

ELECTRICAL SPECIFICATION

SECTION 16010 ELECTRICAL GENERAL PROVISIONS

1 GENERAL
.1 PROVIDE ALL MATERIALS, LABOUR, PLANT AND EQUIPMENT NECESSARY TO MAKE A COMPLETE INSTALLATION AS DESCRIBED AND SHOWN. THIS INSTALLATION SHALL BE LEFT COMPLETE AND READY FOR OPERATION.
.2 THE ENTIRE INSTALLATION SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE BY THE CITY. REPLACE AT NO ADDITIONAL COST ANY WORK OR MATERIAL WHICH MAY FAIL OR PROVE DEFECTIVE DURING THE GUARANTEE PERIOD.
.3 THE INSTALLATION SHALL CONFORM IN EVERY RESPECT TO THE RULES AND REGULATIONS OF THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND ALL LOCAL CODES. ALL WORK SHALL BE UNIFORM AND HIGH QUALITY. ALL EQUIPMENT SUPPLIED UNDER THIS CONTRACT SHALL BE NEW AND BUILT IN ACCORDANCE WITH EEMAC STANDARDS AND SHALL BE CSA AND LOCALLY APPROVED. PROVIDE INSPECTION CERTIFICATE UPON COMPLETION OF THE WORK.
.4 CAREFULLY EXAMINE ALL PLANS AND SPECIFICATIONS PERTAINING TO THIS CONTRACT AND VISIT SITE TO DETERMINE ALL FACTORS AFFECTING COSTS AND INCLUDE SAME IN BID. NOTIFY CONTRACT ADMINISTRATOR OF DISCREPANCIES OR CONFLICTS WITH ANY REGULATION BEFORE SUBMITTING PRICE. FAILING SUCH NOTIFICATION, THE CONTRACTOR SHALL MEET ALL SUCH REQUIREMENTS WITHOUT EXTRA COST TO THE CITY.
.5 OBTAIN ALL NECESSARY PERMITS, PAY ALL NECESSARY FEES, GIVE ALL NECESSARY NOTICES AND OBTAIN APPROVAL OF THE ELECTRICAL AUTHORITIES HAVING JURISDICTION.

2 SHOP DRAWINGS
.1 SUBMIT SIX (6) COPIES OF SHOP DRAWINGS FOR ALL EQUIPMENT.
.2 EQUIPMENT PROPOSED SHALL MEET THE SAME STANDARDS OF PERFORMANCE, QUALITY AND WORKMANSHIP AS THAT SPECIFIED.

3 AS-BUILTS
.1 PROVIDE TWO COPIES OF "AS-BUILT" DRAWINGS.

4 OPERATION AND MAINTENANCE MANUALS
.1 PROVIDE DATA FOR INCORPORATION INTO MAINTENANCE MANUAL. MANUAL SHALL INCLUDE INSTRUCTIONS FOR ALL EQUIPMENT SUPPLIED, COPY OF REVIEWED SHOP DRAWINGS AND TECHNICAL DATA SUCH AS PARTS LISTS, OPERATING INSTRUCTIONS, MAINTENANCE INSTRUCTIONS, ETC. THREE (3) HARD COVER COPIES OF MAINTENANCE MANUALS ARE TO BE SUBMITTED.

5 REMOVALS
.1 REMOVE ALL UNNECESSARY EXISTING ELECTRICAL EQUIPMENT, WIRING AND FIXTURES IN THOSE PORTIONS OF THE EXISTING BUILDING WHICH ARE BEING REMODELLED OR DEMOLISHED. THE EQUIPMENT MAY BE REUSED ON THIS PROJECT IF, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, SUCH EQUIPMENT IS IN SATISFACTORY CONDITION AND MEETS THE STANDARDS ESTABLISHED. THE CITY MAY REMOVE FROM THE MATERIALS AND/OR EQUIPMENT REMAINING WHICH HE WISHES TO RETAIN AND THE REMAINDER SHALL BE REMOVED FROM THE SITE.
.2 ANY ELECTRICAL EQUIPMENT IN REMODELLED SECTIONS OR IN STRUCTURES REMOVED OR ALTERED, ADJACENT TO NEW WORK, NECESSARY FOR THE OPERATION OF THE EXISTING BUILDING, SHALL BE RELOCATED AS NECESSARY.
.3 ALL EXISTING EQUIPMENT REUSED SHALL BE MADE GOOD AND GUARANTEED.
.4 POWER INTERRUPTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE A TIME SUITABLE TO THE BUILDING OCCUPANT(S).

6 WORK IN EXISTING BUILDING
.1 CO-ORDINATION
.1 THE BUILDING SHALL REMAIN OPEN AND IN NORMAL OPERATION DURING THE CONSTRUCTION PERIOD.
.2 WHERE EXISTING SERVICES SUCH AS ELECTRICAL POWER, FIRE ALARM SYSTEM, SOUND SYSTEM, ETC. ARE REQUIRED TO BE INTERRUPTED AND/OR SHUT DOWN, CO-ORDINATE THE SHUTDOWNS WITH THE CONTRACT ADMINISTRATOR AND CARRY OUT THE WORK AT A TIME AND IN A MANNER ACCEPTABLE TO THEM. CAREFULLY SCHEDULE ALL DISRUPTION AND/OR SHUT-DOWNS AND ENSURE THAT THE DURATION OF SAME IS KEPT TO THE ABSOLUTE MINIMUM. SUBMIT FOR APPROVAL A WRITTEN, CONCISE SCHEDULE OF EACH DISRUPTION AT LEAST 120 HOURS IN ADVANCE OF PERFORMING WORK AND OBTAIN CITY'S WRITTEN CONSENT PRIOR TO IMPLEMENTING.
.3 SHOULD ANY TEMPORARY CONNECTIONS BE REQUIRED TO MAINTAIN SERVICES DURING WORK IN THE EXISTING BUILDING, SUPPLY AND INSTALL ALL NECESSARY MATERIAL AND EQUIPMENT AND PROVIDE ALL LABOUR AT NO EXTRA COST. SHOULD ANY EXISTING SYSTEM BE DAMAGED, MAKE FULL REPAIRS WITHOUT EXTRA COST, AND TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
.4 IF EXISTING EQUIPMENT SHOWN ON DRAWINGS IS DEFECTIVE IT SHOULD BE BROUGHT TO THE CONTRACT ADMINISTRATOR'S ATTENTION PRIOR TO WORK COMPLETION.
.2 INSTALLATION
.1 INSTALL BOXES, CONDUIT AND WIRING THROUGH EXISTING AREAS AS REQUIRED FOR THE NEW INSTALLATION.
.2 ADD MODULES, SWITCHES, ETC. IN EXISTING CONTROL PANELS, AS REQUIRED, TO EXTEND EXISTING SYSTEMS TO NEW OR RENOVATED AREAS.
.3 PATCH AND REPAIR WALLS AND CEILING IN EXISTING AREAS THAT HAVE BEEN DAMAGED OR CUT OPEN DUE TO THE NEW ELECTRICAL INSTALLATION.
.4 WHERE NEW CABLES OR CONDUITS HAVE BEEN INSTALLED THROUGH EXISTING FIRE RATED WALLS, SEAL OPENING AROUND CABLES AND CONDUIT TO MAINTAIN FIRE RATING.
.3 ALL EXISTING EQUIPMENT REUSED SHALL BE MADE GOOD AND GUARANTEED.
.4 POWER INTERRUPTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE A TIME SUITABLE TO THE BUILDING OCCUPANT(S).

SECTION 16100 ELECTRICAL MATERIALS AND INSTALLATION

1 WIRING METHOD
.1 FOR GENERAL PURPOSE WIRING: RW90 CONDUCTORS IN EMT CONDUIT. USE AC90 FOR FIXTURE DROPS AND IN METAL STUD WALLS.
.2 FOR OUTDOOR WIRING USE TECK TYPE CONDUCTORS. PVC CONDUIT AND RW90 CONDUCTORS MAY BE USED ONLY WHERE NOTED ON THE DRAWINGS.
.3 FOR CONNECTION TO MOTORS AND MISCELLANEOUS MECHANICAL EQUIPMENT USE LIQUITIGHT FLEXIBLE CONDUIT.
.4 RUN ALL CONDUIT AND CABLE CONCEALED, PARALLEL AND PERPENDICULAR TO BUILDING LINES, STAPLED AND/OR CLIPPED IN A NEAT WORKMANLIKE MANNER.
.5 ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG EXCEPT AS NOTED.

2 GROUNDING
.1 THE ENTIRE INSTALLATION SHALL BE GROUNDED IN CONFORMANCE TO THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE.
.2 COMPLY WITH SECTION 24 OF THE CANADIAN ELECTRICAL CODE AND CSA 232 FOR PATIENT CARE AREAS.
.3 ALL CONDUIT TO HAVE A SEPARATE INSULATED GROUND CONDUCTOR.

3 BOXES
.1 OUTLET, JUNCTION AND SWITCH BOXES SHALL BE GALVANIZED STEEL AND SIZED ACCORDING TO THE ELECTRICAL CODE AND TO SUIT EACH APPLICATION.
.2 PROVIDE MOULDED BOX VAPOUR BARRIER: FACTORY MOULDED POLYETHYLENE BOX FOR USE WITH RECESSED ELECTRIC BOXES IN EXTERIOR WALLS.

4 WIRING DEVICES
.1 PROVIDE WIRING DEVICES FOR ALL OUTLETS AS REQUIRED AND INDICATED. COLOUR AND MOUNTING TO MATCH EXISTING.
.2 STANDARD OF ACCEPTANCE FOR DEVICES SHALL BE AS FOLLOWS:
.1 SINGLE POLE, 2-POLE, 3-WAY AND 4-WAY WALL MOUNTED GENERAL PURPOSE SWITCHES SHALL BE PREMIUM SPECIFICATION TOGGLE TYPE 15A 125VAC. TO BE SERIES HUBBELL #1201, ARROW HART #1891, BRYANT #4801 OR LEVITON #1201.
.2 NEMA 5-15R 15A 125VAC RECEPTACLES SHALL BE U-GROUND PARALLEL SLOT SIDE WIRE AS FOLLOWS
.1 GENERAL PURPOSE DUPLEX AND SIMPLEX TO BE SERIES HUBBELL #5262, ARROW HART #5262, BRYANT #5262, CCE #4065 OR LEVITON #5262LL.
.3 COVERPLATES FOR DEVICES SHALL BE STAINLESS STEEL.

5 LIGHTING SYSTEM - GENERAL
.1 PROVIDE FIXTURES EQUAL TO THOSE SPECIFIED WITH LAMPS, SUSPENSION HARDWARE, LENSES AND ALL OTHER ACCESSORIES REQUIRED TO COMPLETE THE INSTALLATION.
.2 FLUORESCENT FIXTURE BALLASTS SHALL BE T-8 PREMIUM ELECTRONIC TYPE. TOTAL HARMONIC DISTORTION LESS THAN 10% BALLAST MUST BE LISTED BY MANTOBA HYDRO AS ACCEPTABLE BY THEIR POWER SMART REBATE PROGRAM.

6 WALL BOX DIMMERS
.1 WALL BOX DIMMERS AND SPEED CONTROLLERS SHALL BE SUPPLIED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. THEY SHALL BE AS MANUFACTURED BY LUTRON OR APPROVED EQUAL AND AS FOLLOWS:
.1 DIMMERS (INCANDESCENT):
.1
.1 NOVA NT-1000/1000 WATT
.2 NOVA NT-1500/1500 WATT
.2 UNLESS SPECIFIED OTHERWISE ALL DIMMERS SHALL BE 1000 WATT TYPE. SUPPLY DIMMERS TO SUIT CIRCUIT LOADING.
.2 DIMMERS (FLUORESCENT):
.1 NOVA NTF-10.
.2 PROVIDE A SEPARATE NEUTRAL WIRE FOR EACH DIMMER CIRCUIT.

7 LUTRON 64000 DIMMING SYSTEMS

WARRANTY
• LUTRON SYSTEMS COME WITH A LIMITED EIGHT-YEAR WARRANTY WHEN FACTORY COMMISSIONING IS PURCHASED-100% FOR THE FIRST TWO YEARS (INCLUDING PARTS AND LABOR) AND AN 8-YEAR REPLACEMENT PARTS PROGRAM FOR ANY DEFECTIVE PARTS. THE WARRANTY PERIOD BEGINS AFTER SUCCESSFUL FACTORY COMMISSIONING OF THE SYSTEMS.
• EXTENDED WARRANTIES ARE ALSO AVAILABLE

SERVICE
• LUTRON OFFERS TECHNICAL SUPPORT 24 HOURS A DAY, 7 DAYS A WEEK, 365 DAYS A YEAR.

LUTRON POWER PANELS HAVE THE FOLLOWING:
• UL AIR GAP OFF - OFF MEANS OFF. REDUCES THE RISK OF ELECTRICAL SHOCK WHEN LIGHTING FIXTURES OR CIRCUITS ARE BEING SERVICED. EVEN WHEN THERE IS NO VISIBLE LIGHT, YOU CAN MEASURE 50 VOLTS OR MORE. BY HAVING THE AIR GAP OFF, ALL POWER IS REMOVED FROM THAT CIRCUIT.
• LUTRON PANELS EMPLOY TRIACS FOR DIMMING -VS- SCRS. A TRIAC IS LESS SUSCEPTIBLE TO SURGES BECAUSE IT IS CONSTRUCTED WITH MORE SILICON. IF AN SCR FAILS IN AN OPEN POSITION, THE DIRECT CURRENT GENERATED WILL DAMAGE TRANSFORMERS, WHICH CAN RESULT IN DAMAGE TO THE TRANSFORMER, OR FIRE. THIS IS APPLICABLE TO LOW VOLTAGE, FLUORESCENT, AND NEON/COLD CATHODE LOAD TYPES.
• LUTRON USES NATURAL CONVECTION COOLING FOR DIMMER PANELS SO THERE ARE NO COMPONENTS THAT MIGHT FAIL. (IT'S NOT ONLY A FAN THAT CAN FAIL, BUT THE THERMAL COUPLER THAT CAUSES THE FAN TO KICK IN IS ALSO A SOURCE OF CONCERN).
• BYPASS JUMPERS ARE INSTALLED IN LUTRON PANELS PRIOR TO SHIPMENT TO PROTECT THE DIMMERS FROM SHORTS.
• OVERLOADED CIRCUITS, ETC. THIS ALSO MAKES IT VERY SIMPLE TO HAVE "WORKING LIGHTS" WHILE THE CONTRACTOR DOES HIS WORK. IT IS NOT NECESSARY IN THE LUTRON PANEL TO PHYSICALLY MOVE AND THEN RE-CONNECT WIRES FOR PERMANENT POWER.
• LUTRON PANELS INCORPORATE 10-YEAR POWER FAILURE MEMORY THAT WILL RETURN THE LIGHT LEVELS TO THEIR SAME LEVELS AS BEFORE A POWER OUTAGE-NOT JUST FULL -ON OR FULL - OFF.
• RTS-S-REAL TIME ILLUMINATION STABILITY SYSTEM TO PROVIDE STABLE FREQUENCY, PHASE SHIFT, AND ELECTRICAL NOISE ON THE LINE. LUTRON DEVELOPED THE RTS-S TECHNOLOGY. RTS-S ALLOWS LUTRON DIMMERS TO COMPENSATE FOR INCOMING LINE VOLTAGE VARIATIONS SUCH AS CHANGES IN RMS VOLTAGE, FREQUENCY SHIFTS, HARMONICS, AND LINE NOISE IN REAL-TIME CONDITIONS. THE DIMMERS ARE CAPABLE OF MAINTAINING CONSTANT POWER TO THE LOAD BY CHECKING FOR CHANGES 120 TIMES PER SECOND AT 60 HERTZ UNDER THE FOLLOWING CONDITIONS: (CONTINUED) 2
PLUS OR MINUS 2% CHANGE IN RMS VOLTAGE PER CYCLE
PLUS OR MINUS 2% RATE OF CHANGE IN FREQUENCY PER SECOND
• LUTRON DIMMERS ARE UL LISTED AND UNIVERSAL FOR ALL LOAD TYPES AND ALLOWS FOR EASY RECONFIGURATION, MODULES ARE NOT REQUIRED.
• LUTRON PANELS ARE PROTECTED AGAINST A SURGE OF 6000 VOLTS, 3000 AMPS AS DEFINED BY ANS/IEEE STANDARD C62.41. THIS IS THE EQUIVALENT OF A NEAR LIGHTNING STRIKE TO THE POWER LINE SUPPLYING THE SCHOOL. WITHOUT THIS PROTECTION, THE POWER SURGE (RESULTING FROM LIGHTNING) WILL DESTROY THE PANEL PROCESSOR AND THE DIMMER CIRCUIT.

LUTRON SYSTEMS OFFER THE OPPORTUNITY TO INTEGRATE WITH THE MAJOR NETWORK TECHNOLOGIES, VIA RS232, OR CONTACT CLOSURES TO BACNET, LONWORKS ETC. LUTRON PANELS MAY ALSO BE EQUIPPED WITH A DMX LINK, WHERE THE DIMMING PANEL IS USED FOR THEATRICAL APPLICATIONS IN THE STAGE AREA.

MANUFACTURER TO PROVIDE SET-UP, PROGRAMMING, COMMISSIONING, TRAINING, ETC.

8 EXIT LIGHTING SYSTEM
.1 PROVIDE EXIT LIGHTING AS SHOWN WITH WIRING RUN IN DEDICATED CONDUIT SYSTEM. WIRING SHALL BE MINIMUM #12 AWG WITH TYPE RW-90 INSULATION.
.2 FIXTURE SHALL MATCH EXISTING.
.3 WHERE EMERGENCY LIGHTING IS AVAILABLE PROVIDE NEW EXIT LIGHTS WITH THIRD LAMP TO MATCH VOLTAGE AND CONNECT.
.4 STANDARD OF ACCEPTANCE SHALL BE AS FOLLOWS:

	EMERGI-LITE	LUMACELL	READY-LITE
SINGLE FACE	51 SERIES	LER-400 SERIES	RX-2000 LED
DOUBLE FACE	51 SERIES	LER-400 SERIES	RX-2000 LED

9 EMERGENCY LIGHTING SYSTEM
.1 PROVIDE EMERGENCY UNITS RATED FOR 120VAC INPUT AND OUTPUT AS INDICATED FOR 30 MINUTES MINIMUM, C/W WALL MOUNTING SHELF.
.2 UNIT SHALL HAVE TEST BUTTON, POWER ON INDICATOR.
.3 REMOTE HEADS SHALL BE QUARTZ HALOGEN RATED FOR 9 WATT WITH SAME VOLTAGE AS UNIT. NUMBER OF LAMPS PER HEAD SHALL BE AS INDICATED ON DRAWING.
.4 BATTERIES SHALL BE MAINTENANCE FREE FOR A PERIOD OF 10 YEARS.
.5 STANDARD OF ACCEPTANCE SHALL BE AS FOLLOWS:

	EMERGENCY UNIT	LUMACELL	EMERGI-LITE	QUALITE
EMERGENCY UNIT	#RGT2H	#RGT2H	#12EL-144	#12PCKL
REMOTE LAMPS (SINGLE)	#M1-1	#M1-1	#E79	#SF
REMOTE LAMPS (DOUBLE)	#M1-2	#M1-2	#E90	#SF2

10 POWER DISTRIBUTION SYSTEM
.1 PROVIDE ALL BREAKERS, CONDUIT, DISCONNECTS, CONDUCTORS AND ACCESSORIES REQUIRED FOR THE INSTALLATION OF PANELBOARDS AS INDICATED ON THE DRAWING AND IN THIS SPECIFICATION.
.2 SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH SECTION 16010.
.3 DRAWINGS TO INCLUDE ELECTRICAL DETAIL OF PANEL, BRANCH BREAKER TYPE, QUANTITY, AMPACITY AND ENCLOSURE DIMENSION.
.4 IN ADDITION TO CSA REQUIREMENTS, MANUFACTURER'S NAMEPLATE MUST SHOW FAULT CURRENT THAT PANEL INCLUDING BREAKERS HAS BEEN BUILT TO WITHSTAND.
.5 PANELBOARDS: TO CSA C-22.2 NO. 29.
.6 PANELBOARDS: PRODUCT OF ONE MANUFACTURER.
.7 250V BRANCH CIRCUIT PANELBOARDS: BUS AND BREAKERS RATED FOR 10KA (SYMMETRICAL) INTERRUPTING CAPACITY MINIMUM OR AS INDICATED.
.8 SEQUENCE PHASE BUSSING SUCH THAT CIRCUIT BREAKERS WILL BE NUMBERED IN CONSECUTIVE ORDER, WITH EACH BREAKER IDENTIFIED BY PERMANENT NUMBER IDENTIFICATION AS TO CIRCUIT NUMBER AND PHASE.
.9 PANELBOARDS: MAINS, NUMBER OF CIRCUITS, AND NUMBER AND SIZE OF BRANCH CIRCUIT BREAKERS AS INDICATED.
.10 PROVIDE PANEL COVERS FOR ALL PANELBOARDS AND SUPPLY TWO KEYS FOR EACH PANELBOARD AND KEY PANELBOARDS ALIKE.
.11 ALUMINUM BUS WITH NEUTRAL OF SAME AMPERE RATING AS MAINS.
.12 MAINS: SUITABLE FOR BOLT-ON 25MM WIDE BREAKERS.
.13 MULTI-POLE BREAKERS SHALL BE OF ONE PIECE CONSTRUCTION WITH COMMON TRIP.
.14 PROVIDE BREAKERS AS INDICATED IN THE PANEL SCHEDULE AND AS INDICATED ON THE DRAWING.
.15 ALL NEW BREAKERS SHALL MATCH PANEL VOLTAGE UNLESS INDICATED OTHERWISE. CIRCUIT BREAKERS SHALL BE THERMAL MAGNETIC TYPE.
.16 NAMEPLATE FOR EACH PANELBOARD 20 X 90MM ENGRAVED AS INDICATED.
.17 COMPLETE CIRCUIT DIRECTORY WITH TYPED WRITTEN LEGEND SHOWING LOCATION AND LOAD OF EACH CIRCUIT.
.18 ACCEPTABLE MANUFACTURERS: CUTLER HAMMER (WESTINGHOUSE), SCHNEIDER (PFE), SQUARE D AND SIEMENS.
.19 LOCATE PANELBOARDS AS INDICATED AND MOUNT SECURELY. PLUMB, TRUE AND SQUARE, TO ADJOINING SURFACES.
.20 WIRING IN PANELBOARDS SHALL BE NEAT AND SET IN AS IF LACED. ALL NEUTRAL CONDUCTORS SHALL BE IDENTIFIED IN THE PANEL WITH THEIR ASSOCIATED CIRCUIT NUMBERS BY MEANS OF BRADY MARKERS.
.21 ALL PANELBOARDS THROUGHOUT THE BUILDING SHALL BE PHASED TOGETHER SUCH THAT THE LEFT-HAND, CENTRE AND RIGHT-HAND PANELBOARD BUSES REPRESENT PHASES A, B AND C RESPECTIVELY. ALL INDICATING METERS SHALL BE IDENTIFIED TO THIS SEQUENCE.
.22 INTERRUPTING CAPACITY OF NEW BREAKERS IN EXISTING PANELS SHALL MATCH EXISTING.

11 TELEPHONE SYSTEM
.1 PROVIDE AND INSTALL EMPTY CONDUIT AND OUTLET BOXES IN WALLS FOR THE TELEPHONE SYSTEM AS SHOWN ON THE DRAWINGS. ALL CONDUIT SHALL BE LEFT WITH #14 AWG FULL WIRES. CONDUIT INSTALLATION SHALL BE CARRIED OUT IN CONJUNCTION WITH AND TO THE SATISFACTION OF THE TELEPHONE UTILITY.

12 ELECTRIC HEATING SYSTEM
.1 PROVIDE ELECTRIC HEATERS EQUAL TO THOSE SPECIFIED WITH MOUNTING HARDWARE AND ALL OTHER ACCESSORIES REQUIRED TO COMPLETE THE INSTALLATION.
.2 PROVIDE THERMOSTATS AS SPECIFIED.

13 MOUNTING HEIGHTS

.1 MOUNTING HEIGHT IS CENTERLINE OF EQUIPMENT ABOVE FINISHED FLOOR. IF MOUNTING HEIGHT IS NOT INDICATED VERIFY BEFORE PROCEEDING WITH INSTALLATION. MOUNT SAME HEIGHT AS EXISTING IF DIFFERENT FROM THAT SHOWN HERE UNLESS INDICATED OTHERWISE ON DRAWING.
.2 MOUNTING HEIGHTS ARE AS FOLLOWS:

.1 LOCAL SWITCHES	54 INCHES	(1350MM)
.2 WALL RECEPTACLES:		
.1 GENERAL	14 INCHES	(350MM)
.2 ABOVE HEATER	8 INCHES	(200MM)
.3 ABOVE COUNTER OR SPLASHBACK	7 INCHES	(175MM)
.4 IN SERVICE ROOMS	54 INCHES	(1350MM)
.3 TELEPHONE OUTLETS:		
.1 GENERAL	14 INCHES	(350MM)
.2 WALL MOUNTED	48 INCHES	(1200MM)
.4 COMPUTER OUTLET	14 INCHES	(350MM)
.5 EMERGENCY LIGHTING UNIT	102 INCHES	(2600MM)
.6 EMERGENCY LIGHTING UNIT RECEPTACLE	102 INCHES	(2600MM)

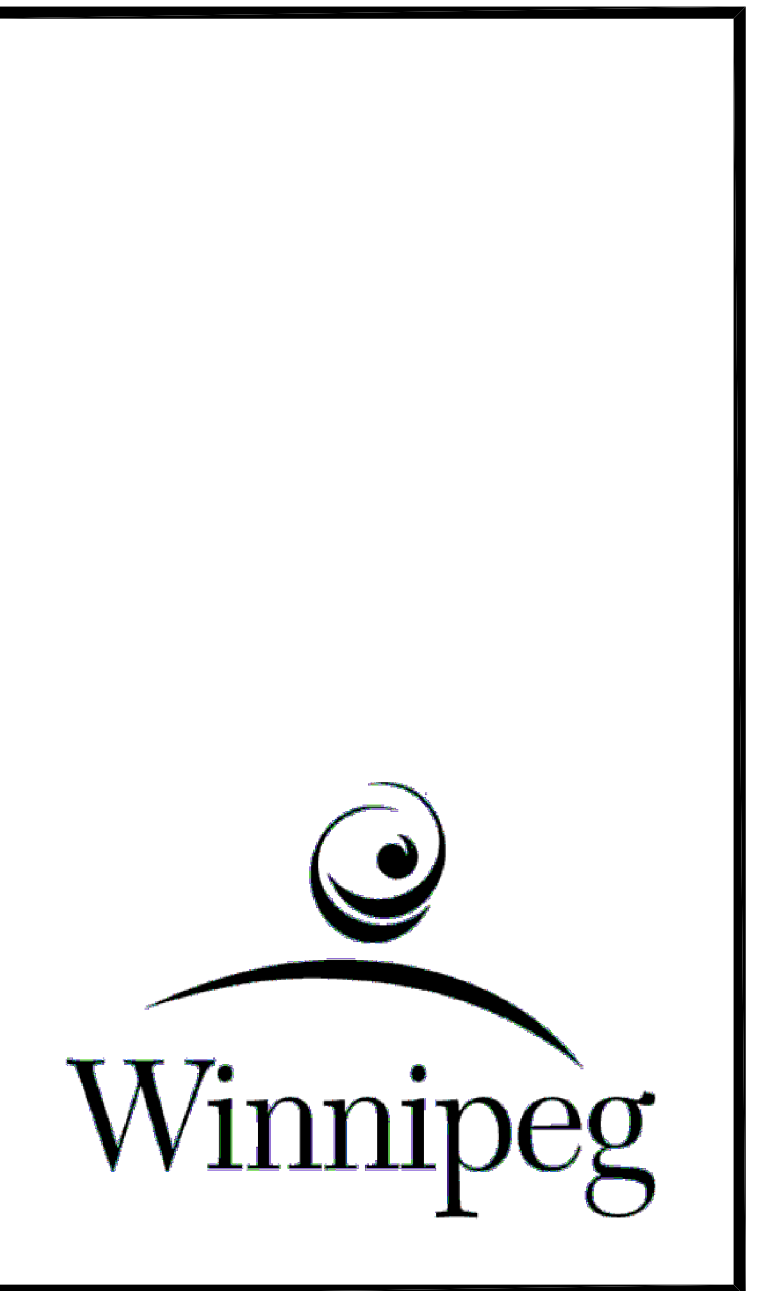
14 MECHANICAL CONNECTIONS
.1 REFER TO MECHANICAL DRAWINGS FOR THE EXACT LOCATION OF MOTOR CONTROL DEVICES, AND OTHER MECHANICAL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTION.
.2 OBTAIN FULL INFORMATION FROM DIV. 15, REGARDING WIRING, CONTROLS, OVERLOAD HEATERS, EQUIPMENT RATINGS AND OVERCURRENT PROTECTION. NOTIFY THE DIV. 15 SUBCONTRACTOR, AT ONCE, IF ANY INFORMATION PROVIDED IS INCORRECT OR UNSATISFACTORY.
.3 CO-ORDINATE CONTROL WIRING REQUIREMENTS WITH DIV. 15 AND PROVIDE ALL CONTROL WIRING AND CONNECTIONS AS REQUIRED TO MAKE THE CONTROL SYSTEMS OPERATE AS SPECIFIED.

15 CONDUITS AND CABLE
.1 DRAWINGS DO NOT INDICATE ALL CONDUIT AND CABLE RUNS. THOSE INDICATED ARE IN DIAGRAMATIC FORM ONLY.
.2 MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS INDICATED OTHERWISE.
.3 ALL CONDUITS SHALL HAVE A SEPARATE INSULATED GREEN GROUND CONDUCTOR.

16 CONDUITS, FASTENINGS AND FITTINGS
.1 ONE HOLE STEEL STRAPS TO SECURE SURFACE CONDUITS 50MM AND SMALLER.
.2 FITTINGS FOR RACEWAYS: TO CSA C22.2 NO. 18
.3 FITTINGS: MANUFACTURED FOR USE WITH CONDUIT SPECIFIED COATING SAME AS CONDUIT.
.4 FACTORY "TELS" WHERE 90° BENDS ARE REQUIRED FOR 25MM AND LARGER CONDUITS.
.5 STEEL SET SCREEN CONNECTORS AND COUPLINGS: INSULATED THROAT LINERS ON CONNECTORS.

17 DISCONNECT SWITCHES
.1 FUSIBLE AND NON-FUSIBLE DISCONNECT SWITCH IN CSA ENCLOSURE.
.2 PROVISION FOR PADLOCKING "ON-OFF" SWITCH POSITION BY THREE LOCKS.
.3 MECHANICAL INTERLOCKED DOOR TO PREVENT OPENING WHEN HANDLE IS IN "ON" POSITION.
.4 QUICK-MAKE, QUICK-BREAK ACTION.
.5 "ON-OFF" SWITCH POSITION INDICATION ON SWITCH ENCLOSURE COVER.
.6 INSTALL DISCONNECT SWITCHES AS INDICATED ON DRAWINGS.
.7 WEATHERPROOF WHERE REQUIRED.

18 MANUAL MOTOR STARTERS
.1 MANUAL MOTOR STARTERS WITH COMPONENTS AS FOLLOWS:
.1 SWITCHING MECHANICAL QUICKMAKE AND BREAK.
.2 OVERLOAD HEATERS, MANUAL RESET, TRIP INDICATING HANDLE.
.2 ACCESSORIES:
.1 TOGGLE SWITCH LABELLED.
.2 INDICATING LIGHT: TYPE AND COLOR TO MATCH EXISTING STARTERS.



REV	DESCRIPTION	DATE	BY
2	REVISED FOR TENDER	Jul 26, 2006	LK
1	ISSUED FOR TENDER	May 10, 2006	CM
0	ISSUED FOR 99% REVIEW	May 03, 2006	CM

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2	REVISED FOR TENDER	Jul 26, 2006	LK
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SEAL:

APEGN
Certificate of Authorization
SMS Engineering Ltd.
No. 166 Expiry: April 30, 2007

SEAL:

ORIGINAL
CONTRACT DRAWING
SIGNED AND SEALED BY
B.D. LESKO, P. ENG
MAY 10, 2006

THIS DRAWING MUST NOT BE SCALED.
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DATUMS AND LEVELS PRIOR TO COMMENCEMENT OF WORK AND IS HELD RESPONSIBLE FOR REPORTING ANY DISCREPANCY OR OMISSION TO THE CONTRACT ADMINISTRATOR IMMEDIATELY.
THIS DRAWING IS THE EXCLUSIVE PROPERTY OF NEIL COOPER ARCHITECT INC. AND CAN BE REPRODUCED ONLY WITH THE PERMISSION OF NEIL COOPER ARCHITECT INC. IN WHICH CASE THE REPRODUCTION MUST BEAR THEIR NAME AS THE ARCHITECTURAL FIRM.

DRAWING:

SPECIFICATIONS

PROJECT:

ADDITION TO 770 ROSS AVENUE

Winnipeg, Manitoba

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