

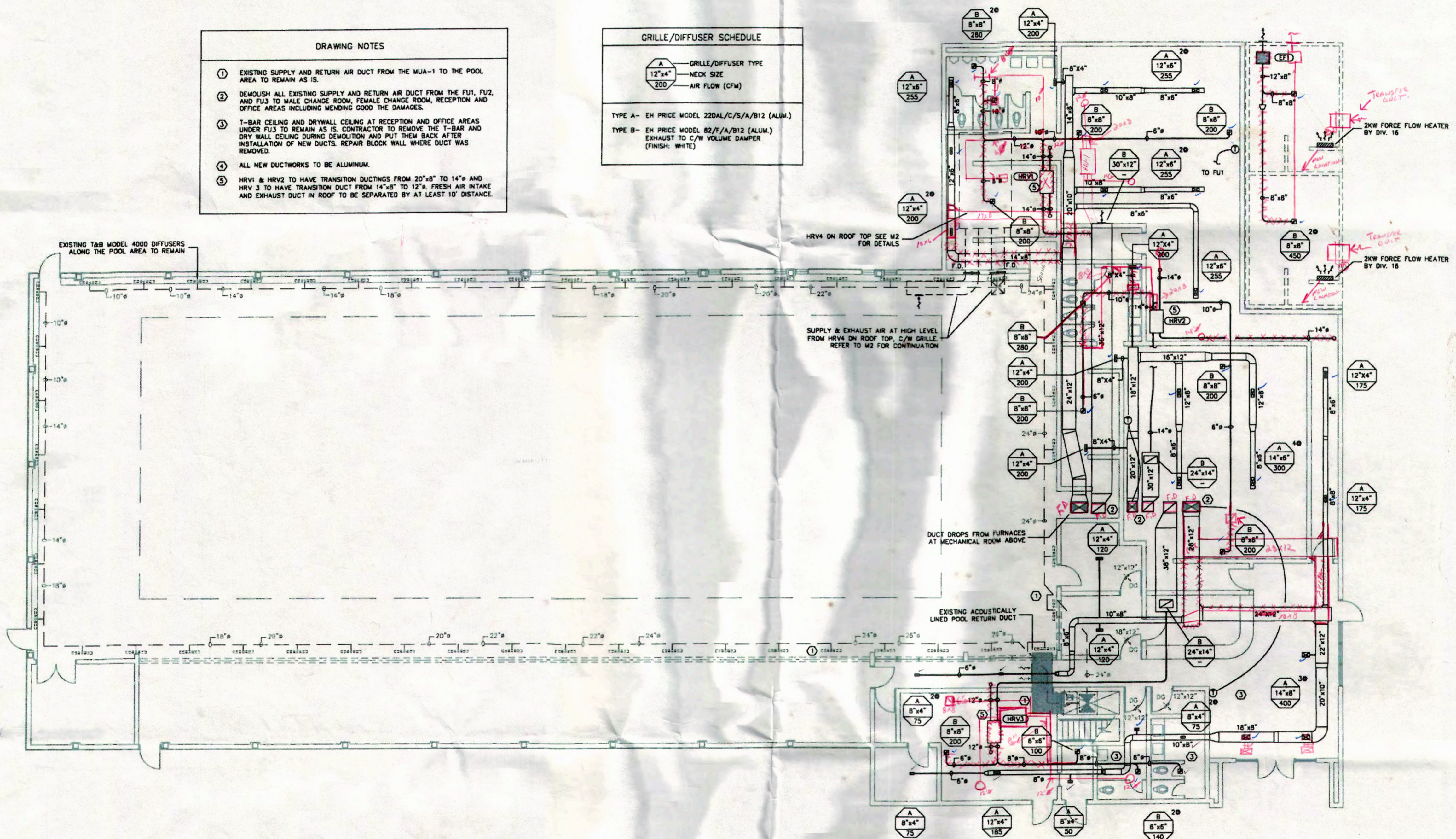
Aquaplex 2013 Drawings

- DRAWING NOTES**
- EXISTING SUPPLY AND RETURN AIR DUCT FROM THE MUA-1 TO THE POOL AREA TO REMAIN AS IS.
 - DEMOLISH ALL EXISTING SUPPLY AND RETURN AIR DUCT FROM THE FU1, FU2, AND FU3 TO MALE CHANGE ROOM, FEMALE CHANGE ROOM, RECEPTION AND OFFICE AREAS INCLUDING MENDING GOOD THE DAMAGES.
 - T-BAR CEILING AND DRYWALL CEILING AT RECEPTION AND OFFICE AREAS UNDER FU3 TO REMAIN AS IS. CONTRACTOR TO REMOVE THE T-BAR AND DRY WALL CEILING DURING DEMOLITION AND PUT THEM BACK AFTER INSTALLATION OF NEW DUCTS. REPAIR BLOCK WALL WHERE DUCT WAS REMOVED.
 - ALL NEW DUCTWORKS TO BE ALUMINUM.
 - HRV1 & HRV2 TO HAVE TRANSITION DUCTINGS FROM 20"x8" TO 14"x6" AND HRV3 TO HAVE TRANSITION DUCT FROM 14"x8" TO 12"x6". FRESH AIR INTAKE AND EXHAUST DUCT IN ROOF TO BE SEPARATED BY AT LEAST 10' DISTANCE.

GRILLE/DIFFUSER SCHEDULE

	A - GRILLE/DIFFUSER TYPE
	B - NECK SIZE
	C - AIR FLOW (CFM)

TYPE A - EH PRICE MODEL 220AL/C/S/A/B12 (ALUM.)
 TYPE B - EH PRICE MODEL 82/F/A/B12 (ALUM.)
 EXHAUST TO C/W VOLUME DAMPER (FINISH: WHITE)



1 MAIN FLOOR PLAN - H.V.A.C.
 M1 SCALE 1/8"=1'-0"

- NOTES**
- DO NOT SCALE THIS DRAWING
 - THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIM'S, DATUMS AND ELEVATIONS AND REPORT ANY ERRORS AND OMISSIONS TO ENGINEER PRIOR TO COMMENCING WITH RELATED WORK
 - THIS IS A COPYRIGHT AND SHALL NOT BE REPRODUCED WITHOUT WRITTEN PERMISSION

ISSUES & REVISIONS

NO.	DESCRIPTION	DATE
1	ISSUED FOR TENDER	13/07/05
2	ISSUED FOR TENDER/REV 1	13/07/18
3	ISSUED FOR TENDER/REV 2	13/07/24
4	ISSUED FOR TENDER/REV 3	13/08/28

SEALS:

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PROJECT:

AQUAPLEX RENOVATIONS

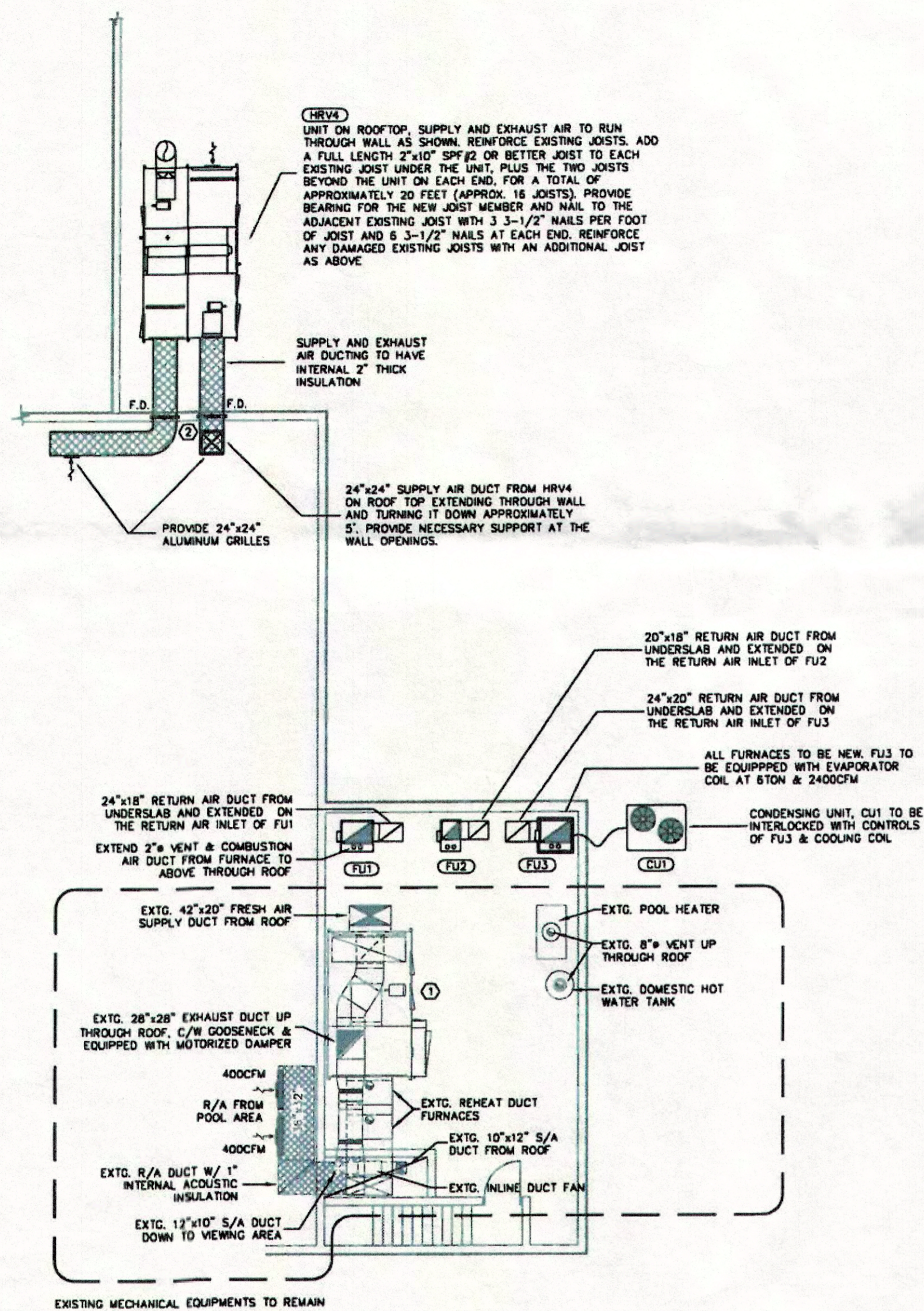
PROJECT #:	DATE:
D13-065	13/05/01
DRAWN:	CHECKED:
EJ	LK
SCALE:	FILE:
AS NOTED	-

TITLE:

MAIN FLOOR PLAN
 H.V.A.C. LAY-OUT

DRAWING:

M1



1 MECHANICAL ROOM - H.V.A.C. EQUIPMENT LAY-OUT
M2 SCALE 1/8"=1'-0"

DRAWING NOTES:

- EXISTING MAKE-UP AIR TO BE RETROFITTED. THE FOLLOWING WOULD BE THE SCOPE OF WORK:
1.1 REPLACE DAMPER MOTORS AND CONTROLLERS.
1.2 INSTALL NEW HUMIDISTAT AND ROOM TEMPERATURE CONTROLS.
1.3 INSTALL NEW GAS VALVES AND VFD'S.
1.4 IMPLEMENT FAN SPEED CONTROL ON ROOM HUMIDITY AND TEMPERATURE CONTROL.
- PROVIDE STRUCTURAL SUPPORT WHERE THE DUCT ENTERING INTO THE POOL FROM HRV-4.
- ALL NEW DUCTWORKS TO BE ALUMINUM.
- RELOCATE EXISTING PLUMBING VENT AT LEAST 10' OFF THE INTAKE OF ALL HRV'S.

NOTES

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5		
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PROJECT:

AQUAPLEX RENOVATIONS

PROJECT #: D13-065 DATE: 13/05/01
DRAWN: EJ CHECKED: LK
SCALE: AS NOTED FILE: -

TITLE:
MACHINE ROOM H.V.A.C. LAY-OUT & SCHEDULES

DRAWING:
M2

FURNACE SCHEDULE																
NO.	MANUFACTURER MODEL	HEATING CAPACITY (MBH)		COOLING CAPACITY (MBH)		WEIGHT (LBS)	BLOWER DATA				ELECTRICAL DATA				REMARKS	
		HI-ALT. INPUT	MBH OUTPUT	SENS.	TOTAL		CFM	ESP "W.G.	ELECTRICAL		MCA	FLA	MOCP	V/PH/HZ		FEEDERS
									HP	V/PH/HZ						
FU1	ENGINEERED AIR XE-225-CF	202.5	162	-	-	600	2100	0.5	3/4	-	-	-	-	208/3/60	SEE ELECTRICAL	LOCATION - MECHANICAL ROOM (DWG. M2) SEE NOTES: ②③
FU2	ENGINEERED AIR XE-130-CF	-	-	-	-	350	1800	-	1/2	-	-	-	-	208/3/60	SEE ELECTRICAL	LOCATION - MECHANICAL ROOM (DWG. M2) SEE NOTES: ②③
FU3	ENGINEERED AIR XE-225-CF	202.5	162	-	-	600	2400	0.5	3/4	-	-	-	-	208/3/60	SEE ELECTRICAL	LOCATION - MECHANICAL ROOM (DWG. M2) SEE NOTES: ①②③

NOTES:
 ① PROVIDE A BARRIER CASED CAVTCOL4 FOR COOLING FOR FU3. INTERLOCK FU3 WITH CONDENSING UNIT CU1 ON ROOF TOP.
 ② UNITS TO COME WITH PROGRAMMABLE THERMOSTAT TO BE LOCATED WHERE INDICATED ON DRAWINGS.
 ③ TO BE INTERLOCKED WITH BMS CONTROLS.

CONDENSING UNIT SCHEDULE																
NO.	MANUFACTURER MODEL	HEATING CAPACITY (-)		COOLING CAPACITY (MBH)		WATER FLOW (GPM)	BLOWER DATA				ELECTRICAL DATA				REMARKS	
		INPUT	OUTPUT	SENS.	TOTAL		CFM	ESP "W.G.	ELECTRICAL		MCA	FLA	MOCP	V/PH/HZ		FEEDERS
									HP	V/PH/HZ						
CU1	CARRIER 38AU207	-	-	-	72,000	-	-	-	-	-	-	-	-	208/230 3/60	SEE ELECTRICAL	SEE NOTES: ①②③

NOTES:
 ① UNITS TO BE PURON REFRIGERANT.
 ② UNITS TO BE MOUNTED ON ROOF, WHERE INDICATED ON DRAWINGS. INTERLOCK CONDENSING UNIT WITH FU3.
 ③ TO BE INTERLOCKED WITH BMS CONTROLS.

HRV SCHEDULE																
NO.	MANUFACTURER MODEL	HEATING CAPACITY (MBH)		COOLING CAPACITY (MBH)		WEIGHT (LBS)	BLOWER DATA				ELECTRICAL DATA				REMARKS	
		HI-ALT. INPUT	MBH OUTPUT	SENS.	TOTAL		CFM	ESP "W.G.	ELECTRICAL		MCA	FLA	MOCP	V/PH/HZ		FEEDERS
									HP	V/PH/HZ						
HRV1	VANEE 12LCEACXSN	-	-	-	-	208	1180	0.10	1/3 HP	-	-	11.7	-	115/1/60	SEE ELEC.	SEE NOTE: ①②③ (DWG. M1)
HRV2	VANEE 12LCEACXSN	-	-	-	-	208	880	0.60	1/3 HP	-	-	11.7	-	115/1/60	SEE ELEC.	SEE NOTE: ①②③ (DWG. M1)
HRV3	VANEE 8LCEAWKSN	-	-	-	-	170	580	0.60	1/4 HP	-	-	5.7	-	115/1/60	SEE ELEC.	SEE NOTE: ①②③ (DWG. M1)
HRV4	ENGINEERED AIR LMA4/HSP	-	-	-	-	4000	4000	0.75	5	-	-	34.95	-	208/3/60	SEE ELEC.	SEE NOTE: ①②③④ (DWG. M2)

NOTES:
 ① UNITS TO RUN VIA TIME CLOCK. SET TIME CLOCK TO ACTIVATE ERV/HRV UNITS 1HR PRIOR TO OPERATING HOURS AND DE-ACTIVATE 1HR AFTER OPERATING HOURS.
 ② EXTEND DRAIN LINE TO EXISTING FLOOR DRAIN AND/OR LAVATORY DRAIN.
 ③ TO BE INTERLOCKED WITH BMS CONTROLS.
 ④ HRV4 TO BE EQUIPPED WITH ROOF CURB TO BE AS PER MANUFACTURER'S SPECIFICATIONS.

EXHAUST FAN SCHEDULE											
TAG	FAN DETAILS			FAN PERFORMANCE				ELECTRICAL			REMARKS
	LOCATION	DESCRIPTION	MANUFACTURER & MODEL	CFM	STAT. PR. " W.G.	RPM	HP/WATTS	MOCP	V/PH/HZ		
EF1	CHEMICAL RM DWNG. M1	EXHAUST FAN, INLINE	BROAN MODEL L900L	900	0.10	810	306WATTS	-	120/1/60	NOTES: ①	

NOTES:
 ① TO RUN FROM WALL SWITCH.

THE FOLLOWING SPECIFICATIONS SHALL BE READ IN CONJUNCTION WITH THE DRAWINGS.
MECHANICAL SPECIFICATION AND REQUIREMENTS

- 1. TENDERS**
- 1.1 ACKNOWLEDGE IN YOUR TENDER DOCUMENTS THAT ALL DRAWINGS, ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, CIVIL, LANDSCAPING, ETC. WERE RECEIVED AND REVIEWED PRIOR TO SUBMITTING A TENDER.
 - 1.2 ACKNOWLEDGE IN YOUR TENDER DOCUMENTS THAT ALL ADDENDA AND CLARIFICATIONS AFFECTING THE WORK WERE RECEIVED, CONFIRM WITH THE DESIGN ENGINEER.
 - 1.3 ACKNOWLEDGE IN YOUR TENDER THAT THE SPECIFICATIONS ATTACHED TO THE DRAWINGS OR BOOK FORM WERE RECEIVED AND SUBSEQUENTLY REVIEWED.
 - 1.4 SHOW IN THE TENDER DOCUMENT AS SEPARATE ITEMS ALL CASH ALLOWANCES INCLUDED IN THE TOTAL TENDER AMOUNT.
 - 1.5 CLEARLY DEFINE ANY ITEMS NOT INCLUDED IN THE TENDER SUBMITTED.
 - 1.6 PROVIDE TO THE DESIGN ENGINEER WITHIN 48 HOURS OF RECEIPT OF LETTER OF INTENT TO PROCEED OR AWARD OF CONTRACT A BREAKDOWN OF THE TENDER AS FOLLOWS:
 - A) SITE SERVICES (WHERE APPLICABLE)
 - B) PLUMBING
 1. MATERIALS
 2. LABOUR
 - C) MECHANICAL
 1. MATERIALS
 2. LABOUR
 - D) SHEET METAL
 1. MATERIALS
 2. LABOUR
 - E) CONTROLS

- 2. SITE CONDITIONS**
- 2.1 BEFORE TENDERING:
 - 2.1.1 REFER TO THE DEVELOPMENT SITE SERVICES PLANS TO CONFIRM GRADES, ELEVATIONS, LOCATIONS AND CONNECTIONS TO ALL SERVICES.
 - 2.1.2 EXAMINE SITE AND OBTAIN ALL CONDITIONS AFFECTING THE WORK OF THIS DIVISION.
 - 2.1.3 OBTAIN ALL ADDENDA AND CLARIFICATIONS.
 - 2.1.4 EXAMINE ALL DRAWINGS, ARCHITECTURAL, STRUCTURAL AND ELECTRICAL AND REPORT ANY DISCREPANCIES AT ONCE AND IN TIME FOR VERIFICATION AND CORRECTION OF DRAWINGS AND SPECIFICATIONS.
 - 2.1.5 EXAMINE ALL ARCHITECTURAL DRAWINGS TO CONFIRM LOCATIONS OF RATED ASSEMBLIES FOR FIRE STOPPING REQUIREMENTS AND FIRE DAMPER INSTALLATION REQUIREMENTS. WHERE FIRE STOPPING IS EXCLUDED FROM THE MECHANICAL TENDERING THE RESPONSIBILITY REMAINS WITH THIS CONTRACTOR TO ADVISE THE GENERAL CONTRACTOR/PROJECT MANAGER OF ALL REQUIREMENTS SPECIFIED IN THIS SPECIFICATION FOR FIRE STOPPING.

- 3. SCOPE**
- 3.1 PROVIDE ALL LABOUR, MATERIALS, EQUIPMENT, SERVICES TO COMPLETE THE WORK OF THE MECHANICAL DIVISION AS SPECIFIED HERE-IN AND AS SHOWN ON THE DRAWINGS.
 - 3.2 COMMISSION ALL SYSTEMS, ADJUST AND BALANCE THE SYSTEMS TO MAKE FULLY OPERATIONAL, PRIOR TO TURN OVER TO THE OWNER.
 - 3.3 AT TURN OVER TO THE OWNER, DEMONSTRATE THE SYSTEMS AND THEIR OPERATION TO THE OWNERS OPERATING PERSONNEL. PROVIDE DETAILED INSTRUCTIONS COMPLETE WITH MANUALS, WRITTEN DESCRIPTIONS AND SEMINARS.
 - 3.4 OBTAIN WRITTEN ACCEPTANCE FROM THE OWNER THAT THE OWNERS OPERATING PERSONNEL ARE FULLY CONVERSANT WITH ALL SYSTEMS.

- 4. SERVICE CONNECTIONS**
- 4.1 EXTEND WATER, SANITARY WASTE AND STORM UTILITY SERVICE TO CONNECTION LOCATIONS DESIGNATED ON THE SITE SERVICES DOCUMENTS. CONFIRM ALL LOCATIONS AND REQUIREMENT PRIOR TO CONSTRUCTION.
- 5. INTENT OF THE DRAWINGS AND SPECIFICATIONS**
- 5.1 INFORMATION REQUIRED IN LAYING OUT THE WORK SHALL BE OBTAINED BY REFERENCE TO ALL CONTRACT DOCUMENTS. CHANGES REQUIRED TO ACCOMMODATE ALL ASPECTS OF THE PROJECT SHALL NOT BE MADE WITHOUT PRIOR APPROVAL.
 - 5.2 DRAWINGS SHOW THE GENERAL LOCATION AND ROUTE OF EQUIPMENT, PIPING, DUCTWORK, ETC. BUT MAY NOT SHOW ALL NECESSARY DETAILS. IT IS THE INTENT, HOWEVER, THAT THE INSTALLATION BE NEAT, STRAIGHT, ETC., MAKING BEST USE OF THE SPACE, CONSIDERING HEADROOM AND PROVIDING SPACE FOR TURNING.
 - 5.3 INSTALLATION SHALL BE COORDINATED WITH ALL TRADES TO PREVENT INTERFERENCE. WITH PRIOR APPROVAL, LOCATIONS AND ROUTES OF SERVICES MAY BE CHANGED PROVIDED THE DESIGN CONDITIONS ARE NOT CHANGED AND NO EXTRA COST IS INVOLVED.

- 6. CONFIRMATION OF INSTALLATION**
- 6.1 CONTRACTOR SHALL PROVIDE WRITTEN CONFIRMATION TO THE DESIGN ENGINEER OF THE FOLLOWING:
 - A) THE DATE OF PROPOSED CONSTRUCTION START FOR INSTALLATION OF MECHANICAL SYSTEMS.
 - B) THE DATE OF UNDERGROUND PIPING COMPLETION PRIOR TO BACKFILLING. NOTIFY THE ENGINEER 48 HOURS PRIOR TO COMPLETION AND ARRANGE FOR A REVIEW OF THE INSTALLATION PRIOR TO COVERING.
 - C) THE DATE OF COMPLETION OF PLUMBING MECHANICAL AND SHEET METAL ROUGH-IN. THIS MAY BE REQUIRED ON A FLOOR BY FLOOR BASIS DEPENDING ON THE PROJECT AND TRIM. ENSURE ALL REQUIRED FIRE STOPPING IS IN PLACE. NOTIFY THE ENGINEER 48 HOURS PRIOR TO COMPLETION AND ARRANGE FOR A REVIEW OF THE INSTALLATION PRIOR TO COVERING.
 - D) THE DATE OF EQUIPMENT START-UP. NOTIFY THE ENGINEER 48 HOURS PRIOR TO START-UP DATE AND TIME.
 - E) THE DATE OF FINAL FINISHING. NOTIFY THE ENGINEER 48 HOURS PRIOR TO COMPLETION AND ARRANGE FOR A REVIEW OF THE INSTALLATION.
 - F) THE DATE OF TURN OVER TO THE OWNER.

- 7. CODES AND REGULATIONS**
- 7.1 ALL WORK IS INTENDED TO COMPLY WITH THE LATEST APPLICABLE PROVINCIAL BUILDING REGULATIONS AND LOCAL CODES. SHOULD THE DOCUMENTS INDICATE CONSTRUCTION METHODS OR MATERIALS OF A LESSER STANDARD, THE WORK SHALL BE DONE TO CONFORM TO CODE STANDARDS. HOWEVER, IN NO INSTANCE SHALL THE STANDARDS ESTABLISHED BY THE DOCUMENTS BE REDUCED.

- 8. PERMITS AND FEES**
- 8.1 PROVIDE ALL NOTICES, OBTAIN THE NECESSARY PERMITS AND PAY ALL FEES WHICH ARE REQUIRED TO COMPLETE THE WORK SPECIFIED HEREIN.
 - 8.2 SUBMIT COPIES OF ALL PERMITS OBTAINED TO THE DESIGN ENGINEER WITHIN 72 HOURS OF RECEIPT.
 - 8.3 FURNISH CERTIFICATES AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH THE CODES AND REGULATIONS OF THE JURISDICTION HAVING JURISDICTION. ALL CHARGES REQUESTED BY THE AUTHORITY SHALL BE MADE AT NO EXTRA CHARGE.

- 9. CO-ORDINATION**
- 9.1 WHERE WORK DEPENDS UPON EQUIPMENT BEING INSTALLED BY OTHERS, CONFIRM LOCATION OF ALL SUCH EQUIPMENT WITH THE TRADE CONCERNED PRIOR TO INSTALLING ANY CONDUIT, DUCTS, ETC. WHERE EQUIPMENT IS BEING SUPPLIED THAT IS BEING BUILT-IN WITH WORK OF OTHER CONTRACTORS, SUPPLY THE EQUIPMENT OR NECESSARY DIMENSIONS TO THE RESPECTIVE TRADES CONCERNED.
 - 9.2 GIVE THE WORK PERSONAL SUPERVISION, LAYOUT OWN WORK, DO ALL NECESSARY LENDING AND MEASURING. FURNISH FULL SIZE AND DETAIL DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED MEASUREMENTS OF DRAWINGS. NO PLEA AS TO THE ACTIONS AND DIRECTIONS OF OTHER THAN THE ENGINEER WILL BE ACCEPTED IN JURISDICTION OF ANY ERROR IN CONSTRUCTION WHERE A DEPARTURE IS MADE FROM THE DRAWINGS, SPECIFICATIONS OR CONTRACT. IT SHALL REMAIN THE DUTY OF THE CONTRACTOR TO TAKE HIS OWN MEASUREMENTS OF THE WORK.
 - 9.3 OBTAIN CLARIFICATION FROM ENGINEER WHERE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS NOT CLEAR.
 - 9.4 CHECK DRAWINGS AND SPECIFICATIONS OF OTHER TRADES FOR CONFLICTS WITH MECHANICAL WORK PRIOR TO COMMENCING WORK. REPORT SUCH CONFLICTS WITH ENGINEER AND OBTAIN A WRITTEN RESOLVE BEFORE PROCEEDING WITH WORK. FAILURE TO REPORT SUCH CONFLICTS WILL RESULT IN THE CONTRACTORS RESPONSIBILITY TO MAKE WHATEVER ADJUSTMENTS THAT ARE REQUIRED.
 - 9.5 ALL ANCHORS, SLEEVES, INSERTS, ETC. REQUIRED FOR THE MECHANICAL PORTION OF THE CONTRACT SHALL BE INSTALLED AT THE PROPER TIME AND WHEN REQUIRED TO CO-ORDINATE JOB PROGRESS WITH OTHER TRADES.

- 11. MOUNTING HEIGHTS**
- 11.1 THE FOLLOWING MOUNTING HEIGHTS ARE TO BE USED AS A GENERAL GUIDE FOR LOCATIONS OF CONTROL DEVICES:

TERMOSTATS	1400MM TO CENTRE FROM FINISHED FLOOR
HUMIDISTATS	1400MM TO CENTRE FROM FINISHED FLOOR
NO/OD DETECTORS	800MM TO CENTRE FROM FINISHED FLOOR
MECHANICAL AREA TEMPERATURE SE	1500MM TO CENTRE FROM FINISHED FLOOR
SPEED CONTROLS	1400MM TO CENTRE FROM FINISHED FLOOR
	1200MM TO CENTRE FROM FINISHED FLOOR
 - 11.2 REFER ALSO TO ELECTRICAL DRAWINGS AND SPECIFICATIONS. MOUNTING HEIGHTS SHALL CO-ORDINATE WITH ELECTRICAL MOUNTING HEIGHTS WHERE APPLICABLE.
 - 11.3 WHERE DEVICES ARE SUBJECT TO DAMAGE BY MOVEMENT OF EQUIPMENT, FURNITURE, VEHICLES, ETC. PROVIDE GUARDS FOR PROTECTION.

- 12. ALTERNATE EQUIPMENT**
- 12.1 IT IS THE INTENTION, WHERE MANUFACTURERS HAVE BEEN SPECIFIED TO ESTABLISH THE STANDARD TO LIMIT THE NUMBER OF MANUFACTURERS BIDDING, BUT SPECIFIED EQUIPMENT MUST FORM THE BASIS OF THE QUOTATION.
 - 12.2 ALTERNATE EQUIPMENT WILL ONLY BE CONSIDERED WHEN COST SAVINGS ARE DETAILED AND SUBMITTED WITH COMPLETE TECHNICAL DESCRIPTIONS, ILLUSTRATIONS OF CONSTRUCTION, CAPACITY, PERFORMANCE, ETC., OF THE EQUIPMENT PROPOSED WITH AN ITEMIZATION OF THE POINTS THAT DIFFER FROM THE SPECIFIED EQUIPMENT.

- 13. SUBMITTAL OF SHOP DRAWINGS**
- 13.1 SHOP DRAWINGS MUST BE SUBMITTED FOR ALL EQUIPMENT AND SYSTEMS TO BE INSTALLED. SUBMIT ALL SHOP DRAWINGS WITHIN 45 DAYS OF RECEIPT OF LETTER OF INTENT TO PROCEED OR AWARD OF CONTRACT.
 - 13.2 SHOP DRAWINGS SHALL BE SUBMITTED IN NO LESS THAN SIX (6) COPIES. DIGITAL INFORMATION IS NOT ACCEPTABLE.
 - 13.3 SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING:
 - 3.1 ALL DIMENSIONAL DATA AND PERTINENT INFORMATION REQUIRED FOR ROUGHING-IN AND INSTALLATION.
 - 3.2 PRIOR TO FORWARDING SHOP DRAWINGS TO THE ENGINEER FOR REVIEW THE CONTRACTOR SHALL REVIEW THE SHOP DRAWING AND IDENTIFY ALL VARIATIONS TO THE SPECIFICATIONS AND DETAILS. THE CONTRACTOR MUST APPLY A STAMP INDICATING COMPANY NAME, DATE OF REVIEW AND SIGNATURE OF THE COMPANY'S REPRESENTATIVE WHO CARRIED OUT THE REVIEW. THIS STAMP IS REQUIRED TO AVOID A REVIEW FEE THAT WILL BE CHARGED BY THE ENGINEER.
 - 3.3 SHOP DRAWINGS FOR ALL EQUIPMENT MUST BE SUBMITTED WITHIN SIX WEEKS OF AWARD OF CONTRACT OR DATE OF LETTER OF INTENT TO PROCEED.
 - 3.4 ALL TECHNICAL DATA INCLUDING CAPACITY CURVES, GRAPHS, ENGINEERING AND PERFORMANCE CHARTS, ETC. TO ENABLE A COMPLETE CHECK OF EQUIPMENT CAPABILITIES.
 - 3.5 WIRING, PIPING, CONTROLS AND SERVICE CONNECTION DATA FOR ALL TRADES.
 - 3.6 MOTOR SIZE COMPLETE WITH VOLTAGE AND CURRENT RATINGS AND AN INDICATION IF MOTOR SIZES DIFFER FROM THOSE SPECIFIED.
 - 3.7 A LIST OR SUMMARY INDICATING HOW THE SUBMITTED EQUIPMENT DIFFERS FROM THAT SPECIFIED.
 - 3.8 SCHEDULES AS APPLICABLE TO COILS, RADIATORS, GRILLES, ETC.
 - 3.9 JOB NAME, MECHANICAL CONTRACTOR, GENERAL CONTRACTOR, SUPPLIER OR AGENT, MANUFACTURER, CONSULTANT.
 - 3.10 DETAILS OF EQUIPMENT WARRANTIES DULY EXECUTED FOR THE PERIOD BEGINNING AT FINAL ACCEPTANCE OF THE OWNER.
 - 13.4 PRIOR TO SUBMISSION TO THE DESIGN ENGINEER THE MECHANICAL CONTRACTOR SHALL REVIEW THE SHOP DRAWINGS FOR COMPLIANCE TO THE SPECIFICATIONS SHALL APPLY THE CONTRACTOR'S STAMP INDICATING SUCH REVIEW HAS BEEN CARRIED OUT AND THE PERSON WHO PERFORMED THE REVIEW.

- 14. GUARANTEE**
- 14.1 GUARANTEE ALL LABOR, MATERIALS, EQUIPMENT ETC. INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF 12 MONTHS AFTER FINAL ACCEPTANCE OF THE COMPLETED CONTRACT.
 - 14.2 EXTENDED WARRANTY AS PROVIDED BY SOME EQUIPMENT SUPPLIERS SHALL IN NO WAY BE VOIDED BY THIS CLAUSE.

- 15. FOREMAN'S SUPERVISION**
- 15.1 ALL THE WORK SHALL BE CARRIED OUT UNDER THE CONTINUOUS SUPERVISION AND RESPONSIBILITY OF A COMPETENT FULL TIME SUPERINTENDENT WITH EXPERIENCE IN WORK OF THIS CLASS AND SIZE.

- 16. MAINTENANCE OF A CLEAN AND SAFE PROJECT**
- 16.1 REMOVE ALL DEBRIS PERTAINING TO THIS PORTION OF THE CONTRACT, AT REGULAR INTERVALS TO MAINTAIN A CLEAN AND SAFE PROJECT.
 - 16.2 ABIDE BY ALL PROVINCIAL AND FEDERAL SAFETY REGULATIONS.

- 17. RECORD DRAWINGS**
- 17.1 AT COMPLETION OF THE PROJECT PROVIDE THE OWNER WITH TWO (2) SETS OF RECORD DRAWINGS.
 - 17.2 SHOW RECORD CONDITIONS WITH RESPECT TO MATERIALS, SIZES, ROUTES AND LOCATION. PLOT LOCATIONS OF ACCESS DOORS, VALVES, DAMPERS, ETC.
 - 17.3 PLOT ACCURATELY ALL UNDERGROUND PIPING, DUCTWORK, ETC. SHOWING INVERT ELEVATIONS, CLEAN-OUTS, ETC.

- 18. OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS**
- 18.1 PREPARE THREE (3) COMPLETE SETS OF OPERATING AND MAINTENANCE INSTRUCTIONS FOR THE MECHANICAL EQUIPMENT AND SYSTEMS AND PRESENT FOR APPROVAL TO THE ARCHITECT AT LEAST TWO MONTHS PRIOR TO PROJECT COMPLETION. THESE INSTRUCTIONS SHALL INCLUDE THE MANUFACTURERS DATA ON ALL EQUIPMENT INSTALLED ON THE PROJECT AND SHALL INCLUDE:
 - 18.1.1 COPY OF ALL APPROVED SHOP DRAWINGS.
 - 18.1.2 CONTRACTORS OWN SUPPLEMENTAL INSTRUCTIONS ON LUBRICATION, FREQUENCY OF MAINTENANCE, ETC.
 - 18.1.3 COPY OF VALVE CHART SHOWING LOCATION AND FUNCTION OF EACH VALVE.
 - 18.1.4 COPY OF AS-BUILT DRAWINGS.
 - 18.1.5 COPY OF AIR AND WATER BALANCE REPORT.
 - 18.1.6 LIST OF ALL SUB-TRADES, SUPPLIERS, ETC. WITH ADDRESSES AND PHONE NUMBERS.
 - 18.1.7 JOB NAME, PRIME MECHANICAL CONTRACTOR AND GENERAL CONTRACTOR.
 - 18.2 ADVISE AND INSTRUCT THE OWNER OR HIS REPRESENTATIVE ON THE LOCATION, FUNCTION AND GENERAL MAINTENANCE AND OPERATION OF ALL EQUIPMENT PARTS INSTALLED.

- 19. TEMPORARY USE OF EQUIPMENT**
- 19.1 MAKE WRITTEN APPLICATION FOR USE OF THE PERMANENT HEATING AND VENTILATION SYSTEM AND AIR CONDITIONING SYSTEMS FOR USE DURING CONSTRUCTION.
 - 19.2 WARRANTY OF EQUIPMENT AND INSTALLATION SHALL NOT BE AFFECTED.
 - 19.3 MAINTAIN EQUIPMENT AND FILTERS DURING PERIOD OF USE, AND INSTALL NEW FILTERS AT TIME OF TURN OVER TO OWNER.

- 20. SYSTEM ACCEPTANCE AND TURN OVER PROCEDURES**
- 20.1 PROVIDE WRITTEN CONFIRMATION TO THE ENGINEERS AND THE OWNER TWO WEEKS PRIOR TO THE DATE WHEN SYSTEMS WILL BE COMPLETE AND READY FOR TURN OVER.
 - 20.2 SUBMIT PRIOR TO TURNOVER A COMMISSIONING REPORT ON EACH ITEM OF THE MECHANICAL EQUIPMENT INSTALLED. COMMISSIONING REPORT SHALL BE COMPLETED BY THE MANUFACTURER AND SHALL INCLUDE ALL INFORMATION PERTINENT TO THE OPERATION OF THE UNIT. REPORT SHALL BE SIGNED BY THE TECHNICIAN RESPONSIBLE FOR THE START-UP PROCEDURE. COMMISSIONING REPORTS SHALL INCLUDE THE FOLLOWING INFORMATION:
 - 20.2.1 WIRING DRAW ON EACH PHASE: MOTORS FOR PUMPS, FANS, COMPRESSORS, ETC.
 - 20.2.2 VOLTAGE ON EACH PHASE: MOTORS FOR PUMPS, FANS, COMPRESSORS, ETC.
 - 20.2.3 RPM: MOTORS, FANS, PUMPS, COMPRESSORS, ETC.
 - 20.2.4 WATER FLOW: PUMPS, COILS, RADIANT PANELS, RADIATION, CHILLERS, HEAT EXCHANGERS, FILTERS, BOILERS, ETC.
 - 20.2.5 AIR FLOW: FANS, COILS, CONDENSING UNIT FILTERS, ETC.
 - 20.2.6 VIBRATION ANALYSIS: INITIAL DEFLECTION, FREQUENCY.
 - 20.2.7 SOUND LEVEL ANALYSIS: SOUND POWER LEVEL, DB EACH BAND.

- 21. EXCAVATION AND BACKFILL**
- 21.1 ALL PROCEDURES FOR EXCAVATION, BACKFILL, REPAIRING OF ROADS AND SIDEWALKS, ETC. IS SPECIFIED IN THE ARCHITECTURAL CONTRACT DOCUMENTS PROVIDE INFORMATION REGARDING TRENCH LOCATIONS AND GRADES AS REQUIRED.
 - 21.2 IT IS THE MECHANICAL CONTRACTORS RESPONSIBILITY UNLESS OTHERWISE INDICATED TO CARRY OUT ALL NECESSARY EXCAVATION, BACKFILL, COMPACTON, ETC. ASSOCIATED WITH THE MECHANICAL INSTALLATION.
 - 21.3 COORDINATE THESE ACTIVITIES WITH THE GENERAL CONTRACTOR/PROJECT MANAGER.

- 22. NAMEPLATES, VALVE TAGS, PIPING AND DUCTWORK IDENTIFICATION**
- 22.1 EACH PIECE OF MECHANICAL EQUIPMENT SHALL BE COMPLETE WITH A LAMINATED NAMEPLATE SECURELY FASTENED IN A CONSPICUOUS PLACE ON THE EQUIPMENT.
 - 22.1.1 THE NAMEPLATE SHALL BE A MINIMUM OF 3/32 (2MM) THICK LAMINATED PHENOLIC PLASTIC. MINIMUM SIZE SHALL BE 4 (100MM) LONG BY 2 (50MM) WIDE WITH MAXIMUM LETTER HEIGHT OF 1/8 (3MM). LETTERS SHALL BE WITH BLACK FACE AND WHITE CENTRE AND WITH 7/32 (5MM) HIGH LETTERING ENGRAVED THROUGH TO THE WHITE LAMINATION.
 - 22.1.2 ALL VALVES SHALL BE PROVIDED WITH TAGS, OTHER THAN VALVES ON CONNECTIONS, INDUCTION UNITS OR OTHER SPACE HEATING, COOLING UNITS AND VALVES ON PLUMBING FIXTURES. PROVIDE A CHART OR CHARTS INDICATING LOCATION, SERVICE AND ZONE OF EACH VALVE. CHARTS SHALL BE SET IN METAL PICTURE FRAMES WITH CLEAR GLASS OR LUCITE FRONT AND FASTENED SECURELY WHERE DIRECTED BY THE CONSULTANT.
 - 22.2 TAGS SHALL BE ROUND OR SQUARE COLOR CODED PHENOLIC PLASTIC WITH ENGRAVED NUMBERS AND/OR LETTERS AS REQUIRED. TAGS SHALL BE A MINIMUM OF 1 INCH (25MM) DIAMETER AND MAGNUM TO SUIT NUMBERING SYSTEM, NUMBERED WITH NOMINAL 1/2 (12MM) HIGH STAMPED LETTERS AND FASTENED SECURELY WITH BRASS 8 HOLEDS OR CHAINS.
 - 22.3 AFTER COMPLETION OF MARKING AND/OR PAINTING, ALL PIPING AND DUCTWORK SHALL BE ISOLATED TO SHOW THE SERVICE AND DIRECTION OF FLOW.

- 23. PIPING HANGERS AND SUPPORTS**
- 23.1 INSTALL ALL PIPING AND EQUIPMENT USING APPROVED HANGERS AND SUPPORTS REQUIRED FOR A SAFE AND TRADEMANLIKE INSTALLATION.
 - 23.2 PIPE HANGERS SHALL BE RING OR CLEVIS TYPE, IN WET/DAMP AREAS (I.E. VEHICLE WASH BUILDING) USE GALVANIZED EQUIPMENT.
 - 23.3 PIPE ROLLS SHALL HAVE CAST IRON ROLLERS, SHAPED TO ACCEPT THE OUTSIDE DIAMETER OF THE INSULATED PIPE.
 - 23.4 RISER CLAMPS SHALL BE INSTALLED ON RESILIENT ACOUSTICAL PADS.
 - 23.5 PLUMB ALL WATER AND DRAIN RISERS.
 - 23.6 SUPPLY AUXILIARY STRUCTURAL MEMBERS WHERE PIPING, DUCTS OR EQUIPMENT MUST BE SUSPENDED BETWEEN THE JOISTS OR BEAMS OF THE STRUCTURE, OR WHERE REQUIRED TO REPLACE INDIVIDUAL HANGER TO ALLOW FOR INSTALLATION OF NEW SERVICES.
 - 23.7 PROVIDE DETAILS AND EXACT LOCATION OF ANCHOR BOLTS.
 - 23.8 HANGERS SHALL BE EITHER CLAMPED TO STEEL BEAMS OR JOISTS, OR ATTACHED TO APPROVED CONCRETE INSETS.
 - 23.9 SUSPENDED PIPING SHALL BE SUPPORTED BY ADJUSTABLE ROD HANGERS SIZED AS FOLLOWS:

PIPE SIZE	HANGER ROD DIAMETER
2 (50MM) AND UNDER	3/8 (9MM)
2-1/2 (63MM) AND 3 (75MM)	1/2 (12MM)
4 (100MM) AND 5 (125MM)	5/8 (16MM)
6 (150MM)	3/4 (19MM)
8 (200MM) TO 12 (300MM)	7/8 (22MM)
 - 23.10 HANGER SPACING FOR PLUMBING AND DRAINAGE SERVICES SHALL COMPLY WITH THE PLUMBING CODE.
 - 23.11 HANGER SPACING FOR FIRE PROTECTION SERVICES SHALL COMPLY WITH THE N.F.P.A. CODES.
 - 23.12 HANGER SPACING FOR OTHER SERVICES SHALL BE AS FOLLOWS:

NOMINAL PIPE DIAMETER	MAXIMUM SPAN UP TO AND INCLUDING 1" (25MM)	7'-0" (21.3M)
	1-1/2" (38MM) AND LARGER	15'-0" (4.57M)
	1-1/2" (38MM) AND LARGER	15'-0" (4.57M)
 - 23.13 HORIZONTAL PIPING 2 (50MM) DIAMETER AND LARGER SHALL BE SUPPORTED BY ADJUSTABLE WROUGHT IRON CLEVIS TYPE HANGERS. SMALLER PIPING SHALL BE SUPPORTED BY ADJUSTABLE SPLIT RING HANGERS OR CLEVIS TYPE HANGERS.
 - 23.14 FOR COLD WATER SERVICES 12MM AND LARGER USE A GALVANIZED STEEL SHIELD BETWEEN INSULATION AND HANGER.
 - 23.15 EXTERIOR MOUNTED COMPONENTS SHALL BE GALVANIZED.
 - 23.16 SUPPORT VERTICAL PIPES AT TOP AND BOTTOM.
 - 23.17 PERFORATED STRAP HANGERS ARE NOT ALLOWED.
 - 23.18 WOUND PIPE INSTALLED ON ROOF WITH PIPE SUPPORTS MANUFACTURED BY PRO PIPE INDUSTRIES.

- 24. TESTING AND BALANCING**
- 24.1 WATER
 - 24.1.1 TEST ALL PLUMBING SYSTEMS IN ACCORDANCE WITH ALL APPLICABLE PLUMBING CODES. TEST AND SUBMIT TEST REPORTS FOR ALL CROSS-CONNECTIONS AND BACKFLOW DEVICES INSTALLED.
 - 24.1.2 REPAIR ANY LEAKS OR DEFECTS AND REPEAT THE TESTS.
 - 24.2 AIR
 - 24.2.1 REPLACE THE COMPLETE AIR SYSTEM INCLUDING AIR VOLUMES AND CONTROL SETTINGS UNDER MAXIMUM SYSTEM PRESSURE DROP CONDITIONS (FILTER AT REPLACEMENT CONDITION). THE ENTIRE SYSTEM SHALL BE TESTED FOR NOISE, TIGHTNESS OF JOINTS AND PROPER FUNCTIONING OF THE SYSTEM. NOISE TESTS SHALL BE MADE UNDER MINIMUM SYSTEM PRESSURE DROP CONDITIONS (HIGHEST AIR VELOCITIES AND CLEAN FILTER CONDITIONS). THIS SECTION SHALL MAKE ALL NECESSARY ALTERATIONS AND REPEAT THE TESTS UNTIL SATISFACTORY OPERATION IS ACHIEVED.
 - 24.2.2 ADJUST MINIMUM OUTSIDE AIR CONTROLS AND ADJUST RETURN AIR AND EXHAUST AIR DAMPER LINKAGES TO ENSURE CORRECT AIR QUANTITIES.
 - 24.2.3 THE CONTRACTOR SHALL EMPLOY AN INDEPENDENT BALANCING COMPANY TO BALANCE THE AIR SYSTEM.
 - 24.2.4 THE INDEPENDENT BALANCING COMPANY SHALL MEASURE AND REPORT UPON THE VOLUME AT EACH DIFFUSER, REGISTER AND GRILLE. REPORT WILL ALSO SHOW THE AIR QUANTITY HANDLED BY EACH FAN, THE STATIC PRESSURE UPSTREAM AND DOWNSTREAM OF EACH FAN AND THE AIR SPEED AND THE MOTOR CURRENT. ALSO TO BE REPORTED UPON ARE THE AIR FLOW AT OUTDOOR RETURN AND EXHAUST AIR DAMPERS UNDER CONDITIONS OF MINIMUM OUTDOOR AIR. INCLUDE THE COST TO CHANGE DUCT COMPONENTS TO REDUCE/INCREASE FAN SPEED AS REQUESTED.

- 25. PIPES AND FITTINGS**
- 25.1 DOMESTIC WATER
 - 25.1.1 INTERIOR ABOVE GRADE
 - 25.1.1.1 TYPE 1 HARD COPPER WITH WROUGHT COPPER, BRONZE OR CAST BRONZE FITTINGS. SOLDED JOINTS TO BE WITH 85/15 TIN/ANTIMONY SOLDER. ALL MAINS, HORIZONTAL AND VERTICAL RISERS, SHALL BE INSTALLED USING COPPER PIPING.
 - 25.1.2 SANITARY WATER AND STORM
 - 25.1.2.1 INTERIOR ABOVE GRADE
 - 25.1.2.1.1 MEDIUM WEIGHT CAST IRON OR DWV COPPER. JOINTS MECHANICAL, CALKED, CAST BRONZE WITH 50/50 LEAD/TIN SOLDER.
 - 25.1.2.1.2 SYSTEM IS PVC DWV PLASTIC PIPING IN COMPLIANCE WITH CAN/ULC S102.2 WHERE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION.
 - 25.1.2.1.3 SYSTEM IS 1.5-3.0" PVC PIPING IN COMPLIANCE WITH CAN/ULC S102.2. USE IN BUILDINGS CLASSIFIED AS NON-COMBUSTIBLE.
 - 25.1.2.1.4 IN AIR PLenums USE PIPING THAT IS CLASSIFIED NON-COMBUSTIBLE.
 - 25.1.2.2 INTERIOR BURIED
 - 25.1.2.2.1 MEDIUM WEIGHT CAST IRON WITH MECHANICAL JOINT OR ABS OR PVC PLASTIC PIPING WITH SOLVENT FITTINGS.
 - 25.1.2.3 EXTERIOR BURIED
 - 25.1.2.3.1 UNDER 300MM MEDIUM CAST IRON, OR ASTM C14 CONCRETE. JOINTS TO BE CALKED AND GASHTED.
 - 25.1.2.3.2 300MM AND OVER SAME AS ABOVE, BUT CONCRETE TO BE REINFORCED TO ASTM C78.
 - 25.1.2.3.3 PVC SEWER PIPE 300MM AND 300MM AND FITTINGS IN COMPLIANCE WITH CSA B138.1 (303A), WITH RING TIGHT GASKETS.
 - 25.1.3 NATURAL GAS PIPING
 - 25.1.3.1 SCHEDULE 40 CONTINUOUS WELD FITTINGS MALLEABLE IRON FOR 50MM AND UNDER OVER 65MM WELDED FITTINGS. ALL PIPE AND FITTINGS IN CONCEALED AREAS TO BE HELDED. ALL OUTSIDE PIPING SHALL BE TAPED AND PAINTED. TAPE ALL JOINTS AND FITTINGS.

- 26. PIPING INSTALLATION**
- 26.1 KEEP OPEN ENDS OF PIPE FREE FROM SCALE AND DIRT.
 - 26.2 GRADE PIPING IN ORDER THAT AIR MAY BE ELIMINATED WHEN SYSTEMS ARE FILLED.
 - 26.3 ENSURE NO CONTACT BETWEEN COPPER AND FERROUS METAL.
 - 26.4 PROVIDE DIELECTRIC INSULATING COUPLINGS WHERE PIPE OF DISSIMILAR METALS ARE JOINED.
 - 26.5 SLOPE ALL PIPING TO A LOW POINT FOR DRAINING.
 - 26.6 SUPPORT PIPING WITH ADJUSTABLE RING OR CLEVIS HANGERS AND ROOS. PERFORATED BAND IRON, WIRE, OR CHAIN NOT ALLOWED. PIPING RUNNING ABOVE ROOF TO BE MOUNTED ON ENVIROTRAP PIER SUPPORT SYSTEM.
 - 26.7 ALL THE UNDERGROUND SERVICE PIPES MUST BE PLACED ON THE SOLE DRAINAGE. ANY NET SIFT SOIL AND ORGANIC SOIL EXISTING BELOW THE PIPES, MUST BE OVER-EXCAVATED AND REPLACED WITH WELL COMPACTED PIT-RUN GRAVEL. THE SUBGRADE SOIL AND BEDDING SOIL BENEATH THE PIPES SHOULD NOT BE ALLOWED TO BE FROZEN. ALL THE FILL AND BACKFILL MATERIAL IN THE TRENCH SHOULD BE FREE OF ORGANIC AND FROZEN SOIL. ALL THE MATERIAL FOR FILLING AND BACKFILLING PURPOSES MUST BE PLACED IN 150MM LIFTS AND COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY. CONFIRM SOIL CONDITIONS WITH THE GENERAL CONTRACTOR PRIOR TO INSTALLATION. OBTAIN AND SUBMIT COMPACTION REPORTS FOR ALL PIPE BEDDING.
 - 26.8 IN CLOSED CIRCUIT PIPING SYSTEMS INSTALL AIR VENTS (COMPLETE WITH SHUT OFF VALVE) AT ALL HIGH POINTS FOR AIR ELIMINATION.

- 27. VALVE TYPES**
- 27.1 VALVES FOR THROTTLING SERVICE SHALL BE GLOBE TYPE, SHUT-OFF AND ISOLATING VALVES SHALL BE GATE TYPE. ALL SUITABLE FOR SYSTEM WORKING PRESSURE.
 - 27.2 WATER SYSTEMS (HOT/COLD DOMESTIC WATER, CHILLED WATER CONDENSER WATER, ETC.)
 - 27.2.1 USE FULL PORT BALL VALVES WITH THREADED/FLANGED ENDS FOR ISOLATION/SHUTOFF. PROVIDE STEM EXTENSIONS, AS NECESSARY TO ACCOMMODATE PIPING INSULATION. OPERATING PRESSURE SHALL NOT EXCEED VALVES 8 INCHES AND LARGER.
 - 27.2.2 ISOLATION/SERVICE VALVES USED SERVICE IN 1/2 INCH TO 2 INCH PIPE SIZES. HEAVY DUTY OR INDUSTRIAL SERVICE RATED WITH SOLID WEDGE OSG AND NON-RISING STEM. THREADED PIPE AND FITTINGS SHALL BE COATED WITH TETON IMPREGNATED WHEAT-SIZE, ON WELD THREADS ONLY, PRIOR TO ASSEMBLY.

- 28. VALVE LOCATIONS**
- 28.1 PROVIDE VALVES AS OUTLINED BELOW AND AS SHOWN ON DRAWINGS:
 - 28.1.1 AT BASE OF ALL DOMESTIC WATER (COLD, HOT, RECHG) RISERS PIPING RISERS.
 - 28.1.2 TO ISOLATE FIXTURE GROUPINGS.
 - 28.1.3 AT INLET AND OUTLET OF ALL APPARATUS.
 - 28.1.4 UPSTREAM OF UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT.

- 29. THERMAL INSULATION**
- 29.1 SUPPLY AND INSTALL INSULATION FOR MECHANICAL SYSTEMS AS SPECIFIED HEREIN. BOTH CONCEALED AND EXPOSED PIPING SHALL BE INSULATED.
 - 29.2 INSULATION SHALL BE SUPPLIED AND INSTALLED BY AN INDEPENDENT FIRM NORMALLY ENGAED IN THIS TYPE OF WORK.
 - 29.3 ALL MATERIALS SHALL BE NEW, UNIFORM AND UNDAMAGED WITH LABELING OF UL RATING, PRODUCT DENSITY AND THICKNESS CLEARLY VISIBLE. ALL INSULATION SHALL BE CERTIFIED FOR THE INTENDED APPLICATION.
 - 29.4 INSTALL ALL INSULATION IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. USE APPROPRIATE SADDLES TO PREVENT DISTORTION TO INSULATING MATERIALS AND JACKET COVERINGS.
 - 29.5 INSULATE AS FOLLOWS:

SERVICE	THICKNESS	INSULATION TYPE
DOMESTIC COLD & HOT WATER (SUPPLY & RECIRCULATION) (CONCEALED & EXPOSED)	25MM FOR ALL PIPE SIZES	FIBERGLASS RIGID HEAVY DENSITY PIPE INSULATION WITH ASJ JACKET SEAL
EXHAUST AIR DUCTWORK	25MM	FLEXIBLE RIGID FIBERGLASS FOL FACED DUCT INSULATION
AIR CONDITION SUPPLY DUCT	25MM	FLEXIBLE FIBERGLASS FOL FACED DUCT INSULATION
RAIN WATER LEADERS	25MM	FIBERGLASS HEAVY DENSITY PIPE INSULATION WITH VAPOR BARRIER AND ASJ JACKET.

- 30. CLEANOUTS**
- 30.1 CLEANOUTS TO BE THE FOLLOWING TYPE:
 - 30.1.1 CONCRETE FLOORS - AMCON CO-200-RK-4.
 - 30.1.2 FINISHED FLOORS - AMCON CO-200-T-1.

- 31. PLUMBING FIXTURES**
- 31.1 ALL FIXTURES SHALL BE FREE FROM FLAWS OR BLEMISHES AND SUBJECT TO THE APPROVAL. ALL FINISHED SURFACES SHALL BE CLEAR, SMOOTH AND BRIGHT AND GUARANTEED NOT TO CRAZE, COLOR OR SCALE.
 - 31.2 FIXTURE SUPPORT MUST BE SUCH THAT THEY WILL NOT COME LOOSE WITH ORDINARY USAGE AND THAT ANCHORING WILL BE RIGID. REINFORCE WALL BEHIND FIXTURES IF REQUIRED FOR PROPER SUPPORT.
 - 31.3 REFER TO FIXTURES SCHEDULE ON DRAWINGS. CONFIRM WALL FIXTURE TYPES WITH OWNER PRIOR TO ORDERING.
 - 31.4 WHEELCHAIR ACCESSIBLE LAVATORY PIPING AND ANGLE VALVE ASSEMBLIES SHALL BE COVERED WITH THE WOLDED, ANTI-MICROBIAL, TRUCERO, INC. LAVATORY GUARD. UNDERNEATH PROTECTIVE PIPE COVER ACCESSORY, COLOUR WHITE. COVER SHALL BE SECURED WITH SNAP CLIP FLUSH, RE-USEABLE FASTENERS, ANGLE STOP SHALL HAVE LOCK-UP LOCKING ACCESS COVER.

- 32. FLOOR DRAINS AND TRENCH DRAINS**
- 32.1 WASHROOMS, KITCHENS, AND OTHER FINISHED AREAS WATS DRAINAGE TD-100
 - 32.2 TRENCH DRAINS WATS PER SLOPED C/W HEAVY DUTY GRATE SUITABLE FOR VEHICLE TRAFFIC
 - 32.3 PROVIDE TRAPS FOR DRAINS CONNECTED DIRECTLY TO SANITARY WASTE SYSTEM
 - 32.4 PROVIDE TRAP BREAK CONNECTIONS FOR ALL DRAINS WITHOUT A PERMANENT INVERT WATER SOURCE.
 - 32.5 FOR OTHER SPECIAL DRAINS REFER TO DRAWINGS.
 - 32.6 ALL DRAINS SHALL BE MINIMUM 100MM DIAMETER UNLESS OTHERWISE INDICATED ON DRAWINGS.

- 33. FIRE SUPPRESSION**
- 33.1 FIRE EXTINGUISHERS
 - 33.1.1 SUPPLY AND INSTALL FIRE EXTINGUISHERS WHERE SHOWN ON THE DRAWINGS. INSTALL FIRE EXTINGUISHERS IN ACCORDANCE WITH NFPA-10, PORTABLE FIRE EXTINGUISHERS.
 - 33.1.2 DRY CHEMICAL FIRE EXTINGUISHERS TO BE THE AMMONIUM PHOSPHATE TYPE, UL APPROVED, CLASS ABC, SIZE TO BE 4.54 KG GENERAL USE.
 - 33.1.3 FIRE EXTINGUISHERS LOCATED IN PUBLIC AREAS, CORRIDORS, ETC. TO BE COMPLETE WITH CABINETS CONFORMING TO N.F.P.A. NO. 10, NATIONAL FIRE EQUIPMENT MODEL CE-950-3-2 SEM RECESSED TYPE.
 - 33.1.4 DRY CHEMICAL FIRE EXTINGUISHERS TO BE THE SODIUM BICARBONATE TYPE, UL APPROVED CLASS ABC, SIZE TO BE 4.54 KG - 300MM KITCHENS.

- 34. DUCTWORK**
- 34.1 ACCEPTABLE MATERIALS
 - 34.1.1 FIRE DAMPERS SHALL BE UNDERWRITERS LABORATORIES LABELED. FIRE DAMPERS IN SUPPLY AIR DUCTS SHALL HAVE THE BLADES CLEAR OF THE AIR STREAM. FIRE-STOP FLAPS SHALL BE AS SHOWN IN THE UNDERWRITERS LABORATORIES LIST. PROVIDE DETAILED INSTRUCTIONS FOR THE INSTALLATION OF SHOP DRAWINGS FOR ALL DAMPERS AND FIRE STOP FLAPS TO BE INSTALLED.
 - 34.1.2 ACOUSTIC INSULATION SHALL BE 1 (25MM) THICK RIGID COATED GLASS FIBRE. OSGREGLASS INSULATION WITH K VALUE AT 24 DEG C OF 0.033 W/M DEG C COATED TO PREVENT FIBRE EROSION AT VELOCITIES UP TO 20M/S MINIMUM.
 - 34.1.3 BALANCING OR SPLITTER DAMPERS SHALL BE RATTLE FREE AND LEAK RESISTANT. BEARING ROOFS SHALL BE SIZED TO SUIT THE DAMPER SIZE. NEOPRENE SEALS SHALL BE USED TO MINIMIZE LEAKS.
 - 34.1.4 TURNING VANES SHALL BE EITHER DOUBLE THICKNESS WITH EXTENDED LEADING AND TRAILING EDGES AS SPECIFIED IN ACOUSTIC AND SHAMCHA STANDARDS.
 - 34.1.5 WALL EXHAUST HOODS AND INTAKE VENTS SHALL BE EQUAL TO DUNOAS.
 - 34.2 INSTALLATION
 - 34.2.1 CONSTRUCT AND INSTALL DUCTWORK IN ACCORDANCE WITH SHAMCHA.
 - 34.2.2 CONSTRUCT AND INSTALL ALL FITTINGS IN ACCORDANCE WITH SHAMCHA INCLUDING BALANCING DAMPERS, SPLITTER DAMPERS, TURNING VANES ETC.
 - 34.2.3 SEAL ALL DUCTWORK AND FITTINGS WITH OIL RESISTANT, POLYMER TYPE FLAME RESISTANT DUCT SEALANT. (TEMP RANGE -30°C TO +93°C)

- 35. SHAMCHA SEAL CLASS 'C' FOR METAL DUCTWORK TO 500Pa.**
SHAMCHA SEAL CLASS 'A' FOR METAL DUCTWORK EXCEEDING 500Pa.
- 35.1 FLEXIBLE DUCTWORK MAY BE USED FOR SUPPLY AIR CONNECTIONS TO DIFFUSERS. MAXIMUM ONE (1) METER LENGTH. DO NOT USE IN MEDIUM OR HIGH PRESSURE DUCTWORK OR ANY EXHAUST DUCTWORK TO FAN OR FROM APPLIANCES.
 - 35.2 INSTALL DUCTS IN LOCATIONS, SHAPES AND SIZES SHOWN. LAYOUT DUCTWORK IN ADVANCE TO ASSURE THAT IT WILL FIT IN THE SPACE PROVIDED.
 - 35.3 MAKE ALL LAPS IN THE DIRECTION OF AIR FLOW. USE RIVETS AND BOLTS WHERE POSSIBLE.
 - 35.4 DUCTS SHALL BE BRACED, STIFFENED, AND TIGHT SO THEY WILL NOT BREATHE, RATTLE, VIBRATE OR SAC. CROSS-BREAK ALL RECTANGULAR DUCTS WITH HEIGHTS OR WIDTHS 300MM OR LARGER.
 - 35.5 HANG ALL DUCTWORK SECURELY AND IN A RIGID MANNER.
 - 35.6 SUPPORT ALL VERTICAL DUCTS AT EACH FLOOR, ON ALL SIDES, WITH ANGLE RIVETED TO THE DUCTS.
 - 35.7 BASE LOW PRESSURE, MEDIUM PRESSURE AND HIGH PRESSURE DUCT CONSTRUCTION ON ASHRAE METHOD OF CONSTRUCTION.
 - 35.8 CONSTRUCT LOW PRESSURE RECTANGULAR DUCTS FOR SYSTEMS LESS THAN 2 (0.5 SPA) STATIC PRESSURE AND UNDER 2000 FPM (10.2 M/S) VELOCITY. LOGICAL JOINTS SHALL BE PITTSBURGH LOCK SEAM AT EDGE OF DUCT AND GROOVED SEAM ON FACE OF DUCT.
 - 35.9 INSTALL MANUAL DUCT BALANCING AT ALL BRANCH TAKE-OFFS FROM MAINS DAMPERS BALANCING AND WHERE SHOWN ON THE DRAWINGS, FABRICATE DAMPERS OF GALVANIZED STEEL 18 US GAUGE OR HEAVIER.
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82. CONTROL SYSTEMS

1. SCOPE
 1. SUPPLY AND INSTALL AN ELECTRONIC AUTOMATIC CONTROL SYSTEM
 2. ALL EQUIPMENT AND COMPONENTS REQUIRED AND NOT SPECIFICALLY LISTED OR OUTLINED BUT WHICH ARE NECESSARY TO FULFILL THE INTENT OF THIS SPECIFICATION ARE TO BE PROVIDED.
 3. THE CONTROL SYSTEM SHALL BE A FULL DIRECT DIGITAL CONTROL SYSTEM, CONNECTING ALL HEATING AND AIR CONDITIONING EQUIPMENT WITH NETWORK CONTROLLERS FOR A FULLY AUTOMATED SYSTEM. EACH VAV BOX IS TO BE PROVIDED WITH AN ELECTRONIC THERMOSTAT AND CONNECTED TO THE BUILDING MANAGEMENT SYSTEM.
 4. THE BUILDING MANAGEMENT SYSTEM WILL INCLUDE A CENTRAL WORK STATION, SOFTWARE SYSTEM AND FLOOR PLAN GRAPHICS CAPABLE OF OFF-HOURS SET BACK, PREPROGRAMMED OPERATION AND MANUAL OVERRIDES. ENERGY MANAGEMENT, EQUIPMENT MONITORING AND CONTROL, AND TEMPERATURE CONTROL SHALL BE INCORPORATED.
 5. ACCEPTABLE MANUFACTURERS: HONEYWELL, JOHNSON CONTROL.
 6. ACCEPTABLE FACTS INTEGRATORS: CONSERVANT TECHNOLOGIES, AUTOMATIC CONTROLS LTD. OR EQUIVALENT. INTERESTED FACTS PROVIDERS SHALL CONTACT DEK ENGINEERING FOR APPROVAL ON THE EQUIVALENCY PRIOR TO COMMENCING WORK.
 7. CONTROLS TO BE DDC.
 8. COORDINATE WITH ELECTRICAL FOR LIGHTING CONTROL, IF ANY.
2. QUALITY ASSURANCE
 1. SUPPLY AND INSTALL AUTOMATIC CONTROLS FOR THE MECHANICAL SYSTEMS BY COMPETENT MECHANICS IN THE EMPLOY OF FIRMS SPECIALIZING IN THIS TYPE OF WORK.
 2. ON COMPLETION OF THE INSTALLATION, COMPLETELY ADJUST, READY FOR USE. ALL THERMOSTATS, SENSORS, VALVES, DAMPERS, MOTORS, RELAYS, CONTROLLERS PROVIDED.
 3. MATERIALS AND EQUIPMENT SHALL BE CATALOGUED PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN PRODUCTION AND INSTALLATION OF AUTOMATIC TEMPERATURE CONTROL SYSTEMS AND SHALL BE MANUFACTURER'S LATEST STANDARD DESIGN THAT COMPLES WITH THE SPECIFICATION REQUIREMENTS.
 4. INSTALL SYSTEM USING COMPETENT WORKMEN WHO ARE FULLY TRAINED IN THE INSTALLATION OF TEMPERATURE CONTROL EQUIPMENT.
3. SUBMITTALS
 1. PROVIDE SHOP DRAWINGS AND TECHNICAL LITERATURE ON ALL SYSTEMS COMPONENTS AS A SUPPLEMENT TO EXISTING SHOP DRAWINGS AND DATA.
 2. THE CONTROL DRAWINGS SHALL BE REVIEWED AND THE SHOP DRAWINGS REVISED TO INDICATE THE ACTUAL AS-INSTALLED CONDITION, WITH THE REVISIONS CLEARLY IDENTIFIED AND DESCRIBED.
 3. INCLUDE THE MANUAL WITH OPERATING AND MAINTENANCE MANUALS.
4. WIRING
 1. PROVIDE ALL LINE AND LOW VOLTAGE WIRING AND COMPONENTS INCIDENTAL TO THE TEMPERATURE CONTROL SYSTEM, EXCEPT WHEN LINE VOLTAGE THERMOSTATS ARE SPECIFIED.
 2. INSTALL ALL INTERLOCKING WIRING.
 3. PERFORM ALL WIRING IN ACCORDANCE WITH ALL LOCAL AND NATIONAL CODES.
 4. ALL LINE AND LOW VOLTAGE ELECTRICAL CONTROL WIRING THROUGHOUT THE BUILDING SHALL BE RUN IN CONDUIT.
 5. SUPPLY AND INSTALL CONTROL TRANSFORMER IN A SEPARATE ENCLOSURE.
 6. COORDINATE WITH ELECTRICAL CONTRACTOR FOR LINE POWER SUPPLY.
5. HVAC EQUIPMENT
 1. MAKE-UP AIR UNIT, MUA-1 : ENGINEERED AIR DJS140
 1. MUA-1 IS LOCATED IN THE MECHANICAL ROOM
 2. TO BE PROVIDED WITH THIS WORK
 3. DEDICATED FOR POOL AREA
 2. FURNACE FU1
 1. THE FURNACE, FU1, IS LOCATED IN THE MECHANICAL ROOM
 2. TO BE INSTALLED WITH THIS WORK
 3. DEDICATED FOR MALE CHANGE AND WASHROOM
 3. FURNACE FU2
 1. THE FURNACE, FU2, IS LOCATED IN THE MECHANICAL ROOM
 2. TO BE INSTALLED WITH THIS WORK
 3. DEDICATED FOR FEMALE CHANGE AND WASHROOM
 4. FURNACE FU3
 1. THE FURNACE, FU3, IS LOCATED IN THE MECHANICAL ROOM
 2. TO BE INTEGRATED WITH A SERIES COOLING COIL WITH THIS WORK
 3. DEDICATED FOR RECEPTION, OFFICE AND OTHER ROOMS REQUIRING BOTH HEATING AND COOLING
 5. CONDENSING UNIT
 1. THE CONDENSING UNIT IS LOCATED ON THE ROOF OF THE FEMALE CHANGE ROOM AND AT THE EASTSIDE OF THE MECHANICAL ROOM
 2. TO BE HOOKED UP WITH THE FURNACE FU3 WITH THIS WORK
 6. HEAT RECOVERY VENTILATOR - HRV1
 1. HRV1 IS LOCATED IN THE MALE WASHROOM, CEILING SUSPENDED
 2. TO BE INSTALLED WITH THIS WORK
 3. SUPPLY AIR FROM THE HRV IS CONNECTED TO THE RETURN AIR OF THE FURNACE, FU1
 7. HEAT RECOVERY VENTILATOR - HRV2
 1. HRV2 IS LOCATED IN THE FEMALE WASHROOM, CEILING SUSPENDED
 2. TO BE INSTALLED WITH THIS WORK
 3. SUPPLY AIR FROM THE HRV IS CONNECTED TO THE RETURN AIR OF THE FURNACE, FU2
 8. HEAT RECOVERY VENTILATOR - HRV3
 1. HRV3 IS LOCATED IN THE PUBLIC WASHROOM, CEILING SUSPENDED
 2. TO BE INSTALLED WITH THIS WORK
 3. SUPPLY AIR FROM THE HRV IS CONNECTED TO THE RETURN AIR OF THE FURNACE, FU3
 9. HEAT RECOVERY VENTILATOR - HRV4
 1. HRV4 IS LOCATED ON THE ROOF OF THE MALE WASHROOM, AS SHOWN ON THE DRAWING.
 2. TO BE INSTALLED WITH THIS WORK
 3. SUPPLY AIR FROM THE HRV IS RELEASED INTO THE POOL AREA
6. SENSORS
 1. SUPPLY AIR TEMPERATURE SENSORS.
 2. SUPPLY AIR PRESSURE SENSORS.
 3. RETURN AIR TEMPERATURE SENSORS.
 4. SPACE PRESSURE SENSORS.
 5. OUTDOOR AIR TEMPERATURE SENSOR.
 6. MIXED AIR TEMPERATURE SENSORS.
 7. OUTDOOR AIR AND RETURN AIR DAMPER CONTROLS.
 8. MINIMUM OUTDOOR AIR CFM VOLUME CONTROLS.
 9. FREEZE PROTECTION CONTROLS AND ALARMS.
 10. WATER TEMPERATURE SENSORS FOR THE POOL.
7. SEQUENCE OF OPERATION FOR OCCUPIED MODE
 1. OCCUPIED MODE TO BE SET ON AN ADJUSTABLE TIME SCHEDULE.
 1. MUA-1
 1. SUPPLY FAN
 2. THE SUPPLY FAN SHALL BE CONSTANT VOLUME.
 2. RETURN FAN
 1. THE RETURN FAN SHALL RUN WHEN THE SUPPLY FAN RUNS AND SHALL BE CONSTANT VOLUME.
 3. OUTDOOR AIR, EXHAUST AND RETURN AIR DAMPERS
 1. SHALL MODULATE IN SEQUENCE AND MODULATE OPEN AND CLOSE TO OBTAIN A MIXED AIR TEMPERATURE OF 55F WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW THE RETURN AIR TEMPERATURE.
 2. OUTDOOR AIR VOLUME SHALL BE SET VIA BALANCING CONTRACTOR TO MAINTAIN MINIMUM FRESH AIR.
 3. GAS HEAT SECTION SHALL MODULATE TO MAINTAIN A MINIMUM 75F SPACE TEMPERATURE.
 4. MIXED AIR TEMPERATURES SHALL BE MAINTAINED AT 55F.
 5. THE ASSOCIATED HRV-4 UNIT SHALL OPERATE INDEPENDENTLY OF THE AIR HANDLING AIR UNIT TO MAINTAIN HUMIDITY SETPOINT.
 6. CONTROLS TO BE ADJUSTABLE.
 2. FURNACES FU-1, FU-2 & FU-3 THE SUPPLY FAN SHALL BE CONSTANT VOLUME.
 1. GAS HEAT SECTION SHALL CYCLE TO MAINTAIN SPACE TEMPERATURE.
 3. FURNACE FU-4
 1. THE SUPPLY FAN SHALL BE CONSTANT VOLUME.
 2. GAS HEAT SECTION SHALL CYCLE TO MAINTAIN SPACE TEMPERATURE.
 3. MECHANICAL COOLING WILL BE PROVIDED VIA CYCLING 2 STAGES OF THE CONDENSING UNIT TO MAINTAIN SETPOINT.
 4. CONDENSING UNIT SHALL BE CONTROLLED OFF DURING PERIODS WHEN MORE THAN TWO FILTER PUMPS ARE OPERATING (THERE ARE THREE PUMPS EACH 30 HP CAPACITY).
2. HUMIDITY CONTROL
 1. HUMIDISTAT SHALL MONITOR SPACE RELATIVE HUMIDITY LEVEL TO MAINTAIN 50% RH.
 2. IF HUMIDITY RISES ABOVE 50% RH, HRV-4 SHALL BE ENERGIZED TO MAINTAIN SETPOINT.
 3. SYSTEM SHALL CONTINUE TO OPERATE FOR 25 MINUTES BEYOND THE POINT WHEN HUMIDITY IS CLEARED.
 4. INTERLOCK THE RESPECTIVE EXHAUST FAN(S) TO BE ACTIVATED BY THE FIRST LEVEL OF ALARM (50PPM) FROM THE CO/NO DETECTION AND IN TURN ENERGIZE THE CAPACITY LEVEL OF THE ASSOCIATED MAKE-UP AIR UNIT. IF BUILD UP OF CO CONTINUES, THEN THE HRV-4 SHALL BE ENERGIZED.
3. FREEZE PROTECTION
 1. FREEZE PROTECTION SHALL BE ACTIVATED WHEN THE MIXED AIR TEMPERATURE DROPS BELOW ADJUSTABLE SET POINT OF 35F FOR MORE THAN 180 SECONDS.
 2. THE OUTDOOR AIR DAMPERS SHALL CLOSE 100%.
 3. RETURN DAMPERS OPEN 100% AND THE UNIT SHALL SHUT DOWN.
 4. MANUAL RESET AT THE UNIT SHALL BE REQUIRED.
4. EXHAUST FAN INTERLOCK
 1. INTERLOCK THE RESPECTIVE EXHAUST FAN(S) TO BE ACTIVATED TO OPERATE WITH ASSOCIATED MAKE-UP AIR UNIT OR FURNACE.

8. SEQUENCE OF OPERATION FOR UNOCCUPIED MODE
 1. UNOCCUPIED MODE IS OPPOSITE TO OCCUPIED MODE.
 2. SET POINT BASED ON DIFFERENCE OF TEMPERATURE BETWEEN WATER AND AIR OF THE POOL AREA.
 1. AHU-1
 1. THE SUPPLY FAN
 2. FAN SHALL ONLY RUN WHEN THERE IS A CALL FOR HEATING FROM THE REMOTE SPACE. TEMPERATURE SENSORS IN THE SPACES AND SHALL RUN FOR A MINIMUM OF 20 MINUTES.
 3. WHEN THE SUPPLY FAN IS ACTIVATED IT SHALL MAINTAIN THE NIGHT SETBACK TEMPERATURE SET POINT.
 2. RETURN FAN
 1. THE RETURN FAN SHALL RUN WHEN THE SUPPLY FAN RUNS AND SHALL MAINTAIN MIXED AIR TEMPERATURE.
 3. OUTDOOR AIR DAMPERS AND RETURN AIR DAMPERS
 1. OUTDOOR AIR DAMPER SHALL CLOSE 100%.
 2. RETURN DAMPER SHALL OPEN 100%.
 4. MECHANICAL COOLING
 1. SHALL BE DISABLED.
 5. FURNACE UNITS FU-1, FU-2, FU-3 & FU-4
 1. FANS SHALL ONLY RUN WHEN THERE IS A CALL FOR HEATING FROM THE REMOTE SPACE. TEMPERATURE SENSORS IN THE SPACES AND SHALL RUN FOR A MINIMUM OF 20 MINUTES.
 2. WHEN THE FAN IS ACTIVATED IT SHALL MAINTAIN THE NIGHT SETBACK TEMPERATURE SET POINT.

NOTES

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ISSUES & REVISIONS

NO.	DESCRIPTION	DATE
△	ISSUED FOR TENDER	13/07/05
△	ISSUED FOR TENDER/REV	13/08/29
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SEALS:

CONSULTANTS:



**D.B.K.
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PROJECT:

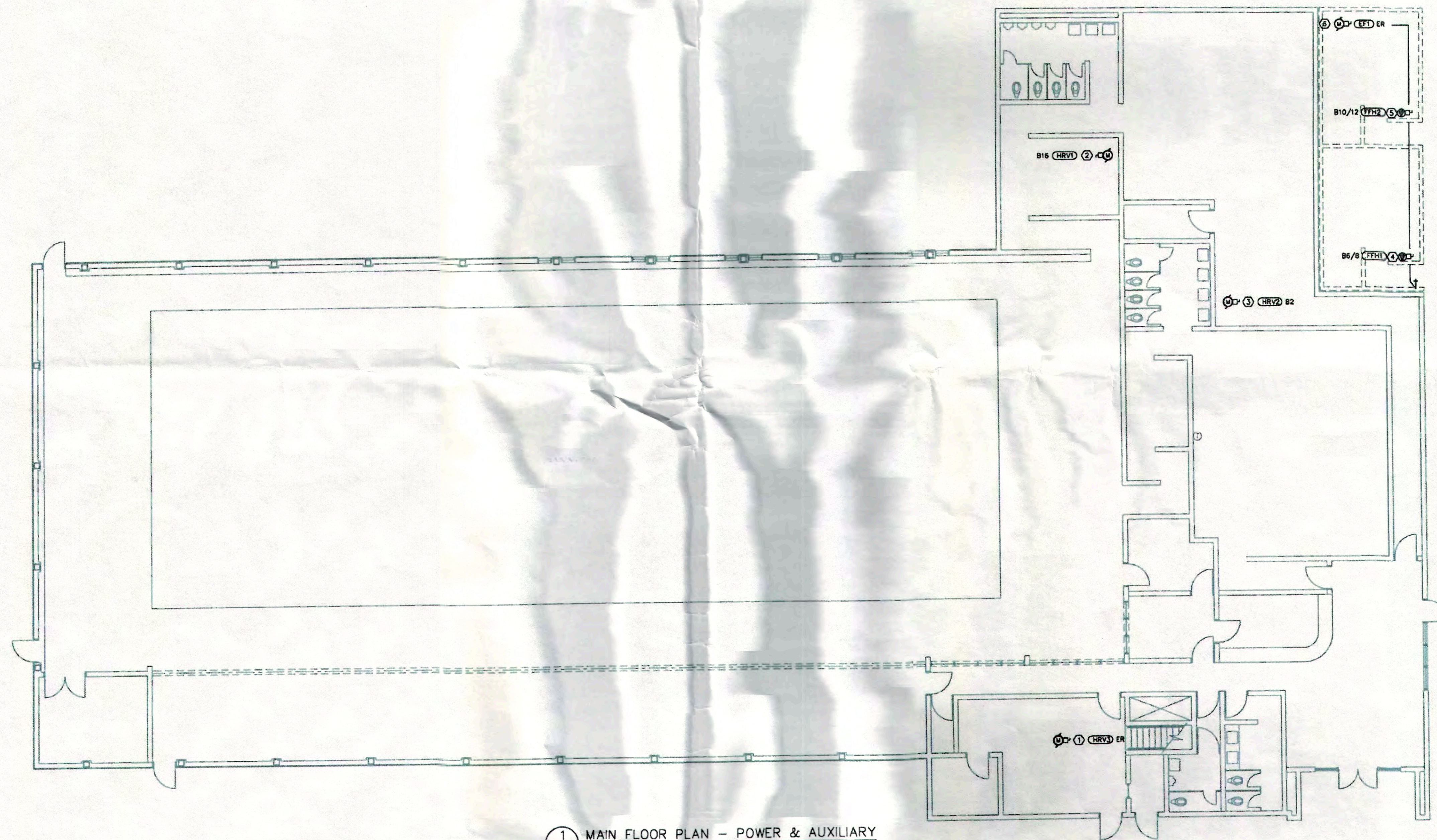
AQUAPLEX
RENOVATIONS

PROJECT # D13-065	DATE: 13/05/01
DRAWN: EJ	CHECKED: LK
SCALE: AS NOTED	FILE:

TITLE:
MECHANICAL
DETAILS AND
SPECIFICATIONS

DRAWING:

M4



1 MAIN FLOOR PLAN - POWER & AUXILIARY
E1 SCALE 1/8"=1'-0"

POWER & AUXILIARY NOTES

- UTILIZE EXISTING POWER CONNECTION FROM EXISTING EXHAUST FAN. EXHAUST FAN TO BE REMOVED. RECONNECT HRV FROM EXISTING POWER CONNECTION.
- PROVIDE POWER CONNECTION FOR HRV1, CONNECTION TO BE 120V, 1PH, 2W, 600W C/W 12C-2#10 CU FROM PANEL B.
- PROVIDE POWER CONNECTION FOR HRV2, CONNECTION TO BE 120V, 1PH, 2W, 600W C/W 12C-2#10 CU FROM PANEL B.
- PROVIDE POWER CONNECTION FOR FFH1, CONNECTION TO BE 208V, 1PH, 2W, 2000W C/W 25C-2#10 CU FROM PANEL B. CIRCUIT BREAKER B6/8.
- PROVIDE POWER CONNECTION FOR FFH2, CONNECTION TO BE 208V, 1PH, 2W, 2000W C/W 25C-2#10 CU FROM PANEL B. CIRCUIT BREAKER B10/12.
- UTILIZE EXISTING POWER CONNECTION FROM EXISTING EXHAUST FAN. EXHAUST FAN TO BE REMOVED. RECONNECT NEW EF1 FROM EXISTING POWER CONNECTION.

SYMBOL LEGEND

SYMBOL	DESCRIPTION	MOUNTING	SYMBOL	DESCRIPTION	MOUNTING
[]	PUSHBUTTON(S) AS INDICATED	48in/1220mm	ER	EXISTING TO REMAIN	AS INDICATED
⊕	THERMOSTAT/HUMIDISTAT	60in/1525mm	MDP	MAIN DISTRIBUTION PANEL	AS INDICATED
⊖	UNFUSED DISCONNECT	60in/1525mm	TTB	TELEPHONE TERMINAL BOARD	AS INDICATED
⊕ ⊖	SWITCH/COMBINATION MAGNETIC STARTER	60in/1525mm	AF1	ABOVE FINISHED FLOOR	AS INDICATED
⊕	MOTOR	AS INDICATED	A37*	PANEL A/CCT 37/SWITCH	AS INDICATED
⊕ ⊕ ⊕	120V/15A RECEPTACLE (S-15R) SINGLE/DUPLEX/QUADPLEX OR AS NOTED	12in/305mm OR AS NOTED	⊕	FLUSH CEILING/CEILING SPACE	AS INDICATED
⊕ ⊕ ⊕	120V/15A DUPLEX RECEPTACLE (S-15R) GFI/SPLIT SWITCHED ONE SIDE	12in/305mm OR AS NOTED	⊕	CONDUIT IN CEILING OR WALL	AS INDICATED
⊕ ⊕ ⊕	120V/15A DUPLEX RECEPTACLE (S-15R) ISOLATED GROUND/SURGE PROTECTION	12in/305mm OR AS NOTED	⊕	CONDUIT C/W NUMBER OF CONDUCTORS	AS INDICATED
⊕ ⊕ ⊕	120V/20A RECEPTACLE (S-20RA) DUPLEX/DUPLEX GFI	12in/305mm OR AS NOTED	⊕	CONDUIT C/W GROUND CONDUCTOR	AS INDICATED
⊕ ⊕ ⊕	SPECIAL RECEPTACLE AS NOTED/HARDWIRED EQUIPMENT CONNECTION	12in/305mm OR AS NOTED	⊕	CONDUIT HOME RUN TO SOURCE	AS INDICATED
⊕ ⊕ ⊕	COMMUNICATION OUTLET TELEPHONE, VOICE/DATA, TELEVISION	12in/305mm OR AS NOTED	⊕	FLEXIBLE METALLIC CONDUIT OR 'BX'	AS INDICATED
⊕ ⊕	JUNCTION BOX - SPECIFIC USE	AS INDICATED			
⊕	LINE VOLTAGE SWITCH BLANK SINGLE-POLE, 2P; TWO-POLE	48in/1220mm			
⊕	LINE VOLTAGE SWITCH 3P; THREE-POLE, 3; THREE-WAY	48in/1220mm			
⊕	MOTION SENSOR	AS INDICATED			
⊕	CEILING FAN	AS INDICATED			

MOUNTING IS INDICATED FROM FINISHED FLOOR TO CENTRE OF DEVICE. DEVICES ARE TO BE MOUNTED VERTICALLY UNLESS INDICATED OTHERWISE. WHERE MOUNTING IS NOT INDICATED, VERIFY PRIOR TO INSTALLATION. DEVICES IN CONCRETE BLOCK ARE TO BE MOUNTED IN BOTTOM OF CLOSEST BLOCK COURSE. MOUNTING INDICATED ON DIMS OR SPECIFICATIONS WHICH MAKE EXCEPTION TO LEGEND MOUNTING SHALL HAVE PRECEDENCE. VERIFY ALL MOUNTING WITH ENGINEER PRIOR TO INSTALLATION. SEE SPECIFICATIONS FOR ADDITIONAL CRITERIA.

NOTES

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ISSUES & REVISIONS

NO.	DESCRIPTION	DATE
1	TENDER	13/07/08

SEALS:

PROFESSIONAL ENGINEER ALBERTA
142537
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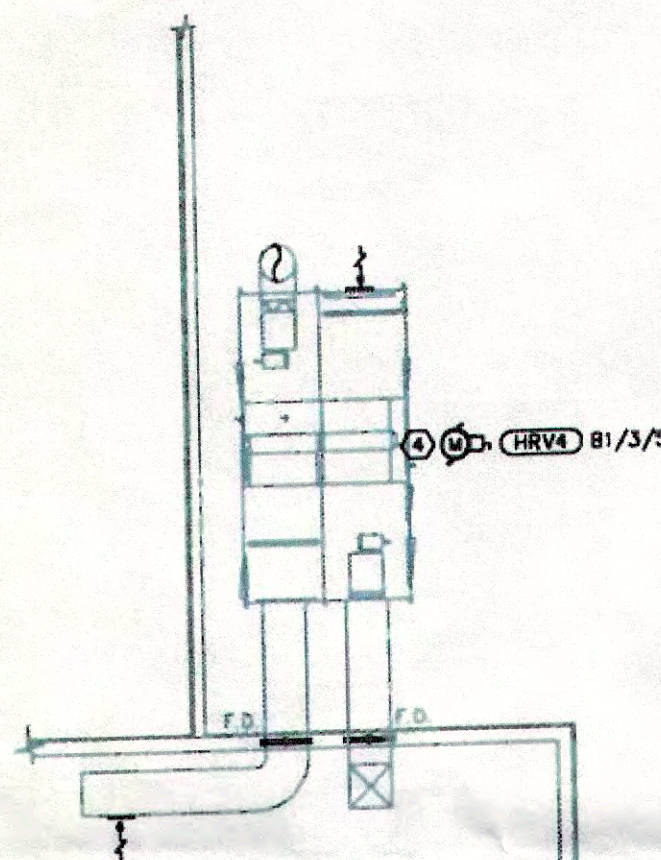
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PROJECT:
AQUAPLEX RENOVATIONS

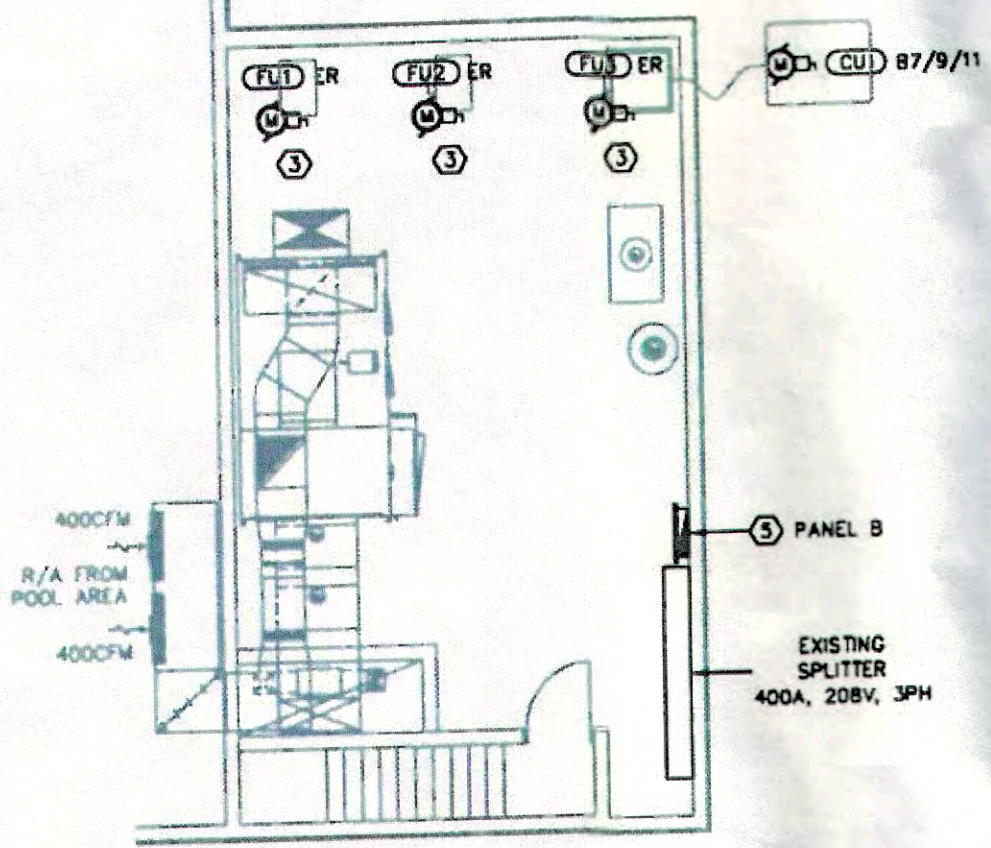
PROJECT #: D13-065 DATE: 13/05/01
DRAWN: JD CHECKED: JCG
SCALE: AS NOTED FILE: -

TITLE:
FLOOR PLAN POWER & AUXILIARY

DRAWING:
E1



- NOTES**
- INTERLOCK FURNACE FUJ WITH CONDENSING UNIT CU1.
 - COORDINATE ALL CONTROL SEQUENCE WITH BMS SYSTEM.
 - EXISTING CONNECTION TO REMAIN.
 - PROVIDE CONNECTION AS INDICATED, SEE POWER DISTRIBUTION SINGLE LINE.
 - RELOCATED ALL EXISTING DISCONNECT SWITCHES TO ACCOMMODATE NEW PANEL B.



1 MECHANICAL ROOM - EXISTING EQUIPMENT LAY-OUT
E2 NTS

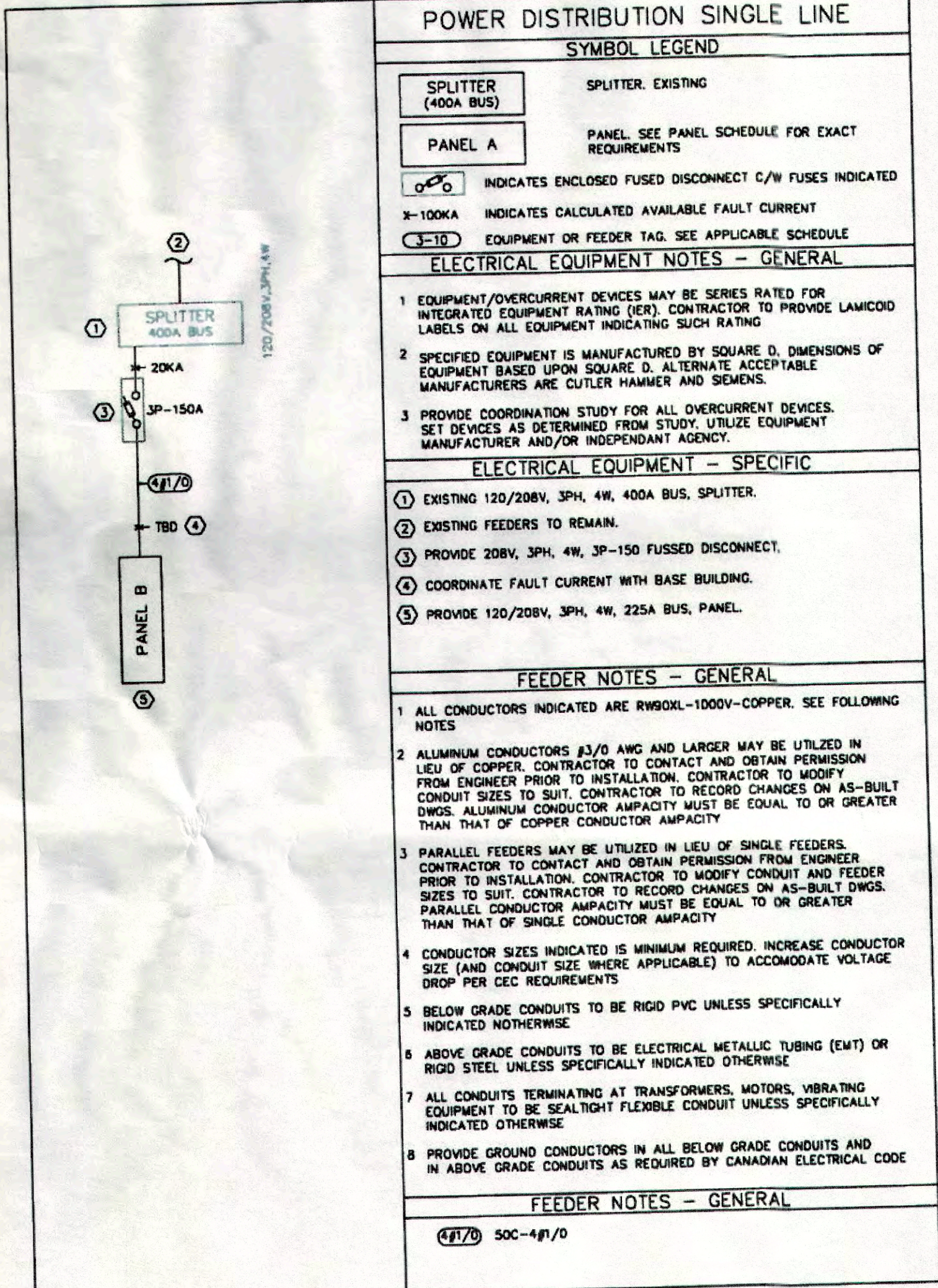
MECHANICAL EQUIPMENT SCHEDULE					NOTES		MOTOR STARTER ACCESSORIES	
GENERAL NOTES					PACKAGE UNIT	EXISTING CONNECTION TO REMAIN	INTERLOCK WITH FUJ	RUN CONTINUOUSLY
ELECTRICAL CONTRACTOR TO OBTAIN MECHANICAL SHOP DWGS AND REVIEW ADVISE ENGINEER OF ANY DISCREPANCIES BETWEEN MECHANICAL SHOP DWGS AND MECHANICAL EQUIPMENT SCHEDULE. MECHANICAL SHOP DWGS TO BE PROVIDED TO ENGINEER PRIOR TO ENGINEERS REVIEW OF ELECTRICAL SHOP DWGS.					PROVIDE DISCONNECT	EXISTING	PROVIDE WEATHERPROOF DISCONNECT	NEUA 4 WATER/DRUST
ALL LINE AND LOW VOLTAGE CONTROL WIRING BY MECHANICAL CONTRACTOR EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. INTERLOCK REFERS TO ELECTRICAL CONTRACTOR TO PROVIDE CONTROL WIRING					EXISTING CONNECTION TO REMAIN	INTERLOCK WITH FUJ	PROVIDE WEATHERPROOF DISCONNECT	HAND/OFF/AUTO
ALL MOTOR STARTER ACCESSORIES TO BE CONFIRMED BY MECHANICAL CONTRACTOR					EXISTING CONNECTION TO REMAIN	INTERLOCK WITH FUJ	PROVIDE WEATHERPROOF DISCONNECT	SELECTOR SWITCH
					EXISTING CONNECTION TO REMAIN	INTERLOCK WITH FUJ	PROVIDE WEATHERPROOF DISCONNECT	PILOT LIGHTS
					EXISTING CONNECTION TO REMAIN	INTERLOCK WITH FUJ	PROVIDE WEATHERPROOF DISCONNECT	OVERCURRENT CONTROL
					EXISTING CONNECTION TO REMAIN	INTERLOCK WITH FUJ	PROVIDE WEATHERPROOF DISCONNECT	TRANSFORMER
TAG	DESCRIPTION	LOAD	O/C	CONDUIT/WIRING	PACKAGE UNIT	EXISTING CONNECTION TO REMAIN	INTERLOCK WITH FUJ	RUN CONTINUOUSLY
HRV1	HEAT RECOVERY VENT.	120V, 1PH, 2W, 11.7A	1P-30A	12C-2#12 RWSXL CU				
HRV2	HEAT RECOVERY VENT.	120V, 1PH, 2W, 11.7A	1P-30A	12C-2#10 RWSXL CU				
HRV3	HEAT RECOVERY VENT.	120V, 1PH, 2W, 5.7A	1P-15A	12C-2#12 RWSXL CU				
HRV4	HEAT RECOVERY VENT.	208V, 3PH, 3W, 34.95A	3P-50A	25C-3#6 RWSXL CU				
EF1	EXHAUST FAN	120V, 1PH, 2W, FHP	1P-15A	12C-2#12 RWSXL CU				
FU1	FURNACE 1	208V, 3PH, 3W, 3/4HP	3P-15A	12C-3#12 RWSXL CU				
FU2	FURNACE 2	208V, 3PH, 3W, 1/2HP	3P-15A	12C-3#12 RWSXL CU				
FU3	FURNACE 3	208V, 3PH, 3W, 3/4HP	3P-15A	12C-3#12 RWSXL CU				
CU1	CONDENSING UNIT 1	208V, 3PH, 3W, 28.8A	3P-50A	32C-3#6 RWSXL CU				

NEW

PANEL B		120/208V, 3PH, 4W, 42CCT, 225A BUS, SURFACE MOUNTED PANEL/CCT BKRS TO HAVE *KA INTERRUPTING CAPACITY										
WATTS	SERVICE	BKR NO	PH	NO	BKR	SERVICE	WATTS					
4200	HRV2	3P 1			2 30A	HRV2	1400					
4200		- 3			4 15A	BMS	400					
4200		50A 5			6 2P	FFH1	1000					
3200	CU1	3P 7			8 15A		1000					
3200		50A 11			10 2P		1000					
		13			12 15A	FFH2	1000					
		15			14 30A	EFF1	1400					
		17			16 30A	GRV1	1400					
		19			17							
		21			18							
		23			19							
		25			20							
		27			21							
		29			22							
		31			23							
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					41							
					42							

*SEE SINGLE LINE FOR INTERRUPTING CAPACITY **INDICATES CCT BKR C/W LOCK-ON DEVICE
INDICATES GR TYPE CCT BKR *INDICATES ARC TYPE CCT BKR

PANEL LOAD SUMMARY						
LOAD	LIGHTING	HEATING	COOLING	MOTORS	AUXILIARY	TOTAL
CONNECTED	8000W	4000W	9600W	12600W	0W	34.2KW
DEMAND FACTORS	100%	100%	0%	100%	50%	
CALCULATED DEMAND	8000W	4000W	0W	12600W	0W	34.2KW
TOTAL DEMAND	CALCULATED DEMAND PLUS LARGEST MOTOR O/C DEVICE					52.2KW



- POWER DISTRIBUTION SINGLE LINE**
- SYMBOL LEGEND**
- SPLITTER (400A BUS)
 - PANEL A
 - INDICATES ENCLOSED FUSED DISCONNECT C/W FUSES INDICATED
 - X-100KA INDICATES CALCULATED AVAILABLE FAULT CURRENT
 - 10-EQUIPMENT OR FEEDER TAG. SEE APPLICABLE SCHEDULE
- ELECTRICAL EQUIPMENT NOTES - GENERAL**
- EQUIPMENT/OVERCURRENT DEVICES MAY BE SERIES RATED FOR INTEGRATED EQUIPMENT RATING (IER). CONTRACTOR TO PROVIDE LAMCDD LABELS ON ALL EQUIPMENT INDICATING SUCH RATING.
 - SPECIFIED EQUIPMENT IS MANUFACTURED BY SQUARE D. DIMENSIONS OF EQUIPMENT BASED UPON SQUARE D. ALTERNATE ACCEPTABLE MANUFACTURERS ARE CUTLER HAMMER AND SIEDMS.
 - PROVIDE COORDINATION STUDY FOR ALL OVERCURRENT DEVICES. SET DEVICES AS DETERMINED FROM STUDY. UTILIZE EQUIPMENT MANUFACTURER AND/OR INDEPENDANT AGENCY.
- ELECTRICAL EQUIPMENT - SPECIFIC**
- EXISTING 120/208V, 3PH, 4W, 400A BUS, SPLITTER.
 - EXISTING FEEDERS TO REMAIN.
 - PROVIDE 208V, 3PH, 4W, 3P-150 FUSED DISCONNECT.
 - COORDINATE FAULT CURRENT WITH BASE BUILDING.
 - PROVIDE 120/208V, 3PH, 4W, 225A BUS, PANEL.
- FEEDER NOTES - GENERAL**
- ALL CONDUCTORS INDICATED ARE RWSXL-1000V-COPPER. SEE FOLLOWING NOTES
 - ALUMINUM CONDUCTORS #3/0 AWG AND LARGER MAY BE UTILIZED IN LIEU OF COPPER. CONTRACTOR TO CONTACT AND OBTAIN PERMISSION FROM ENGINEER PRIOR TO INSTALLATION. CONTRACTOR TO MODIFY CONDUIT SIZES TO SUIT. CONTRACTOR TO RECORD CHANGES ON AS-BUILT DWGS. ALUMINUM CONDUCTOR AMPACITY MUST BE EQUAL TO OR GREATER THAN THAT OF COPPER CONDUCTOR AMPACITY
 - PARALLEL FEEDERS MAY BE UTILIZED IN LIEU OF SINGLE FEEDERS. CONTRACTOR TO CONTACT AND OBTAIN PERMISSION FROM ENGINEER PRIOR TO INSTALLATION. CONTRACTOR TO MODIFY CONDUIT AND FEEDER SIZES TO SUIT. CONTRACTOR TO RECORD CHANGES ON AS-BUILT DWGS. PARALLEL CONDUCTOR AMPACITY MUST BE EQUAL TO OR GREATER THAN THAT OF SINGLE CONDUCTOR AMPACITY
 - CONDUCTOR SIZES INDICATED IS MINIMUM REQUIRED. INCREASE CONDUCTOR SIZE (AND CONDUIT SIZE WHERE APPLICABLE) TO ACCOMMODATE VOLTAGE DROP PER CEC REQUIREMENTS
 - BELOW GRADE CONDUITS TO BE RIGID PVC UNLESS SPECIFICALLY INDICATED OTHERWISE
 - ABOVE GRADE CONDUITS TO BE ELECTRICAL METALLIC TUBING (EMT) OR RIGID STEEL UNLESS SPECIFICALLY INDICATED OTHERWISE
 - ALL CONDUITS TERMINATING AT TRANSFORMERS, MOTORS, VIBRATING EQUIPMENT TO BE SEALTIGHT FLEXIBLE CONDUIT UNLESS SPECIFICALLY INDICATED OTHERWISE
 - PROVIDE GROUND CONDUCTORS IN ALL BELOW GRADE CONDUITS AND IN ABOVE GRADE CONDUITS AS REQUIRED BY CANADIAN ELECTRICAL CODE
- FEEDER NOTES - GENERAL**
- 4FT/0 50C-4#1/0

ELECTRICAL EQUIPMENT SCHEDULE							
TAG	DESCRIPTION	DIMENSIONS	MOUNTING	LOAD	O/C	CONDUIT/WIRING	MANUFACTURER/CAT NO.
FFH1-2	STANDARD ELECTRIC FORCE FLOW HEATER C/W INTEGRAL THERMOSTAT/WHITE HOUSING	16-1/2x22 81/4x 31/4 410x581x1040mm	WALL	208V, 1PH, 2W, 2000W	2P-15A	18C-2#10 RWSXL CU	OULETT NO. OAC SERIES DAC2008-208V-2000W-WHITE

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ISSUES & REVISIONS		
NO.	DESCRIPTION	DATE
1	TENDER	13/07/08

SEALS:

PROFESSIONAL ENGINEER
LUTICAL KAMU
142337
PERMIT# P5983
2013-07-02

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PROJECT:

AQUAPLEX RENOVATIONS

PROJECT #:	D13-065	DATE:	13.05.01
DRAWN:	JD	CHECKED:	JCG
SCALE:	AS NOTED	FILE:	

TITLE:

ELECTRICAL DETAILS

DRAWING:

E2

D.B.K. ENGINEERING LTD. AQUAPLEX RENOVATIONS

ELECTRICAL SPECIFICATIONS AND REQUIREMENTS

<p>1. GENERAL</p> <p>1. THE SPECIFICATION COVERING THE BIDDING AND CONTRACT REQUIREMENTS, GENERAL REQUIREMENTS, AND ALL ASSOCIATED SECTIONS FORM AN INTEGRAL PART OF THIS SPECIFICATION AND SHALL BE READ IN CONJUNCTION HEREWITH.</p> <p>2. THE INTENT OF THIS SPECIFICATION AND DRAWINGS IS TO PROVIDE A COMPLETE AND FULLY OPERATIONAL ELECTRICAL SYSTEM.</p> <p>2. PERMITS, CERTIFICATES AND FEES</p> <p>1. THE INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF THE CURRENT EDITION OF THE CANADIAN ELECTRICAL CODE AND ALL RELEVANT BY-LAWS OF A LOCAL ELECTRICAL AUTHORITY.</p> <p>2. OBTAIN ALL PERMITS REQUIRED AND, AFTER COMPLETION OF THE WORK, FURNISH TO THE ENGINEER A CERTIFICATE OF FINAL INSPECTION AND APPROVAL FROM THE INSPECTION DEPARTMENT. TAKE OUT ALL PERMITS REQUIRED AT THE BEGINNING OF THE WORK.</p> <p>3. SUBMIT TWO (2) SETS OF DRAWINGS TO THE ELECTRICAL INSPECTION DEPARTMENT AND INCLUDE ALL COSTS FOR PRINTS, SURVEY, ETC. IN THE ELECTRICAL TENDER.</p> <p>3. EXAMINATION</p> <p>1. EXAMINE THE ARCHITECTURAL, STRUCTURAL, AND MECHANICAL DRAWINGS TO ENSURE THAT THE WORK UNDER THIS CONTRACT CAN BE SATISFACTORILY CARRIED OUT. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING ANY WORK.</p> <p>2. THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE SITE, EXISTING STRUCTURES AND LOCAL CONDITIONS AND BE SATISFIED THAT THE WORK CAN BE CARRIED OUT AS SHOWN IN THE CONTRACT DOCUMENTS AND THAT THE EQUIPMENT SPECIFIED IS SUITABLE FOR ITS INTENDED USE IN THE NEW CONSTRUCTION. NO EXTRAS WILL BE ALLOWED FOR WORK NECESSITATED BY CONDITIONS ORDINARILY EVENT ON SITE.</p> <p>4. SUPERVISION</p> <p>1. THE ELECTRICAL INSTALLATION SHALL BE EXECUTED IN A SATISFACTORY WORKMANLIKE MANNER AND SHALL PRESENT A NEAT MECHANICAL APPEARANCE WHEN COMPLETED. WORK NOT CONSIDERED SATISFACTORY TO THE ENGINEER SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.</p> <p>2. KEEP ON THE JOB DURING ITS PROGRESS, A COMPETENT FOREMAN, HOLDING A FIRST CLASS JOURNEYMEN CERTIFICATE, AND NECESSARY ASSISTANTS. ALL SATISFACTORY TO THE ENGINEER, GIVE EFFICIENT SUPERVISION TO THE WORK, USING SKILL AND ATTENTION.</p> <p>5. CO-ORDINATION</p> <p>1. WHERE WORK DEPENDS UPON EQUIPMENT BEING INSTALLED BY OTHERS, CONFIRM LOCATION OF ALL SUCH EQUIPMENT WITH THE TRADE CONCERNED PRIOR TO INSTALLING ANY CONDUIT, OUTLETS, ETC. WHERE EQUIPMENT IS BEING SUPPLIED THAT IS BEING BUILT-IN WITH WORK OF OTHER CONTRACTORS, SUPPLY THE EQUIPMENT OR NECESSARY DIMENSIONS TO THE RESPECTIVE TRADES CONCERNED.</p> <p>2. GIVE THE WORK PERSONAL SUPERVISION, LAYOUT OWN WORK, DO ALL NECESSARY LEVELING AND MEASURING, FIGURES, FULL SIZE AND DETAIL DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED MEASUREMENTS OF DRAWINGS. NO PLEA AS TO THE ACTIONS AND DIRECTIONS OF OTHER THAN THE ENGINEER WILL BE ACCEPTED IN JURISDICTION OF ANY ERROR IN CONSTRUCTION WHERE A DEPARTURE IS MADE FROM THE DRAWINGS, SPECIFICATIONS OR CONTRACT. IT SHALL REMAIN THE DUTY OF THE CONTRACTOR TO TAKE HIS OWN MEASUREMENTS OF THE WORK.</p> <p>3. OBTAIN CLARIFICATION FROM ENGINEER WHERE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS NOT CLEAR.</p> <p>4. CHECK DRAWINGS AND SPECIFICATIONS OF OTHER TRADES FOR CONFLICTS WITH ELECTRICAL WORK PRIOR TO COMMENCING WORK. REPORT SUCH CONFLICTS WITH ENGINEER AND OBTAIN A WRITTEN RULING BEFORE PROCEEDING WITH WORK. FAILURE TO REPORT SUCH CONFLICTS WILL RESULT IN THE CONTRACTOR'S RESPONSIBILITY TO MAKE WHATEVER ADJUSTMENTS THAT ARE REQUIRED.</p> <p>5. ALL ANCHORS, SLEEVES, INSERTS, ETC. REQUIRED FOR THE ELECTRICAL PORTION OF THE CONTRACT SHALL BE INSTALLED AT THE PROPER TIME AND WHEN REQUIRED TO CO-ORDINATE JOB PROGRESS WITH OTHER TRADES.</p> <p>6. ACCURACY OF DATA</p> <p>1. DRAWINGS ARE SCHEMATIC, EXACT LOCATIONS, DISTANCES, LEVELS AND OTHER DIMENSIONS SHALL BE GOVERNED BY THE BUILDING AS CONSTRUCTED.</p> <p>2. DRAWINGS INDICATE FLOOR PLANS AND/OR DETAILS INDICATING LOCATION OF OUTLETS, ETC. AND ASSOCIATED EQUIPMENT. THEY ARE DESIGN DRAWINGS AND DO NOT SHOW EVERY OFFSET, BEND, ELBOW OR JUNCTION BOX WHICH MAY BE REQUIRED FOR INSTALLATION IN THE SPACE PROVIDED. FOLLOW THE DRAWINGS AS CLOSELY AS IS PRACTICAL AND INSTALL ADDITIONAL BENDS, OFFSETS AND JUNCTION BOXES WHERE REQUIRED BY LOCAL CONDITIONS FROM MEASUREMENTS TAKEN AT THE BUILDING, SUBJECT TO APPROVAL, AND WITHOUT ADDITIONAL COST TO THE OWNER. THE DRAWINGS AND SPECIFICATIONS TOGETHER PROVIDE FOR A COMPLETE AND WORKABLE FACILITY, WITH ALL COMPONENTS IN SATISFACTORY AND OPERATING CONDITION. THESE DRAWINGS AND SPECIFICATIONS SHALL FORM A BASIS FOR THE TENDER PRICE AND SHALL BE USED TO PROVIDE A COMPLETE ELECTRICAL INSTALLATION AS DIRECTED IN EACH OR BOTH DOCUMENTS.</p> <p>3. ALL NOTES ON DRAWINGS WHICH MAKE EXCEPTION TO THESE SPECIFICATIONS HAVE PRECEDENCE EXCEPT ADDENDA WHERE SPECIFIC REFERENCE IS MADE.</p> <p>4. OUTLETS OR EQUIPMENT SHALL BE MOVED TO ANY POINT WITHIN A THREE (3) METRE RADIUS WHEN RELOCATION IS REQUESTED BY ENGINEER BEFORE WORK IS SUBSTANTIALLY COMPLETED.</p> <p>7. MATERIAL STANDARDS</p> <p>1. ALL MATERIAL SUPPLIED SHALL BE NEW OF THE QUALITY SPECIFIED. ALL EQUIPMENT SHALL CONFORM TO THE STANDARDS OF THE CANADIAN STANDARDS ASSOCIATION AND SHALL BEAR THE NECESSARY CSA APPROVAL LABEL. FOR ANY MATERIAL NOT CSA APPROVED, OBTAIN THE APPROVAL OF THE LOCAL INSPECTION AUTHORITY AND BEAR ALL INSPECTION CHARGES LEVIED AND ANY MODIFICATION COSTS REQUIRED.</p> <p>2. UNLESS OTHERWISE SPECIFICALLY CALLED FOR IN THE SPECIFICATIONS, UNIFORMITY OF MANUFACTURE SHALL BE MAINTAINED FOR ANY PARTICULAR TYPE OF EQUIPMENT THROUGHOUT THE PROJECT.</p> <p>8. APPROVAL OF MATERIAL</p> <p>1. PROPOSALS FOR SUBSTITUTION MAY BE SUBMITTED ONLY AFTER AWARD OF CONTRACT. SUCH REQUESTS MUST INCLUDE STATEMENTS OF RESPECTIVE COSTS OF ITEMS ORIGINALLY SPECIFIED AND PROPOSED SUBSTITUTIONS.</p> <p>2. PROPOSALS WILL BE CONSIDERED BY ENGINEER IF:</p> <ol style="list-style-type: none"> PRODUCTS SELECTED BY TENDERER FROM THOSE SPECIFIED ARE NOT AVAILABLE DELIVERY DATE OF PRODUCTS SELECTED FROM THOSE SPECIFIED IS NOT AVAILABLE ALTERNATIVE PRODUCTS TO THOSE SPECIFIED, WHICH ARE BROUGHT TO ATTENTION OF AND CONSIDERED BY ENGINEER AS EQUIVALENT TO THOSE SPECIFIED WILL RESULT IN A CREDIT TO THE CONTRACT AMOUNT. 	<p>3. SHOULD PROPOSED SUBSTITUTION BE ACCEPTED EITHER IN PART OR IN WHOLE, ASSUME FULL RESPONSIBILITY AND COSTS WHEN SUBSTITUTION AFFECTS OTHER WORK ON PROJECT.</p> <p>4. ALL CREDITS ARISING FROM APPROVAL OF SUBSTITUTIONS WILL BE CREDITED TO CONTRACTOR IN SUCH AMOUNTS AS MAY BE DETERMINED BY ENGINEER AND CONTRACT PRICE WILL BE ADJUSTED ACCORDINGLY. NO SUBSTITUTIONS WILL BE PERMITTED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.</p> <p>5. SUBMIT NO LATER THAN THIRTY (30) DAYS AFTER CONTRACT IS SIGNED A COMPLETE LIST OF MATERIALS BEING USED FOR THE JOB.</p> <p>9. SHOP DRAWINGS</p> <p>1. SUBMIT SHOP DRAWINGS OF ELECTRICAL EQUIPMENT TO THE ENGINEER FOR REVIEW. FABRICATION OF EQUIPMENT SHALL NOT COMMENCE UNTIL SHOP DRAWINGS OF SUCH EQUIPMENT HAVE BEEN REVIEWED BY THE ENGINEER. FIVE (5) SETS SHALL BE SUBMITTED WITH LOCAL INSPECTION DEPARTMENT APPROVAL, WHERE REQUIRED, INCLUDE MANUFACTURER'S CATALOGUE CUTS AND PHOTOMETRIC DATA FOR LIGHTING FIXTURES.</p> <p>2. SUBMIT SHOP DRAWINGS OF ALL ITEMS OF ELECTRICAL EQUIPMENT PRIOR TO INSTALLATION.</p> <p>10. CUTTING, PATCHING, ETC.</p> <p>1. STRUCTURAL MEMBERS SHALL NOT BE CUT WITHOUT THE CONSENT OF ENGINEER AND/OR STRUCTURAL ENGINEERS ON THE SITE. FOR ALL NECESSARY CUTTING, CHANNELING, CORE DRILLING, SLEEVING, X-RAYING, ETC., PROVIDE OWN FORCES AND NECESSARY EQUIPMENT REQUIRED TO COMPLETE THE ELECTRICAL FACILITIES.</p> <p>2. ALL CUTTING, PATCHING, ETC. WILL BE DONE AT THIS CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE OWNER.</p> <p>11. INSPECTION OF WORK/TESTS</p> <p>1. BEFORE ENERGIZING ANY PORTION OF THE ELECTRICAL SYSTEM, PERFORM MEGGER TESTS ON ALL FEEDERS AND BRANCH CIRCUITS. RESULTS SHALL CONFORM TO CANADIAN ELECTRICAL CODE, THE SATISFACTION OF AUTHORIZED INSPECTION AUTHORITY AND THE ENGINEER. SUBMIT RESULTS TO ENGINEER AND INCLUDED IN OPERATING/MAINTENANCE MANUALS.</p> <p>2. UPON COMPLETION OF THE BUILDING AND IMMEDIATELY PRIOR TO FINAL INSPECTION AND TAKEOVER, CHECK LOAD BALANCE ON ALL FEEDERS AND AT DISTRIBUTION CENTRES, PANELS, ETC. CONDUCT TESTS BY TURNING ON ALL POSSIBLE LOADS IN THE BUILDING AND CHECKING THE LOAD CURRENT BALANCE. IF LOAD UNBALANCE EXCEEDS 15% RECONNECT CIRCUITS TO BALANCE THE LOAD. SUBMIT FINAL READINGS TO ENGINEER AND INCLUDED IN OPERATING/MAINTENANCE MANUALS.</p> <p>3. IN CO-OPERATION WITH THE MECHANICAL CONTRACTOR, TAKE CLIP-ON AMPMETER READINGS ON ALL PHASES OF ALL MECHANICAL EQUIPMENT MOTORS WITH MOTORS OPERATING UNDER FULL LOAD CONDITIONS. TEST READINGS SHALL BE SUBMITTED TO ENGINEER, MECHANICAL CONTRACTOR AND INCLUDED IN OPERATING/MAINTENANCE MANUALS. PLATE OF READINGS TO INCLUDE MOTOR HORSEPOWER, MOTOR DESIGNATION, MOTOR NAMEPLATE DATA, ACTUAL AMPERAGE, MEASURED AND OVERLOAD HEATER NUMBER.</p> <p>12. START-UP</p> <p>1. INSTRUCT OPERATING PERSONNEL IN OPERATION, CARE AND MAINTENANCE OF INSTALLATION AT TIMES ARRANGED WITH THE OWNER.</p> <p>2. WHERE SPECIFIED HEREIN, ARRANGE AND PAY FOR THE SERVICES OF THE MANUFACTURER'S FACTORY SERVICE ENGINEER TO SUPERVISE START-UP OF INSTALLATION, CHECK, ADJUST, BALANCE AND CALIBRATE COMPONENTS. PROVIDE THESE SERVICES AS OFTEN AS NECESSARY TO PUT INSTALLATION IN WORKING ORDER AND TO ENSURE THAT OPERATING PERSONNEL ARE CONVERSANT WITH ALL ASPECTS OF OPERATION, CARE AND MAINTENANCE.</p> <p>13. EQUIPMENT IDENTIFICATION</p> <p>1. PANELS, PULL BOXES, DISCONNECT SWITCHES, STARTERS, SPLITTERS SHALL BE FACTORY FINISHED GLOSS AIR DRY GRAY ENAMEL OVER CORROSION RESISTANT SEALER PRIMER.</p> <p>2. IDENTIFY ELECTRICAL EQUIPMENT WITH NAME PLATES.</p> <p>3. NAME PLATES: LAMINATED 3 MM THICK PLASTIC ENGRAVING SHEET, BLACK FACE, WHITE CORE, SELF ADHESIVE FINISH.</p> <p>4. THE FOLLOWING WITH NAME PLATES:</p> <ol style="list-style-type: none"> PANELS: IDENTIFY AS INDICATED ON DRAWINGS, INDICATE MAIN VOLTAGE, PHASE AND AMPERAGE, IE: "PANEL A, 120/208V, 3PH, 4W, 225A BUS" DISCONNECT SWITCHES, STARTERS, CONTACTORS AND EQUIPMENT BEING CONTROLLED: INDICATE MAIN VOLTAGE, PHASE AND AMPERAGE TERMINAL CABINETS AND PULL BOXES: INDICATE SYSTEM, MAIN VOLTAGE, PHASE AND AMPERAGE TRANSFORMERS: IDENTIFY AS INDICATED ON DRAWINGS, INDICATE CAPACITY, PRIMARY AND SECONDARY VOLTAGES, PHASE AND KVVA, IE: "TRANSFORMER TA, 600-120/208V, 45KVA" <p>5. SUBMIT NAMEPLATE DESCRIPTION TO THE ENGINEER FOR REVIEW. FABRICATION OF NAMEPLATES SHALL NOT COMMENCE UNTIL REVIEWED BY THE ENGINEER.</p> <p>14. RECORD (AS BUILT) DRAWINGS</p> <p>1. AT COMPLETION OF THE PROJECT, PROVIDE THE OWNER WITH TWO PRINTED SETS OF RECORD DRAWINGS.</p> <p>2. AT COMPLETION OF THE PROJECT, PROVIDE THE OWNER WITH ONE DIGITAL FORMAT RECORD DRAWINGS.</p> <p>3. ACCURATELY RECORD LOCATION OF ALL ELECTRICAL EQUIPMENT, OUTLETS AND CONDUIT RUNS AS INSTALLED ON THE SITE AND AS BEING AT VARIANCE WITH THE ORIGINAL DRAWINGS. THESE RECORD PLANS SHALL INCLUDE ALL PERTINENT NOTATIONS, REVISED NOTATIONS, REVISED CONDUIT COUNTS, ETC. AND SHALL BE KEPT UP-TO-DATE AT ALL TIMES ON THE JOB SITE.</p> <p>4. NOTE THAT D.B.K. CONSULTING ENGINEERS IS TO PRODUCE RECORD DRAWINGS. COSTS FOR SERVICES OF D.B.K. CONSULTING ENGINEERS FOR PRODUCING PRINTED AND DIGITAL FORMAT RECORD DRAWINGS SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. CONTRACTOR TO ALLOW</p> <p align="center">\$300 (THREE HUNDRED DOLLARS) PER EACH ISSUED FOR TENDER ELECTRICAL DRAWING</p> <p>COSTS SHALL BE INCLUDED IN THE ELECTRICAL CONTRACTORS TOTAL TENDER PRICE</p> <p>15. OPERATING/MAINTENANCE MANUALS</p> <p>1. FOR EACH ITEM OF SPECIAL APPARATUS, SUPPLY SPECIFIC INDEXED COPIES OF MANUALS. EACH COPY SHALL CONTAIN THE FOLLOWING:</p> <ol style="list-style-type: none"> A COPY OF EACH "REVIEWED" SHOP DRAWING COMPLETE EXPLANATION OF OPERATION PRINCIPLES AND SEQUENCES RECOMMENDED MAINTENANCE PRACTICES AND PRECAUTIONS COMPLETE WIRING AND CONNECTION DIAGRAMS TEST READINGS. 	<p>2. ENSURE THAT OPERATING AND MAINTENANCE INSTRUCTIONS ARE SPECIFIC AND APPLY TO THE MODELS AND TYPES OF EQUIPMENT PROVIDED.</p> <p>16. VOLTAGE RATINGS</p> <p>1. OPERATING VOLTAGES TO CSA C235.</p> <p>2. MOTORS, LIGHTING, ELECTRICAL HEATING, CONTROL AND DISTRIBUTION DEVICES AND EQUIPMENT TO OPERATE SATISFACTORILY AT 80 Hz. WITHIN NORMAL OPERATING LIMITS ESTABLISHED BY ABOVE MENTIONED STANDARD. EQUIPMENT TO OPERATE IN EXTREME OPERATING CONDITIONS ESTABLISHED IN ABOVE STANDARD WITHOUT DAMAGE TO EQUIPMENT.</p> <p>17. FIREPROOFING</p> <p>1. WHERE SLEEVES OR OPENINGS ARE INSTALLED IN WALLS, FLOORS, ROOF OR PARTITIONS TO ACCOMMODATE RACEWAYS OR CABLES, PROVIDE ALL NECESSARY SEALS, FITTINGS, BARRIERS AND FIRE-RESISTANT MATERIALS TO RESTORE THE INSTALLATION TO ITS ORIGINAL FIRE RATING TO THE SATISFACTION OF THE GOVERNING AUTHORITIES.</p> <p>18. CLEANING</p> <p>1. THIS CONTRACTOR AND/OR HIS SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING UP ALL DEBRIS ACCUMULATED DURING THE COURSE OF THE WORK. UPON COMPLETION OF THE CONTRACT AND WHENEVER DIRECTED BY THE ENGINEER, THE COMPLETE INSTALLATION SHALL BE MAINTAINED IN A NEAT AND TIDY MANNER DURING ITS ENTIRE COURSE.</p> <p>2. AT THE COMPLETION OF THE WORK, A COMPLETE AND THOROUGH CLEAN-UP SHALL BE DONE ON THE SURFACES AND INTERIORS OF ALL EQUIPMENT, AN INDUSTRIAL TYPE VACUUM CLEANER SHALL BE USED AS PART OF THE CLEANING.</p> <p>19. CIRCUITING</p> <p>1. IN SOME CASES, CONDUIT AND WIRING IS NOT INDICATED, BUT THE REQUIREMENT FOR THE WORK IS REQUIRED. THEY ARE NEVERTHELESS TO BE PROVIDED AS INTENDED.</p> <p>2. CONNECT AND WIRE ALL DEVICES AND EQUIPMENT SHOWN AS INDICATED USING WIRING AND RACEWAY METHODS SPECIFIED.</p> <p>3. PROVIDE ALL WIRING REQUIRED FOR OPERATION OF THE EQUIPMENT AND IN ACCORDANCE WITH THESE SPECIFICATIONS, THE ELECTRICAL CODE AND MANUFACTURER'S INSTRUCTIONS.</p> <p>4. COMMON NEUTRALS ARE NOT TO BE USED ON CIRCUITS CONTAINING DIMMERS OR ISOLATED GROUND RECEPTACLES. PROVIDE A SEPARATE NEUTRAL PER CIRCUIT FOR SUCH INSTALLATIONS.</p> <p>5. PROVIDE A SEPARATE #12 INSULATED GROUND PER CIRCUIT CONTAINING ISOLATED GROUND RECEPTACLES.</p> <p>20. FINAL</p> <p>1. POINTS NOT SPECIFICALLY MENTIONED SHALL BE IN STRICT ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE AND REGULATIONS OF THE ELECTRICAL INSPECTION DEPARTMENT FROM WHICH THE PERMIT WAS OBTAINED. THE LATEST REVISIONS AND/OR AMENDMENTS TO THIS CODE WITH APPLICABLE DATE RESTRICTIONS, SHALL ALSO GOVERN WORK ON THIS CONTRACT.</p> <p>2. LEAVE THE WORK COMPLETE TO THE APPROVAL OF THE ENGINEER.</p> <p>21. GUARANTEE</p> <p>1. FURNISH A WRITTEN GUARANTEE/WARRANTY COUNTERSIGNED AND GUARANTEED BY THE GENERAL CONTRACTOR STATING:</p> <p>THAT ALL WORK EXECUTED UNDER THIS CONTRACT WILL BE FREE FROM DEFECTS OF WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THIS WORK, EXCEPT FOR INCANDESCENT LAMPS WHICH SHALL BE FOR A PERIOD OF SIX (6) MONTHS.</p> <p>2. THE ABOVE PARTIES FURTHER AGREE THAT THEY WILL, AT THEIR OWN EXPENSE, REPAIR AND REPLACE ALL SUCH DEFECTIVE WORK AND OTHER WORK DAMAGED THEREBY WHICH FAILS OR BECOMES DEFECTIVE DURING THE TERM OF THE GUARANTEE/WARRANTY PROVIDED THAT SUCH DEFECTIVE IS NOT DUE TO IMPROPER USAGE.</p> <p>3. THE PERIOD OF THE GUARANTEE SPECIFIED SHALL IN NO WAY SUPPLANT ANY OTHER GUARANTEE OF A LONGER PERIOD BUT SHALL BE BINDING ON WORK NOT OTHERWISE COVERED.</p> <p>22. CONDUIT</p> <p>1. WIRING IN CONCRETE MASONRY CONSTRUCTION SHALL BE INSTALLED IN RIGID GALVANIZED STEEL (RGS) CONDUIT. CONDUITS INSTALLED IN AREAS EXPOSED TO MOISTURE SHALL HAVE WATER TIGHT FITTINGS. CONDUIT IN ALL OTHER AREAS SHALL BE EMT.</p> <p>2. ALL WIRING IN FINISHED AREAS SHALL BE CONCEALED. CONDUITS SHALL BE RUN ON THE SQUARE AND PARALLEL TO THE BUILDING LINES. CONDUITS MAY BE EXPOSED IN MECHANICAL AND STORAGE ROOMS.</p> <p>3. CONDUIT AND WIRING SHALL BE GROUPED WHERE POSSIBLE AND CLIPPED IN A NEAT AND WORKMANLIKE MANNER.</p> <p>4. RIGID PVC CONDUIT TO BE USED UNDERGROUND INCLUDING: UTILITY SERVICES, BRANCH CIRCUITS AND BENEATH CONCRETE AND PAVED AREAS.</p> <p>5. MAKE CONNECTIONS TO TRANSFORMERS, MOTORS AND VIBRATING EQUIPMENT WITH LIQUID TIGHT FLEXIBLE CONDUIT AND CONNECTORS.</p> <p>6. MINIMUM SIZED CONDUIT IS 13MM.</p> <p>7. FLEXIBLE METALLIC CONDUIT MAY BE USED FOR SHORT CONNECTIONS TO INDOOR EQUIPMENT.</p> <p>8. INSTALL ALL WIRING IN CONDUIT WITH NUMBER OF WIRES PER CONDUIT AND SIZE OF CONDUIT AS INDICATED AND IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE.</p> <p>9. INSTALL CSA APPROVED EXPANSION FITTING COMPLETE WITH GROUNDING JUMPER WHERE CONDUITS CROSS BUILDING EXPANSION JOINTS OR SLABS. PROVIDE BEND OR OFFSET IN CONDUIT ADJACENT TO BUILDING EXPANSION JOINT WHERE CONDUIT IS INSTALLED ABOVE SUSPENDED CEILING.</p> <p>10. INSTALL CONDUIT AS MECHANICAL PROTECTION FOR ALL OPEN WIRING INCLUDING NONMETALLIC SHEATHED CABLE.</p> <p>23. WIRE AND CABLE</p> <p>1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, ALL WIRING SHALL BE COPPER, MINIMUM #12 AWG STRANDED FOR POWER CIRCUITS, #14 AWG MINIMUM FOR CONTROL CIRCUITS. WIRE AND FEEDER TYPE SHALL BE R90 XLPE INSULATED, 600V. FOR EXTERIOR, INDOOR WIRING SHALL BE R90 XLPE 600V. COLOR CODE BRANCH WIRING AS FOLLOWS:</p> <p>EQUIPMENT GROUNDING CONDUCTION: GREEN NEUTRAL CONDUCTOR: WHITE 120/208V PHASE CONDUCTORS: RED, BLACK, BLUE</p>	<p>2. INSTALL ALL WIRES IN RACEWAYS, WIRE AND CONNECT EQUIPMENT TO CIRCUITS INDICATED.</p> <p>3. ALL FEEDERS AND MOTOR CIRCUITS TO BE WIRED IN CONDUIT. WHERE CONDUIT AND WIRE IS INDICATED, IT SHALL BE USED.</p> <p>4. ALL WIRING TO BE IN CONDUIT FOR FIRE ALARM, EMERGENCY LIGHTING AND EXIT SIGNS EXCEPT WHERE SPECIFICALLY APPROVED OTHERWISE BY ENGINEER.</p> <p>5. ARMORED CABLE (BX), CSA TYPE AC-90 OR FLEXIBLE METALLIC CONDUIT SHALL ONLY BE USED AS FOLLOWS:</p> <ol style="list-style-type: none"> WHERE PERMITTED BY ENGINEER. INDIVIDUAL DROPS FROM JUNCTION BOXES IN CEILING SPACES TO LUMINAIRES ("DAISY-CHAINING" OF LUMINAIRES IS NOT PERMITTED). <p>6. ALL UNDERGROUND WIRING SHALL BE INSTALLED IN CONDUIT.</p> <p>7. ALUMINUM WIRING IS NOT PERMITTED EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE AND WHERE PERMITTED BY ENGINEER.</p> <p>24. OUTLET BOXES</p> <p>1. OUTLET, JUNCTION AND SWITCH BOXES SHALL BE GALVANIZED PRESSED STEEL OF SIZE TYPE TO SUIT EACH INDIVIDUAL APPLICATION. BOX TYPE TO BE 34131, 32171, 72171 OR M80 ACCORDING TO SIZE RESTRICTION AND MOUNTING TYPE. TYPE 1121 UTILITY BOXES ARE NOT PERMITTED.</p> <p>2. EACH OUTLET MUST BE SUITABLE IN ALL RESPECTS FOR THE APPLICATION COMPLETE WITH ALL ACCESSORIES, PLASTER RIMS AND COVERS.</p> <p>3. ALL BOXES SHALL BE SIZED TO ACCOMMODATE THE NUMBER OF RACEWAYS AND CONDUCTORS, TELEPHONE AND VOICE AND/OR DATA BOXES SHALL BE SIZED TO APPLICABLE STANDARDS AND UTILITY STANDARDS.</p> <p>4. ALL PULL AND JUNCTION BOXES MUST BE ACCESSIBLE AFTER THE BUILDING IS COMPLETE.</p> <p>25. WIRING DEVICES/COVERPLATES</p> <p>1. EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE, WIRING DEVICES TO BE SPECIFICATION GRADE.</p> <p>2. COLOR OF ALL WIRING DEVICES/COVERPLATES TO BE DETERMINED BY ARCHITECT AS FOLLOWS:</p> <ol style="list-style-type: none"> 120V, 15A/20A SWITCHES SINGLE/DOUBLE RECEPTACLES GROUND FAULT RECEPTACLES ISOLATED GROUND DUPLEX RECEPTACLES SPECIAL RECEPTACLES AS NOTED SWITCH AND PILOT LIGHT DIMMER SWITCHES - 1500W <p>3. COVERPLATES FOR WIRING DEVICES TO BE AS FOLLOWS:</p> <ol style="list-style-type: none"> A) IN SERVICE AND MECHANICAL ROOMS - HUBBELL STAINLESS STEEL S SERIES B) EXTERIOR AND WEATHERPROOF AREAS - SECTOR GRAY WIG/WOR SERIES <p>4. PRIOR TO ORDERING, CONFIRM COLOR AND STYLE OF ALL WIRING DEVICES AND COVERPLATES WITH ARCHITECT.</p> <p>5. WIRING DEVICES ADJACENT ONE ANOTHER SHALL BE ARRANGED IN A NEAT SYMMETRICAL PATTERN TO THE APPROVAL OF THE ENGINEER. WIRING DEVICES ARE TO BE STACKED AND ALIGNED BOTH VERTICALLY AND HORIZONTALLY.</p> <p>6. PROVIDE MATCHING PLUGS WITH CORP FOR ALL SPECIAL RECEPTACLES. CONNECT TO ASSOCIATED EQUIPMENT.</p> <p>7. MOUNT RECEPTACLES VERTICALLY WITH GROUND PIN DOWN.</p> <p>8. SPECIFICATION GRADE WIRING DEVICES AS MANUFACTURED BY BRYANT, HUBBELL AND LEVITON ARE APPROVED FOR USE.</p> <p>9. ALL WIRING DEVICES OF THE SAME TYPE SHALL BE BY THE SAME MANUFACTURER.</p> <p>26. DISCONNECT SWITCHES</p> <p>1. THREE PHASE MOTOR DISCONNECT SWITCHES AND 3 POLE UNFUSED, 600 VOLT IN EIMAC TYPE 1 ENCLOSURE.</p> <p>2. SINGLE PHASE DISCONNECT SWITCHES, SINGLE POLE TOGGLE SWITCH.</p> <p>3. INSTALL MOTOR AND CIRCUIT DISCONNECT SWITCHES AS REQUIRED BY CODE OR CALLED FOR IN TENDER DOCUMENTS.</p> <p>4. AMPERE AND HORSE POWER RATING AS REQUIRED BY THE CIRCUIT AND ASSOCIATED EQUIPMENT OR AS INDICATED.</p> <p>27. SERVICE AND DISTRIBUTION</p> <p>1. ALL THE REQUIREMENTS OF THE SERVING UTILITY COMPANIES SHALL GOVERN THE SERVICE INSTALLATION AND SUCH UTILITIES SHALL BE NOTIFIED AT THE TIME WORK IS COMMENCED ON THE PROJECT WITH DRAWINGS AND SPECIFICATIONS SUBMITTED TO SAME IF REQUESTED.</p> <p>2. CO-ORDINATE THE COMPLETE SERVICE INSTALLATIONS WITH THE SERVING UTILITY COMPANIES.</p> <p>28. GROUNDING</p> <p>1. INSTALL COMPLETE GROUNDING SYSTEM AS INDICATED AND IN ACCORDANCE WITH CANADIAN ELECTRICAL CODE AND ELECTRICAL INSPECTION AUTHORITY HAVING JURISDICTION.</p> <p>2. TESTS MEASURE GROUND GRID RESISTANCE WITH AN EARTH TEST MEGGER AND INSTALL GROUND RODS AND CONDUCTORS AS REQUIRED UNTIL RESISTANCE TO GROUND COMPLES WITH CODE REQUIREMENTS.</p> <p>3. GROUND RODS SHALL BE MINIMUM 3000MM LONG BY 20MM IN DIAMETER COPPER CLAD STEEL GROUND RODS.</p> <p>4. GROUND CONDUCTORS - BARE STRANDED 100 PERCENT COPPER CABLES, MINIMUM #3/0 AWG.</p> <p>CONNECTION FROM GROUNDING GRID - THERMAWELD CABLE CONNECTIONS AND CONNECTION TO GROUND RODS, FROM TWO POINTS ON THE GROUND LOOP. INSTALL A #3/0 GROUND CONDUCTOR IN 25MM CONDUIT TO MAIN GROUND BUS.</p> <p>5. FROM GROUND BUS IN MAIN SWITCHGEAR, CONNECT #3/0 GROUND CONDUCTOR IN 25MM CONDUIT TO THE WATER MAIN WITH APPROVED GROUND CLAMP AHEAD OF THE WATER METER.</p> <p>6. INSTALL ONE #3/0 GROUND CONDUCTOR JUMPER OF FLEXIBLE COPPER STRIP CONDUCTOR AROUND THE WATER METER AND ASSOCIATED UNIONS AND VALVES TO GROUND BUILDING SIDE OF WATER SYSTEM.</p> <p>7. PROVIDE A SEPARATE COPPER CABLE BONDING CONDUCTOR IN ALL CONDUITS INSTALLED UNDERGROUND OR IN CONCRETE SLABS.</p>	<p>8. PROVIDE A SEPARATE COPPER CABLE BONDING CONDUCTOR IN ALL UNDERFLOOR OR IN FLOOR RACEWAYS AND UTILIZE TO MAINTAIN GROUND CONTINUITY AT ALL DEVICES/BOXES.</p> <p>29. BRANCH CIRCUIT PANELBOARDS</p> <p>1. FLUSH AND SURFACE MOUNTED AS INDICATED COMPLETE WITH PANEL TRIM HAVING CONCEALED HINGES AND TRIM MOUNTING SCREWS, HINGED LOCKING DOOR AND FLUSH CATCH.</p> <p>2. PROVIDE TWO KEYS FOR EACH PANEL INTERCHANGEABLE WITH PANELS OF SAME VOLTAGE.</p> <p>3. PHASE AND VOLTAGE AS INDICATED. SOLID NEUTRAL SEQUENCE STYLE BUSSING, FULL CAPACITY BOLT-ON MOULDED CASE CIRCUIT BREAKERS, MAIN LUGS TYPE.</p> <p>4. CIRCUIT BREAKERS TO BE OF SIZES AND NUMBER OF POLES AS INDICATED, MINIMUM 25MM WIDE, INTERRUPTING CAPACITY SYMMETRICAL AS INDICATED, SEE SINGLE LINE.</p> <p>5. EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE, PANELS TO BE SQUARE D WITH TYPE 80 BREAKERS. ACCEPTABLE ALTERNATE MANUFACTURERS ARE CUTLER HAMMER AND SIEMENS.</p> <p>6. AFFIX TYPEWRITTEN DIRECTORY TO THE INSIDE COVER OF PANEL BOARD INDICATING LOADS CONTROLLED BY EACH CIRCUIT.</p> <p>7. PANEL DIRECTORY MUST BE ACCURATE. COPY OF PANEL DIRECTORY FOR EACH PANEL MUST BE SUBMITTED IN MAINTENANCE BROCHURES.</p> <p>8. MOUNT PANELBOARDS AT 1980 MM TO TOP.</p> <p>9. PROVIDE LUGS FOR PARALLEL FEEDERS WHERE REQUIRED.</p> <p>10. PANELS AND CIRCUIT BREAKERS TO BE RATED FOR AVAILABLE FAULT CURRENT.</p> <p>11. PANELS AND CIRCUIT BREAKERS MAY BE INTEGRAL EQUIPMENT RATED FOR AVAILABLE FAULT CURRENT. REFER TO SINGLE LINE.</p> <p>30. MOTOR STARTERS</p> <p>1. MAGNETIC MOTOR STARTERS TO BE ENCLOSED TYPE, ACROSS THE LINE FULL VOLTAGE NON-REVERSING, COMPLETE WITH CONTACTOR, ONE OVERLOAD RELAY PER PHASE, TWO PILOT LIGHT AND RESET BUTTON AND HSA SWITCH IN COVER, TWO SETS OF N/O AUXILIARY CONTACTS IN ADDITION TO STANDARD HOLDING CONTACTS AND CONTROL CIRCUIT FUSES. SEE MECHANICAL EQUIPMENT SCHEDULE FOR ALTERNATE STARTER REQUIREMENTS.</p> <p>2. SINGLE PHASE MANUAL MOTOR STARTERS TO BE TOGGLE OPERATED 120 VOLT COMPLETE WITH PILOT LIGHT AND OVERLOAD HEATER.</p> <p>3. SELECT OVERLOAD HEATER TO SUIT MOTORS.</p> <p>4. SIZE STARTER TO MOTOR AND CIRCUIT.</p> <p>31. EMERGENCY LIGHTING/EXIT SIGNS</p> <p>1. CONNECT REMOTE EMERGENCY LIGHTS AND EXIT LIGHTS TO BATTERY UNIT. MINIMUM CONDUCTOR SIZE TO BE #12AWG. INCREASE CONDUCTOR SIZE AS NECESSARY TO NEGATE VOLTAGE DROP. INSTALLATION TO BE PER MANUFACTURERS INSTRUCTIONS.</p> <p>2. FOR EXIT LIGHTS, PROVIDE DOUBLE FACE TYPES EXCEPT FOR FLAT FACE MOUNTED. PROVIDE DIRECTION ARROWS WHERE INDICATED. CONNECT TO BATTERY AND TO AC CIRCUIT. PROVIDE LED LAMPS.</p> <p>32. LUMINAIRES</p> <p>1. ALL LUMINAIRES SHALL BE COMPLETE WITH LAMPS AND ACCESSORIES TO LEAVE THE FIXTURE COMPLETE IN POSITION AND OPERATING.</p> <p>2. PROVIDE ALL MOUNTING ACCESSORIES TRIMS AND ACCESSORIES TO SUIT THE CEILING AND INSTALLATION.</p> <p>3. INCANDESCENT LAMPS SHALL BE EXTENDED SERVICE, LONG LIFE 130 VOLT, INSIDE PROTECTED.</p> <p>FLUORESCENT LAMPS SHALL BE 41K FOR RAPID START.</p> <p>4. FLUORESCENT BALLASTS SHALL BE LOW NOISE, A RATING, RAPID START, THERMAL PROTECTION, AUTOMATIC RESET, HIGH POWER FACTOR, DIM CERTIFIED.</p> <p>5. HID BALLASTS AND LAMPS AS INDICATED IN LUMINAIRE SCHEDULE.</p> <p>6. LUMINAIRES ARE AS SPECIFIED IN LUMINAIRE SCHEDULE.</p> <p>7. ALL LUMINAIRES SHALL BE SUPPORTED FROM THE STRUCTURE ABOVE INDEPENDENT OF THE CEILING.</p> <p>8. PROVIDE ALL ADDITIONAL SUPPORTS, HANGERS AND STEEL REQUIRED TO SUPPORT LUMINAIRES LOCATED UNDER MECHANICAL DUCTS.</p> <p>9. EXACT LOCATIONS OF ALL LUMINAIRES IN AREAS HAVING A CEILING, SEE ARCHITECTURAL REFLECTED CEILING PLANS.</p>
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NOTES

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ISSUES & REVISIONS

NO.	DESCRIPTION	DATE
1	TENDER	13/07/08

SEALS:

PERMIT# P5983
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PROJECT:

AQUAPLEX RENOVATIONS

PROJECT #	D13-065	DATE:	13/05/01
DRAWN:	JD	CHECKED:	JCG
SCALE:	AS NOTED	FILE:	-

TITLE:

ELECTRICAL SPECIFICATION

DRAWING:

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