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Basis of Design Narrative

ELECTRICAL

Winnipeg Fire Paramedic Station (WFPS) 15, Winnipeg, MB

The following basis of design narrative is based on a schematic design and intended for the procurement of a mechanical and electrical design build contract. This specification is intended to describe the minimum performance requirements of the mechanical and electrical systems. Proposed deviations from the basis of design shall be described fully for review and acceptance by the Owner. Refer to design-build request for proposal for additional requirements.

I. Basis of design:

1. Plan drawings by City of Winnipeg dated February 26, 2025.
2. Generally, this scope of work will include the construction of a new two storey fire station, with basement, for WFPS in Winnipeg, Manitoba. The work will include but not be limited to all building, site development, and site services.
3. The Project design minimums are to be based around, but not restricted to, the following:
 - a) Efficiency Manitoba Commercial Building Standard
 - b) Manitoba Building Codes, including the Manitoba Energy Code for Buildings (2011).
 - c) National Fire Code of Canada
 - d) CSA C22.1-21: Canadian Electrical Code (CEC)
 - e) Manitoba Electrical Code
 - f) IES Lighting Standards
 - g) CAN/ULC-S524 Installation of Fire Alarm Systems
 - h) WFPS Program and Functional Requirements
 - i) WFPS Station Standards
 - j) CoW Green Building Policy: New City-Owned Buildings and Major Additions
(<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=5989>)
 - k) CoW Accessible Design Standard
 - l) CoW Universal Design Policy
(<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=3604>)
 - m) CoW Standard Construction Specifications
 - n) Applicable local code(s)

II. Electrical

A. General Electrical

1. Electrical shall provide the complete supply and installation of all electrical items noted including all equipment, materials and commissioning necessary for a fully functional system.
2. Refer to architectural drawings for room layouts, general areas, and quantities for take-offs.



3. Include all costs associated with electrical permits, fire alarm verification, systems commissioning and systems training.
4. The work as herein described is based on schematic design development and subject to final design.
5. Coordinate with the design team all requirements including space, pathways, ratings and any other project requirements for all electrical, communications and safety/security systems.
6. All devices, equipment and installation within the floor area of the Apparatus Bay and all non-fully enclosed spaces attached to Apparatus Bay shall be suitable for use in a Zone 2 Classification as per Section 18 of the Canadian Electrical Code up to 50mm AFF.
7. Coordinate with mechanical trades to confirm the supply and installation of all controls for mechanical systems.
8. Floor mounted equipment shall be mounted on 4" concrete housekeeping pads, to be identified by electrical and coordinated with general contractor.
9. Identification & Labelling:
 - a) Provide nylon labels for all equipment.
 - b) Provide lamacoid labels on all distribution equipment, CDPs & panelboards.
10. Provide Shop Drawings for owner & design team review prior to equipment procurement.
11. Provide O&Ms and as-built drawings in PDF format

B. Site Services

1. Coordinate new underground site service complete with padmount transformer and CSTE location with Manitoba Hydro. A 347/600V, 3PH, 4W, 800A CSTE complete with built-in metering is anticipated to be required.
2. Coordinate new underground site services with Bell MTS and Shaw Fibre complete with two (2) x 4" (103mm) conduits complete with pullwire from property line to entrance demarcation in IT room on basement floor.
3. Provide circuit with underground conductors to illuminated pylon signage.
4. Parking Receptacles:
 - a) Provide IPLC parking receptacles for all 21 staff stalls on site. Each stall shall be separately fed from a dedicated 120V/20A circuit.
 - b) Provide unit price for two (2) Class 2 Electric Vehicle Charging Station to be located within 100' of the building.
5. Provide building exterior lighting at all entrances/exits.
6. Provide pole mounted LED lighting throughout parking lot.
 - a) Pole mounted lighting shall be controlled by astronomical timeclock.
 - b) Pole mounted lighting shall be of a type that minimizes or provided with accessories to contain light pollution

C. Distribution & Panelboards

1. Provide 347/600V, 3PH, 4W service entrance rated distribution in main electrical room. Distribution to be sized to accommodate 25% extra electrical capacity.

2. Provide 200A/3P manual transfer switch between main distribution (MD-1) and distribution panel (SD-B) and disconnect switch complete with cam-lock for connection to WFPS portable generator. Generator disconnect with receptacle to be located near portable generator trailer parking stall.
3. Provide transformers and distribution as required to serve all required loads. Where space does not allow, suspend transformer in combined data/electrical room to accommodate layouts.
4. Provide auxiliary gutters at CDPs to aid in meeting energy code requirements to facilitate the ability to monitor loads.
5. Provide separate 120/208V panelboards for HVAC systems, interior & exterior lighting to facilitate energy code requirements.
6. Provide dedicated panelboards per floor per area to serve required loads.
7. Provide type-written panelboard directories.
8. Distribution Transformers shall be Dry-type, two winding, with copper or aluminum windings. Enclosure shall be Type 3R and wall mounted or floor mounted c/w housekeeping pad as indicated.
9. Distribution panels shall be floor mounted type complete with aluminum bus bars and sprinkler shielding. Circuit breakers shall be bolt-on type. Short circuit rating shall be minimum 22kA for 208V panels and 25kA for 600V panels. Distribution panels shall be sized to have 25% spare breaker capacity.
10. Branch circuit panels shall be flush or surface mounted as required complete with aluminum bus bars and sprinkler shielding. Circuit breakers shall be molded case bolt-on type. Minimum kA rating shall be 10kA for 208V panels and 14kA for 600V panels. Branch circuit panels shall be sized to have 25% spare breaker capacity.
11. Provide a short circuit, coordination, and arc flash study.

D. Central UPS System

1. Provide dual online conversion 5kVA 120/240V UPS complete with maintenance bypass and dedicated output panel for radio, telecom, and network loads.

E. Lighting

1. Provide lighting in all areas. Lighting shall be suitable for the designated room occupancy and shall be coordinated with the architectural approach for ceilings.
2. The following minimum lighting levels shall be maintained:
 - a) Lobby & Corridors – 10 foot-candles
 - b) Offices– 30 foot-candles
 - c) Staff Rooms – 20 foot-candles
 - d) Sleep Quarters – 10 foot-candles
 - e) Training Classrooms – 50 foot-candles
 - f) Kitchen/Dining Room/Lounge – 30 foot-candles
 - g) Fitness Area – 30 foot-candles
 - h) Washrooms – 20 foot-candles



3. Lighting shall be LED throughout, 120V using 0-10V 10% dimming or addressable drivers. Provide 1% dimming to in Sleep Quarters.
4. Provide building exterior lighting at all entrances/exits.
5. Provide building exterior lighting to serve the parking lot.
6. All lighting shall be Efficiency Manitoba approved.

F. Lighting Control

1. Provide lighting control complete with occupancy sensing and daylight harvesting in all areas to meet energy code requirements.
2. Provide dimming control throughout all non-service spaces.
3. Exterior lighting controls will incorporate photocell on/timeclock off control.
4. A full building low voltage addressable lighting control system will be utilized.
5. Provide wall controls for dimming override in all rooms.

G. Wiring

1. All wiring and feeders will be copper unless noted otherwise. Use of aluminum alloy wiring is permitted for distribution feeders 100Amp rated and larger only.
2. Minimum wire size shall be #12 AWG.
3. All wiring on exterior walls shall be run in conduit, or metal raceway/wiremold to avoid compromising the building envelope.
4. All wiring and devices in the Apparatus Bay and Hose Tower shall be rated for wet location.
5. All wiring in ceiling spaces shall be run in conduit, with AC90 drops to individual devices as required.

H. Devices

1. Provide receptacles to suit layout requirements.
2. Wiring devices shall be "standard" style, commercial specification grade complete with stainless steel coverplates. Color of devices to be confirmed by architect.
3. Wire and connect door operators.

I. Fire Alarm

1. Provide new addressable fire alarm system throughout c/w provision for remote connection to a Central Monitoring Station (monitoring shall be by City of Winnipeg).
2. Provide one 120V/15A dedicated circuit to a junction box and one CAT6 data drop (homerun to IT Room) in ceiling space above the Fire Alarm Panel for COW monitoring equipment.
3. Main Fire Alarm panel shall be located at the main entrance.
4. A remote annunciator will not be required.
5. Provide manual initiating devices (pullstations) at all exits.
6. Provide smoke detection where required including:

- a) Public corridors
 - b) Mechanical/electrical rooms.
- 7. Provide combination visual/audible notification devices throughout.
 - 8. Provide carbon monoxide detection throughout to suit code requirements.
 - 9. Wire and connect sprinkler tamper and flow switches.
 - 10. Provide verification of fire alarm system.

J. Exit & Emergency Lighting

- 1. Emergency and egress lighting shall be provided throughout all means of egress and service spaces to suit code requirements.
- 2. Emergency battery banks shall be minimum 12 volt with adequate wattage. The battery banks shall be complete with 6 watt MR16 LED lamps, zone sensing to pick up egress lighting circuits and multiple night lighting circuits as required.
- 3. Emergency lighting double remote heads will be surface designer series equal to Lumacell Signature Collection, complete with minimum 6 watt MR16 LED lamps. Remote heads will be provided to suit code requirements.
- 4. Exit lighting will be extruded aluminum equal to Lumacell LA series complete with LED and pictogram stencil. All signs shall be universal mount. Exit signs shall be provided to suit new egress requirements.

K. Communication Systems

- 1. A central IT room will house equipment for the following systems:
 - a) PA system
 - b) Card Access System
 - c) Security System
 - d) Metasys System
- 2. A new floor mounted communication rack shall be provided within the IT room to pick up new communication outlets throughout. The rack shall be complete with required patch panels. All active equipment shall be provided by the City of Winnipeg.
- 3. Provide a dedicated cable for a red-phone located in the public entrance.
- 4. Provide communications outlets complete with two (2) CAT6 cables back to the new rack at each computer or printer location. All cabling shall be supplied and installed by the electrical contractor including testing and termination.
- 5. Provide J-hooks above accessible ceiling locations and a conduit system in all exposed locations for routing of all communication cabling.

L. Intercom

- 1. Provide Video based Intercom at public entrance complete with receiving stations at the Floor Watch desk, Apparatus Bay, and Lounge.

2. The interior master stations shall be complete with color video monitor, speaker, and microphone for 2-way communication between interior master stations and exterior door stations. Door release functionality for either exterior door shall be provided at each of the master stations. Each door station shall have the ability to call-forward to another master station as required.
3. The exterior door stations shall be complete with weatherproof and vandal proof enclosure, color video camera, speaker, and microphone for 2-way communication between exterior door station and interior master stations.
4. The door intercom system shall be integrated with the door/access control system.

M. Access Control / Intrusion Alarm System

1. Provide a complete access control and intrusion alarm system:
 - a) Control panel to be Mercury LP1502 / Mercury MR52
 - b) Cabinet to be Altronix
 - c) Two (2) annunciator keypads.
 - d) Card readers, electric strikes, request to exit devices, and door contacts for each exterior door. Allow for five (5) doors.
 - e) Glass-break detectors at four (4) locations.
 - f) Motion detectors at four (4) locations.
 - g) Fridge temperature sensor for med fridge.

N. CCTV System

1. N/A

O. Public Address System

1. Provide a 70V TOA public address system (TOA A-912MK3-120W and P-120 or P-240 amplifier) complete with distributed speakers throughout and one paging microphone (TOA PM-660U). Provide back box and mounting supports as required. Speakers in shower rooms to be waterproof type. Mount paging amplifier in IT Room. System shall be complete with the following modules:
 - a) M-01 Microphone Input
 - b) S-03 Gong Tone Generator
 - c) U-01 Unbalanced Line Input
2. Provide dedicated UPS circuit for power.
3. Speakers:
 - a) Suspended ceilings - recessed flush style complete with backbox.
 - b) Apparatus Bay – horn style
 - c) Other Areas - surface mounted speakers complete with backbox.
4. The system shall be complete with minimum 4-paging zones.
5. Provide communication outlet complete with two cables at PA cabinet/amplifier location.
6. Provide one shielded 2C cable with ground (Belden P/N: B9451P) from the amplifier to the desk in Floor Watch.
7. All system cabling shall be in conduit.

P. Miscellaneous Equipment

1. Wire and connect all owner supplied equipment, including but not limited to the following:
 - a) An automatic retractable 20A receptacle on cord reel for vehicle battery charging station for each vehicle bay in Apparatus Bay.
 - b) Two pressure washers in Apparatus Bay.
 - c) One shelf-mounted battery charging station.
 - d) Industrial laundry and Kitchen equipment.
 - e) Provide three dedicated 20A circuits for fitness equipment in the Fitness Room.
2. Provide flush-mounted floor boxes for power and data in the training room.
3. Provide contactor based emergency shutoff system for kitchen appliances complete with mushroom-style shut-down buttons.
4. Wire and connect barrier free door operators complete with all associated wiring and controls.
5. Provide one (1) dual-port Level 2 Electric Vehicle Charging System.
 - a) Provide capacity for one (1) future dual-port Level Electric Vehicle Charging System.

Q. Mechanical Equipment

1. Wire and connect all mechanical equipment requiring electrical connections as indicated by mechanical.
2. Coordinate with mechanical to provide electric heat as required, including, but not limited to:
 - a) Baseboard heaters for:
 - (1) Storage room
 - (2) Stairs
 - b) Forced flow heaters for:
 - (1) Entrance vestibule
 - c) Unit heaters for:
 - (1) Hose tower stair
 - (2) Compressor room
 - (3) Gear lockers
 - (4) Mechanical area (Mezz)
 - (5) Mechanical room
 - (6) Electrical room
 - d) Radiant ceiling panels for:
 - (1) Washcloset/Shower
 - e) Thermostat controls for all the above
3. Refer to mechanical basis of design for further requirements under this heading.

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