

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 CONTRACTOR. 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 TENDER. NOTIFY CONTRACT ADMINISTRATOR OF DISCREPANCIES OR CONFLICTS WITH ANY REGULATION BEFORE SUBMITTING PRICE. FAILING SUCH NOTIFICATION, THIS 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 REVEALED 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 SELECT 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 DISRUPTED AND/OR SHUT DOWN, CO-ORDINATE THE SHUTDOWNS WITH THE CITY AND CARRY OUT THE WORK AT A TIME AND IN AN ACCEPTABLE MANNER. 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 THE 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 ADMINISTRATORS 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 CEILINGS 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.
 - 5 ALL EXISTING EQUIPMENT REUSED SHALL BE MADE GOOD AND GUARANTEED.
 - 6 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 CONNECTION TO MISCELLANEOUS MECHANICAL EQUIPMENT USE LIQUITIGHT FLEXIBLE CONDUIT.
 - 2 RUN ALL CONDUIT AND CABLE CONCEALED, PARALLEL AND PERPENDICULAR TO BUILDING LINES, STAPLED AND/OR CLIPPED IN A NEAT WORKMANLIKE MANNER.
 - 3 ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG EXCEPT AS NOTED.
 - 4 PROVIDE TECK CABLES WHERE INDICATED. TECK CABLES TO BE 1000V, COPPER, FT-4 RATED, SIZE AS INDICATED.
 - 5 WIRE IN CONDUIT TO BE USED WHERE INDICATED. CONDUIT TO BE C/W STEEL FITTINGS AND INSULATED THROATS.
- 2 GROUNDING
- 1 THE ENTIRE INSTALLATION SHALL BE GROUNDED IN CONFORMANCE TO THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE.
 - 2 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.
- 4 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 TYPEWRITTEN LEGEND SHOWING LOCATION AND LOAD OF EACH CIRCUIT.
 - 18 ACCEPTABLE MANUFACTURERS: CUTLER HAMMER (WESTINGHOUSE), SCHNEIDER (FPE), 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 BUSSES 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.

- 5 DRY-TYPE TRANSFORMERS UP TO 600V PRIMARY
- 1 SUBMIT PRODUCT DATA IN ACCORDANCE WITH SECTION 16010.
 - 2 DRY-TYPE TRANSFORMERS: TO CSA C22.2 NO. 47, CSA C9.
 - 3 USE TRANSFORMERS OF ONE MANUFACTURER THROUGHOUT PROJECT.
 - 4 TYPE: ANN.
 - 5 3 PHASE, 600V DELTA PRIMARY, 120/208V WYE, SECONDARY, 60 HZ, COPPER WINDINGS.
 - 6 VOLTAGE TAPS: 4 AT 2-1/2% TWO FCBN: TWO FCBN.
 - 7 INSULATION: CLASS, 150 DEG C TEMPERATURE RISE.
 - 8 BASIC IMPULSE LEVEL (BIL): STANDARD
 - 9 HPOIT: STANDARD
 - 10 AVERAGE SOUND LEVEL: 50 DB FOR UP TO 150 KVA AND 55 DB ABOVE 150 KVA.
 - 11 IMPEDANCE AT 75 DEG. C: TO BE 3% TO 5%.
 - 12 K-19 RATED.
 - 13 ENCLOSURE: EEMAC 1, REMOVABLE METAL FRONT PANEL, SPRINKLERPROOF IN SPRINKLERED BUILDINGS.
 - 14 MOUNTING: FLOOR OR WALL.
 - 15 FINISH: IN ACCORDANCE WITH SECTION 16010 - ELECTRICAL GENERAL REQUIREMENTS.
 - 16 SCHNEIDER (FPE), HAMMOND, REX MANUFACTURING, CUTLER HAMMER (WESTINGHOUSE), POLYGON, SIEMENS.
 - 17 MOUNT DRY-TYPE TRANSFORMERS UP TO 75 KVA AS INDICATED.
 - 18 MOUNT ALL DRY TYPE TRANSFORMERS ON 3 1/2" HIGH CONCRETE HOUSEKEEPING PAD AS SHOWN ON E1-1R4. CONCRETE PAD SHALL BE PRIMED AND PAINTED WITH EPOXY BASE PAINT PRIOR TO INSTALLATION OF TRANSFORMERS. CONSTRUCTION OF PAD SHALL NOT IMPAIR THE INTEGRITY OF THE EXISTING EPOXY COATED FLOOR. IF INCLUDED, REPAIR ALL DAMAGE TO EPOXY FLOOR AS PER MANUFACTURERS SPECIFICATION. SEAL BASE OF PAD AT FLOOR WITH TWO PART POLYURETHANE CAULKING COMPATIBLE WITH EXISTING FLOOR COATING.
 - 19 ENSURE ADEQUATE CLEARANCE AROUND TRANSFORMER FOR VENTILATION.
 - 20 INSTALL TRANSFORMERS IN LEVEL UPRIGHT POSITION.
 - 21 REMOVE SHIPPING SUPPORTS ONLY AFTER TRANSFORMER IS INSTALLED AND JUST BEFORE PUTTING INTO SERVICE.
 - 22 LOOSEN ISOLATION PAD BOLTS UNTIL NO COMPRESSION IS VISIBLE.
 - 23 MOUNT TRANSFORMERS WITH VIBRATION ISOLATION.
 - 24 MAKE PRIMARY AND SECONDARY CONNECTIONS INDICATED ON WRING DIAGRAM.
 - 25 ENERGIZE TRANSFORMERS IMMEDIATELY AFTER INSTALLATION IS COMPLETED, WHERE PRACTICABLE.
- 6 CONDUITS AND CABLE
- 1 DRAWINGS DO NOT INDICATE ALL CONDUIT AND CABLE RUNS. THOSE INDICATED ARE IN DIAGRAMMATIC FORM ONLY.
 - 2 MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS INDICATED OTHERWISE.
 - 3 ALL CONDUITS SHALL HAVE A SEPARATE INSULATED GREEN GROUND CONDUCTOR.
- 7 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 "ELLS" WHERE 90 DEGREES ARE REQUIRED FOR 25MM AND LARGER CONDUITS
 - 5 STEEL SET SCREW CONNECTORS AND COUPLINGS. INSULATED THROAT LINERS ON CONNECTORS.
- 8 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.
- 9 AUTOMATIC TRANSFER SWITCH
- 1 TO BE ASCO SERIES 7000, #A-UB-A-3-400-C-SX-C
 - 1 AUTOMATIC TRANSFER SWITCH.
 - 2 OPEN TRANSITION COMPLETE WITH BY-PASS.
 - 3 SOLID NEUTRAL.
 - 4 3 POLE.
 - 5 400 AMP.
 - 6 120/208V.
 - 7 ACCESSORIES
 - 1 2C (TIME DELAY).
 - 2 6D (SELECTOR SWITCH FOR AUTO/MANUAL RETRANSFER).
 - 3 12 - 3 POSITION ENGINE CONTROL SELECTOR SWITCH (STOP/AUTO/TEST).
 - 4 99 - PUSH TO TEST PILOT LIGHTS.
 - 5 23B 3 PHASE AMMETER COMPLETE WITH SELECTOR SWITCH.
 - 6 24B 3 PHASE VOLT METER COMPLETE WITH SELECTOR SWITCH.
 - 7 73 AC1 SURGE PROTECTION, NORMAL SUPPLY.
 - 8 73 AC2 SURGE PROTECTION, EMERGENCY SUPPLY.
 - 9 CSA 1 ENCLOSURE.
 - 2 PROVIDE SET-UP AND TESTING BY A FACTORY TRAINED TECHNICIAN. PROVIDE TEST REPORT OF SET-UP INCLUDING FULL COMMISSIONING OF NEW EQUIPMENT.
- 10 CDP
- 1 PROVIDE CDP PANELS WHERE INDICATED.
 - 2 CDP TO BE ALUMINUM BUS, PANEL COVER, HINGED DOOR PANEL.
 - 3 VOLTAGE AND KA RATINGS AS INDICATED.
 - 4 PROVIDE BREAKERS AS INDICATED C/W SPACES/SPARES AS INDICATED.
 - 5 MANUFACTURERS AS PER PANELBOARDS.

| | | | |
|-----|--------------------|----|-----------|
| 5 | ISSUED FOR TENDER | CB | AUG. 2/05 |
| 1 | ISSUED FOR PHASE 1 | CB | MAY 6/05 |
| No. | Revisions | By | Date |



APEGM
Certificate of Authorization
SMS Engineering Ltd.
No. 166 Expiry: April 30, 2006

PROVINCE OF MANITOBA
17205
B.D.
LESKO
REGISTERED ENGINEER

SMS ENGINEERING

SMS Engineering Ltd. Consulting Engineers
770 Bratford Street Winnipeg MB Canada R3H 0N3
Telephone 204.775.0291 Fax 204.772.2153
sms@smseeng.com

Project Title

**THE CITY OF WINNIPEG
80 KVA UPS INSTALLATION
AT 510 MAIN ST.
WINNIPEG MANITOBA**

Drawing Title

ELECTRICAL SPECIFICATIONS

| | | |
|-----------------------------|--------------------------------|-----------------------|
| Drawn By AA | Checked By CB | Approved By BDL |
| Scale AS NOTED | Date AUGUST 2005 | File No. 04-257-01 |
| Revision Number 5 | Drawing Number E-2R5 | OF 2 |