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26 00 10 BASIC MATERIAL AND METHODS

1.1 GENERAL REQUIREMENTS

1. The specification covering the General Conditions of the Contract, General Specifications, and all associated sections form an integral part of this specification and shall be read in conjunction herewith.

1.2 SCOPE

1. Provide all materials, labour, plant and equipment required for a complete and working installation as herein specified and as shown on the drawings.
2. The electrical installation shall be in accordance with the current edition of the Canadian Electrical Code, Provincial and Municipal codes and regulations.
3. Obtain all permits, approvals and pay all related fees required for this installation.
4. All equipment supplied under this Contract shall be new and be C.S.A. approved.
5. Co-ordinate all telephone and cablevision conduit runs with MTS and Shaw before installation begins.
6. Arrange for, and coordinate, rough-in and final inspections with the City of Winnipeg and Contract Administrator.

1.3 DEFINITIONS

- The following are definitions of terms and expressions used in the specification:
- CONTRACT ADMINISTRATOR means Electrical Engineering Contract Administrator;
 - MCW/AGE Consulting Professional Engineers
 - INSPECTION AUTHORITY means agent of any authority having jurisdiction over construction standards associated with any part of electrical work on site.
 - SUPPLY AUTHORITY means electrical power utility company responsible for delivery of electrical power to project.
 - ELECTRICAL CODE means as shown on contract drawings or noted in Contract Documents.
 - TYPE TESTED means that each piece of equipment produced by Manufacturer is not fully tested. An original piece with similar arrangement has been fully tested and results of that test are available.
 - PROVIDE means to supply, install and leave in working order all materials and necessary wiring, supports, access panels, etc., as necessary for equipment indicated.

1.4 EXAMINATION

1. Examine the architectural, structural, and landscaping drawings to ensure that the work under this Contract can be satisfactorily carried out. Report any discrepancies to the Contract Administrator prior to submission of bid.
2. Examine the site, local conditions and all existing apparatus if any to be re-used and verify that the condition of this equipment is suitable for its intended use in the new construction.

1.5 SUPERVISION

1. Supervise the work at all times through a responsible and competent supervisor.
2. Full co-operation shall be shown with other trades to facilitate installations and to avoid delays in carrying out the work.

1.6 ACCURACY OF DATA

1. Drawings are schematic; exact locations, distances, levels and other dimensions shall be governed by the building as constructed.
2. Outlets or equipment shall be moved to any point within a 10' radius when the Contract Administrator requests relocation before the work has been substantially completed, without additional cost.
3. Branch circuit wiring shall be installed with circuits arranged exactly as shown on the drawings. Conduit and cable runs shall be modified to suit the installation.
4. Contractor shall provide a typical mock-up of one area if requested prior to complete rough-in.

1.7 APPROVAL OF MATERIAL

1. Request for approval of material as equals or alternates to that specified shall be submitted to the Contract Administrator with a stamped self-addressed envelope and performance specifications ten (10) working days prior to the bid submittal. Samples shall be provided on request.
2. Approvals shall be transmitted electronically providing all pertinent information is included for a complete review by the Contract Administrator.

1.8 SHOP DRAWINGS

1. Submit shop drawings of electrical equipment to the Contract Administrator for review. Fabrication of equipment shall not commence until the Contract Administrator has reviewed shop drawings of such equipment. Two (2) sets shall be submitted with local inspection Department approval where required.
2. Shop drawings shall be transmitted electronically and in PDF format and Contractor shall include their review confirmation.
3. Electronic Submissions (.pdf only).
a. Send electronic shop drawings submittals to wpg.ehshopdrawing@mcw.com only, please do not copy staff members directly.

1.9 "AS-BUILT" DRAWINGS

1. Contractor shall maintain accurate "as-built" drawings on site and shall be present for review at each site review. Submit these record drawings in AutoCAD 2010 or newer format for review at the completion of the project. Note that changes to architectural and structural floor plans must be included. (A minimum of \$1,000.00 per drawing shall be held-back until all drawings are submitted and deemed complete.) The Contract Administrator will not perform final inspections nor certify for occupancy until the "as-built" drawings have been received, reviewed and accepted. After acceptance of "as-built" drawings by the Contract Administrator, provide one (1) complete set on CD-ROM and three (3) sets of prints.
2. As-builts shall include circuiting of new and existing equipment to remain. Transfer changes to electronic disc AutoCAD file. Submit disc and hard copy for final review and submission to Owners.
3. Submit a Certificate of Inspection from the local inspection Authority upon completion of work and include with As-builts.
4. The Contract Administrator reserves the right to recommend that a portion of the Contract funds be withheld pending submission of acceptable as-built drawings.

1.10 TEST

1. The electrical installation shall be completely tested demonstrating that the equipment and systems installed perform in the manner intended.

1.11 GUARANTEE

1. The satisfactory operation of all work shall be guaranteed for a period of 12 calendar months after final acceptance of the building.

1.12 REQUEST FOR CHANGE

1. All quotations in response to request for change shall be submitted complete with an itemized cost breakdown of all materials and labour required in the change.

1.13 REQUEST FOR INFORMATION

1. Allow ten (10) working days for MCW/AGE to respond to all requests for information.
2. All requests for information shall be reviewed by the Contractor prior to submitting to ensure the information is not on the drawings or specification.

1.14 GROUNDING

1. The entire installation shall be grounded in accordance with the Canadian Electrical Code.

1.15 WORKMANSHIP

1. Install equipment, conduit and cables in a workmanlike manner to present a neat appearance to the satisfaction of the Contract Administrator. Install conduit and cable runs parallel and perpendicular in chases, behind furring or above ceilings. In areas where systems are to be exposed (electrical room only), install neatly and group to present a tidy appearance.
2. Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with adequate clearances and accessibility for same.
3. Include, in the work, all requirements shown on the shop drawings or manufacturers' installation instructions.
4. Replace work unsatisfactory to the Contract Administrator without extra cost.
5. All conduit must be clipped to structure by means of anchors or supported by Unistrut hangers as close to U/S as possible. Tie wraps for wire hanging and fastening is not acceptable, unless pre-authorized by the Building Owner. Perforated strapping is also unacceptable.
6. All support material for all luminaires, outlet boxes, junction boxes, etc. in a non-combustible building shall be of non-combustible material. Wood is not acceptable.

1.16 IDENTIFICATION OF EQUIPMENT

1. All equipment, including receptacles, shall be identified with engraved lamacold nameplates either screwed or riveted in place. Where Phenolic plastic coverplates are utilized, the circuit identification to be attached to the outlet box, visible when the coverplate is removed.
2. The utilization of Dynamo 6000, P-Touch or equal is acceptable for receptacle.
3. Wiring for coverplates shall be confirmed by Contract Administrator.

1.17 CUTTING AND PATCHING

1. Arrange and pay for all cutting and patching as required for the electrical installation.

1.18 WIRING METHODS

1. Unless otherwise shown on the drawings, all wires shall be copper, minimum #12 AWG with 90°C x-link insulation. Wiring to be installed in conduit.
2. Wiring in concrete or masonry construction shall be in steel electrical metallic tubing (EMT). Provide a separate grounding conductor in EMT conduit runs embedded in concrete slabs. Conduits installed in areas exposed to moisture shall have watertight fittings.
3. All wiring in finished areas shall be concealed. Conduits shall be run at right angles to the building lines.
4. Conduit and wiring shall be grouped where possible and clipped in a neat and workmanlike manner.
5. Conduit runs shall be installed and inspected before runs are installed to ensure conformance with Item 5 herein.
6. Main underground wiring shall be run in 53mm (2") red PVC conduit.
7. Main underground wiring shall be #1/0 triplex Al. cabling to maximum distance of 245m (800'). Utilize #12AWG RW90 for connection to wiring devices.

1.19 MOUNTING

1. Mounting height of equipment is from finished floor to centerline of equipment unless specified or indicated otherwise.
2. If mounting height of equipment is not indicated, verify with Contract Administrator before proceeding with installation.
3. Install electrical equipment at the following heights unless indicated or directed otherwise.
a. General receptacles, telephone and television outlets: 18" (450mm).
b. As per architectural elevations.
4. All transformers, motor control centres and floor-mounted distribution panels shall be mounted on 4" (100mm) concrete housekeeping pads. The Electrical Subcontractor shall be responsible for provision of these pads. Where ceiling heights will not allow housekeeping pads to be installed below distributions, and where pre-approved by the Contract Administrator, 1½" (38mm) galvanized cantstruss shall be provided in place of the pad.

26 05 35 OUTLET BOXES

1. Outlet, junction and switch boxes shall be galvanized pressed steel of size and type to suit each individual application.
2. Where buildings have curtain walls outlets shall not be located anywhere on the outside curtain wall. Outlets shown thus shall be mounted on the nearest dividing wall 2' from outside wall, or nearest furred out column.

26 06 21 MECHANICAL EQUIPMENT WIRING

1. Provide starters and wiring for all heating, ventilating and plumbing equipment unless specified otherwise.
2. Control wiring for mechanical equipment shall be performed by Mechanical Subcontractor. Electrical Subcontractor shall provide 120V circuit in location designated by Controls Contractor.
3. Electrical Subcontractor to provide all control wiring for Owner supplied equipment and as designed on drawing.
4. Refer to the mechanical drawings for the exact location of mechanical equipment requiring an electrical connection.
5. Electrical Subcontractor shall report any discrepancies in voltage and control wiring specifications.
6. Provide a means of disconnect for all mechanical equipment.

26 06 22 MISCELLANEOUS APPARATUS AND APPLIANCES

1.1 GENERAL

1. Provide all required electrical devices, components, conduits, fittings, wiring, disconnects, and miscellaneous equipment to make all connections to equipment.
2. Be familiar with the apparatus being supplied and carefully coordinate and cooperate with the supplier/installer to ensure a proper and complete installation.

1.2 RECEPTACLES

1. Where equipment has line cord and plug, ensure cap is compatible with receptacle. Provide cord sets to equipment where required.

26 24 16 PANELBOARDS

1. New panelboards shall match the existing. Load centres are not acceptable. Panels shall be complete with panel trim having concealed hinges and trim mounting screws, locking door with flush catch. Provide two (2) keys for each panel.
2. Load centres are acceptable for residential suite panels only.
3. Circuit breakers shall be bolt on moulded case with thermal breakers rated at 10,000A symmetrical.
4. Affix typewritten directory to the inside of the panelboard indicating loads controlled by each circuit.
5. Panelboards to be surface or recessed mounted as indicated.
6. Revise the directory in existing panels to suit revised circuiting (typewritten). Place existing directory behind new directory for verification by Contract Administrator.

26 27 10 MAIN DISTRIBUTION

1. Arrangement and size of components shall be as shown on drawing.
2. Provide new breakers for renovations as shown on drawing and appropriate mounting hardware to suit existing distribution. Exact requirement to be determined prior to bid closing.

26 27 26 WIRING DEVICES

1. Colours of receptacles, switches, outlets and coverplates shall be confirmed with Contract Administrator, Contract Administrator or Contract Administrator.
2. Receptacles shall be 15 ampere, 125 VAC, ivory, parallel slot, U-ground, side and back wiring screw terminate. Approved manufacturers are: Hubbell No. 5262, Arrow Hart No. 5262, Bryant No. 5262 or equal.
3. Hard wired dimmable LED luminaires shall be provided with 0-10V driver with compatible dimmer control. Approved dimmers are Lutron or Leviton.
4. Provide stainless steel coverplates for recessed devices.
5. Wet location covers shall be equal to Cooper, Metal WeatherBox While-In-Use protective covers, WUMV-1 for vertical mounting and WIUMH-1 for horizontal mounting. Plastic covers will not be accepted.

26 50 00 LIGHTING

1.1 GENERAL

1. Supply and install all luminaires complete with lamps. All new luminaires shall be provided with Driver or electronic ballast, Power Smart approved.
2. Install luminaires supplied by the Owner, as indicated.
3. Re-lamp all fixtures to be re-used.
4. Lighting shall adhere to the Manitoba Hydro Power Smart Program.
5. All LED fixtures shall utilize Power Smart approved ballasts or drivers.
6. All 347 volt luminaires shall be complete with integral disconnect switch to meet CEC Part 1 Rule 30-308(4).

1.2 BALLASTS AND ACCESSORIES

1. Provide ballasts and accessories as indicated.
2. Ballasts and Drivers used in exterior luminaires shall be rated at -20°C (-4°F) starting.

1.3 SITE LIGHTING

1. Provide post top, landscape and roadway luminaires as indicated.
2. Coordinate with the Contractor to provide concrete bases for pole-mounted luminaires and ballards as detailed. Anchor bolts to be designed to suit local wind conditions.
3. Provide a hand hole, complete with gasketted cover and ground lug on each pole.

1.4 LED LIGHTING

1. All LED lighting shall have the following I.E.S. testing to be considered for installation.
2. LM 80 08 Approved methods measuring lumen maintenance for SSL light sources.
3. LM 79 08 Approved methods for electrical photo and metric measurements of solid state lighting products.
4. All LED lamps and drivers shall have minimum 5 year warranty with minimal hours of operation of 50,000 hours or equal to luminaires hours.
5. Heat dissipation and maximum heat build up shall be submitted for review.

1.5 INSTALLATION (LUMINAIRES)

1. Install luminaires at locations indicated, complete with all wiring, connections, fittings, hangers, aligners, box covers and accessories, as required.
2. Install luminaires and lens materials in architectural details, as indicated.
3. Install luminaires parallel with building lines. Wall-mounted luminaires shall be installed plumb.
4. Review all ceiling type, construction details and mounting arrangements before placing luminaire orders and ensure that all mounting assemblies, frames, rings and similar features are included for and match the required installation.
5. All luminaires and assemblies shall be properly secured and supported. Support luminaires independent of the ceiling construction, complete with all fasteners, framing and hangers, as may be required. Do not secure luminaires to mechanical ductwork or other vibration producing apparatus, unless specifically detailed on the drawings.
6. Where a luminaire is suspended from the ceiling using a self-aligning box cover, an additional ground wire from the outlet box to the luminaire shall be provided.
7. Coordinate the installation of luminaires with the work of other trades, ensuring that the necessary depths and mounting spaces are provided. Luminaires which cannot be installed due to a conflict with structural members, pipes or ductwork shall be relocated to a more suitable location, as directed by the Contract Administrator and/or Contract Administrator.
8. Install post top, landscape and roadway luminaires plumb.

1.6 WIRING

1. Connect luminaires to lighting circuits as indicated.

1.7 LAMPS

1. Adjust lamp position in adjustable lamp holder-type luminaires to produce the proper beam distribution for the specified lamp.




1.8 TESTS

1. Perform tests in accordance with Section 26 00 10.
2. Check luminaires and replace defective lamps, ballasts, lenses and accessories.

1.9 CLEANING

1. Prior to take-over of the project, clean the lenses and reflectors of all luminaires with a damp cloth to remove dust, smudges and fingerprints.

NOTE:
These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

 Certificate of Authorization MCW/AGE Consulting Professional Engineers No. 589 Expiry: April 30, 2017		 MCW / AGE Consulting Professional Engineers 210-1571 Wellington Avenue Winnipeg, Manitoba, R3P 0G4 Phone : (204) 778-7000 Fax : (204) 778-1119 E-Mail: mcw_wpg@mcw.com		ENGINEER'S SEAL	 THE CITY OF WINNIPEG PUBLIC WORKS DEPARTMENT ENGINEERING SERVICES DIVISION
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3	ISSUED FOR TENDER	05/25/16	MJB		
3	ISSUED FOR CITY OF WINNIPEG REVIEW	05/10/16	MJB		
2	ISSUED TO UIG STRUCTURES FOR REVIEW	04/08/16	MJB		
1	ISSUED FOR CITY OF WINNIPEG REVIEW	03/18/16	MJB		