CONNECTION OF THIS SERVICE.

COATED BODY AND STAINLESS STEEL WORKING PARTS, STRAINER AND PRIMARY AND SECONDARY CHECK VALVES. CHECK VALVE SEATS AND DISKS TO BE REPLACEABLE.

- 5.6. PLUMBING FIXTURES: 5.6.1. PROVIDE CSA COMPLIANT PLUMBING FIXTURES.
- 5.6.3. CAULK ALL AROUND BASES OF MOP SERVICE SINKS, BUILT-IN BATHTUBS, AND OTHER BUILT-IN FIXTURES.
- 5.7. <u>VALVES:</u> 5.7.1. SUBMIT SHOP DRAWINGS FOR ALL VALVES.
- 5.7.2. POTABLE (DOMESTIC) WATER

5.7.2.1. REFERENCE STANDARDS:

- 5.7.2.1.1. LEAD FREE, 0.25% CONTENT PER NSF-61/372 5.7.2.1.2. BRONZE TO ASTM C89530
- 5.7.2.1.3. BRASS TO ASTM C46750 5.7.2.1.4. CAST IRON TO ASTM A126

5.6.2. PROVIDE PLUMBING FIXTURES AS INDICATED IN SCHEDULE ON DRAWINGS.

- 5.7.2.1.5. STAINLESS STEEL TO ASTM A351 5.7.2.1.6. CPVC RATED TO 1,600 KPA (232 PSI) AT 23°C (73°F) 5.7.2.1.7. ALL PRESSURE RATINGS, SIZES TO MSS SP-25
- ISOLATION / SHUT-OFF: 3 PIECE BRASS OR BRONZE BODY, 1,034 KPA (150 PSI) 60 WOG RATING, FULL PORT, STAINLESS STEEL BALL, LOCKING LEVER HANDLE WITH INSULATION STEM EXTENSION. SOLDERED, THREADED OR PEX CONNECTIONS. MANUFACTURED TO MSS SP-110.
- 5.7.2.3. CHECK: Y PATTERN SWING TYPE, BRONZE BODY / TRIM. 860 KPA (125 PSI) 200 WOG RATING TO MSS SP-80.

5.7.2.4. CHECK (PUMP DISCHARGE): SPRING LOADED SWING TO MSS SP-71, CLASS 125.

THROTTLING: GLOBE, BRONZE BODY, RISING STEM, 800 KPA (125 PSIG) / 200

VOG. MANUFACTURED TO MSS SP-110. 5.7.2.6. <u>RELIEF VALVES:</u> ASME RATED CAPABLE OF RELIEVING FLOW AT 25% ABOVE WORKING PRESSURE. BODY CONSTRUCTION AND TYPE OF TRIM SHALL BE

SUITABLE FOR SPECIFIC SERVICE.

FLOOR DRAINS: PROVIDE FLOOR DRAIN SIZES AS INDICATED ON DRAWINGS, WITH APPED PRIMER CONNECTION IN DRAIN BODY AND TO CONFORM WITH CODE

TRAP SEAL PRIMER.

5.8. PLUMBING SPECIALTIES:

OTHERWISE INDICATED. 5.8.2. <u>CLEANOUTS (CO):</u> 5.8.2.1. PROVIDE CLEANOUTS IN DRAINAGE PIPING AT LOCATIONS INDICATED ON DRAWINGS, AT BASE OF EACH VERTICAL STACK OR RAINWATER LEADER AND

BUILDING, AS REQUIRED TO COMPLY WITH BUILDING CODE.

REQUIREMENTS. PROVIDE EACH FLOOR DRAIN WITH DEEP SEAL "P" TRAP UNLESS

ON WALL. TYPE OF COVER TO SUIT WALL SURFACE AND CONSTRUCTION. TRAP SEAL PRIMER: PROVIDE LEAD FREE TRAP SEAL PRIMER. PRIMER TO BE CAPABLE OF BEING INSTALLED ON PIPING UP TO 40 MM (1-1/2"). PROVIDE SHUTOFF VALVE

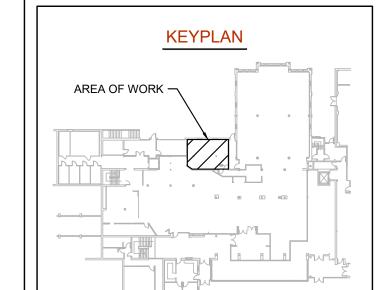
UPSTREAM AND UNION DOWNSTREAM OF PRIMER. TRAP GUARD MAY BE USED IN LIEU OF

5.8.2.2. WHERE CLEANOUTS ARE CONCEALED IN WALLS, PROVIDE AN ACCESS COVER

AS CLOSE AS POSSIBLE TO WHERE THE DRAINAGE PIPING LEAVES THE

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> Kingston, ON K7M 8S8 P 613.900.0845 KITCHENER: 210-137 Glasgow Street, Office #141 Kitchener, ON N2G 4X8 P 519.472.7640

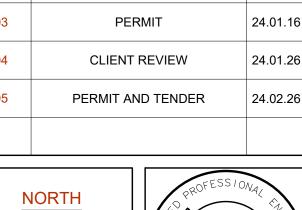


REVISIONS ISSUED FOR DATE 90% CLIENT REVIEW 23.09.15 FINAL CLIENT REVIEW 23.12.01

FINAL CLIENT REVIEW

23.12.22

JRG





JRG REVIEWED

DRAWN

WILFRID LAURIER UNIVERSITY DISH ROOM

PROJECT

CHECKED

75 UNIVERSITY AVE W. WATERLOO, ON N2L 3C5

> SPECIFICATIONS -**MECHANICAL**

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ADDRESS

CE-5716

DRAWING TITLE

DRAWING NUMBER

PROJECT NO.

6. AIR DISTRIBUTION SYSTEM:

6.1. <u>DUCTWORK:</u>

6.1.1. <u>GENERAL:</u>

- 6.1.1.1. PROVIDE DUCTWORK CONSTRUCTED TO SMACNA 250 PA (1" W.G.) PRESSURE CLASSIFICATION & SEAL CLASS A. FOLLOW ALL OF THE LATEST SMACNA REQUIREMENTS.
- 6.1.1.2. SEAL ALL DUCT JOINTS AND CONNECTIONS TO DIFFUSERS AND EQUIPMENT WITH HIGH VELOCITY WATER BASED DUCT SEALER.
- 6.1.1.3. PROVIDE DUCTS OF SIZES INDICATED ON DRAWINGS. WHERE DUCTS ARE TO BE FURNISHED WITH ACOUSTIC DUCT INSULATION, ADJUST DUCT SIZE TO ACCOMMODATE THICKNESS, WITH CLEAR INSIDE DIMENSIONS AS INDICATED
- 6.1.1.4. CONTINUOUSLY SOLDER OR SEAL JOINTS IN EXTERIOR AIR INTAKE DUCTS AND PLENUMS TO PREVENT DRIPPING OF MOISTURE.
- 6.1.1.5. PROVIDE DUCTWORK OF GALVANIZED STEEL SHEET UNLESS INDICATED OTHERWISE.
- 6.1.1.6. DUCTWORK ASPECT RATIOS CAN BE ADJUSTED TO A MAXIMUM OF 4:1 WHILE KEEPING AT LEAST THE SAME CROSS SECTIONAL AREA, TO AVOID INTERFERENCES, AS REQUIRED.
- 6.1.2. RECTANGULAR DUCTWORK:
 - 6.1.2.1. FOR LONGITUDINAL JOINTS ON RECTANGULAR DUCTWORK, FURNISH PITTSBURGH LOCK JOINTS TIGHTLY CLOSED ALONG FULL LENGTH OF SEAM.
 - 6.1.2.2. CROSS-BREAK FLAT SURFACES BETWEEN JOINTS, OR BETWEEN JOINTS AND INTERMEDIATE REINFORCEMENTS, TO PREVENT VIBRATION OR BUCKLING.
 - 6.1.2.3. WHERE ELBOWS ARE INDICATED AS SQUARE TYPE, PROVIDE AIR TURNING VANES OF DOUBLE BLADE CONSTRUCTION.
- 6.1.3. FLEXIBLE TYPE ROUND DUCTWORK:
 - 6.1.3.1. FURNISH FLEXIBLE TYPE ROUND DUCTWORK BETWEEN TRUNK SUPPLY DUCT AND CEILING DIFFUSERS AND WHERE INDICATED ON DRAWINGS (MAXIMUM 1,500 MM (5') LENGTH). REFER TO DETAIL ON DRAWING.
 - 6.1.3.2. PROVIDE FLEXIBLE DUCT OF POLYMERIC LINER BONDED TO WIRE SPIRAL. WHERE INSTALLED IN CEILING SPACE USED AS A RETURN PLENUM, DUCTS SHALL MEET BUILDING CODE FLAME SPREAD AND SMOKE DEVELOPMENT REQUIREMENTS.
 - 6.1.3.3. FLEXIBLE TYPE ROUND DUCTWORK EXPOSED TO VIEW IS NOT ACCEPTABLE.
- 6.1.4. <u>DISHWASHER EXHAUST DUCTWORK:</u> FABRICATE EXHAUST DUCTWORK FROM DISHWASHER UNIT OR HOOD THROUGH EXHAUST FAN TO ATMOSPHERE, INCLUDING FIRE DAMPERS, FROM 0.5 MM (26 GA) STAINLESS STEEL SHEET TYPE 304 TO ASTM A 167-99 WITH 2B FINISH. FURNISH DRIVE SLIP, S-SLIP OR 25 MM (1") POCKET SLIP TRANSVERSE JOINTS AT 2,400 MM (8'-0") OC. FURNISH PITTSBURGH SEAM OR DOUBLE SEAM LONGITUDINAL JOINTS. BRAZE ALL JOINTS IN BOTTOM SECTIONS OF HORIZONTAL DUCTWORK.
- 6.1.5. SUPPORTS AND HANGERS:
 - 6.1.5.1. RECTANGULAR DUCTWORK:
 - 6.1.5.1.1. FOR DUCTS UP TO 760 MM (30") WIDE: FURNISH STRAP HANGERS OF GALVANIZED SHEET STOCK WITH EDGES FOLDED OVER. BEND STRAP HANGER AROUND BOTTOM OF DUCT FOR MINIMUM OF 38 MM (1-1/2") AND ATTACH TO SIDES AND BOTTOM OF DUCT.

6.1.5.2. ROUND DUCTWORK:

6.1.5.2.1. FOR DUCTS UP TO 900 MM (36") DIAMETER: FURNISH STRAP BAND AND HANGER OF 25 MM (1") X 20 GA. GALVANIZED SHEET STOCK WITH EDGES FOLDED OVER. BAND IS TO FIT TIGHT TO DUCT ALL AROUND AND CONNECT TO HANGER STRAP WITH LOAD RATED

6.2. <u>DIFFUSERS, REGISTERS AND GRILLES:</u>

- 6.2.1. REFER TO SCHEDULE AND TAGS ON DRAWINGS FOR ACCESSORIES, NECK SIZE, DIMENSIONS AND CAPACITY.
- 6.2.2. COORDINATE PLACEMENT OF DIFFUSERS, REGISTERS AND GRILLES IN CEILINGS WITH ELECTRICAL AND CEILING INSTALLATION TRADES AND EXACT LOCATION TO FINAL APPROVAL OF CONSULTANT.
- 6.2.3. PROVIDE FRAME ACCESSORIES AS REQUIRED TO SUIT CEILING AND WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL DRAWINGS.

6.3. SHEET METAL SPECIALTIES:

6.3.1. BALANCING DAMPERS:

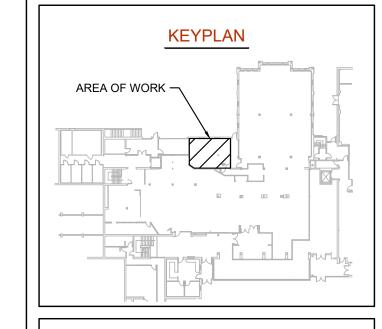
- 6.3.1.1. LOCKING QUADRANT BALANCING DAMPERS, MANUALLY OPERATED OPPOSED BLADE TYPE, OR BUTTERFLY BLADE TYPE, FABRICATED FROM GALVANIZED STEEL SHEET. PROVIDE WHERE INDICATED ON DRAWINGS AND AS REQUIRED TO ALLOW FOR SYSTEM BALANCING.
- 6.3.2. ACCESS DOORS: PROVIDE ACCESS DOORS IN DUCTWORK AND PLENUMS TO ALLOW SERVICING, MAINTENANCE AND INSPECTION OF CONTROL DAMPERS, FIRE DETECTORS, BOTH SIDES OF FIRE AND FIRE/SMOKE DAMPERS, CONTROL ELEMENTS, BEARINGS AND AS INDICATED ON DRAWINGS. FURNISH ACCESS DOORS AT LEAST 300 MM X 150 MM (12" X 6") UNLESS DUCT DIMENSIONS PREVENT.
- 6.3.3. FLEXIBLE DUCT CONNECTIONS: 75 MM (3") WIDE LISTED FIRE RETARDENT NEOPRENE COATED WOVEN GLASS FIBRE FABRIC TO NFPA 701, CRIMPED INTO 75 MM (3") 24 GA. (0.6MM) GALVANIZED STEEL EDGING STRIPS. MANUFACTURED TO SMACNA STANDARDS



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Kingston, ON K7M 8S8 P 613.900.0845



REVISIONS								
NO.	ISSUED FOR	DATE						
00	90% CLIENT REVIEW	23.09.15						
01	FINAL CLIENT REVIEW	23.12.01						
02	FINAL CLIENT REVIEW	23.12.22						
03	PERMIT	24.01.16						
04	CLIENT REVIEW	24.01.26						
05	PERMIT AND TENDER	24.02.26						



BCD DRAWN JRG REVIEWED CHECKED

PROJECT

WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

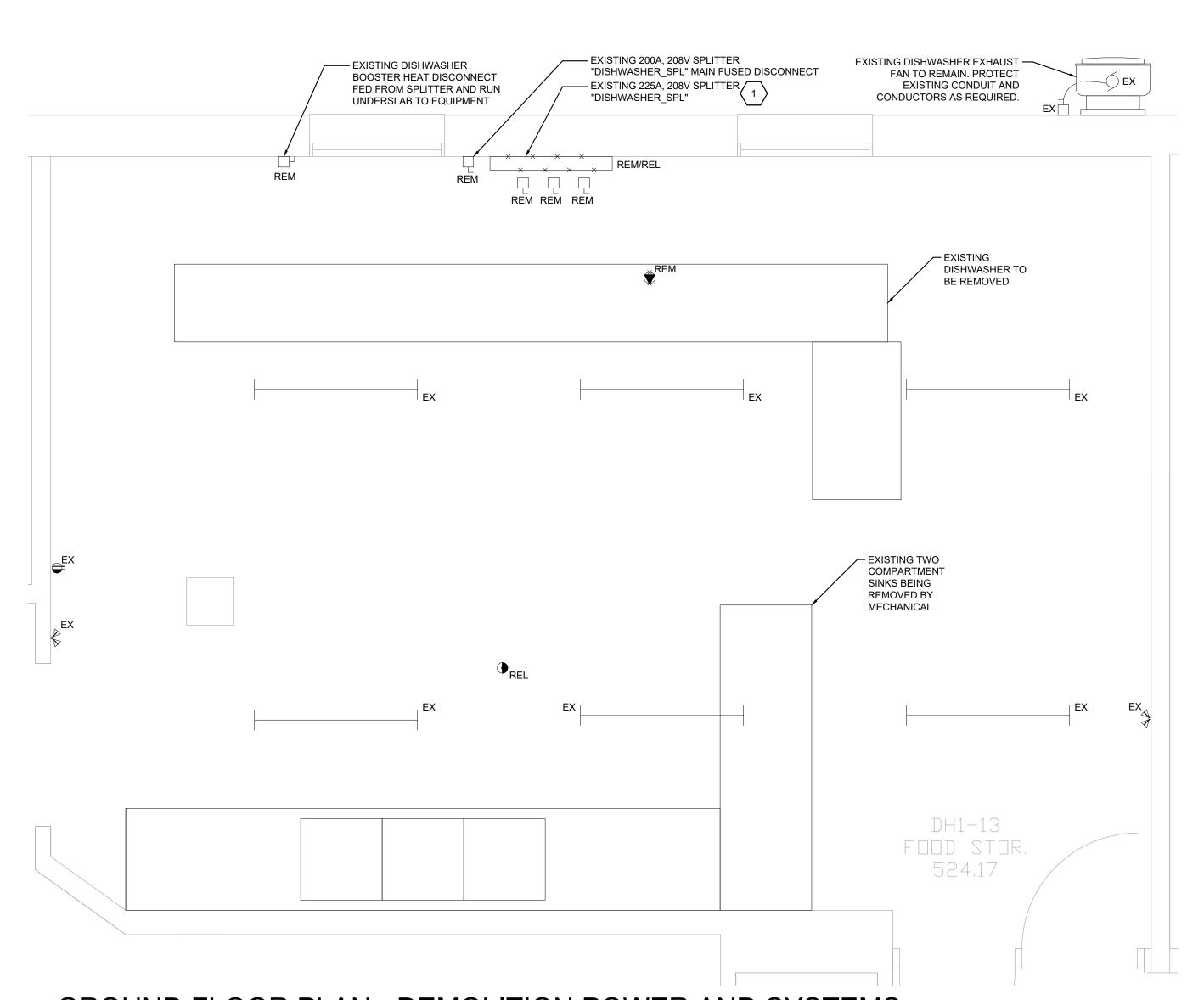
CE-5716

DRAWING TITLE

SPECIFICATIONS CONT'D -**MECHANICAL**

DRAWING NUMBER

M6 OF 6



GROUND FLOOR PLAN - DEMOLITION POWER AND SYSTEMS

DEMOLITION DRAWING NOTES (INDICATED WITH HEXAGONS):

1. PROTECT EXISTING FEED TO SPLITTER 'DISHWASHER_SPLT' FOR RECONNECTION TO NEW PANEL 'P-DW'.

GENERAL DRAWING NOTES (APPLICABLE TO ALL DRAWINGS):

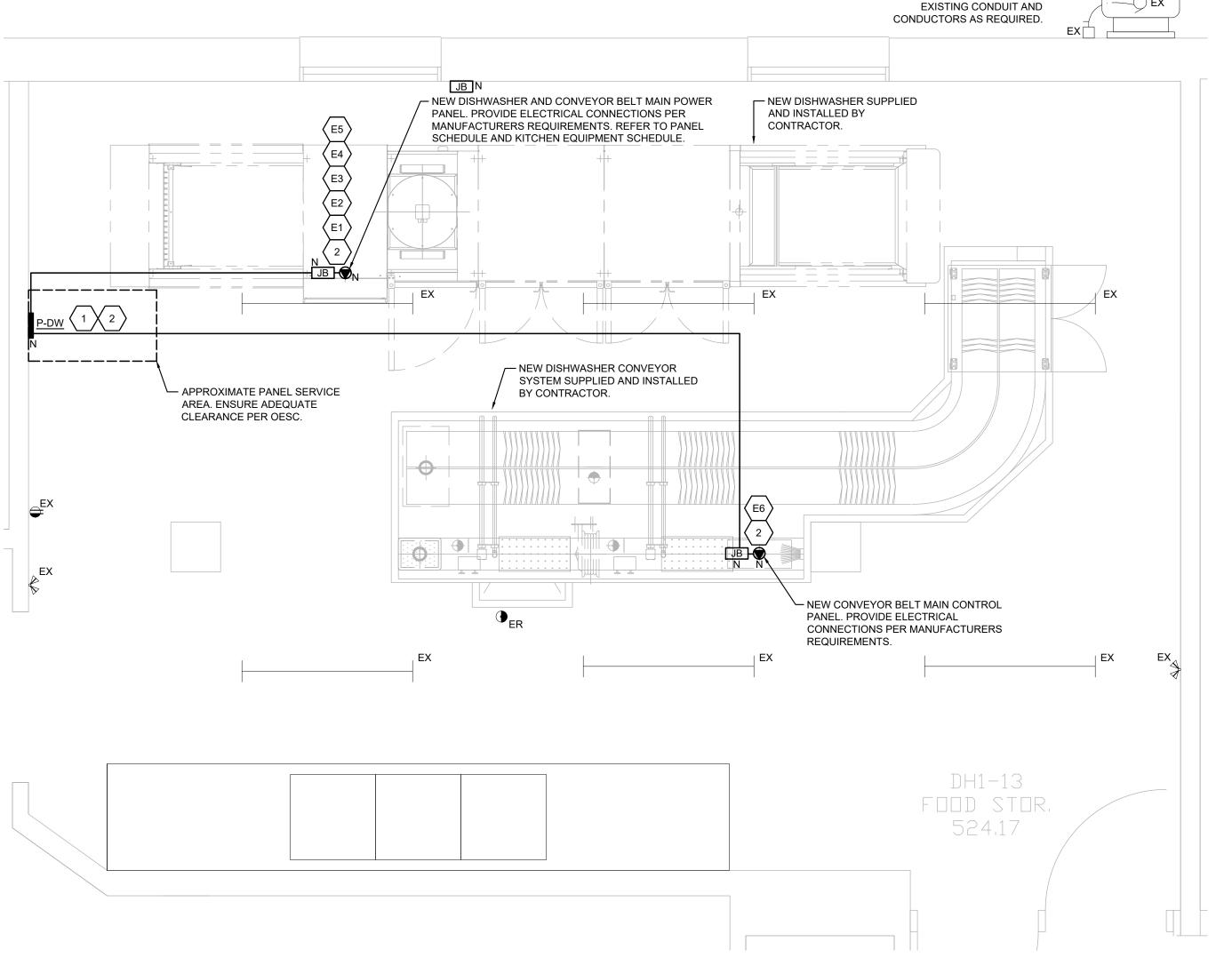
1. EXISTING LIGHTING AND LIGHTING CONTROL TO REMAIN.

- 2. ALL EXISTING ELECTRICAL EQUIPMENT TO REMAIN UNLESS OTHERWISE IDENTIFIED ON THE DRAWINGS, GENERAL NOTES, OR SPECIFICATIONS.
- 3. NOT ALL EXISTING ELECTRICAL DEVICES SHOWN. EXISTING CONDITIONS SHOWN ARE LIMITED TO A VISUAL SITE TAKEOFF BY CALLIDUS ENGINEERING AND A REVIEW OF HISTORICAL DRAWINGS PROVIDED BY WLU. CONTRACTOR TO ATTEND SITE PRIOR TO PRICING AND FLAG ANY SITE CONDITIONS IMPACTING THE SCOPE OF WORK TO THE CONSULTANT.
- 4. COORDINATE WITH FACILITY MAINTENANCE DEPARTMENT FOR DISPOSAL OF REMOVED DEVICES. DISPOSE OF ALL UNWANTED DEVICES AS REQUIRED PER FACILITY STANDARDS.
- 5. DISCONNECT AND MAKE SAFE EQUIPMENT FOR REMOVAL BY MECHANICAL. COORDINATE WITH MECHANICAL TRADE AND NEW EQUIPMENT SUPPLIER FOR SCHEDULING OF DISCONNECTION OF EXISTING EQUIPMENT AND POWER ROUGH IN TO NEW EQUIPMENT.

KITCHEN EQUIPMENT SCHEDULE													
ITEM NO	DESCRIPTION	ELECTRICAL REQUIREMENTS											
		HP	KW	FLA	MCA, MOCP	VOLTS	PHASE	WIRING	PLUG IN REC	DIRECT CONN	CCT No.	ISO SWITCH	NOTES
E1	DISHWASHER - MOTOR AND CONTROLS (1TB)	-	=	29.1	40	208	3	3-#8+GND IN 21MM C	-	Х	DW-1,3,5	-	1
E2	DISHWASHER - ELECTRIC TANK HEAT (2TB)	-	17.3	48	70	208	3	3-#4+GND IN 27MM C	-	Х	DW-7,9,11	-	-
E3	DISHWASHER - ELECTRIC TANK HEAT (3TB)	-	17.3	48	70	208	3	3-#4+GND IN 27MM C	-	Х	DW-13, 15, 17	-	-
E4	DISHWASHER - DUAL RINSE (4TB)	-	10.7	29.7	40	208	3	3-#8+GND IN 21MM C	-	Х	DW-2,4,6	-	-
E5	DISHWASHER - ELECTRIC BOOSTER (5TB)	-	15	41.6	60	208	3	3-#6+GND IN 27MM C	-	X	DW-8,10,12	-	-
E6	CONVEYOR - MAIN CONTROL PANEL	-	-	-	-	208	1	Z#1Z+GND IN Z1MM	-	Х	DW-14,16	-	-

GENERAL NOTES: - EQUIPMENT NOTES CORRECSPOND TO HOBART EQUIPMENT DRAWING Z-FT23-113.

COORDINATE ALL POWER REQUIREMENTS AND CONNECTION LOCATIONS WITH FINAL EQUIPMENT SHOP DRAWINGS AT NO ADDITIONAL COST TO THE OWNER. -COORDINATE WITH EQUIPMENT SUPPLIER/INSTALLER (HOBARTS) FOR DELINEATION IN ELECTRICAL SCOPE. CONFIRM IF HOBARTS IS PROVIDING AND INSTALLING THE FLEX FROM THE CEILING JUNCTION BOX TO EQUIPMENT PRIOR TO ROUGH-IN. PROVIDE ANY ADDITIONAL WIRING, CONDUIT, JUNCTION BOXES ETC FOR A COMPLETE INSTALLATION. - REFER TO PROPOSED DRAWING NOTE 2 FOR ADDITIONAL WIRING INSTRUCTIONS.



GROUND FLOOR PLAN - PROPOSED POWER AND SYSTEMS

PROPOSED DRAWING NOTES (INDICATED WITH HEXAGONS):

- 1. REPLACE EXISTING 'DISWASHER_SPLT' 208V 225A RATED SPLITTER AND ASSOCIATED DISCONNECTS WITH NEW 200A PANEL 'P-DW' AND NEW OVERCURRENT DEVICES FOR NEW HOBART DISHWASHING MACHINE, CONFIRM NAMING CONVENTION WITH FACILITY PRIOR TO APPLYING PERMANENT LABELS. REUSE EXISTING FEED TO 'DISHWASHER SPLT' FOR NEW PANEL FROM DISTRIBUTION PANEL 'DH PNL', SUBJECT TO OESC COMPLIANCE. MODIFY AND EXTEND EXISTING CONDUCTORS AND CONDUIT AS REQUIRED. REFER TO PANEL SCHEDULE FOR DETAILS.
- 2. POWER FOR DISHWASHER/CONVEYER BELT ASSEMBLY COMPONENTS TO BE RUN FROM NEW PANEL, OVERHEAD IN CEILING SPACE, TO JUNCTION BOX IN CEILING THEN TO FLEXIBLE CABLE DOWN TO EQUIPMENT MAIN POWER CONTROL PANEL. CONFIRM POWER CONNECTION TYPES AND LOCATIONS WITH FINAL EQUIPMENT SHOP DRAWINGS AND EQUIPMENT INSTALLER (HOBART). PROVIDE STRAIN RELIEF (KELLEM GRIP OR EQUIVALENTS) TO INDIVIDUAL FLEX DROPS TO EQUIPMENT AS REQUIRED. CONTRACTOR TO PROVIDE 24" X 4" STAINLESS STEEL WIRE MESH CABLE TRAY FROM CEILING TO CONTROL PANEL FOR SUPPORTING OF POWER CABLES AND PIPING. CABLE TRAY TO BE CABLOFIL OR APPROVED EQUAL. CONFIRM EXACT REQUIREMENTS AND DIMENSIONS WITH DISHWASHER AND CONVERYOR EQUIPMENT MANUFACTURERS
- 3. RELOCATE EXISTING FIRE DETECTOR AS REQUIRED FOR NEW MECHANICAL WORK. COORDINATE WITH MECHANICAL DRAWINGS AND TRADE TO FINALIZE RELOCATION ONSITE. RE-VERIFY DEVICE IF REQUIRED.

PANEL:		P-DW		VOLTS:		208 / 120			MAINS: 200 Amps, Main Breaker Amps						
						PH/Wi	re:	3	1	3			A.I.C.:	TBC	
FED FRO	OM:	DH_PNI	L			TYPE:		BCP				MOUN	NTING:	Surface , NEMA 3R ENCLOSURE	
		LOAD			OCD		CCT P		Ph CCT	OCD		LOAD			
kW	Type	DE	SCRIPTIC	N / LOCAT	TION	Α	Р	NO.		NO.	Р	Α	Type	DESCRIPTION / LOCATION	kW
3.49	EQU	DIGUMAQUED, MOTOD AND				1	a	2			EQU		3.57		
3.49	EQU	DIS	DISHWASHER - MOTOR AND CONTROLS (1TB)		40	3	3	b	4	3	40	EQU	DISHWASHER - DUAL RINSE (4TB)	3.57	
3.49	EQU	55525 (115)				5	С	6			EQU		3.57		
5.77	EQU	DISHWASHER - ELECTRIC TANK HEAT (2TB)		70	3	7	а	8	3	60	EQU	DISHWASHER - ELECTRIC BOOSTER (5TB)	5.00		
5.77	EQU					9	b	10			EQU		5.00		
5.77	EQU		(213)				11	С	12			EQU	(- · - /	5.00	
5.77	EQU	DIGINA.	DISHWASHER - ELECTRIC TANK HEAT (3TB)		70	3	13	a	14	2	15	EQU	CONVEYOR BELT- MAIN CONTROL PANEL	1.00	
5.77	EQU	DISHWAS					15	b	16			EQU		1.00	
5.77	EQU		10	. = ,				17	С	18					
								19	a	20					
								21	b	22					
								23	С	24					
								25	а	26					
								27	b	28					
								29	С	30					
								31	а	32					
								33	b	34					
								35	С	36					
								37	a	38					
								39	b	40					
								41	С	42					
Phase kW		a b c total KW		Max. Demand			54		kW	Notes:					
Connected Load		24.6	24.6	23.6	72.8	Min. Eq	uip	208	٧,	3	PH				
Summer Demand		18.4	18.4	17.7	54.6	100%	Rated	OK		151	Α				
Winter Der	mand	18.4	18.4	17.7	54.6	80%	Rated	OK		189	Α				

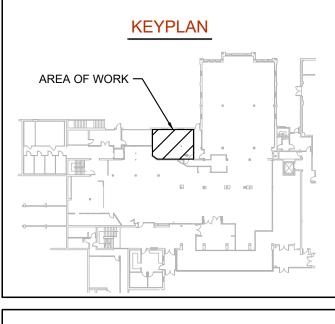
ELECTRICAL LEGEND			
SYMBOL	DESCRIPTION		
EX	EXISTING TO REMAIN		
REM	REMOVE EXISTING		
REL	RELOCATE EXISTING		
N	NEW		
-× ×	DEMOLITION		
	EXISTING		
	NEW		
	ELECTRICAL PANEL		
Ø	CONNECTION TO MOTOR OR MOTORIZED PIECE OF EQUIPMENT		
	DIRECT CONNECTION		
Z h	FUSED DISCONNECT		
마	NON-FUSED DISCONNECT		
Ф	GFI RECEPTACLE		
4	EMERGENCY LIGHT HEADS - SINGLE AND DOUBLE		
	RECTANGULAR LIGHT FIXTURE		
JB	JUNCTION BOX		

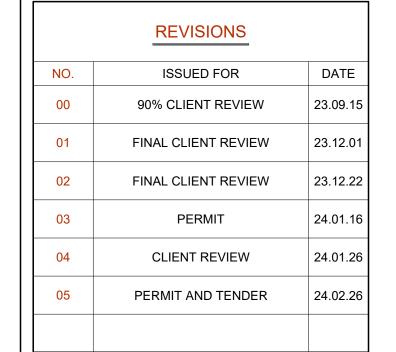
EXISTING DISHWASHER EXHAUST -

FAN TO REMAIN. PROTECT

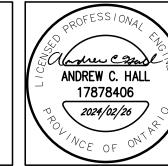


KINGSTON: 1471 John Counter Blvd. Unit 301 Kingston, ON K7M 8S8 P 613.900.0845 KITCHENER: 210-137 Glasgow Street, Office #141 Kitchener, ON N2G 4X8 P 519.472.7640 W www.callidus.ca E info@callidus.ca









ACH REVIEWED CHECKED PROJECT

SPO DRAWN

WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

CE-5716

DRAWING TITLE

GROUND FLOOR PLANS, SCHEDULES, NOTES, & LEGEND

DRAWING NUMBER

E1 OF 2

ELECTRICAL GENERAL REQUIREMENTS

GENERAL CONDITIONS

- ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO ELECTRICAL SAFETY CODE, THE LOCAL ELECTRICAL SAFETY AUTHORITY INSPECTION OFFICE, THE ONTARIO BUILDING CODE, THE ONTARIO FIRE CODE AND ANY OTHER LOCAL REGULATIONS HAVING JURISDICTION OVER THE WORK OF THIS TRADE.
- 2. BEFORE TENDERING, EXAMINE THE SITE AND ALL DRAWINGS AND SPECIFICATIONS OF ALL TRADES AND BE FAMILIAR WITH THE WORK OF THIS TRADE. NO EXTRAS WILL BE ALLOWED FOR THE FAILURE TO DO SO.
- 3. ALL ELECTRICAL WORK SHALL COMPLY WITH CSA ELECTRICAL BULLETIN APPLICABLE AT TENDER CLOSE. WHERE SPECIFIC BULLETINS ARE NOT NAMED THEY ARE STILL CONSIDERED AN INTEGRAL PART OF THIS SPECIFICATION.
- 4. PROVIDE ALL GROUNDING AND BONDING TO GROUND REQUIRED, REGARDLESS IF NOT SHOWN ON THE DRAWINGS. GROUNDING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ONTARIO ELECTRICAL SAFETY CODE.
- PROVIDE ALL NEW MATERIALS HAVING CSA, CUL, WARNOCK HERSEY OR OTHER APPROVAL AGENCY LABEL AND LISTING. ALL WORKMANSHIP BY THIS TRADE SHALL BE FIRST CLASS, CONFORMING TO INDUSTRY STANDARD PRACTICES FOR SAFETY, ACCESSIBILITY, DURABILITY AND NEATNESS FOR ACCEPTANCE BY THE OWNERS' REPRESENTATIVES.
- ARRANGE AND PAY FOR ALL PERMITS AND INSPECTION FEES REQUIRED FOR THE WORK OF THIS TRADE. SUBMIT TO THE LOCAL ELECTRICAL INSPECTION DEPARTMENT AND/OR ELECTRICAL SUPPLY AUTHORITY ANY AND ALL DRAWINGS REQUIRED FOR PERMITS, FEES, APPROVALS, EXAMINATIONS AND SERVICES.
- PROVIDE ALL CUTTING AND PATCHING REQUIRED FOR THE WORK OF THIS TRADE. ALL CUTTING AND PATCHING SHALL BE PERFORMED BY QUALIFIED TRADES PERSONS. INCLUDE ALL COSTS FOR CUTTING AND PATCHING RELATED TO THE WORK OF THIS TRADE IN THE TENDER PRICE.
- 8. TOUCH-UP ALL SHOP PAINTED EQUIPMENT DAMAGED IN TRANSIT OR DURING INSTALLATION TO MATCH ORIGINAL SHOP FINISH.
- 9. AVOID ACCUMULATION OF DEBRIS AS THE WORK PROGRESSES. ON COMPLETION OF THE CONSTRUCTION AND PRIOR TO THE FINAL INSPECTION AND ACCEPTANCE BY THE OWNER, CLEAN UP AND REMOVE FROM THE SITE ALL SCRAP MATERIALS RESULTING FROM THE WORK OF THIS TRADE.
- 10. CO-ORDINATE THE WORK OF THIS TRADE WITH ALL OTHER TRADES ON THE JOB SO THAT THE WORK MAY PROGRESS WITHOUT ANY DELAY.
- 11. PRIOR TO THE FINAL INSPECTION, CLEAN ALL ELECTRICAL EQUIPMENT. CLEAN ALL CONSTRUCTION DUST AND DIRT FROM INSTALLED EQUIPMENT AT THE END OF THE LIOR
- 12. UPON COMPLETION OF THE WORK, PROVIDE THE FINAL UNCONDITIONAL CERTIFICATE OF ACCEPTANCE FROM THE LOCAL ELECTRICAL SAFETY AUTHORITY INSPECTION OFFICE.
- 13. PROVIDE A ONE YEAR GUARANTEE ON ALL MATERIALS, AND LABOUR FROM THE DATE OF ACCEPTANCE BY THE OWNER. COMPLETE ALL WARRANTY REGISTRATION DOCUMENTATION ON BEHALF OF THE BUILDING OWNER. SUBMIT COPIES OF COMPLETED DOCUMENTATION IN OPERATIONS AND MAINTENANCE MANUALS.
- 14. ON MULTI-PHASE FEEDERS AND PANELS, ADJUST THE PHASE LOADING SO AS NOT TO EXCEED A PHASE IMBALANCE OF 10%, LINE TO LINE, UNDER NORMAL OPERATING CONDITIONS OF THE FEEDER OR PANEL.
- 15. SUBMIT SHOP DRAWINGS IN ELECTRONIC PDF FORMAT FOR THE FOLLOWING EQUIPMENT: BREAKERS, FIRE ALARM DEVICES, EXIT AND EMERGENCY LIGHTING UNITS, ETC. THE SHOP DRAWINGS SHALL BEAR THE NAME OF THE MANUFACTURER, THE MANUFACTURER'S CATALOGUE NUMBER, AND THE CONSULTANT'S DESIGNATION, ALONG WITH ALL PERTINENT INFORMATION PERTAINING TO THAT SPECIFIC PIECE OF EQUIPMENT.
- 16. ALL ELECTRICAL EQUIPMENT SHALL BE MOUNTED PLUMBED TRUE.
- 17. OBTAIN ONE SET OF PRINTS FOR AS-BUILT PURPOSES AND RECORD ON THESE PRINTS ALL CHANGES TO THE DESIGN DRAWINGS TO REFLECT THE ACTUAL CONSTRUCTION CONDITIONS, EQUIPMENT LOCATIONS AND EQUIPMENT SPECIFICATIONS. AT THE END OF CONSTRUCTION, AND PRIOR TO THE FINAL INSPECTION BY THE CONSULTANT, TRANSFER AS-BUILT MARK-UPS TO AUTOCAD/REVIT AND SUBMIT AUTOCAD AND PDF FILES TO THE CONSULTANT SUBMIT FOR REVIEW. SUBMIT FINAL CAD FILES OF THE AS-BUILT DRAWINGS ON USB KEY. NO FINAL INSPECTION WILL BE PERFORMED UNTIL THESE DRAWINGS ARE SUBMITTED.
- 18. PREPARE THREE SETS OF OPERATIONS AND MAINTENANCE MANUALS FOR PRESENTATION TO THE OWNER. PROVIDE COPIES OF ALL REVIEWED SHOP DRAWINGS FOR THE PROJECT, MANUFACTURER'S INSTALLATION INSTRUCTIONS, MANUFACTURER'S MAINTENANCE INSTRUCTIONS, AND COPIES OF ALL TEST DATA, VERIFICATION CERTIFICATES, MANUFACTURER'S WARRANTIES AND GUARANTEES, THE GUARANTEE OF THIS TRADE INDICATING START DATE AND END DATE AS WELL AS CONTRACT NUMBERS.
- 19. WHERE THE WORD PROVIDE IS USED IN THESE SPECIFICATIONS OR ON THE DRAWINGS, IT HAS THE MEANING "PROVIDE AND INSTALL COMPLETE WITH ALL ASSOCIATED MOUNTING HARDWARE AND CONNECTIONS".
- 20. CHANGES IN THE WORK
- 20.1. CHANGES TO THE CONTRACT REQUIRING ADDITIONS TO OR DELETIONS FROM THE WORK OF THIS DIVISION SHALL BE CARRIED OUT UPON WRITTEN REQUEST OF THE CONSULTANT. EXTRAS TO THE CONTRACT OR CREDITS SHALL BE SUBMITTED WITH A COMPLETE COST BREAKDOWN AS FOLLOWS: MATERIALS, QUANTITIES AND UNIT PRICES FOR ALL EQUIPMENT REQUIRED OR DELETED. UNIT MAN HOURS TOTAL MATERIAL COST. TOTAL MAN HOURS. HOURLY RATE. (REFER TO SUPPLEMENTARY CONDITIONS AND GENERAL CONTRACT). TOTAL OVERHEAD AND PROFIT. (REFER TO SUPPLEMENTARY CONDITIONS AND GENERAL CONTRACT).

CONDUCTORS & RACEWAYS

- 2. DESIGN IS BASED ON COPPER CONDUCTORS EXCEPT WHERE SHOWN ON THE DRAWINGS. ALUMINUM CONDUCTORS MAY BE USED ONLY FOR FEEDERS #6 AWG OR LARGER. SIZE THE ALUMINUM CONDUCTORS TO THE EQUIVALENT AMPACITY OF COPPER CONDUCTORS. CONDUCTORS IN UNDERGROUND RACEWAYS MAY BE RWU90 IN POLYETHYLENE PIPE.
- TERMINATE ALUMINUM FEEDER CONDUCTORS WITH PRESSURE CONNECTORS, AND UTILIZE AN OXIDE PREVENTATIVE SOLUTION "PENETROX" ON ALL BARE SURFACES.
- LUGS TO BE ALUMINUM OR ALUMINUM/COPPER ALLOY ONLY.

 4. ALL CONDUCTORS ARE TO BE INSTALLED IN RACEWAYS AS DESCRIBED BELOW:
- 4.1. IN CONCRETE SLAB, UNDERGROUND BURIED, BELOW SLAB ON GRADE OR EXTERIOR EXPOSED SURFACE RACEWAYS: PVC CONDUIT
- 4.2. INTERIOR SURFACE RACEWAYS, BRANCH CIRCUIT WIRING FROM PANELS, CONCEALED IN ACCESSIBLE CEILINGS AND INTERIOR WALLS OR IN INTERIOR CONCRETE BLOCK CONSTRUCTION: EMT RACEWAYS
- 4.3. IN METAL STUD PARTITION WALLS, BRANCH CIRCUIT WIRING FROM PANELS IN SUITE OR TENANT OCCUPANCIES, IN INTERIOR CONCRETE BLOCK WALLS, FOR FINAL DROPS TO FIXTURES IN CEILING SPACES. (LENGTH NOT TO EXCEED 3M IN THIS APPLICATION): ARMOURED CABLE (BX).
- 4.4. IN WOOD STUD CONSTRUCTION: NMD-7 COPPER CONDUCTORS ARE PERMITTED FOR BRANCH CIRCUIT WIRING AS DIRECTED BY THE ENGINEER.
- 4.5. FOR EXISTING CONSTRUCTION WHERE EXISTING WALLS AND FINISHES ARE TO REMAIN: SURFACE METAL RACEWAYS (SMR)
- 4.6. OBTAIN PERMISSION FROM THE CONSULTANT PRIOR TO INSTALLATION. COLOUR AND SIZE OF RACEWAYS TO BE CONFIRMED WITH CONSULTANT FOR THE SPECIFIC APPLICATION.
- MINIMUM RACEWAY SIZE FOR EXTERIOR U/G BURIED APPLICATION IS 3/4" (19MM).
 MINIMUM BURIES DEPTH IS 36" (900MM) BELOW FINISHED GRADE.
- 6. ALL CONDUIT AND WIRING IS TO BE CONCEALED IN ALL FINISHED AREAS.

SERVICE AND DISTRIBUTION

 DISTRIBUTION SYSTEM IS EXISTING. PROVIDE AND INSTALL NEW EQUIPMENT, AND MODIFY EXISTING DISTRIBTUION AND EQUIPMENT, AS DESCRIBED ON THE DRAWINGS,

- 2. ACCEPTABLE MANUFACTURERS FOR DISTRIBUTION EQUIPMENT INCLUDE:
 EATON-CUTLER HAMMER, AND SCHNEIDER CANADA. PREFERENCE TO MATCH
 PREVALENT EXISTING MANUFACTURER WITHIN FACILITY. SEEK OUT AND REVIEW
 FACILITY STANDARDS FOR ANY ADDITIONAL REQUIREMENTS.
- 3. FUSES SHALL BE BUSS OR APPROVED EQUAL, OF THE CLASS, TYPE AND AMPERE RATING AS SHOWN ON THE DRAWINGS.
- 4. PROVIDE STICK ON LABEL FOR ALL DISCONNECT SWITCHES, STARTERS, AND PANELS TO CLEARLY INDICATE EQUIPMENT CONTROLLED OR AREA SERVED. INDICATE FUSE SIZE AND TYPE ON ALL FUSED DISCONNECTS.
- 5. PROVIDE CIRCUIT BREAKER PANELS OF THE TYPE, WITH AMPERE CAPACITY, NUMBER OF POLES, BRANCH BREAKER CAPACITY, ETC., AS SPECIFIED IN PANEL SCHEDULE. MOUNTING TO BE AS INDICATED.
- 6. ALL BUSBARS TO BE TIN PLATED COPPER. PROVIDE COPPER GROUND BUS IN EACH PANEL BOARD.
- 7. PROVIDE A TYPEWRITTEN DIRECTORY CARD ON THE INSIDE OF THE PANEL DOOR IN A
 METAL FRAME WITH CLEAR PLASTIC COVER
- 8. ALL BRANCH BREAKERS SHALL BE THERMAL-MAGNETIC TRIP INDICATED, AMBIENT
- 9. ALL SURFACE MOUNTED EQUIPMENT SHALL BE MOUNTED ON 19 MM (3/4"), FIRE RATED, PLYWOOD BACKBOARD.

TEMPERATURE COMPENSATED AND BOLTED TO THE BUS BAR.

WIRING FOR OTHER TRADES

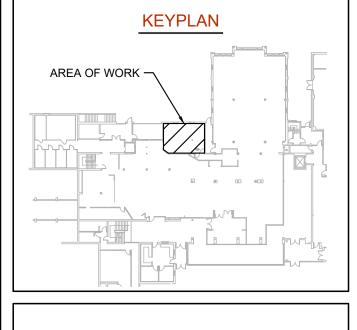
- 1. PROVIDE POWER WIRING FOR ELECTRICALLY OPERATED EQUIPMENT OF OTHER TRADES AS NOTED ON THE DRAWINGS OR DEFINED IN THIS SPECIFICATION. PROVIDE ALL STARTERS AND DISCONNECT SWITCHES FOR A COMPLETE AND OPERATING SYSTEM
- 2. PROVIDE POWER AND WIRING TO THE ELECTRICALLY OPERATED EQUIPMENT AS DETAILED IN WIRING FOR MECHANICAL EQUIPMENT SCHEDULE. THIS LIST DOES NOT DETAIL THE SCOPE OF WORK FOR EACH PIECE OF EQUIPMENT. CO-ORDINATE WITH MECHANICAL CONTRACTOR FOR THE EXACT POWER REQUIREMENTS OF THE EQUIPMENT TO BE SUPPLIED TO THE PROJECT. DO NOT PROCEED WITH THE INSTALLATION OF ANY OF THE ELECTRICAL ROUGH-IN UNTIL THE POWER SUPPLY REQUIREMENTS AND THE POINTS OF CONNECTION HAVE BEEN ESTABLISHED FROM THE SHOP DRAWINGS FOR THE EQUIPMENT OF MECHANICAL CONTRACTOR.
- 3. PROVIDE POWER WIRING TO ALL CONTROL DEVICES SUPPLIED BY MECHANICAL CONTRACTOR AND OPERATING AT 100 VAC OR GREATER.
- 4. PROVIDE CONTROL WIRING FOR ALL CONTROL DEVICES WITH OPERATING VOLTAGES OF THE CONTROLS GREATER THAN 100VAC.
- 5. PROVIDE RACEWAYS/CONDUITS FOR ALL CONTROL WIRING AS IDENTIFIED ON THE DRAWINGS FOR USE BY MECHANICAL CONTRACTOR. PROVIDE OUTLET BOXES AS DIRECTED BY MECHANICAL CONTRACTOR FOR ALL TERMINAL POINTS IN THE CONTROL SYSTEM. CO-ORDINATE WITH MECHANICAL CONTRACTOR.

RENOVATIONS ON EXISTING BUILDING

- 1. RENOVATIONS SHALL BE MADE ON THE EXISTING BUILDING AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN. REMOVE ALL EXISTING LUMINARIES, OUTLET BOXES, SWITCHES, RECEPTACLES, ETC. AS INDICATED ON DRAWINGS. ALL EQUIPMENT REMOVED AND NOT REUSED SHALL REMAIN THE PROPERTY OF THE OWNER UNLESS SPECIFICALLY NOTED OTHERWISE. ALL EQUIPMENT INSTALLED IN RENOVATED AREAS SHALL BE NEW. ELECTRICAL TRADE WILL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR ELECTRICAL INSTALLATION. ALL CONDUIT SHALL BE INSTALLED CONCEALED IN FINISHED AREAS UNLESS SPECIFICALLY NOTED OTHERWISE.
- NEW CONDUCTORS SHALL BE INSTALLED TO THE NEAREST OUTLET AS REQUIRED FOR EQUIPMENT THAT IS RELOCATED. INSTALLATION OF JUNCTION BOXES FOR SPLICING PURPOSES SHALL NOT BE PERMITTED UNLESS SPECIFICALLY CALLED FOR.
- PROVIDE ALL CONDUCTORS REQUIRED TO RECONNECT EXISTING CIRCUITS WHERE REQUIRED THAT MAY BE DISRUPTED DUE TO RENOVATIONS ON THE EXISTING FLOOR.
- 4. PROVIDE NEW BREAKERS WHERE REQUIRED IN EXISTING PANELS TO PICK-UP ADDITIONAL CIRCUITS INDICATED ON THE DRAWINGS.
- 5. COORDINATE WITH MECHANICAL DRAWINGS AND SAFELY DISCONNECT AND REMOVE ALL MOTOR/MECHANICAL EQUIPMENT BEING DEMOLISHED. REMOVE UNUSED WIRING/CONNECTION BACK TO SOURCE PANEL. EXTEND WIRING/CONNECTION OF ALL MOTOR/MECHANICAL EQUIPMENT BEING RELOCATED. PROVIDE PROPER JUNCTION BOX AT EACH POINT OF EXTENSION.

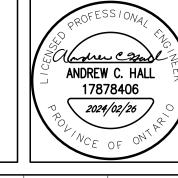
WIRES AND CABLES SHALL COMPLY WITH OBC 3.1.5.18.





	REVISIONS	
NO.	ISSUED FOR	DATE
00	90% CLIENT REVIEW	23.09.15
01	FINAL CLIENT REVIEW	23.12.01
02	FINAL CLIENT REVIEW	23.12.22
03	PERMIT	24.01.16
04	CLIENT REVIEW	24.01.26
05	PERMIT AND TENDER	24.02.26





DESIGN SPO DRAWN SPO/AV
CHECKED ACH REVIEWED ACH

PROJECT

WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

CE-5716

DRAWING TITLE

ELECTRICAL
SPECIFICATIONS & SINGLE
LINE DIAGRAM

DRAWING NUMBER

E2 OF 2

