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LIST OF DRAWINGS:

MECHANICAL DRAWINGS:

M0 COVER SHEET

PARTIAL FLOOR PLANS - MECHANICAL

MECHANICAL DETAILS

M3 MECHANICAL EQUIPMENT SCHEDULES AND SPECIFICATIONS

ELECTRICAL DRAWINGS:

ELECTRICAL LAYOUT - DEMOLITION & NEW

CONSTRUCTION

E2 ELECTRICAL SPECIFICATIONS

ELECTRICAL

CONTACT: ALAN JONES

ISSUED FOR TENDER SEPTEMBER 15, 2011









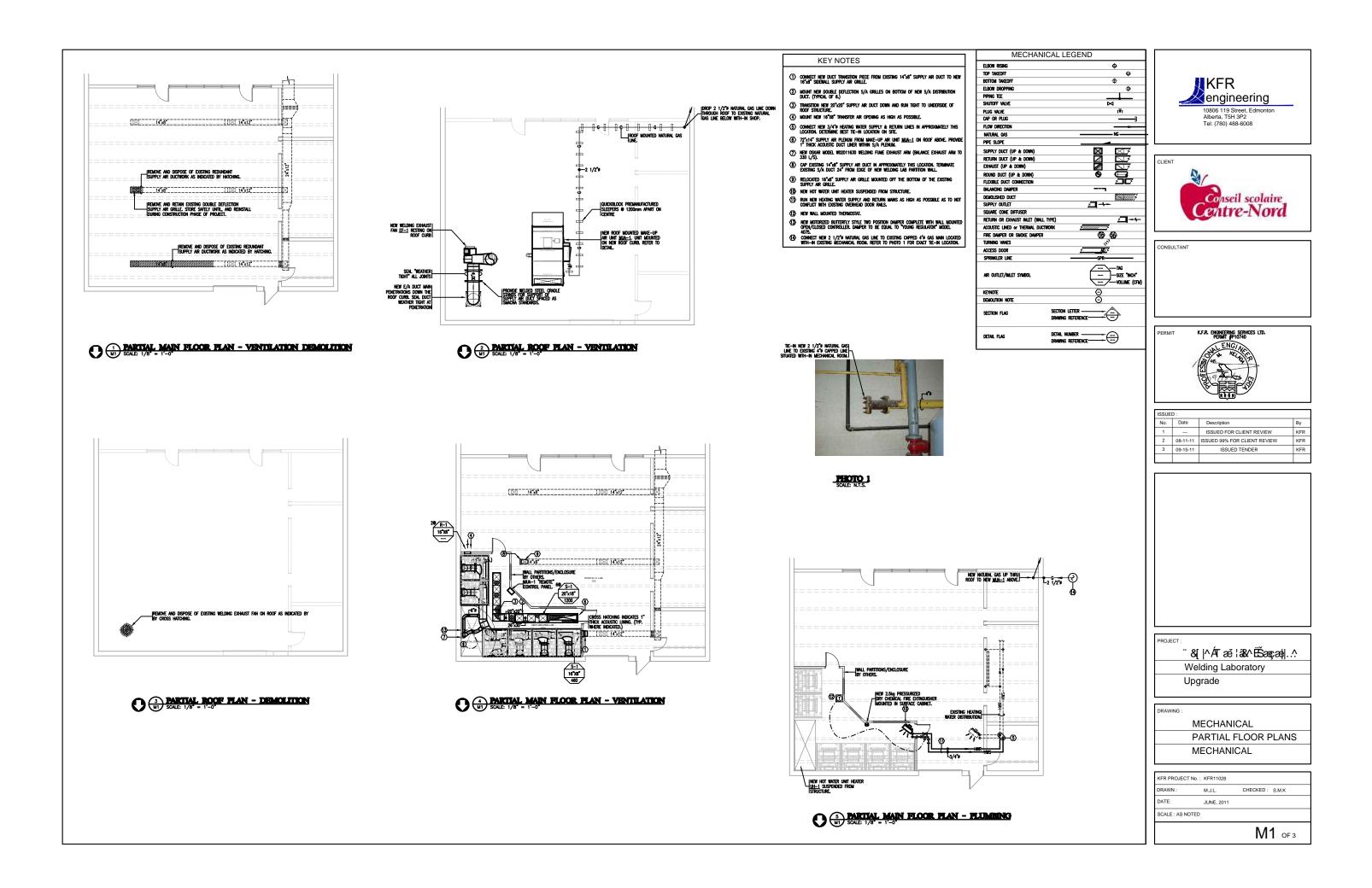
ISSUE			
No.	Date	Description	Ву
1		ISSUED FOR CLIENT REVIEW	KFR
2	08-11-11	ISSUED 99% FOR CLIENT REVIEW	KFR
3	09-15-11	ISSUED TENDER	KFR

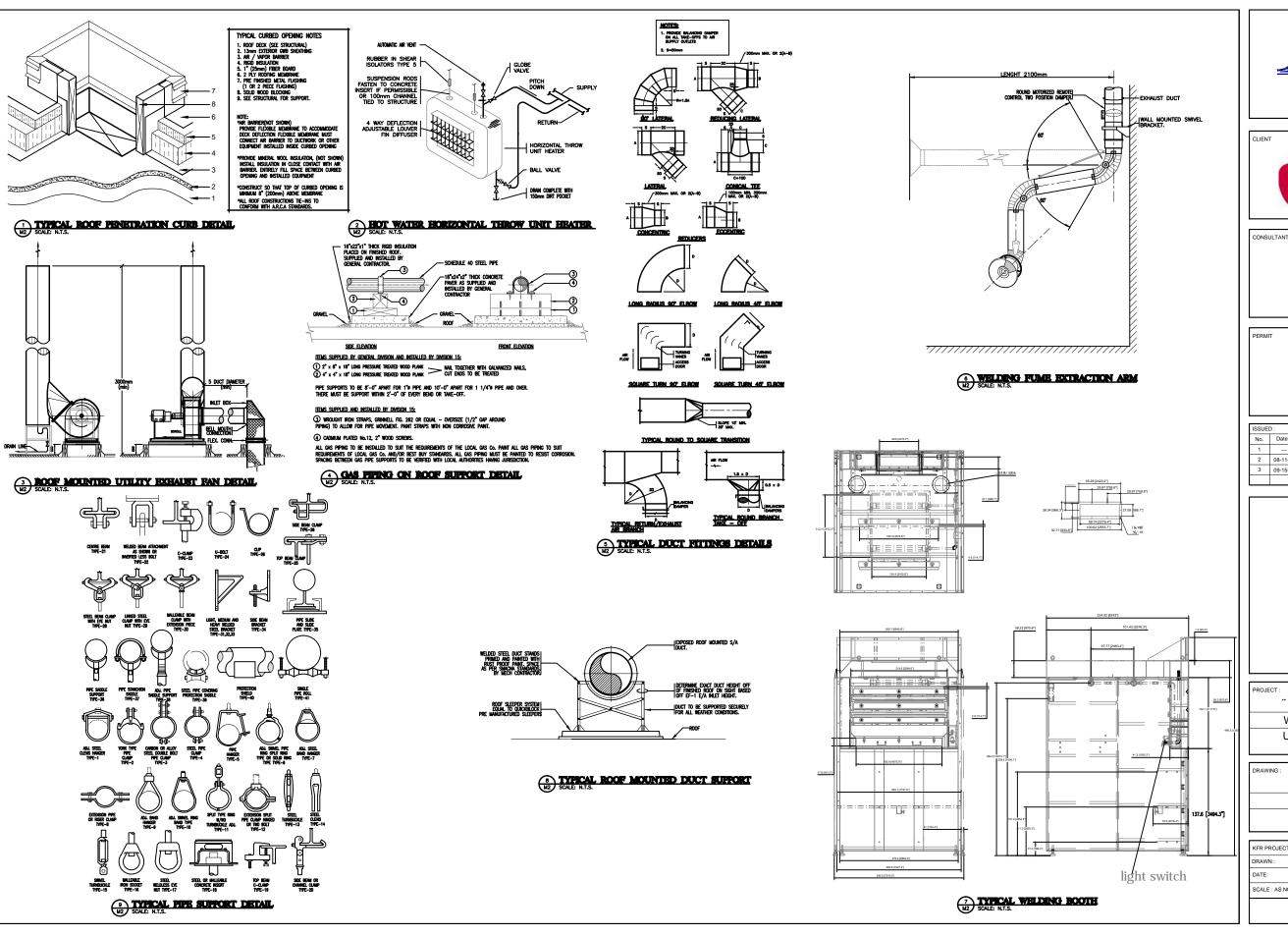
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	Welding Laboratory
	Upgrade

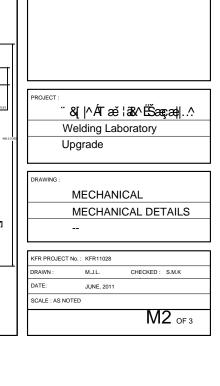
DRAWING :		
	MECHANICAL	
	COVER SHEET	

DRAWN:	M.J.L.	CHECKED: S.M.K
DATE:	JUNE, 2011	
SCALE : AS NO	TED	
		1.40









IKFR

engineering

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Conseil scolaire Centre-Nord

K.F.R. ENGINEERING SERVICES LTD. PERMIT #P10740

ISSUED FOR CLIENT REVIEW
ISSUED 99% FOR CLIENT REVIEW

FAN SCHEDULES TAG UNIT DESCRIPTION LOCATION MANUFACTURER MODEL CAPACITY (CFM) E.S.P. (inches wg) FAN R.P.M. MOTOR (H.P.)/POWE DESCRIPTION/REMARKS EMENT TALU. (TOP AN WELDING EXHAUST SWB-224-30 7200 MUA-1/SF-1 MAKE-UP AIR UNIT SUPPLY AIR FAN ROOF MOUNTED S/A PLENUM LAU 7200

	MAKE-UP AIR UNIT SCHEDULE:									
UNIT TAG	LOCATION	MANUFACTURER	MODEL	LINER Type	LENGTH (INCH)	WIDTH (INCH)	HEIGHT (INCH)	INPUT RATING (BTU/HR)	OUTPUT RATING (BTU/HR)	REMARKS
MUA-1	ROOF (SHOP AREA)	ENGINEERED AIR	DJX100/0	PERFORATED	306	154	76	1,000,000	900,000	WELDING LAB MAKE-UP AIR UNIT

			DIFFUSERS/G	RILLES SCHEDULES		
TAG	MANUFACTURER	MODEL	FINISH	CEILING TYPE	DESCRIPTION/REMARKS	OPTIONS
<u>S-1</u>	E.H. PRICE	SERIES 520	B12	T-BAR/DRYWALL/DUCT MOUNTED	DOUBLE DEFLECTION RECTANGULAR GRILLE	
R-1	E.H. PRICE	SERIES 90	B12	T-BAR/DRYWALL/ DUCT MOUNTED	return/transfer air grille	

	UNIT HEATER SCHEDULE								
TAG									
<u>UH-1</u>	WELDING LAB 150A	HEATING	ENGINEERED AIR	V1 (VERTICAL)	52.4	5.4	1.0	1/20	VERTICAL PROJECTION HYDRONIC UNIT HEATER

					FILTER SCHEDULE					
TAG	LOCATION	SERVICE	MANUFACTURER	MODEL	TOTAL AIR VOLUME (CFM)	FACE VELOCITY (FPM)	EFFICIENCY	INITIAL RESISTANCE (IN. WG)	INITIAL RESISTANCE (IN. WG)	NOTES:
<u>PF-1</u>	MUA-1	PREFILTER	FARR	30/30	25,000	500	30%	0.08	0.28	
<u>F-1</u>	MUA-1	FINAL FILTER	FARR	30/30	25,000	500	30%	0.08	0.28	

	ISOLATION SCHEDULE								
ISOLATION EQUIPMENT			BASE		DLATOR				
DESCRIPTION	UNIT No.	TYPE	THICKNESS (mm)	TYPE	STATIC DEFLECTION (mm)	REMARKS			
UNIT HEATERS	UH-1-UH-15			6	12mm				
MUA-1				2	25mm				

	WELDING FUME EXTRACTION ARM						
TAG	MANUFACTURER	MODEL	CAPACITY (L/s)	ESP (Pg)	SOUND LEVEL	DESCRIPTION/REMARKS	
FEA-1	OSKAR	W02011630	330	498	-	EXTRACTOR ARM TO BE $_{\rm c}/_{\rm w}$ 360' rotation, c/w oskar wall mounting bracket model wsd 160. Extraction arm hose to be rated at 2007f/95'C	

WELDING BOOTH SPECIFICATION

WE SASS IS YES MELDING POOT HEREOGEN ATIONS

The W B5000 series range from $2^{\circ} \times 2^{\circ}$ to $12^{\circ} \times 12^{\circ}$ and all come standard with an engineer of rear panel that supports the cooling weight, guiding, elect Call and gas lines. Si pile panels are nowled before an entire of an enclosed and relocated divisions causing without leadings with the node and before the chearts is integrated has one point or giving both. The coolin has one five component (best panel, both and are described, how side panels and hooly that make up an inhibitious both. Further are noted that search and the cooling are considered and the cool of the transition of the cooling are considered and the cooling are considered as a considered and the cooling are considered as a considered and the cooling are considered and the cooling are considered and the cooling are considered as a considered and the cooling are considered and the considered and the considered and the considered and the considered are considered as a considered and the considered a

- But no arm brackets are standard in the WB series and come standard with a cover pate for future use.
 Hood Dimensions 5 (% 7.27 x 8.57)
 Bock Drish Dimensions: 4.8 % 7.28 % 9.1 % 7.27
 Hood link Opening 67 x 17
 Hood Series Pater Removable 3.1 % 7.3 1 % service panel
 Beach Crish Adjustable links (1921 1 % 1.3 % 7.4 % 1.3 % 1.4 % 1

OFTION ADD ER: • Adjustable Working Rear Working Table (2 %* Opening for Fixture)

Configuration: Three Booth (3 back/hood panels, 4 side panels)
Two Booth (2 back/hood panels, 3 side panels)

Delivery: 9 - 11 Weeks

WELDING BOOTH SUPPLIED BY "ENERGY TECHNOLOGY PRODUCTS LTD"

MECHANICAL SPECIFICATION

- 1.1 GENERAL

 1. ALL MECHANICAL TRADES WORK WILL BE CONDUCTED UNDER THE DIRECTION OF A PRIME CONTRACTOR, AUTHORITY TO COMMENCE WORK WILL BE PROVIDED TO THE PRIME CONTRACTOR HOROUGH THE OWNER.

 2. THE MIEST OF THIS SPECIFICATION AND DRIMININGS IS TO PROVIDE A COMPLETE AND FULLY OPERATING MECHANICAL LAYOUT IN COMPLETE ACCORD WITH THE 1979 AND HOR BLODGE COLD ME REFERENCES STREAMEDS. MAKE PROVISIONS FOR ALL JACOUR, MITERAL AND EXAMINENT TO CONTRACT THE MECHANICAL WORK.

 3. DIRRINGS AND SPECIFICATION SHE COMPLETED TO EXCHANGE HER WITH HIS STALLED FOR 8Y ONE IS TO BE REMONED TO SHE STALLED STALLED THE STA

- .1 CONTRACTORS SHALL YEST SITE PRIOR TO BIDDING TO DETERMINE EXTENT OF WORK INVOLVED, MAY WORK, FITTINGS, AND/OR ACCESSORY MATERIALS NOT SPECIFICALLY INSTITUCED OR SHOWN ON THE PLANS, BUT OBMOUSLY INSCESSORY TO PROPERLY COMPLETE THE INSTALLATION SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR AS IF SPECIFICALLY NOTED OR DETAILD.
- UCMALID.

 WISHDERSTANDING OF PLANS AND/OR SPECIFICATIONS AND/OR DISCREPANCES SHALL BE REFERRED TO THE ENGINEER TO CLAREFICATION PRIOR TO TENDER SUBMITTAL.

 ASSUME RESPONSIBILITY FOR LAYOUT WORK AND FOR DAMAGE CAUSED TO THE LANDLORD, TENANT, OR OTHERS BY IMPROPER EXECUTION OF WORK.
- EXECUTION OF WORK.

 PROTECT FINSHED AND UNFINISHED WORK FROM DAMAGE.
 TAKE RESPONSIBILITY FOR CONDITION OF MATERIALS AND EQUIPMENT SUPPLIED AND PROTECT UNTIL WORK IS COMPLETED.
- and accepted.

 Verify all bulding and site dimensions and millinork components prior to any fabrication and installation of equipment or materials. No increase in contract cost will be considered for failure to verify these

1.3 PERMITS

.1 CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, FURNISH ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK WIS INSTALLED IN ACCORDANCE WITH THE LAWS AND REGULATIONS OF THE WIRDUS AUTHORITIES HAWNG JURISDICTION, INCLUDING THE MITTORIA BURDING CODES AND ASTRETY CODES ACT.

1.4 CLITTING AND PATCHING

- .1 LOCATE ALL LOCATION OF HOLES FOR MECHANICAL EQUIPMENT AND PROVIDE SLEEVES REQUIRED FOR THE MECHANICAL INSTALL STITUTE.
- INSTALLATIONS.

 2. BE RESPONSIBLE FOR THE COORDINATION OF CUITING AND PATCHING OF BUILDING STRUCTURE REQUIRED BY MECHANICAL MORK UNIDES OTHERWISE INDICATED. REVIEW EXISTING BISS BUILDING STRUCTURAL SYSTEM PROOF TO COMMENCEMENT OF CORMING AND ORTHON APPROVAL FROM STRUCTURAL CONSULTANT IF REQUIRED FOR SPECIAL CONDITIONS (I.E. POST TENSION CONSULTANT IN REQUIRED FOR SPECIAL CONDITIONS (I.E. POST TENSION).
- ORBITATES UPINE ATTENDED THE INTERMEDIATE CONDUIT. X-RAY TO BE DONE AFTER NORMAL WORKING HOURS. TAKE

 3. X-RAY FOR LOCATION OF IN-FLOOR REBINA AND CONDUIT. X-RAY TO BE DONE AFTER NORMAL WORKING HOURS. TAKE

 NECESSARY PRECALITIONS TO PROTECT COMPUTER ROUPFLIGHT WHEIN X-RAYING FLOORS.

 4. PROVIDE FIRE RATED CAULING IN YOUR BETWEEN OPENING AND MECHANICAL SERVICES FOLLOWING COMPLETION OF SERVICE

 INSTALLATIONS TROUGH FIRE RATED WALLS OF FLOORS.

 5. PROVIDE ALL CONCRETE REQUIRED FOR NEW MECHANICAL INSTALLATION AS NOTED ON THE DRAWINGS.

1.5 TESTING

1 TEST COUMPART AND MATERIAS THATES PROFED OR REQUIRED BY JUTHORITIES HAVING JUTISDICTION TO DEMONSTRATE PROPER AND SEE OPERSION, REPORTE PROFE AND SEE OPERSION, REPORTE PROFE AND SEE OPERSION REPORTED AND SEE OPERSION REPORTED THE RECORDING SET ASIAC, SHARE, SAMONA, NFPA, CSA AND OTHER RECORDINGED TEST CORES AS FAR AS FEELD CONDITIONS PERMIT.

.1 PROVIDE OWNER WITH A WRITTEN GUARANTEE WARRANTING APPARATUS FURNISHED TO REMAIN IN SERVICEABLE CONDITION FOR A PERIOD OF ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE BY THE OWNER AND ENGINEER.

1.7 STANDARD OF MATERIALS AND WORKMANSHIP

- .1 MATERIALS SHALL BE NEW AND OF UNIFORM PATTERN THROUGHOUT AND SHALL MEET BASE BUILDING STANDARD OR AS WHERE SPECIFICALLY IDENTIFED IN THIS SPECIFICATION. THIS IS FOR THE PURPOSE OF ESTRELISMING A STANDARD OF QUALITY OF MATERIALS AND MORRAMISHER AND NOT 10 HILT SELECT DEPLOY ONLY TRADESIMEN A STANDARD OF REPORT OF MATERIAL PROGRAMMENT OF THE MATERIAL PROGRAMMENT OF THE MATERIAL PROGRAMMENT OF MATERIALS AND MORRAMMENT AND STANDARD AND STANDARD BY THE ENGINEER AND THE OWNER, REJUNC CONCINENCE MATERIALS AND INSTALL SUITABLE MATERIALS IN THEIR PLOCE.

1.8 SHOP DRAWINGS, ALTERNATIVE MATERIALS AND EQUIPMENT

- 1 CONTRACT DOCUMENTS ARE BASED ON MATERIALS AND EQUIPMENT SPECIFED, APPROVAL BY DIGINEER OF EQUIPMENT SUBMITTED BY THE INCHMENOL TRACE AS EDALA TO THAT SPECIFED DOES NOT RELEVE THE INCCHMICAL TRACE OF ANY RESPONSIBILITY.

 2 CONTRACTOR TO BE COMPLIEDLY RESPONSIBLE FOR ASCENTAMING THAT EVERY ITEM INCLUDE IN THE TEMBER COMPLIES IN ALL RESPECTS WITH THE SPECIFICATIONS AND DIMBINGS, AFTER MANDO OF TEMBER, AND THE OF EQUIPMENT FOUND BY THE BINGHER NOT TO COMPLY WITH THE SPECIFICATIONS AND DIMBINGS, TO BE REPLACED AT NO ADDITIONAL COST WITH AN ITEM OR UNIT OF DIMBINES'S CHOICE.

 3. REVISIONS REQUIRED TO ADMY ALTERNATIONS SHALL BE INCLIDED IN SUCH PROPOSALS, NO INCREASE IN THE CONTRACT PRICE WILL BE CONSIDERED IN COLOMBIONIST THE USE OF EQUIPMENT OTHER THAN THAT SPECIFIED.

 4. SUBMIT SHOP DIMBINGS TO DIMBINES ON ALL EQUIPMENT SPECIFIED IN PREVISIONS DIFFORMANISS FOR ENGINEERY SHOP DIMBINGS FOR DIMBINES FOR PRICE WAS ASSENTED.

1.9 RECORD DRAWINGS

- KEEP ON SITE ONE COMPLETE SET OF DRAWNES FOR DALY RECORDING OF CHANGES AND DEMATIONS.

 UPON COMPLETION OF THE CONSTRUCTION THIS SET OF ON SITE RECORD MIST BE SUMMITTED TO THE ARCHITECT. THE COST
 OF PRODUCING THE ON SITE RECORD WILL BE DEDUCTED FROM THE FINAL PARMENT. DESIGNERS ARE CLIRRENLY INVOICED
 AT \$75.00 PER HOUR PLUS G.S.T.
 A FINAL ELECTRONIC SET OF ON SITE RECORD DRAWNICS MIST BE PREPARED FOR FICAL PROJECT. A RATE OF \$200.00

 PLUS G.S.T. TOR EACH SHEET IN THE RECORD DRAWNINGS THAT HAS A RECORD OF CHANGE AND/OR DEMATION.

.1 CONTRACTORS TO MOTIFY ENGINEER OF DIFFERENCES BETWEEN DRIVINGS AND STIE PRIOR TO FINAL TENDER FOR INCLUSION IN ANY ADDIBIOUSE SISTED. ALLOW FOR WARRINGS HE DECHARICAL MORK DRIVAN MAD SPECIED PRIOR TO SUBMITTING FINAL PRICE, CHINGS WILL MOTE ECHARICADE SISSED ON THE GROUNDS OF DIFFERENCES ON STIE.

1 11 FLECTRICAL

- .1 Submit motor list to the Electrical Trade which dutunes all electrical connections that are required to service mechanical equipment, including voltage, phase and wotor hoispeoner.
 2 Renew all equipment requires electrical hoof-with electrical counterfore prior to ordering excupient. Beside proper electrical connections are determined for all affected and related work.

- PROR TO THE RE-INSTALLATION OF CELING TILES, NOTIFY THE ENGINEER AND ARRANGE FOR A CELING SPACE INSPECTION.

 ADASE BIGHRER TWO (2) DAYS PRIOR TO THE DATE FAM. INSPECTION IS DESIRED. ALL SYSTEMS TO BE FULLY OPERATIONA

 AND ANY DEPOCHACIES SHOULD BE NOTED TO THE ENGINEER.

 ALL DEPOCHACIES SHALL BE COMPLETED WITHIN TWO (2) WEEKS AFTER FAM. INSPECTION AND LETTER SUBMITTED TO

 BIGHRER WITHIN THAT THE ADAISMS THAT THE WORK IS COMPLETE. PALMER TO COMPLETE WORK HILL RESULT IN WORK

 BEND DOIL OF THE AUDICADE AND THE COSTS DAYS

 OF THE ADAISM AND THE COSTS SHALL BE
- BEING DURE, BY THE UNBOUND AND THE CUSTS DEDUCED HOW PIND, PAND, PAND, AND MERCHAND WAS BYFUL BORNE BY THE COMPARION AT A RECOMPANION AS THE BEST OF STEAD OF PRIOR PLUS TRAVEL DOPENESS.

 UPON COMPLETION OF THE MECHANICAL INSTALLATION THE PRIME CONTRACTOR WILL BE RESPONSIBLE FOR MOTHEY THE ENGINEET HAT ALL MAC COMPONIENTS ARE REDUY FOR THE INSTALLATION OF IDENTIFICATION TAGS AND/OR AS ADDITION TO DISTINGT MATERIAL PAND.

1.13 MAINTENANCE MANUALS

.1 PROVIDE THREE (3) COPIES OF ALL SHOP DRAWINGS AND MAINTENANCE DATA IN 3-RING BINDERS.

2.1 HEATING AND VENTILATION

DUCTWORK SHALL BE GALVANIZED STEEL, LOCK FORMING QUALITY, FABRICATE IN ACCORDANCE WITH SMACHA DUCT MANUALS AND ASHRAE HANDBOOKS, DUCTRIORK SHALL MEET THE REQUIREMENTS OF NPPA 90A AND 91 AND COMPOUNT TO APPLICABLE CODES. SEALANTS AND GISKETING TO BE WATER RESISTANT, FIRE RESISTANT AND COMPATIBLE WITH MATTING MATERIALS. SEAL ALL DUCT JOINTS TO MEET SMACHA STRANDOOS.

SACHAN STREAMORS.

NO DIGIT TOPS SHALL BE ALLORED FOR SEALING DUCK.

NO DIGIT TOPS SHALL BE ALLORED FOR SEALING DUCK.

PROR TO FERROLITON OF DUCKWORK, CHECK ALL CELING SHOCKS AND HEIGHTS AND COMPLICTIONS WITH OTHER TRADES AND COMPRISED FOR THE PROPERTY OF THE DIGIT SHALL SHAL

REFLECTIONS. There space permits, round ductwork may be used where drawings have defined rectangular ducts that are not acoustic

2.2 LOW VELOCITY DUCTWORK

- THE MINIMUM SHEET METAL THICKNESS FOR LOW PRESSURE DUCTS INCLUDING FITTINGS, ACCESS DOORS AND OTHER ACCESSORIES SHALL BE AS THE MINIMAL SPEET MEAN, INCOMESS YOR USE PRESSURE DUCTS INCLUDING HITMERS, ACCESS DOURS AND UTHER ACCESSIONES SPILL BE AS FOLLOWS:
 FECTIVABOUR DUCTHORK MAXIMAM WORTH GUIGE UP TO 305mm WIDE. 55mm 305mm TO 760mm WIDE. 70mm ROUND DUCTWORK DUCT DUMBETER GAUSE DUCT TO SCHOOL TOWN TO SERVE TO SERVE AND THE PROBLEM FOR THE SERVE TO LOW PRESSURE DUCTS WITH SOODING MAXIMAM LENGTH OF FLEXIBLE DUCT. HOLD IN PLACE WITH CAULAING COMPOUND AND SIRVE OF THE PROBLEM DUCT TO CHANGE DIFFECTION.
 WHOSE LOW PRESSURE DUCTS ARE CONNECTED DO'N BOUNMENT, TERMAN BOXES OR ANY OTHER APPARATUS, A SCREWED OR BOLTED FLEXIBLE GANGETED AND SIRVLE OF ROUNDED BETTERS IN TERMAN BOXES OR ANY OTHER APPARATUS, A SCREWED OR BOLTED FLEXIBLE GANGETED AND SIRVLE OF ROUNDED BETTERS IN TERMAN BOXES OR ANY OTHER APPARATUS, A SCREWED OR BOLTED SEAL ALL DUCT AUGIST TO PROBLE AN ARTHOR SYSTEM.

2.3 DUCT INSULATION

2.4 BALANCING

- ADJUST AND BUJANCE ARE TERMINALS, DEHAUST FANS AND TERMINAL BOXES TO PROVIDE FLOW ARE RATES WITH 10X ± OF THOSE SPECIFED.

 BUJANCE WATER TERMINALS TO PROVIDE FLOW PATES WITHIN 10X ± OF THOSE SPECIFED.

 BUJANCE FAND BUJANCE MAJOR REV OR DUSTING EQUIPMENT COMPONENTS TO PROVIDE FLOW PATES WITH 10X OF THOSE SPECIFED.

 BUJANCING FIRM SMALL REPORT ANY DEFECTS OR DEFICIENCIES THAT AFFECT OBTAINING SPECIFED FLOW RATES PRIOR TO ISSUING FINAL REPORTS TO DENOMER.
- THE SHALL REPORT ANY DEFECTS OR DEPICENCIES THAT AFFECT OBTAINING SPECIFIED FLOW MATES PROOF TO ISSUING FINAL REPORTS TO SHOUNDED.

 PREFINE REPORT IN ACCORDANCE WITH PROCEDURES, FORMAT AND INFORMATION AND USEND WITHOUT BE CURRENT EDRION OF ARIS CAUDELINE AND SIGHAT TWO (2) COPIESTS IN GROWERE FOR REVIEW, PROVIDE REPORTANTION ON DISSINITE DEQUIPMENT IF REQUIRED.

 BUANDAIG REPORT TO INCLIDE INLET STATE PRESSURES AT TERMAN BOXES AND SUPPLY ARE TEMPERATURES AT BOXES OR DIFFUSERS.

 WHEN TENHAT SPACE IS OCCUPIED PRIOR TO BALANCING, CONTINUE EXECUTION OF SUCH WORK OUTSIDE OF OCCUPIED HOURS. COORDINATE WHITE TENHAT SPACE IS OCCUPIED PRIOR TO BALANCING, CONTINUE EXECUTION OF SUCH WORK OUTSIDE OF OCCUPIED HOURS. COORDINATE WHITE TENHAT.
- WITH TEMANT.

 FERPORT IS RECEITED DUE TO IMPROPER BALANCING PROCEDURES, SYSTEM SHALL BE RE-BALANCED AT NO EXTRA COST.

 EXERGIOE TERMANI, BOXES TO BE SET AT 25% MINIMAIN.

 SET ARE PATTERIOS ON ADALSTRAKE DIFFLESES TO PREVENT DRAFTS AND PROVIDE EQUAL DISTRIBUTION.

 PROVIDE EDITIFICATION THIS ON THE BAY SYSTEM DRECTLY BELOW NEW OR EXISTING TEMANIAL BOXES AND FAINS LOCATED IN THE CELLING.

2.5 FXHAUST FANS

PROVIDE EXHAUST FANS IN THE CELLING SPACE WHERE INDICATED ON THE DRIVINNES AND IN ACCORDANCE WITH THE SCHEDULE ON THIS DRIVINIS, PROVIDE SHOP DRIVINGS ON DIMAST FANS, THATE CONTROL WITH THE STATE MECHANICAL CONTRICTOR AND INSTALLED UNDER ELECTRICAL CONTRICTOR TO THE CASE CHIEF CONTRICTOR. SPRING ISOLATION HANGERS AND ACQUISTICAL TREATMENT TO ENERG CHIEF OPERATION.

PROMDE NEW THERMOSTATS WHERE INDICATED OF BASE BUILDING STAMDING TYPE. ENSURE OPERATING CHARACTERISTICS ARE COMPATIBLE WITH COMPROL COMPONENTS (LE. DIRECT) REVIEWE ACTING).
ALL THERMOSTATS TO BE WILL OF COLUMN MOUNTED AT NORMAL MOUNTING HEIGHT UNLESS SPECIFICALLY NOTED OTHERWISE.

PIPING INSULATION TO BE INSULATED:

- PROVIDE ALL NECESSARY PIPING, MATERIAL AND LABOUR FOR THE SYSTEM AS INDICATED AND TO CONFORM TO THE LATEST NATIONAL PLUMBING AND DRAWAGE ACT.
- AND DIMMARE ACT.

 ALL PIPMS OVER 15 PSIG SHALL UNDERGO A HOROSTATIC TEST AT 1—1/2 TIMES THE DESIGN PRESSURE, HOLD FOR AT LEGST 10 MIN THE PARTY OF THE LAWNER FOR LEWISE. IT LEGST 10 MIN THE PARTY OF THE LEWISE AND THE PARTY SHALL BE FRANCE IN LEWIS AND THEY SHALL BE FRANCE ACCORDING TO NATIONAL BUILDING CODE, PART 8, HACL, USING SINGLE RING OR TRAVEZE THE MAREST.
- OR TRAFEE TYPE HANGER.

 PROVIDE MANUAL AR VEHTS WHERE SHOWN AND/OR REQUIRED FOR ELMINATION OF AIR FROM HIGH POINTS IN PIPMG.

 PROVIDE DRIVEN WHERE SHOWN AND/OR REQUIRED TO ALLOW SERVICING OF THE SYSTEM. EACH DRIVEN OUTLET TO BE VALVED WITH A GATE

 WAVE AND PROVIDED WITH HERPEL AND THERADED DO.

 DRIVEN AND THE SYSTEM OF THE SYSTEM OF THE SYSTEM.

 PREVIOUS DRIVEN SHALL BE TYPE TWO OR TYPE TOWN HERD COPPER OR CHST ROOM WITH MECHANICAL JOINTS.

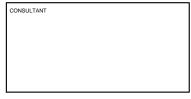
 PREVIOUS DRIVEN SHALL BE TYPE TWO OR TYPE TOWN ENTERING PIPMG SYSTEM DURING CONSTRUCTION.

 ALL HER COLD PIPMG TO BE RESULATED WITH PRECIPIES AND ENTERING PIPMG SYSTEM DURING CONSTRUCTION.
- ALL NEW COLD PIPMS OF DE MISULATED WITH FACTORY APPLED WHOUR BARRIER JACKET, MOULDED TO CONFORM TO PIPMS, "TC WALLE AT 24 DEGREES CEISJUS. MOMBIAIN GLOSS WAY ILEGREES CEISJUS. ALL NEW HOT PIPMS TO BE INSULATED WITH FIRE FIRROUS GLASS INSULATION WITH FACTORY APPLED GENERAL PURPOSE JACKET, MOULDED TO CONFORM TO PIPMS TO BE INSULATED WITH FIRE FIRROUS GLASS INSULATION WITH FACTORY APPLED GENERAL PURPOSE JACKET, MOULDED TO CONFORM TO PIPMS TO BE SULDING STANDARDS. SIMMARIAN GLOSS WAY IN DEGREES CEISJUS. IDENTIFY PIPMS AS PER BUSE BULDING STANDARDS. SIMMARIAN GLOSS WAY IN DEGREES CEISJUS. BULL WAYES UNLESS NOTED OTHERWISE PROVIDE WALLES GOMERITIES WITH SIMES BULLDING STANDARDS. PROVIDE WALLES GARNIER WAS RESPONDED AND THE BASE BULLDING NUMBERIANG SYSTEM FOR NEW WALLES INSTALLED. INCLUDE COPY OF WALLES INSTALLED.
- PROVE 2" (50mm) APPLED POLYURETHANE INSULATION AND FRP JACKET FOR SANTARY SEWER, DOMESTIC COLD WATER SUPPLY & RETURN LINES FROM CITY (DALUIT) CONNECTION TO MECHANICAL ROOM ALL SIZES



Tel: (780) 488-6008







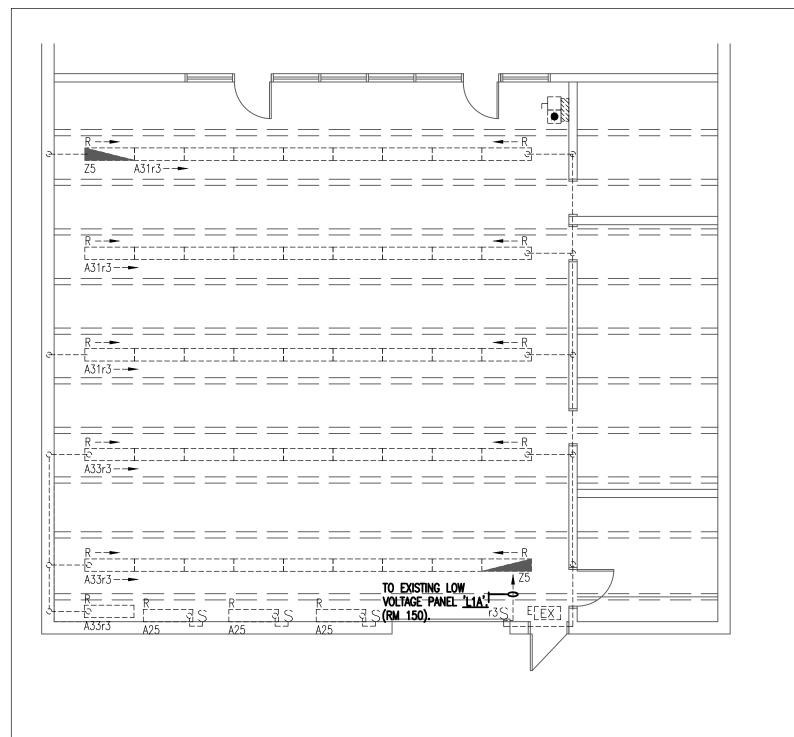
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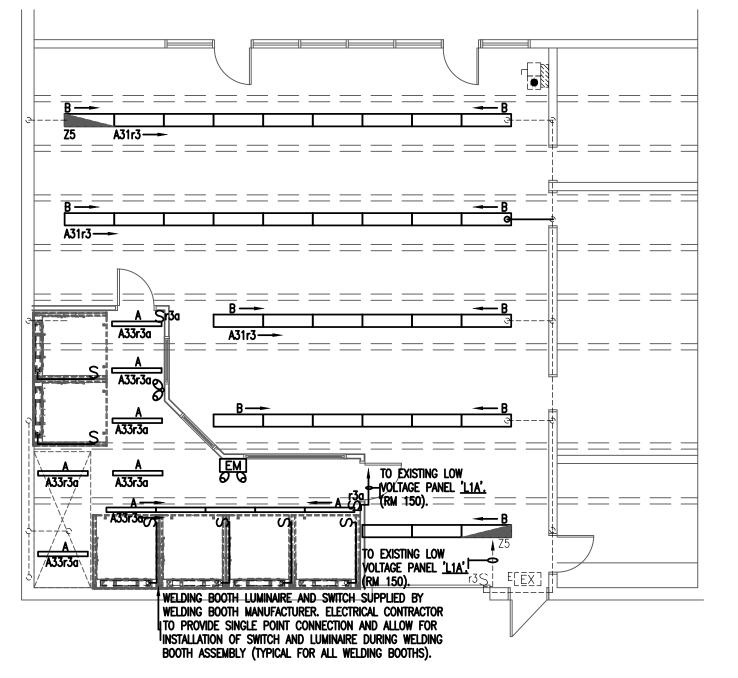
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DRAWING:
MECHANICAL
MECHANICAL
EQUIPMENT SCHEDULES
& SPECIFICATIONS

SCALE : AS NOTED			
DATE:	JUNE, 2011		
DRAWN:	M.J.L.	CHECKED: S.M.K	
KFR PROJECT No.	KFR11028		

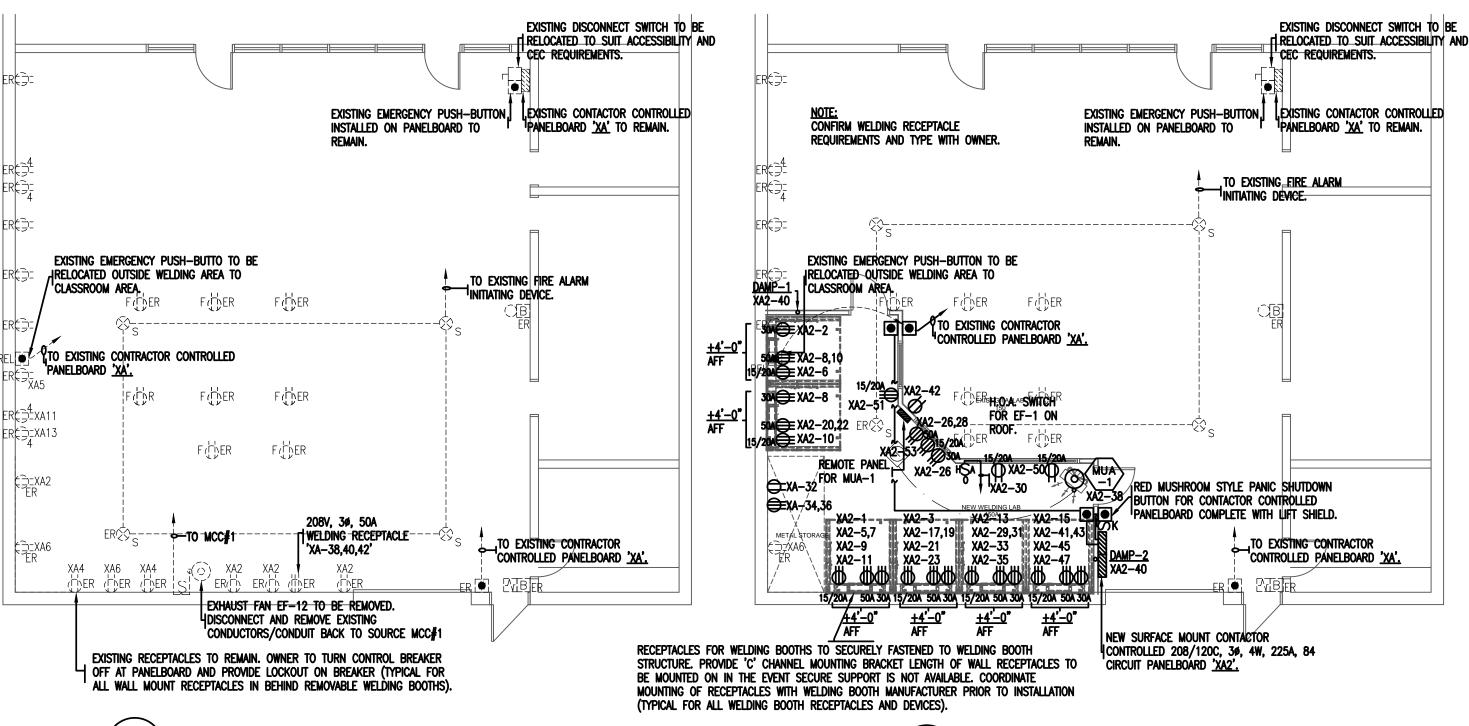
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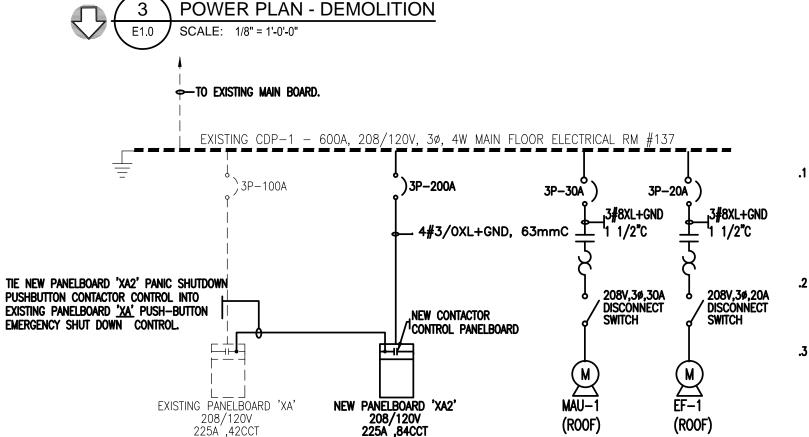












PARTIAL RISER DIAGRAM - NEW CONSTRUCTION

E1.0 / SCALE: NOT TO SCALE

CONTACTOR CONTROLLED PANELBOARDS & EMERGENCY SHUTDOWN PUSH BUTTONS:

.1 CONTACTORS IN MAINS: ELECTRICALLY OPERATED, ELECTRICALLY HELD, OF THE SIZE INDICATED COMPLETE WITH 120V HOLDING COILS WITH SUITABLE CONTROL FUSING. IN CONTROL SECTION provide a 25mm red bullseye pilot light with 220V LAMP operating on 120V indicating a CLOSED CONTACTOR AND ON/OFF SELECTOR SWITCH. CONSTRUCT ENCLOSURE IN COMPLIANCE WITH BULLETIN No. 720 CANADIAN STANDARDS ASSOCIATION WITH HINGED LOCKING DOOR OVER EACH SECTION. CONTACTOR CONTROL UNIT SHALL BE OBTAINED FROM A PANEL OTHER THAN THE PANEL WHICH IS CONTROLLED. CONTACTORS LARGER THAN 200A MAY BE MOUNTED REMOTE FROM PANEL

↑ POWER PLAN - NEW CONSTRUCTION

- .2 REMOTE "OFF" PUSHBUTTONS: HEAVY DUTY, MOMENTARY CONTACT WITH A PALM OPERATED MUSHROOM HEAD PUSHBUTTON WITH RED FINISH. PROVIDE LARGE ENGRAVED LAMACOID NAMEPLATE READING "EMERGENCY OFF" FOR EACH BUTTON (MINIMUM LETTER SIZE 38mm WHITE ENGRAVED ON RED
- .3 CONTACTOR RESET CONTROL UNIT: REMOTE HEAVY DUTY, MOMENTARY CONTACT, TWO (2) POSITION, KEY OPERATED RESET BUTTON COMPLETE WITH ENGRAVED LAMACOID NAMEPLATE READING "RESET-NORMAL". LOCATE RESET UNITS AS DIRECTED BY THE OWNER. IN EACH RESET UNIT ALSO PROVIDE AN EMERGENCY PUSH-BUTTON AS DESCRIBED ABOVE, AS WELL AS A STANDARD BULLSEYE TYPE, 120V RATED RED PILOT LIGHT INDICATING "POWER ON". MOUNT PILOT LIGHT ON SAME FACEPLATE AS RESET SWITCH.

INTERLOCK ALL EXISTING A NEW EMERGENCY SHUTDOWN PANIC BUTTONS WHICH CONTROL PANELBOARDS WITHIN THE RENOVATION SPACE TO EACH OTHER TO ENSURE WHICHEVER BUTTON IS ENGAGED BOTH PANELBOARDS WITHIN THE SPACE WILL SHUTDOWN ROOM ELECTRICAL DEVICES

LUMINAIRE SCHEDULE

LUMINAIRE TYPE		DESCRIPTION	LAMPS	MOUNTING	SEE NOTE
A		8-FB-347V-EBT1-U 'LUMINAIRES IN TANDEM)	1-F32T8	SUSPENDED AIRCRAFT CABLE +8'-0"AFF	-
В	METALUX	(PENDANT WRAP)	2-F32WT8	SUSPENDED PENDANT (MATCH EXISTING)	-
EX	AIMLITE	EXST-U-M-WHT-UNV	LED	AS NOTED ON DRAW	INGS
EXIT SIGN c/w EMER(LIGHTS	GENCY	AIMLITE CXST6-36-U-M-2SM-WHT-ATD-	Q 2-PAR18-12W	AS NOTED ON DRAWINGS	
ЕМ	AIMLITE	EBST-12360-2MB-WHT BATTERY PACK RATED	2-20W-MR16	AS NOTED ON DRAWI	NGS

NOTES:

CONFIRM ALL MOUNTING HEIGHTS ON SITE (MOUNT UNDERSIDE OF STRUCTURAL BEAM LEVEL). COORDINATE INSTALLATION OF SURFACE/SUSPENDED LINEAR LIGHTING WITH MECHANICAL CONTRACTOR, DUCT WORK AND EXISTING STRUCTURAL BEAMS.

GENERAL LUMINAIRE SCHEDULE NOTES

- 1. APPROVED MANUFACTURERS ARE COOPER AND LITHONIA.
- 2. FLUORESCENT BALLASTS SHALL BE ELECTRONIC RAPID START, THD LESS THAN 10%.
- 3. METAL HALIDE BALLASTS SHALL BE PULSE START.
- 4. ALL EMERGENCY/EXIT LIGHTS TO BE 12V-12W HEADS.

FIRE ALARM SYSTEM **ELECTRICAL INSTALLATION INSTRUCTIONS**

- ALL WIRING SHALL BE IN COMPLIANCE WITH THE C.E.C., AUTHORITIES HAVING JURISDICTION AND LOCAL CODES.
- WIRE SIZES SHALL BE AS FOLLOWS:
- AC POWER PER C.E.C.HORN/STROBE, STROBE . . . #16 AWG MIN.
- SMOKE DET., MANUAL STATION, SUPERVISORY CIRCUIT #18 AWG MIN.
- 3. ALL WIRING TO BE INSTALLED IN POWER LIMITING FIRE PROTECTIVE SIGNALING
- 4. DETECTOR LOCATIONS TO AVOID OBSTRUCTIONS. DO NOT INSTALL A SMOKE DETECTOR
- WITHIN 3'-0" OF SUPPLY REGISTERS, GRILLES OR ELECTRIC HEATERS. CONDUCTORS FOR INITIATING DEVICES SUCHAS DETECTORS, MANUAL STATIONS
- SUPERVISROTY DEVICES SHALL UTILIZE THE SAME CONDUIT. ALL AUDIBLE/VISUAL DEVICES AND 120V CIRCUITS SHALL BE RUN IN SEPERATE CONDUIT.
- 6. ALL CONDUCTORS SHALL BE TAGGED AND NUMBERED IN THE CONTROL PANEL & AT THE DEVICE AND SHALL CORRESPOND WITH CONTROL PANEL TERMINAL AND FIELD WIRE NUMBERS.
- INSTALL WIRING CIRCUITS MUST GO TO AND FROM EACH DEVICE. BRANCH CIRCUITS ARE NOT PERMITTED. POLARITY MUST BE OBSERVED THROUGHOUT.
- 8. AVOID GROUND FAULT CONDITIONS OF ALL CONDUCTORS
- 9. DEVICES SHALL BE FLUSH MOUNTED WHEREVER POSSIBLE.
- 10. MOUNT MANUAL STATIONS AT 48" ABOVE FINISHED FLOOR.

—то <u>'CDP-1'</u> ==∰TO REMOTE PANEL IN NEW WELDING LAB. NEW WELDING LAB \ ROOF PLAN - NEW CONSTRUCTION

NEW SURFACE MOUNT PANELBOARD 'XA2' 208/120V. 3ø. 4W. 225A. 84 CIRCUIT

8-20A-1P-120V BREAKERS - WELDING AREA RECEPTACLES 7-30A-2P-208V BREAKERS - WELDING RECEPTACLES 7-50A-2P-208V BREAKERS - WELDING RECEPTACLES 16-15A-1P-120V BREAKERS - GENERAL PURPOSE 20-15A-1P-SPARE BREAKERS 22- PREPARED SPACES

NOTE: CONDUCTORS FOR THE 50A AND 30A RECEPTACLES TO BE MINIMUM #8. ALL DEVICE BOXES TO BE 'FS' BOXES. ALL CONDUIT TO BE INSTALLED c/w COMPRESSION FITTINGS

SYMBOL SCHEDULE

OUTLET BOX OR CONDULET

1'x4' SUSPENDED FLUORESCENT LUMINAIRE

1'x4' SUSPENDED NIGHT LIGHT FLUORESCENT LUMINAIRE

SINGLE POLE SWITCH

COMBINATION HAND/OFF/AUTO MAGNETIC STARTER SWITCH

DUPLEX RECEPTACLE

SURFACE FLOOR MOUNTED OUTLET BOX

SURFACE 30A, 120V, 10 WELDING RECEPTACLE SURFACE 50A, 208V, 10 WELDING RECEPTACLE

15/20A SURFACE 15/20A, T-SLOT RECEPTACLE

PANIC SHUTDOWN CONTACTOR CONTROLLED PANELBOARD PUSH-BUTTON.

FIRE ALARM BREAKGLASS STATION FIRE ALARM SMOKE DETECTOR

FIRE ALARM DUCT DETECTOR

END-OF-LINE RESISTOR

INDIRECT LED EXIT SIGN (NRCAN C860 COMPLIANT), REFER TO

LUMINAIRE SCHEDULE DRAWING E2.0 EMERGENCY BATTERY PACK (10 YEAR LONG LIFE). 12V, 1/2 HR. CAPACITY

c/w 2x20W LONG LIFE MR16 LAMPS. REMOTE EMERGENCY HEAD(S) 12V-20W LONG LIFE MR16

DEVICE NOTES:

- 1. 'ER' EXISTING DEVICE TO REMAIN
- 2. 'F' INDICATES FLOOR MOUNTED DEVICE
- 3. 'R' INDICATES EXISTING DEVICE TO BE REMOVED
- 4. 'REL' INDICATES EXISTING DEVICE TO BE RELOCATED

EXISTING MODULAR FLOOR OUTLETS TO BE REMOVED AND PATCH/REPAIR WORK TO BE COORDINATED WITH THE GENERAL CONTRACTOR.

ELECTRICAL DEMOLITION NOTES

- ELECTRICAL CONTRACTOR TO VISIT SITE DURING TENDER TO DETERMINE EXTENT OF DEMOLITION, RELOCATION, AND RECONNECTION OF EQUIPMENT AND DEVICES. NOT ALL EXISTING TO BE REMOVED/RELOCATED IS SHOWN.
- ELECTRICAL CONTRACTOR TO REMOVE ALL REDUNDANT DEVICES, FEEDERS, AND DATA/TEL CABLING. ELECTRICAL CONTRACTOR TO UPDATE ALL PANEL SCHEDULES AND PROVIDE NEW TYPEWRITTEN SCHEDULES UPON COMPLETION OF PROJECT.
- ELECTRICAL CONTRACTOR TO REFER TO ARCHITECTURAL AND MECHANICAL
- DRAWINGS TO DETERMINE FURTHER DEMOLITION REQUIRED. TEMPORARY LIGHTING TO BE PROVIDED IN ALL AREAS AS REQUIRED. THE
- OPERATION OF THE SPACE CANNOT BE DISRUPTED. WHERE ELECTRICAL WORK TO REMAIN IS DAMAGED OR DISTURBED IN THE COURSE OF WORK, REMOVE DAMAGED PORTIONS AND INSTALL NEW PRODUCTS
- OF EQUAL CAPACITY, QUALITY AND FUNCTIONALITY.
- ACCESSIBLE WORK INDICATED TO BE DEMOLISHED: DISCONNECT POWER AND
- REMOVE EXPOSED ELECTRICAL INSTALLATION IN ITS ENTIRETY.
- . DO NOT REUSE EXISTING MATERIALS UNLESS NOTED ON DRAWINGS. REMOVE ALL UNUSED EQUIPMENT, FIXTURES, ETC.
- FACILITY TO REMAIN IN OPERATION THROUGHOUT CONSTRUCTION. ALLOW FOR OFF HOURS CONSTRUCTION. PROVIDE TEMPORARY CONNECTION OF TELEPHONES, POWER, COMPUTER SYSTEMS, ETC. AS REQUIRED.
- . CUT AND PATCH SURFACES AS REQUIRED.
- 10. BLANK OFF OUTLET BOXES OF ALL REMOVED ELECTRICAL DEVICES WITH APPROPRIATE COVER PLATES. OUTLET BOXES OF REMOVED DEVICES TO REMAIN ONLY IF NECESSARY TO ENSURE CIRCUIT CONTINUITY OF REMAINING
- 11. ENSURE CIRCUIT CONTINUITY OF ALL PANELS AND OUTLETS WHICH ARE REMAINING. 12. KEEP ALL EXISTING SYSTEMS NOT AFFECTED BY RENOVATIONS INTACT AND OPERATIONAL.

KEYED NOTES

 $\overline{\Lambda}$ all other existing devices and infrastructure shall be disconnected and REMOVED. ALL EXISTING INFRASTRUCTURE (CONDUIT/CONDUCTORS ETC.) THAT CANNOT BE REUSED SHALL BE REMOVED BACK TO SOURCE PANEL.

MECHANICAL SCHEDULE

MOTOR TAG	DESCRIPTION	LOAD	VOLT ø	FEEDER	BREAKER	SEE NOTE
EF -1	EXHAUST FAN	5HP	208V 3ø	REFER TO RISER	20A-3P	3,8,9
MUA -1	MAKE UP AIR UNIT	7.5HP	208V 3ø	REFER TO RISER	15A-3P	4,5,6,7,8
UH -1	UNIT HEATER	FRAC.	120V 1ø	2#12XL+GND, 3/4"C	15A-1P	1

NOTES:

- WIRE AND CONNECT THERMOSTAT.
- 2. PROVIDE MANUAL MOTOR STARTER COMPLETE WITH PILOT LIGHT AND KEY SWITCH.
- 3. WIRE AND INTERLOCK WITH MUA-1 4. WRE AND CONNECT CONTROL PANEL.
- 5. UNIT TO SHUT DOWN ON FIRE ALARM.
- 6. PROVIDE FIRE ALARM SMOKE DUCT DETECTORS.
- 7. PROVIDE 120 VOLT CONTROL CIRCUIT.
- 8. WEATHERPROOF DISCONNECT SWITCH
- 9. COMBINATION HAND/OFF/AUTO SWITCH c/w MAGNETIC STARTER

GENERAL MECHANICAL SCHEDULE NOTES

- A. PROVIDE DISCONNECTS AT ALL MOTORS.
- B. WIRE AND CONNECT ALL LINE VOLTAGE CONTROLS.
- C. OBTAIN MOTOR LIST FROM MECHANICAL CONTRATOR TO CONFIRM LOAD, VOLTS AND PHASE OF ALL MOTORS PRIOR TO ORDERING ELECTRICAL DISTRIBUTION EQUIPMENT.



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CONSULTANT

PERMIT



onsulting electrical engineer

WME#3921

ISSUED:					
Date	Description	Ву			
	ISSUED FOR CLIENT REVIEW	SMP			
08-11-11	ISSUED 99% FOR CLIENT REVIEW	SMP			
09-15-11	ISSUED TENDER	SMP			
	Date 08-11-11	Date Description ISSUED FOR CLIENT REVIEW 08-11-11 ISSUED 99% FOR CLIENT REVIEW			

Ecole Maurice-Lavallée Welding Laboratory

Upgrade

DRAWING:

ELECTRICAL LAYOUT DEMOLITION AND NEW CONSTRUCTION

KFR PROJECT No.: KFR11028 CHECKED: SMP JUNE, 2011 **E**1 SCALE: AS NOTED

GENERAL ELECTRICAL PROVISIONS

1.0 DRAWINGS AND SPECIFICATIONS, OTHER SECTIONS

EXAMINE ALL OTHER DRAWINGS AND SPECIFICATION INCLUDED IN THE TENDER DOCUMENTS AND RELATING TO THIS PROJECT. BECOME FULLY INFORMED AS TO THE EXTENT AND CHARACTER OF THE WORK, AND INCLUDE IN TENDER FOR ALL ELECTRICAL WORK AND MATERIALS AS SHOWN ON ANY DRAWING OR REQUIRED UNDER HOTSELFOR THE SPECIFICATION; ANY DISCREPANCIES SHALL BE CONFIRMED IN WRITING WITH

1.1 LOCAL CONDITIONS

VISIT THE SITE OF THE PROPOSED CONSTRUCTION AND EXAMINE CONDITIONS IN RELATION TO THE WORK FAILURE TO NOTE SITE CONDITIONS AND MAKE SUITABLE ALLOWANCE FOR SAME WILL IN NO WAY JUSTIFY A CLAIM FOR ADDITIONAL CHARGES OR COMPENSATION.

ANY DISCREPANCIES BETWEEN THE DRAWINGS AND SPECIFICATIONS AS TO THE TRUE INTENT AND/OR MEANING OF THE DRAWINGS AND SPECIFICATIONS, WILL REQUIRE A CLARIFICATION IN WRITING FROM THE

- THE WORK SHALL BE EXECUTED TO THE SATISFACTION OF THE ENGINEER. KEEP A COMPETENT FOREMAN IN CHARGE OF THE WORK. THIS FOREMAN SHALL FACILITATE THE INSPECTION OF THE WORK AS DIRECTED BY THE ENGINEER. THERE SHALL BE NO EXTRA CHARGES FOR THIS. COMPLETE WORK AS QUICKLY AS POSSIBLE, AND IMMEDIATELY MAKE ANY CHANGES OR MODIFICATIONS REQUESTED BY THE ENGINEER DURING SPECIFIC OR ROUTINE INSPECTIONS; WHETHER REQUESTED TO DO SO VERBALLY OR IN WRITING.
- 2. DURING CONSTRUCTION REMOVE ALL DEBRIS RESULTING FROM ELECTRICAL WORK IN CONTAINERS SUPPLIED
- THE ENTIRE INSTALLATION SHALL COMPLY WITH THE CANADIAN ELECTRICAL CODE LATEST EDITION, THE ALBERTA BUILDING STANDARDS ACT, AND THE LOCAL INSPECTION AUTHORITIES; THE FORMER REQUIREMENTS SHALL BE MET WITHOUT ADDITIONAL CHARGE TO THE OWNER.

OBTAIN AND SUBMIT ALL PERMITS REQUIRED, AND PAY ANY FEES FOR DRAWING APPROVALS. AFTER COMPLETION OF THE WORK FURNISH THE ENGINEER A CERTIFICATE OF FINAL INSPECTION FROM THE LOCAL

1.5 CO-OPERATION AND COORDINATION

- COOPERATE FULLY WITH OTHER TRADES, TO ENSURE COMPLETION OF THE PROJECT.
- 2. PRIOR TO INSTALLATION OF ANY ELECTRICAL EQUIPMENT, THE CONTRACTOR SHALL ENSURE THAT THE ELECTRICAL MATERIAL CAN BE ACCURATELY LOCATED WITH RESPECT TO EQUIPMENT CONNECTIONS, STRUCTURAL AND ARCHITECTURAL DETAILS OF THE PROJECT.

- ALL ELECTRICAL MATERIALS SUPPLIED SHALL BE NEW, AND BEAR THE APPROVAL OF THE CANADIAN
- 2. WHERE EQUIPMENT TYPES OF MAKES ARE LISTED ON THE DRAWINGS, ONLY THESE TYPES SHALL BE USED IN TENDERING PRICE AND INSTALLED ON THE PROJECT. SUBMIT TO THE ENGINEER COMPLETE INFORMATION ON MATERIALS TO BE INSTALLED ON THE PROJECT. PROPOSALS, ACCOMPANIED WITH SCALED PHYSICAL DRAWINGS AND/OR CATALOGUE PAGES GIVING ALL PERTINENT DATA SHALL BE PROVIDED AS REQUESTED

AT THE TIME OF FINAL INSPECTION AND TEST, ALL CONNECTIONS SHALL BE MADE, ALL EQUIPMENT SHALL BE INSTALLED, AND THE ENTIRE SYSTEM SHALL BE CONTINUOUSLY CONNECTED AS FOR NORMAL OPERATION. THE ENTIRE SYSTEM MUST TEST FREE FROM SHORT CIRCUITS AND GROUNDS, AND THE INSULATION RESISTANCE BETWEEN CONDUCTORS AND BETWEEN CONDUCTORS AND GROUND, WITH CONNECTIONS MADE, MUST NOT BE LESS THAN REQUIRED IN THE CANADIAN ELECTRICAL CODE — PART 1. SUPPLY ALL NECESSARY TESTING EQUIPMENT REQUIRED BY THE ENGINEER. BEAR ALL EXPENSES IN CONNECTION WITH THE CARRYING—OUT OF THESE TESTS. DEMONSTRATE TO THE ENGINEER THE PROPER OPERATION OF ALL ELECTRICAL SYSTEMS INSTALLED AND/OR CONNECTED UNDER THESE SECTIONS OF THE SPECIFICATION.

- GUARANTEE ALL ELECTRICAL EQUIPMENT PROVIDED AND/OR INSTALLED AND/OR CONNECTED UNDER THIS SPECIFICATION TO BE FREE FROM DEFECTIVE WORKMANSHIP AND MATERIALS, AND TO REMAIN SO FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL PERFORMANCE. ANY DEFECTS, OTHER THAT THOSE TO THE OWNER WEAR-AND-TEAR, DURING THE AFORESAID PERIOD, SHALL BE REMEDIED AT
- 2. ALL EQUIPMENT OR PARTS OF EQUIPMENT WHICH HAVE A MANUFACTURER'S STANDARD WARRANTY OVER ONE (1) YEAR SHALL BE STATED.

- KEEP A COMPLETE SET OF TENDER DRAWINGS ON THE JOB SITE; THESE DRAWINGS SHALL BE CONTINUOUSLY AND ACCURATELY UPDATED DURING CONSTRUCTION; TO SHOW ALL CHANGES TO THE TENDER DOCUMENTS. DIMENSION ALL SERVICES TO NEAREST PROPERTY LINE. ALL DIMENSIONS TO CLOSE.
- 2. ONE SET OF RED-LINE RECORD DRAWINGS SHALL BE PROVIDED TO THE ENGINEER INDICATING ALL CHANGES, UPON COMPLETION OF THE PROJECT. INCLUDE COST FOR DRAWINGS TO BE UPDATED ELECTRONICALLY.

1.10 PAINTING

1. SUPPLY SPECIFIED ITEMS PAINTED TO THE MANUFACTURER'S STANDARD FINISH.

1.11 PROTECTION OF EQUIPMENT

1.12 SHOP DRAWINGS

- 1. PROTECT FINISHED AND UNFINISHED WORK OF ALL TRADES FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGE SHALL BE REPAIRED AT NO EXPENSE TO THE OWNER.
- RECEIVE, HANDLE, STORE AND TRANSFER TO THE WORK SITE, ALL EQUIPMENT AND MATERIALS, WHETHER SUPPLIED BY THIS SECTION OF THE OWNER.
- 1. UPON COMMENCEMENT OF CONSTRUCTION SUBMIT SHOP DRAWINGS OF ALL ITEMS SPECIFIED ON THE DRAWINGS. AND ALSO ANY ITEM THAT IS CUSTOM DESIGNED FOR THIS INSTALLATION. THESE DRAWINGS SHALL INDICATE THE ARRANGEMENT AND LOCATION OF ALL ITEMS. TERMINAL SIZES SHALL BE SHOWN, AS WELL AS A ONE-LINE DIAGRAM AND ALL CONTROL SCHEMATIC DIAGRAMS. CONTROL WIRING SHALL BE

NUMBER CODED; THIS CODING SHALL BE AFFIXED TO EACH END OF EACH CONTROL CONDUCTOR. 2. MANUFACTURER'S STANDARD SCHEMATIC DRAWINGS:

- MODIFY DRAWINGS TO DELETE INFORMATION WHICH IS NOT APPLICABLE TO THIS PROJECT; SUPPLEMENT STANDARD INFORMATION TO INCLUDE ADDITIONAL INFORMATION APPLICABLE TO THIS
- MANUFACTURER'S CATALOGUE SHEETS, BROCHURES, DIAGRAMS, SCHEDULES, PERFORMANCE CHARTS, ILLUSTRATIONS AND OTHER STANDARD DESCRIPTIVE DATA:
- CLEARLY MARK EACH COPY TO IDENTIFY PERTINENT MATERIALS, PRODUCTS OF MODELS; SHOW DIMENSIONS AND CLEARANCES REQUIRED; SHOW PERFORMANCE CHARACTERISTICS AND CAPACITIES;
- IV. SHOW WIRING DIAGRAM AND CONTROLS.
- 4. SUBMITTALS SHALL INCLUDE:
- DATE AND REVISION DATES: PROJECT TITLE AND NUMBER (TO BE NOTED ON ALL COPIES OF ALL SHOP DRAWINGS SUBMITTED):
- APPLICABLE NAME OF: CONTRACTOR, SUBCONTRACTOR, SUPPLIER, MANUFACTURER AND SEPARATE
- IDENTIFICATION OF PRODUCT OF MATERIALS:

- APPLICABLE STANDARDS, SUCH AS CSA OF CGSB NUMBERS;
 CONTRACTOR'S STAMP, INITIALED OR SIGNED, CERTIFYING THE REVIEW OF SUBMITTAL, VERIFICATION,
 OF FIELD MEASUREMENTS AND COMPLIANCE WITH THE CONTRACT DOCUMENTS.
- 5. REVIEWED SHOP DRAWING MUST BE RECEIVED FROM THE ENGINEER PRIOR TO MANUFACTURING. ANY CORRECTIONS NECESSARY MUST BE MADE TO THE DRAWINGS AND AN INFORMATION COPY RETURNED TO HE ENGINEER. SHOP DRAWINGS RETURNED BY THE ENGINEER DO NOT RELIEVE THIS SECTION FROM OBLIGATION TO FULFILL THE INTENT OF THESE PLANS AND SPECIFICATIONS.

1.13 IDENTIFICATION OF EQUIPMENT

- ALL ITEMS OF NEW ELECTRICAL EQUIPMENT SUCH AS POWER, LIGHTING, SIGNAL AND TELEPHONE PANELS, DISCONNECT SWITCHES, MANUAL AND AUTOMATIC CONTROL DEVICES, ETC. SHALL HAVE NAMEPLATES. THESE NAMEPLATES SHALL BE, UNLESS OTHERWISE SPECIFIED, BLACK PLASTIC LAMICOID WITH ENGRAVED WHITE LATERING, AND ADDEADANCE. NEAT AND UNIFORM IN APPEARANCE.
- 2. NAMEPLATES SHALL INDICATE THE USE AND VOLTAGE OF EQUIPMENT, AS SPECIFIED AND SHOWN IN THE
 - PANELS: VOLTAGE, PHASE, IDENTIFICATION SIGNAL PANELS: SYSTEM NAME
 MANUAL CONTROLS: NAME OF EQUIPMENT CONTROLLED.
 - AUTOMATIC CONTROLS: IDENTIFY AS ON SCHEMATIC DIAGRAMS
- 3. DISTRIBUTION PANELS SHALL HAVE INDIVIDUAL NAMEPLATES INDICATING EACH CIRCUIT'S USE.
- BRANCH CIRCUIT PANEL BOARDS SHALL HAVE TYPED CIRCUIT DIRECTORIES BEHIND CLEAR PLASTIC, ON THE INSIDE OF THE PANEL DOOR.

1.14 ADDENDA AND REVISIONS

ENSURE THIS SECTION HAS RECEIVED ALL ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS, SPECIFICATIONS AND ADDENDA, AND THAT ALL ADDITIONS AND DELETIONS TO THE PROPOSED WORK HAVE BEEN INCLUDED IN THE QUOTATION.

1.15 EQUIPMENT MANUALS

- PROVIDE THREE SETS OF EQUIPMENT MANUAL FOR THE ELECTRICAL EQUIPMENT COVERED UNDER THESE SPECIFICATIONS.
- 2. THESE MANUALS SHALL CONSIST OF MANUFACTURER'S AND GENERAL MAINTENANCE SCHEDULES, ON TYPED OR PRINTED SHEETS, AND AMOUNTED IN A HARD COVER BINDER. ONE (1) COPY OF THESE MANUALS SHALL BE SUBMITTED OF THE ENGINEER FOR APPROVAL PRIOR TO THE FINAL ISSUE.
- THESE MANUALS SHALL COVER A MINIMUM OF THE FOLLOWING MAJOR ITEMS OF EQUIPMENT, IF INSTALLED, AND ANY OTHER PERTINENT ITEMS:
 - ARRANGEMENT, POWER AND CONTROL DRAWINGS; FUSE RATINGS AND/OR RELAY SETTINGS; EQUIPMENT BROCHURES;
 - SHOP DRAWINGS.
 - BRANCH CIRCUIT PANEL BOARDS SHOP DRAWINGS;
 - BREAKER RATINGS
 - CATALOGUE INFORMATION ON EACH MAKE OF FIXTURE INSTALLED, INCLUDING GLASSWARE
 - IV. EMERGENCY LIGHTING AND EXIT SIGNAGE
- 4. THE EQUIPMENT MANUAL SHALL ALSO INCLUDE ALL SPECIFIED WARRANTIES, THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE COMPANY PROVIDING THE WARRANTY, OPERATION PROCEDURES AND THE
- 5. PROVIDE A SEPARATE INSTRUCTION SHEET IN PLASTIC COVER INSTRUCTING PERSONNEL REGARDING SETTING AND OPERATION OF TIME CLOCKS.

1.16 UTILITIES (POWER, TELEPHONE, CATV)

- 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.
- 3. COORDINATE THE COMPLETE SERVICE INSTALLATIONS WITH SERVING UTILITY COMPANIES.
- 4. COSTS TO BE PAID SHALL INCLUDE ALL ON-SITE AND OFF-SITE CHARGES WHICH MAY BE LEVIED BY THE
- 5. OBTAIN ALL ON SITE AND OFF SITE CHARGES FROM UTILITY COMPANIES BEFORE CLOSING OF TENDER. ALL CHARGES MUST BE INCLUDED IN THE TENDER.

RACEWAYS

- 1. CONDUITS: RIGID STEEL, RIGID ALUMINUM, ELECTRIC METALLIC TUBING (EMT), RIGID PVC, DBII.
- 2. FLEXIBLE CONDUITS: STEEL OR ALUMINUM, COMPLETE WITH PVC JACKET WHERE SPECIFIED
- 1.2 INSTALLATION
- PROVIDE AND INSTALL RACEWAYS FOR ALL ELECTRICAL LINE AND LOW VOLTAGE CONDUCTORS. 2. EMT SHALL HAVE COUPLINGS AND CONNECTORS OF THE SET SCREW, SEAMLESS STEEL, CONCRETE-TIGHT
- FITTINGS. IT SHALL NOT BE USED IN WET AREAS, WHERE SUBJECT TO MECHANICAL DAMAGE, OR BELOW
- RIGID PVC SHALL HAVE COUPLINGS AND ADAPTERS WHICH ARE SECURED WITH SOLVENT CEMENT. FIELD BENDS WILL NOT BE ACCEPTED. IT SHALL NOT BE INSTALLED EXPOSED TO MECHANICAL INJURY OR WHERE SUBJECTED TO TEMPERATURES ABOVE 75 DEGREES C.
- 4. FLEXIBLE CONDUIT SHALL BE EITHER STEEL OR ALUMINUM, WITH TWO (2) SCREW CONNECTORS AND ANTI-SHORT BUSHINGS IN DRY AREAS. WET AREAS SHALL BE LIQUID TIGHT.
- 5. RACEWAYS SHALL BE INSTALLED IN SPECIFIC LOCATIONS, AS FOLLOWS:
 - IN CONCRETE BELOW OR ON GRADE
 DBII OR PVC TYPE CONDUIT. CONDUITS RISING ABOVE FLOOR SLAB MUST EXIT AT A 90 DEGREE
 ANGLE TO THE SLAB SURFACE. ADAPT TO METAL WHEN EXITING SLAB.
 - II. CONCEALED IN WALLS AND CEILINGS CONDUITS CONCEALED IN WALLS AND CEILINGS, OTHER THAT IN POURED CONCRETE, MAY BE RIGID STEEL, ALUMINUM OR EMT. CONDUITS SHALL BE CONCEALED WHENEVER POSSIBLE. CONDUITS CONCEALED IN CEILING SPACES SHALL BE RUN NEATLY AND PARALLEL TO BUILDING LINES, AND SUPPORTED AS FOR SURFACE MOUNTED CONDUITS.
 - III. SURFACE MOUNTED SURFACE MOUNTED CONDUITS MAY BE EITHER RIGID STEEL, ALUMINUM OR EMT, WHERE NOT EXPOSED TO MECHANICAL DAMAGE. CONDUITS SHALL BE RUN PARALLEL TO THE BUILDING LINES
 - IF SO NOTED, CONDUITS RUN ON FLAT SURFACES SHALL BE SPACED OFF THE MOUNTING SURFACE. SPACERS, STRAPS AND HARDWARE SHALL BE OF THE SAME METAL AS THE CONDUIT.
 - ONLY RIGID PVC CONDUIT OR DBII SHALL BE USED. IT SHALL ADAPT TO RIGID STEEL CONDUIT WHERE IT EXITS FROM THE GROUND OR IS SUBJECTED TO MECHANICAL DAMAGE. EXPANSION JOINTS SHALL BE PROVIDED AS RECOMMENDED BY THE MANUFACTURER. PROVIDE \Im CONTINUOUS CONCRETE ENCASEMENT. TRENCH SHALL BE FREE OF LOOSE DEBRIS PRIOR TO CONCRETE POUR. PROVIDE PULL WIRES IN SERVICE DUCTS.
- 6. PLUG ALL CONDUIT ENDS TO PREVENT ENTRY OF DIRT; CLEAN ALL CONDUIT PRIOR TO INSTALLATION OF
- 7. COORDINATE THE INSTALLATION OF RACEWAYS WITH OTHER TRADES.
- 8. OFFSET ALL RACEWAYS IN SUCH A MANNER THAT THEY ENTER BOXES NEATLY.
- 9. USE FLEXIBLE RACEWAYS WHEN CONNECTING TO VIBRATING EQUIPMENT; USE FLEXIBLE PVC JACKETED
- RACEWAYS ON ALL MOTOR CONNECTIONS. 10. SEAL CONDUITS PASSING THROUGH HEATED/UNHEATED AREAS.
- 11. ALL CONDUITS SHALL RUN CONCEALED IN FINISHED AREA.
- 12. PROVIDE NYLON PULL WIRES IN ALL EMPTY CONDUITS.

CONDUCTORS

1.1 MATERIALS

- 1. CONDUCTORS SHALL BE COPPER, RW90 X-LINK, 600V INSULATION
- 2. CONDUCTORS SHALL BE MINIMUM #12 AWG.
- 3. ALUMINUM CONDUCTORS SHALL NOT BE UTILIZED, UNLESS SPECIFICALLY INDICATED ON DRAWNGS.

1.2 INSTALLATION

- PROVIDE AND INSTALL CONDUCTORS FOR POWER AND LIGHTING AND CONTROLS, AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN. THIS SHALL CONSIST OF INDIVIDUAL CONDUCTORS OR MULTI-CONDUCTOR CABLES IN RACEWAYS, OR OTHERWISE, AS SHOWN.
- 2. A GROUNDING CONDUCTOR SHALL BE INSTALLED IN CONDUITS AND DUCTS AS SPECIFIED IN THE CANADIAN ELECTRICAL CODE; WHETHER OR NOT IT IS SHOWN ON THE DRAWINGS.
- LARGER WIRE SIZES FOR BRANCH CIRCUITS HOME RUNS SHALL BE MAINTAINED UP TO LUMINAIRE LOCATIONS. DO NOT REDUCE WIRE SIZE.
- 4. ALL WIRING TO BE INSTALLED IN CONDUIT.

1.3 COLOUR CODING

1. CONDUCTORS SHALL HAVE INSULATION, COLOUR CODED AS FOLLOWS: 120/208V

PHASE 'A' PHASE 'B' PHASE 'C' NEUTRAL	
GROUND	



ELECTRICAL SPECIFICATION

<u> WIRING DEVICES</u>

1.1 COMPONENTS

1. TOGGLE SWITCHES

- LINE VOLTAGE SWITCHES SHALL BE TOGGLE TYPE, WITH OPERATING HANDLE. SWITCH BODIES SHALL BE OF PLASTIC.. EXPOSED METAL PARTS SHALL BE PLATED TO RESIST CORROSION. TERMINALS SHALL BE SCREW TYPE OF BACK OR SIDE WRING. CONTACTS SHALL BE SILVER CADMIUM AND THE ACTION SHALL BE QUIET. SWITCHES SHALL BE CSA LISTED AS SUITABLE FOR MOTOR LOADS UP TO 30% OF THE RATED AMPERAGE, AND FOR FLUORESCENT, RESISTANCE OF TUNGSTEN LAMP LOADS UP TO FULL
- II. SWITCHES SHALL BE SPST, OF 3-WAY, RATED 15 AMPERES AT 120 OR 347.
- III. THEY SHALL BE ONE OF THE FOLLOWING MANUFACTURER
- SPECIFICATION GRADE
- IV. ALL SWITCHES SHALL BE OF THE SAME MANUFACTURER AND FINISH THROUGHOUT.

2. RECEPTACLES

STANDARD WALL RECEPTACLES SHALL BE 2-POLE, 3 WRE, 15A, 120V DUPLEX GROUND FOR PARALLEL BLADES. EXPOSED METAL PARTS SHALL BE PLATED TO RESIST CORROSION. BODIES SHALL BE MOULDED PLASTIC WITH NYLON FACE. TERMINAL SHALL BE SCREW TYPE FOR BACK OR SIDE WIRING. EACH TERMINAL SHALL HAVE TWO (2) SCREWS AND A BREAK-OFF LINK TO PERMIT SEPARATE CIRCUITS TO EACH HALF OF THE DUPLEX RECEPTACLE. THE 'U' GROUNDING TERMINAL SHALL BE INTERNALLY CONNECTED TO THE RECEPTACLE MOUNTING STRAPS.

- II. RECEPTACLES SHALL BE ONE OF THE FOLLOWING MANUFACTURER:
- III. ALL RECEPTACLES SHALL BE OF THE SAME MANUFACTURER AND FINISH THROUGHOUT.

COVER PLATES

ALL FLUSH SWITCHES AND RECEPTACLES SHALL BE FITTED WITH STANDARD SIZE, STAINLESS STEEL PLATES. PLATES SHALL HAVE BEVELED EDGED AND SCREWS WITH CHROME-PLATED HEADS. PLATES SHALL FIT TIGHT-TO-THE-WALL AND TO THE WIRING DEVICES.

1.2 INSTALLATION

- MOUNT WIRING DEVICES TO SUIT EQUIPMENT BEING SERVED. FLOOR OUTLETS SHALL BE INSTALLED STRAIGHT AND PARALLEL. DEVICES SHALL BE MOUNTED 12" A.F.F. SWITCHES SHALL BE MOUNTED AT 48" A.F.F. OUTLETS AT COUNTERS SHALL BE 8" ABOVE COUNTER.

<u>SERVICE AND DISTRIBUTION</u>

- 1. PROVIDE AND INSTALL BRANCH CIRCUIT PANEL BOARDS WHERE AND AS SHOWN IN THE DRAWINGS.
- PANEL BOARDS SHALL CONSIST OF DEADFRONT ASSEMBLIES OF MOULDED CASE CIRCUIT BREAKERS IN CODE GAUGE SHEET METAL ENCLOSURES COMPLETE WITH DOOR, LATCH, LOCK AND KEYS. LOCKS SHALL BE KEYED ALIKE. PANELS SHALL BE FACTORY PAINTED. UNUSED BREAKER SPACE TO BE
- PROVIDE MATCHING ENCLOSURES FOR RELAYS.
- 3. PANEL BOARD MAIN BUSSES SHALL BE OF PLATED COPPER OF ALUMINUM; OF AMPERAGE SIZES AS INDICATED ON THE SINGLE LINE DIAGRAM. MAIN LUGS SHALL BE SUITABLE FOR EITHER COPPER OR
- 4. PANEL BOARDS SHALL BE EQUIPPED WITH AUTOMATIC AIR CIRCUIT BOLT-ON BREAKERS. THE CIRCUIT NUMBERING ON BOTH SINGLE AND DOUBLE TUB PANELS SHALL BE CONSECUTIVE, WITH ODD NUMBERS ON THE LEFT AN EVEN NUMBERS ON THE RIGHT. TWO SETS OF IDENTICAL NUMBERS ON DOUBLE TUB
- 5. BREAKER SECTION SHALL BE COMPLETE WITH HINGED LOCKING DOOR AND KEYS; ALL LOCKS SHALL BE
- TYPEWRITTEN CIRCUIT DIRECTORIES SHALL BE MOUNTED IN ALL PANEL BOARDS, IN A SUITABLE METAL

FRAME. DIRECTORIES SHALL BE LISTED IN TWO COLUMNS TO MATCH BREAKER LAYOUT.

- 1.2 INSTALLATION 1. MOUNT PANEL TOPS 6'-0" ABOVE FINISHED FLOOR.
- 1.3 COLOUR CODE
- 1. 120/208V GREY

MOTORS AND CONTROL

(LINE AND LOW VOLTAGE)

- 1.1 WIRE TO AND CONNECT ALL MECHANICAL EQUIPMENT AND CONTROLS.
- 1.2 INSTALL DISCONNECT SWITCHES AT ALL MOTORS. HORSEPOWER RATED, SUITABLE FOR ENVIRONMENT ENCOUNTERED.
- 1.3 MANUAL AND MAGNETIC 3 POLE STARTERS SHALL BE IN CEMA 1 ENCLOSURES OR AS SPECIFIED ON DRAWINGS. SIZE TO SUIT THE VOLTAGE AND HORSEPOWER OF THE
- MOTOR BEING CONTROLLED 1.4 REFER TO MECHANICAL DRAWINGS FOR CONTROL REQUIREMENTS.

COMPLIES WITH THE CODE REQUIREMENTS.

- 1.5 PROVIDE 120 VOLT CONTROL CIRCUITS FOR CONTROL TRANSFORMERS. CONFIRM
- LOCATIONS AND QUANTITIES WITH MECHANICAL CONTRACTOR. 1.6 CONFIRM LOAD, VOLTAGE, AND PHASE OF ALL EQUIPMENT WITH MECHANICAL

CONTRACTOR PRIOR TO ROUGH-IN AND ORDERING OF EQUIPMENT. **GROUNDING**

1.1 SYSTEM

INSTALL A COMPLETE GROUNDING SYSTEM AS REQUIRED BY THE CANADIAN ELECTRICAL CODE, WHETHER OR NOT GROUNDS ARE INDICATED ON DRAWINGS OR SPECIFIED HEREIN. TESTS: MEASURE GROUND GRID RESISTANCE WITH AN EARTH MEGGER AND INSTALL GROUND RODS AND CONDUCTORS AS REQUIRED UNTIL RESISTANCE TO GROUND

1.2 GROUND WIRES 1. INSULATED COPPER CONTAINED IN CONDUIT WHERE SUBJECT TO MECHANICAL DAMAGE. GROUND BUS BAR: BARE COPPER BUS 6mm \times 600mm, ISOLATE FROM WALL WITH INSULATED STANDOFFS.

1.3 INSTALLATION

- 1. PROVIDE CIRCUIT GROUNDS AS REQUIRED BY THE CANADIAN ELECTRICAL CODE.
- INSTALL A #12 TWH GREEN GROUND WIRE IN ALL EMT AND RIGID PVC CONDUITS, AND ALL EXTERIOR UNDERGROUND CONDUITS.

3. EQUIPMENT GROUNDING: FROM GROUNDING BUSHINGS ON SERVICE ENTRANCE CONDUITS

CONNECT 1 #2 GROUND TO THE MAIN DISTRIBUTION CENTER GROUND BUS.

LIGHTING

FIXTURES SHALL BE CONNECTED WITH CONDUCTORS OF AT LEAST 90°C RATING OR HIGHER, AS REQUIRED.

1.2 FLUORESCENT LAMP BALLASTS

- ALL FLUORESCENT LAMP BALLASTS SHALL BE ELECTRONIC T8 (UNLESS OTHERWISE NOTED) THD LESS THAN 20%, INSTANT START. MANUFACTURED BY ADVANCE, MAGNETEK, MOTOROLA
- 2. BALLASTS SUBJECTED TO EXTERIOR TEMPERATURES SHALL BE SUITABLE,

- RAPID START T5 ELECTRONIC BALLASTS. 2. 120V/347V, T5 ELECTRONIC (1 TO 2 LAMPS)
- 3. PARALLEL CIRCUIT, UNDERWRITER'S ;ABORATORY (UL935) LISTED, CLASS P, TYPE OUTDOOR, CSA CERTIFIED.
- 4. LAMP CURRENT CREST FACTOR SHALL BE 1.7 OR LESS (ANSI C82-11).
- 5. MAXIMUM AMBIENT OPERATING TEMPERATURE 75°C
- 6. BALLAST FACTOR GREATER THAN 1.00 (ANSI C82-11)
- 7. POWER FACTOR GREATER THAN .98. 8. INPUT CURRENT TOTAL HARMONIC DISTORTION (THD) SHALL NOT EXCEED 10%
- 9. SHALL COMPLY WITH FCC PART 18 SUB C, NON CONSUMER EQUIPMENT CLASS A FOR EMI AND RFI (CSA C108.6 M91).
- 10. TRANSIENT VOLTAGE PROTECTION TO MEET IEEE S87/ANSI C62.41, C82.1 AND C82.11.

11. SHALL HAVE AN END-OF-LAMP LIFE DETECTION AND SHUTDOWN CIRCUIT WITH AN AUTO

- 12. SHALL PROVIDE RAPID STARTING SEQUENCE CONSISTANT WITH ANSI STANDARD
- 13. ULTRA QUIET OPERATION (SOUND RATED A+).

3. PROVIDE PHONE LINE TO TELEPHONE BOARD.

14. PROVIDE BALLASTS COMPATIBLE DESIGN TO LAMPS SPECIFIED.

- 1.3 FLUORESCENT LAMPS 1. LAMPS SHALL BE MANUFACTURED BY GENERAL ELECTRIC, OSRAM OR PHILIPS.
- .2 TYPE: F32, T8, 1200 mm NOMINAL LENGTH .1 EFFICIENCY: MORE THAN 90 LUMENS/WATT. .2 COLOUR RENDERING INDEX (CRI): MORE THAN 80. .3 COLOUR: 4100 DEGREES KELVIN
- .3 TYPE: F54HO, T5, 1168 NOMINAL LENGTH. .1 EFFICIENCY: MORE THAN 92 LUMENS/WATT. .2 COLOUR RENDERING INDEX (CRI): MORE THAN 85. .3 COLOUR: 4100 DEGREES KEĽVIŇ.

.4 RATED LIFE: MINIMUM 15,000 HOURS • THREE HOURS/START.

.4 RATED LIFE: MINIMUM 20,000 HOURS • THREE HOURS/START. 1.4 FIRE ALARM

- FIRE ALARM SYSTEM SHALL BE INSTALLED TO CAN/ULC \$524 AND VERIFIED TO CAN/ULC \$537. ALLOW COSTS FOR ENGINEER REGISTERED IN PROVINCE OF ALBERTA TO WITNESS FIRE ALARM VERIFICATION. FIRE ALARM SYSTEM SHALL BE ADDRESSABLE, SINGLE STAGE, CLASS A WIRED.
 MANUFACTURED BY EDWARDS, NOTIFIER, OR SIMPLEX. PROVIDE ULC
 APPROVED AUTO-DIALER. PROVIDE ISOLATOR MODULES FOR EVERY 20,000 SQ. FT.

engineering

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CONSULTANT



PERMIT



ISSUED: Description ISSUED FOR CLIENT REVIEW 08-11-11 ISSUED 99% FOR CLIENT REVIEW 3 09-15-11 ISSUED TENDER

DRAWING:

ELECTRICAL SPECIFICATION

Welding Laboratory

École Maurice-Lavallée

KFR PROJECT No.: KFR11028

SCALE : AS NOTED

Upgrade

DRAWN CHECKED: SMP DATE: JUNE, 2011