

ELECTRICAL SPECIFICATION

SECTION 16010 ELECTRICAL GENERAL PROVISIONS

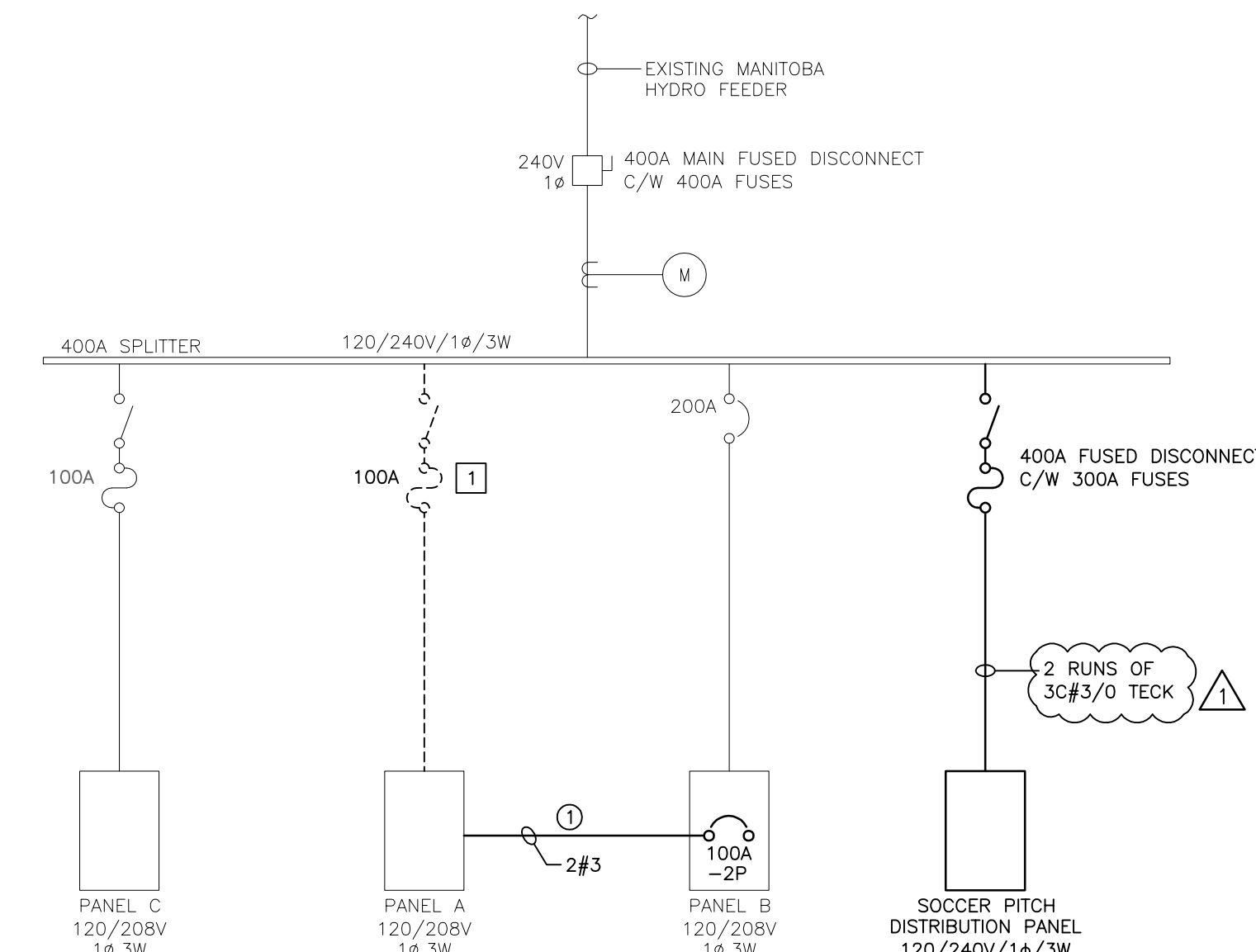
- GENERAL
 - PROVIDE ALL MATERIALS, LABOUR, PLANT AND EQUIPMENT NECESSARY TO MAKE A COMPLETE INSTALLATION AS DESCRIBED AND SHOWN. THIS INSTALLATION SHALL BE LEFT COMPLETE AND READY FOR OPERATION.
 - THE ENTIRE INSTALLATION SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE BY THE CITY OF WINNIPEG. REPLACE AT NO ADDITIONAL COST ANY WORK OR MATERIAL WHICH MAY FAIL OR PROVE DEFECTIVE DURING THE GUARANTEE PERIOD.
 - 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 IEC/EMEC STANDARDS, SHALL BE CSA CERTIFIED OR CERTIFIED BY AN EQUIVALENT RECOGNIZED CERTIFYING AGENCY TO MEET CANADIAN STANDARDS AND LOCALLY APPROVED. ELECTRICAL EQUIPMENT CONSISTING OF INDIVIDUAL CERTIFIED COMPONENTS MUST ALSO HAVE A CSA OR EQUIVALENT CERTIFICATION FOR THE ENTIRE ASSEMBLY. PROVIDE INSPECTION CERTIFICATE UPON COMPLETION OF THE WORK.
 - 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 REGULATIONS BEFORE SUBMITTING PRICE. FAILING SUCH NOTIFICATION, THIS CONTRACTOR SHALL MEET ALL SUCH REQUIREMENTS WITHOUT EXTRA COST TO THE CITY OF WINNIPEG.
 - OBTAIN ALL NECESSARY PERMITS, PAY ALL NECESSARY FEES, GIVE ALL NECESSARY NOTICES AND OBTAIN APPROVAL OF THE ELECTRICAL AUTHORITIES HAVING JURISDICTION.
- SHOP DRAWINGS
 - SUBMIT SIX (6) COPIES OF SHOP DRAWINGS FOR ALL EQUIPMENT TO SHOPDRAWINGS@SMS.ENG.COM.
 - EQUIPMENT PROPOSALS SHALL MEET THE SAME STANDARDS OF PERFORMANCE, QUALITY AND WORKMANSHIP AS THAT SPECIFIED.
 - SHOP DRAWINGS TO BE REVIEWED AND STAMPED BY THE TRADE AND GENERAL CONTRACTOR.
- REQUEST FOR INTERPRETATION (RFI)
 - FOR RFI'S SUBMITTED ELECTRONICALLY, INCLUDE PROJECT NAME AND RFI NUMBER IN SUBJECT LINE OF E-MAIL. SEND RFI'S TO RFI@SMS.ENG.COM.
 - CONTENT OF THE RFI: INCLUDE A DETAILED DESCRIPTION OF THE ITEM NEEDING INTERPRETATION AND PROPOSED SOLUTION.
- AS-BUILTS
 - PROVIDE TWO COPIES OF "AS-BUILT" DRAWINGS, IN AUTOCAD FORMAT ON COMPACT DISK.
- OPERATION AND MAINTENANCE MANUALS
 - PROVIDE DATA FOR INCORPORATION INTO MAINTENANCE MANUAL. MANUAL SHALL INCLUDE INSTRUCTIONS FOR ALL EQUIPMENT SUPPLIED, COPY OF REVISED 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.
- REMOVALS
 - REMOVE ALL UNNECESSARY EXISTING ELECTRICAL EQUIPMENT, WIRING AND FIXTURES IN THOSE PORTIONS OF THE EXISTING BUILDING WHICH ARE BEING REMODELED OR DEMOLISHED. THE CITY OF WINNIPEG MAY SELECT FROM THE MATERIALS AND/OR EQUIPMENT REMAINING WHICH THEY WISH TO RETAIN AND THE REMAINDER SHALL BE REMOVED FROM THE SITE.
 - ANY ELECTRICAL EQUIPMENT IN REMODELED SECTIONS OR IN STRUCTURES REMOVED OR ALTERED, ADJACENT TO NEW WORK, NECESSARY FOR THE OPERATION OF THE EXISTING BUILDING, SHALL BE RELOCATED AND/OR RECONNECTED AS NECESSARY.
 - ALL EXISTING EQUIPMENT REUSED SHALL BE MADE GOOD AND GUARANTEED.
 - POWER INTERRUPTIONS SHALL BE KEPT TO A MINIMUM AND SHALL BE A TIME SUITABLE TO THE BUILDING OCCUPANT(S).
- WORK IN EXISTING BUILDING
 - CO-ORDINATION.
 - THE BUILDING SHALL REMAIN OPEN AND IN NORMAL OPERATION DURING THE CONSTRUCTION PERIOD.
 - 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 OF WINNIPEG 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 SCHEDULE OF EACH DISRUPTION AT LEAST 120 HOURS IN ADVANCE OF PERFORMING WORK AND OBTAIN THE CITY OF WINNIPEG WRITTEN CONSENT PRIOR TO IMPLEMENTING.
 - 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 CITY OF WINNIPEG AND CONTRACT ADMINISTRATOR.
 - IF EXISTING EQUIPMENT SHOWN ON DRAWINGS IS DEFECTIVE IT SHOULD BE BROUGHT TO THE CONTRACT ADMINISTRATOR AND THE CITY OF WINNIPEG ATTENTION PRIOR TO WORK COMPLETION.
 - INSTALLATION.
 - INSTALL BOXES, CONDUIT AND WIRING THROUGH EXISTING AREAS AS REQUIRED FOR THE NEW INSTALLATION.
 - ADD MODULES, SWITCHES, ETC. IN EXISTING CONTROL PANELS, AS REQUIRED, TO EXTEND EXISTING SYSTEMS TO NEW OR RENOVATED AREAS.
 - PATCH AND REPAIR WALLS AND CEILINGS IN EXISTING AREAS THAT HAVE BEEN DAMAGED OR CUT OPEN DUE TO THE NEW ELECTRICAL INSTALLATION.
 - WHERE NEW CABLES OR CONDUITS HAVE BEEN INSTALLED THROUGH EXISTING FIRE RATED WALLS, SEAL OPENING AROUND CABLES AND CONDUIT TO MAINTAIN FIRE RATING.
 - ALL EXISTING EQUIPMENT REUSED SHALL BE MADE GOOD AND GUARANTEED.
 - 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

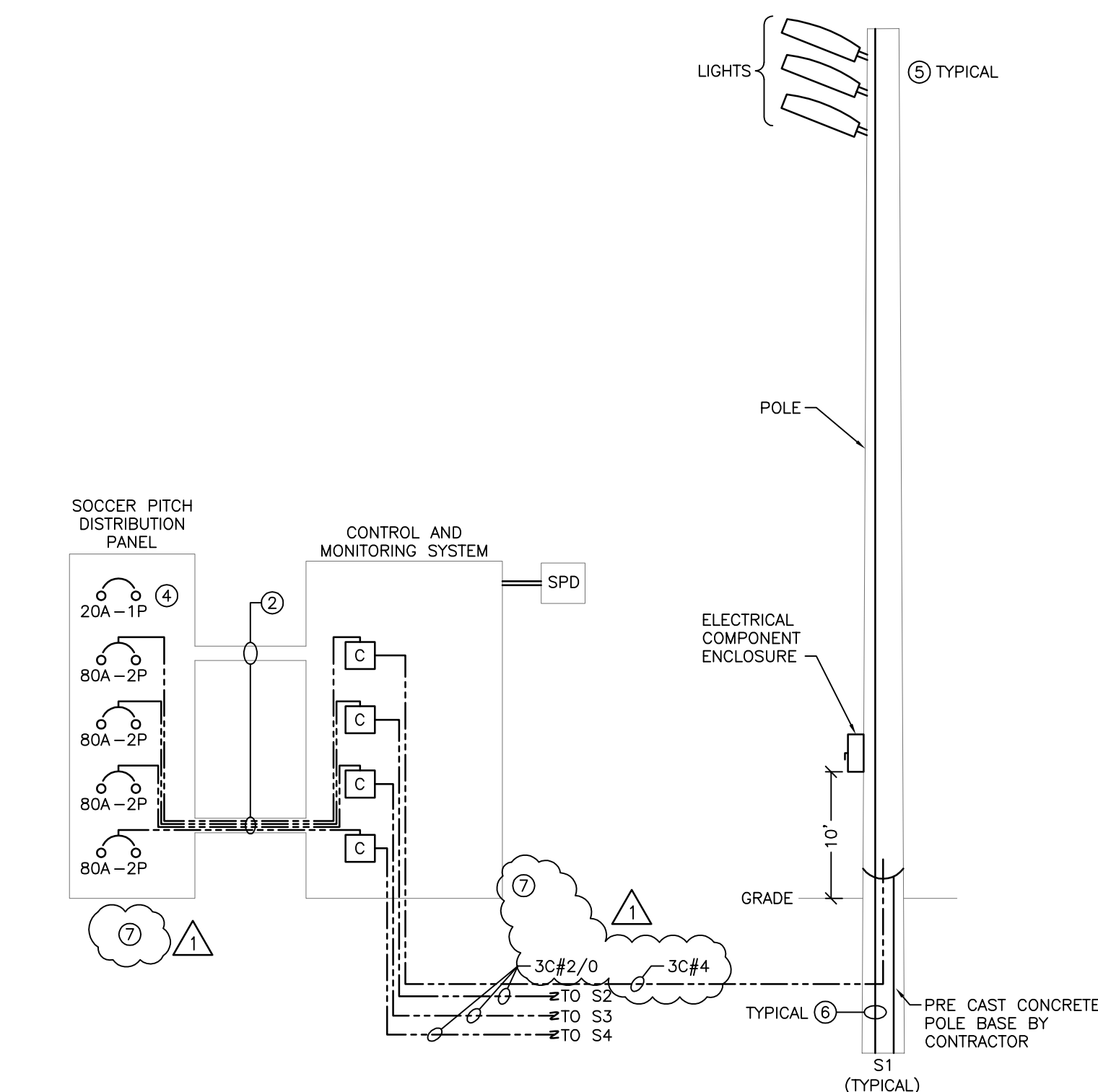
- WIRING METHOD
 - FOR OUTDOOR WIRING USE TECK CONDUCTORS.
 - ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG EXCEPT AS NOTED.
- GROUNDING
 - THE ENTIRE INSTALLATION SHALL BE GROUNDED IN CONFORMANCE TO THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE.
 - ALL CONDUIT TO HAVE A SEPARATE INSULATED GROUND CONDUCTOR.
- BOXES
 - JUNCTION BOXES SHALL BE PVC AND SIZED ACCORDING TO THE ELECTRICAL CODE AND TO SUIT EACH APPLICATION.
- LIGHTING SYSTEM - GENERAL
 - PROVIDE FIXTURES TO THOSE SPECIFIED WITH LAMPS, MOUNTING HARDWARE, LENSES AND ALL OTHER ACCESSORIES REQUIRED TO COMPLETE THE INSTALLATION.
- INSTALLATION OF PVC CONDUITS AND TECK CABLES IN TRENCHES
 - CABLE PROTECTION
 - 38x140MM PLANKS PRESSURE TREATED WITH COLOURED, NAPHTHANE OR 5% PENTACHLOROPHENOL SOLUTION, WATER REPELLENT REPRESENTATIVE.
 - INSTALLATION OF CONDUITS
 - AFTER SAND BED IS IN PLACE, INSTALL CONDUITS OR CABLES MAINTAINING 75MM CLEARANCE FROM EACH SIDE OF TRENCH.
 - PROVIDE OFFSETS FOR THERMAL ACTION AND MINOR EARTH MOVEMENTS.
 - UNDERGROUND CABLE SPLICES NOT ACCEPTABLE.
 - MAINTAIN 150MM MINIMUM SEPARATION BETWEEN CABLES OF DIFFERENT CIRCUITS. MAINTAIN 300MM HORIZONTAL SEPARATION BETWEEN LOW AND HIGH VOLTAGE CABLES. WHEN LOW VOLTAGE CABLES CROSS HIGH VOLTAGE CABLES MAINTAIN 300MM VERTICAL SEPARATION WITH LOW VOLTAGE VALVES IN UPPER POSITION. AT CROSSOVER, MAINTAIN 75MM MINIMUM VERTICAL SEPARATION BETWEEN LOW VOLTAGE CABLES AND 150MM BETWEEN HIGH VOLTAGE CABLES.
 - AFTER SAND PROTECTIVE COVER IS IN PLACE, INSTALL CONTINUOUS ROW OF OVERLAPPING 38x140MM PRESSURE TREATED PLANS AS INDICATED TO COVER LENGTH OF RUN.
- DIRECTIONAL BORING
 - BORING SYSTEM
 - THE DIRECTIONAL BORING MACHINE SHALL CONSIST OF A HYDRAULICALLY POWERED SYSTEM TO ROTATE, PUSH AND PULL HOLLOW DRILL PIPE INTO THE GROUND AT A VARIABLE ANGLE WHILE DELIVERING A PRESSURIZED FLUID MIXTURE TO A GUIDABLE DRILL (BORE) HEAD. THE MACHINE SHALL BE ANCHORED TO THE GROUND TO WITHSTAND THE PULLING, PUSHING AND ROTATING PRESSURE REQUIRED TO COMPLETE THE CROSSING. THE HYDRAULIC POWER SYSTEM SHALL BE SELF-CONTAINED WITH SUFFICIENT PRESSURE AND VOLUME TO POWER BORING OPERATIONS. HYDRAULIC SYSTEM SHALL BE FREE OF LEAKS. RIG SHALL HAVE A SYSTEM TO MONITOR AND RECORD MAXIMUM PULL-BACK PRESSURE DURING PULL-BACK OPERATIONS. THE RIG SHALL BE GROUNDED DURING BORING AND PULL-BACK OPERATIONS. SUFFICIENT SPARES SHALL BE KEPT ON HAND FOR ANY BREAK-DOWNS WHICH CAN BE REASONABLY ANTICIPATED.
 - THE BORE HEAD SHALL BE STEERABLE BY CHANGING ITS ROTATION AND SHALL PROVIDE THE NECESSARY CUTTING SURFACES AND BORING FLUID JETS.
 - MUD MOTORS IF REQUIRED SHALL BE OF ADEQUATE POWER TO TURN THE REQUIRED BORING TOOLS.
 - SHALL BE CONSTRUCTED OF HIGH QUALITY 4130 SEAMLESS TUBING, GRADE D OR BETTER, WITH THREADED BOX AND PINS. TOOL JOINTS SHOULD BE HARDENED TO 32-36 RC.

- BORING PROCEDURE
 - PRIOR TO ANY ALTERATIONS TO WORK-SITE, CONTRACTOR SHALL PHOTOGRAPH OR VIDEO TAPE ENTIRE WORK AREA, INCLUDING ENTRY AND EXIT POINTS. ONE COPY OF WHICH SHALL BE GIVEN TO CONTRACT ADMINISTRATOR AND ONE COPY TO REMAIN WITH CONTRACTOR FOR A PERIOD OF ONE YEAR FOLLOWING THE COMPLETION OF THE PROJECT.
 - WORK SITE AS INDICATED ON DRAWINGS, WITHIN RIGHT-OF-WAY, SHALL BE GRADED OR FILLED TO PROVIDE A LEVEL WORKING AREA. NO ALTERATIONS BEYOND WHAT IS REQUIRED FOR OPERATIONS ARE TO BE MADE. CONTRACTOR SHALL CONFINE ALL ACTIVITIES TO DESIGNATED WORK AREAS.
 - ENTIRE DRILL PATH SHALL BE ACCURATELY SURVEYED WITH ENTRY AND EXIT STAKES PLACED IN THE APPROPRIATE LOCATIONS WITHIN THE AREAS INDICATED ON DRAWINGS. IF CONTRACTOR IS USING A MAGNETIC GUIDANCE SYSTEM, DRILL PATH WILL BE SURVEYED FOR ANY SURFACE GEO-MAGNETIC VARIATIONS OR ANOMALIES.
 - ALL EQUIPMENT SHALL BE CONNECTED TO GROUND WITH A STRANDED COPPER CONDUCTOR. PROVIDE GROUND RODS AS REQUIRED IF EXISTING GROUNDING IS NOT AVAILABLE. ALL GROUNDING EQUIPMENT SHALL BE SIZED TO CARRY THE LARGEST FAULT CURRENT FOR A TIME PERIOD LONG ENOUGH TO ALLOW THE LINE PROTECTION SYSTEM TO OPERATE. AFTER GROUNDING EQUIPMENT HAS CARRIED FAULT CURRENT, ALL COMPONENTS OF THE GROUNDING SYSTEM SHOULD BE IMMEDIATELY REPLACED, AND LATER INSPECTED AND RECONDITIONED, IF NECESSARY, BEFORE REUSE. ADDITIONALLY, ALL BORING UNIT OPERATORS SHALL STAND ON WIRE MESH MATS THAT ARE ALSO CONNECTED TO THE GROUND TO ELIMINATE STEP AND TOUCH POTENTIAL.
 - AT A MINIMUM, THE SYSTEM SHALL BE EQUIPPED WITH AN AUDIBLE ALARM THAT CAN SENSE IF CONTACT IS MADE WITH AN ENERGIZED ELECTRIC CABLE. PROPER OPERATION OF THE SYSTEM SHALL BE CONFIRMED PRIOR TO DRILLING EACH TUNNEL.
 - CONTRACTOR SHALL PLACE SILT FENCE BETWEEN ALL BORING OPERATIONS AND ANY DRAINAGE, WETLAND, WATERWAY OR OTHER AREA DESIGNATED FOR SUCH PROTECTION BY CONTRACT DOCUMENTS, PROVINCIAL, FEDERAL AND LOCAL REGULATIONS. ADDITIONAL ENVIRONMENTAL PROTECTION NECESSARY TO CONTAIN ANY HYDRAULIC OR BORING FLUID SPILLS SHALL BE PUT IN PLACE, INCLUDING BERMS, LINERS, TURBIDITY CURTAINS AND OTHER MEASURES. CONTRACTOR SHALL ADHERE TO ALL APPLICABLE ENVIRONMENTAL REGULATIONS. FUEL OR OIL MAY NOT BE STORED IN RIG CONTAINERS WITHIN 200' OF ANY WATER-BODY OR WETLAND.
 - CONTRACTOR SHALL NOTIFY ALL COMPANIES WITH UNDERGROUND UTILITIES IN THE WORK AREA. ONCE THE UTILITIES HAVE BEEN LOCATED CONTRACTOR SHALL PHYSICALLY IDENTIFY THE EXACT LOCATION OF THE UTILITIES BY VACUUM OR HAND EXCAVATION, WHEN POSSIBLE, IN ORDER TO DETERMINE THE ACTUAL LOCATION AND PATH OF ANY UNDERGROUND UTILITIES WHICH MIGHT BE WITHIN 20 FEET OF THE BORE PATH. CONTRACTOR SHALL NOT COMMENCE BORING OPERATIONS UNTIL THE LOCATION OF ALL UNDERGROUND UTILITIES WITHIN THE WORK AREA HAVE BEEN VERIFIED.
 - THE WORK AREA SHOULD BE BARRICADED TO ALERT PEDESTRIAN OR VEHICULAR TRAFFIC. PEDESTRIANS SHOULD NOT BE ALLOWED NEAR OPERATING MACHINERY. BARRIER TAPE SHOULD BE USED BETWEEN BARRICADES OR CONES. PROTECTION FROM EQUIPMENT THAT HAS THE POSSIBILITY OF BECOMING ENERGIZED IS OF PARTICULAR IMPORTANCE. GUARDS OR BARRICADES SHOULD BE PLACED AROUND EXCAVATIONS TO WARN PEDESTRIANS AND WORKERS.
 - CONTRACTOR SHALL ADHERE TO ALL APPLICABLE PROVINCIAL, FEDERAL AND LOCAL SAFETY REGULATIONS AND OPERATIONS SHALL BE CONDUCTED IN A SAFE MANNER.
 - ADEQUATE COMMUNICATION SHALL BE ESTABLISHED AND MAINTAINED BETWEEN THE BORING MACHINE OPERATOR AND THE CREW MEMBER USING THE DRILL HEAD LOCATOR. RADIO COMMUNICATIONS SHOULD BE USED OVER DISTANCES GREATER THAN 50 FT (15.2 M), OR WHEN OUT OF LINE-OF-SIGHT. IF COMMUNICATION IS LOST, BORING SHALL BE HALTED UNTIL COMMUNICATION IS REESTABLISHED.
 - PILOT HOLE SHALL BE DRILLED ON BORE PATH WITH NO DEVIATIONS GREATER THAN 5% OF DEPTH OVER A LENGTH OF 100'. IN THE EVENT THAT PILOT DOES DEVIATE FROM BORE PATH MORE THAN 5% OF DEPTH IN 100', CONTRACTOR WILL NOTIFY CONTRACT ADMINISTRATOR AND CONTRACT ADMINISTRATOR MAY REQUIRE CONTRACTOR TO PULL-BACK AND RE-DRILL FROM THE LOCATION ALONG BORE PATH BEFORE THE DEVIATION.
 - IN THE EVENT THAT A BORING FLUID FRACTURE, INADVERTENT RETURNS OR RETURNS LOSS OCCURS DURING PILOT HOLE BORING OPERATIONS, CONTRACTOR SHALL CEASE BORING, WAIT AT LEAST 30 MINUTES, INJECT A QUANTITY OF BORING FLUID WITH A VISCOSITY EXCEEDING 120 SECONDS AS MEASURED BY A MARSH FUNNEL AND THEN WAIT ANOTHER 30 MINUTES. IF MUD FRACTURE OR RETURNS LOSS CONTINUES, CONTRACTOR WILL CEASE OPERATIONS AND NOTIFY CONTRACT ADMINISTRATOR. CONTRACT ADMINISTRATOR AND CONTRACTOR WILL DISCUSS ADDITIONAL OPTIONS AND WORK WILL THEN PROCEED ACCORDINGLY.
 - UPON SUCCESSFUL COMPLETION OF PILOT HOLE, CONTRACTOR WILL REAM BORE HOLE TO A MINIMUM OF 25% GREATER THAN OUTSIDE DIAMETER OF PIPE USING THE APPROPRIATE TOOLS. CONTRACTOR WILL NOT ATTEMPT TO REAM AT ONE TIME MORE THAN THE BORING EQUIPMENT AND MUD SYSTEM ARE DESIGNED TO SAFELY HANDLE.
 - AFTER SUCCESSFULLY REAMING BORE HOLE TO THE REQUIRED DIAMETER, CONTRACTOR WILL PULL THE CONDUIT OR CABLE THROUGH THE BORE HOLE IN FRONT OF THE CONDUIT OR CABLE WILL BE A SWIVEL. ONCE PULL-BACK OPERATIONS HAVE COMMENCED, OPERATIONS MUST CONTINUE WITHOUT INTERRUPTION UNTIL CONDUIT OR CABLE IS COMPLETELY PULLED INTO BORE HOLE. DURING PULL-BACK OPERATIONS CONTRACTOR WILL NOT APPLY MORE THAN THE MAXIMUM SAFE CONDUIT OR CABLE PULL PRESSURE AT ANY TIME.
 - IN THE EVENT THAT CONDUIT OR CABLE BECOMES STUCK, CONTRACTOR WILL CEASE PULLING OPERATIONS TO ALLOW ANY POTENTIAL LOCK TO SUBSIDE AND WILL COMMENCE PULLING OPERATIONS. IF CONDUIT OR CABLE REMAINS STUCK, CONTRACTOR WILL NOTIFY CONTRACT ADMINISTRATOR. CONTRACT ADMINISTRATOR AND CONTRACTOR WILL DISCUSS OPTIONS AND THEN WORK WILL PROCEED ACCORDINGLY.
- CONDUITS AND CABLE
 - DRAWINGS DO NOT INDICATE ALL CONDUIT AND CABLE RUNS. THOSE INDICATED ARE IN DIAGRAMMATIC FORM ONLY.
 - MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS INDICATED OTHERWISE.
 - ALL CONDUITS SHALL HAVE A SEPARATE INSULATED GREEN GROUND CONDUCTOR.
- CONDUITS, FASTENINGS AND FITTINGS
 - ONE HOLE STEEL STRAPS TO SECURE SURFACE CONDUITS 50MM AND SMALLER.
 - FITTINGS FOR RACEWAYS: TO CSA C22.2 NO. 18.
 - FITTINGS: MANUFACTURED FOR USE WITH CONDUIT SPECIFIED COATING SAME AS CONDUIT.
 - FACTORY "ELLS" WHERE 90° BENDS ARE REQUIRED.
- CONDUIT AND CABLE IDENTIFICATION
 - COLOUR CODE CONDUITS, BOXES AND METALLIC SHEATHED CABLE.
 - COLOUR CODING TO MATCH EXISTING WHERE APPLICABLE.
 - CONFIRM COLOUR CODING WITH CITY OF WINNIPEG AND CONTRACT ADMINISTRATOR PRIOR TO START OF WORK.
 - CODE WITH PLASTIC TAPE OR PAINT AT POINTS WHERE CONDUIT OR CABLE ENTERS WALL, CEILING OR FLOOR AND AT 15M INTERVALS.
 - COLOURS: 25MM WIDE PRIME COLOUR AND 20MM WIDE AUXILIARY COLOUR.

PRIME	UP TO 250V (NORMAL POWER)	YELLOW
	OTHER CONDUIT SYSTEMS AS DIRECTED ON SITE; ALL CONDUIT SYSTEMS SHALL BE IDENTIFIED.	
 - COLOR OUTLET BOX COVERS TO COLOR DESIGNATED AND SHOW CIRCUIT NUMBERS IN BLACK FELT MARKER ON INSIDE OF COVERS.
- POWER DISTRIBUTION SYSTEM
 - PROVIDE ALL BREAKERS, CONDUIT, DISCONNECTS, CONDUCTORS AND ACCESSORIES REQUIRED FOR THE INSTALLATION OF PANELBOARDS AS INDICATED ON THE DRAWING AND IN THIS SPECIFICATION.
 - SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH ELECTRICAL GENERAL PROVISIONS.
 - DRAWINGS TO INCLUDE ELECTRICAL DETAIL OF PANEL, BRANCH BREAKER TYPE, QUANTITY, AMPACITY AND ENCLOSURE DIMENSION.
 - IN ADDITION TO CSA REQUIREMENTS, MANUFACTURER'S NAMEPLATE MUST SHOW FAULT CURRENT THAT PANEL INCLUDING BREAKERS HAS BEEN BUILT TO WITHSTAND.
 - PANELBOARDS: TO CSA C-22.2 NO. 29.
 - PANELBOARDS: PRODUCT OF ONE MANUFACTURER.
 - 250V BRANCH CIRCUIT PANELBOARDS: BUS AND BREAKERS RATED FOR 10KA (SYMMETRICAL) INTERRUPTING CAPACITY MINIMUM OR AS INDICATED.
 - 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.
 - PANELBOARDS: MAINS, NUMBER OF CIRCUITS, AND NUMBER AND SIZE OF BRANCH CIRCUIT BREAKERS AS INDICATED.
 - PROVIDE PANEL COVERS FOR ALL PANELBOARDS AND SUPPLY TWO KEYS FOR EACH PANELBOARD AND KEY PANELBOARDS ALIKE.
 - ALUMINUM BUS WITH NEUTRAL OF SAME AMPERE RATING AS MAINS.
 - MAIN: SUITABLE FOR BOLT-ON 25MM WIDE BREAKERS.
 - MULTI-POLE BREAKERS SHALL BE OF ONE PIECE CONSTRUCTION WITH COMMON TRIP.
 - PROVIDE BREAKERS AS INDICATED ON THE DRAWING.
 - ALL NEW BREAKERS SHALL MATCH PANEL VOLTAGE UNLESS INDICATED OTHERWISE. CIRCUIT BREAKERS SHALL BE THERMAL MAGNETIC TYPE.
 - NAMEPLATE FOR EACH PANELBOARD 20 X 90mm ENGRAVED AS INDICATED.
 - COMPLETE CIRCUIT DIRECTORY WITH TYPEWRITTEN LEGEND SHOWING LOCATION AND LOAD OF EACH CIRCUIT.
 - ACCEPTABLE MANUFACTURERS: SIEMENS (TO MATCH EXISTING).
 - LOCATE PANELBOARDS AS INDICATED AND MOUNT SECURELY, PLUMB, TRUE AND SQUARE, TO ADJOINING SURFACES.
 - WIRING IN PANELBOARDS SHALL BE HEAT 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.
 - INTERRUPTING CAPACITY OF NEW BREAKERS IN EXISTING PANELS SHALL MATCH EXISTING.



1 SINGLE LINE DIAGRAM
SCALE: N.T.S.



2 DISTRIBUTION DETAIL
SCALE: N.T.S.

DEMOLITION KEY NOTES

- DISCONNECT AND REMOVE 100A FUSED DISCONNECT AND ASSOCIATED FEEDER.

RENOVATION KEY NOTES

- WIRE AND CONNECT PANEL A FROM NEW 100A-2P BREAKER IN PANEL B. WIRE WITH MINIMUM 2#3 IN CONDUIT.
- ELECTRICAL CONDUIT WIREWAY SYSTEM.
- PROVIDE AND INSTALL 4X 80A-2P BREAKERS AS SHOWN. WIRE WITH MINIMUM 2#6 FROM EACH BREAKER TO 80A-2P CONTRACTOR IN CONTROL AND MONITORING SYSTEM FROM EACH CONTRACTOR WIRE TO EACH ELECTRICAL COMPONENT ENCLOSURE AS SHOWN.
- PROVIDE DEDICATED 20A-1P CIRCUIT FOR CONTROL POWER. WIRE WITH MINIMUM 2#12 TO CONTROL AND MONITORING SYSTEM. CONTROL CIRCUIT TO BE IN DEDICATED CONDUIT.
- BALLASTS TO BE SHIPPED SEPARATELY. CONTRACTOR TO WIRE AND INSTALL BALLAST ON EACH FIXTURE.
- INTEGRATED GROUNDING ELECTRODE. REFER TO MUSCO LIGHTING PRE-CAST LIGHT POLE DETAIL FOR MORE INFORMATION.
- INSTALL PANEL AND CONTROL MONITORING SYSTEM PANEL ON A CONCRETE BASE C/W UNISTRUTS WITH PROTECTIVE METAL SKIRT ON BOTH SIDES.



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5			
4			
3			
2			
1	ISSUED FOR ADDENDUM #1	GW	20/11/18
0	ISSUED FOR CONSTRUCTION	GW	11/10/18
NO.	Description	BY	DDMMYY

**ENGINEERS
GEOSCIENTISTS
MANITOBA**
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SMS Engineering Ltd.
No. 166

ORIGINAL
CONTRACT DRAWING
SIGNED AND SEALED BY
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OCTOBER 11, 2018

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Project Title
**ST. VITAL MEMORIAL PARK
FIELD RENOVATION**

Winnipeg MANITOBA
Drawing Title
**ELECTRICAL SPECIFICATION
AND DETAILS**

Drawn By IN	Checked By DF	Approved By GW
Scale AS SHOWN	Date AUGUST 2018	Project No. 18-210-01
Revision Number 1	Drawing Number E2.0	Sheet Order 2 OF 2