Kingsford Hotel Bacolod — BMS

Comprehensive Technical & Commercial Proposal

Document version: 1.0 (initial issue) **Date of issue:** 2026-04-28 **Prepared for:** Megaworld Corporation **Project reference:** TUEC-PR-AUX-010 — Building Management System **Site:** Manhattan Street, The Upper East, Bacolod City, Negros Occidental **Proposal validity:** 90 days from date of issue **Currency:** Philippine Peso (PHP)

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1. Cover Letter

To Megaworld Corporation

Attention: Mr. Rome Amiel P. Gonzales

Dear Sir,

Subject: Proposal — Building Management System, Kingsford Hotel Bacolod

This proposal covers the supply, installation, testing, and commissioning of the BMS for the Kingsford Hotel Bacolod project. It is based on the documents you provided:

- **BMS Points list (TUEC)** — sheets BMS-01, BMS-02, and BMS-03 (Process and Instrumentation Diagrams), dated October 2025, prepared by R.J. Calpo & Company under the seal of Reynaldo J. Calpo, Professional Mechanical Engineer (License No. 0001784)
- **EE Plan (TUEC)** — Construction Bulletin No.8, dated 5 November 2025, prepared by Mario A. Alix Philippines, Inc., covering revised electrical layouts, load schedules, and power riser diagrams
- **Megaworld MC Standards** — DRC-004-2024 Revised BMS Standards Condotels, including Mechanical and Plumbing Points Lists

The project-specific points list governs the scope. The MC Standards serve as the baseline where the project-specific specification is silent. Where the documents are silent or ambiguous, we made the assumptions catalogued in **Section 11 (Stated Assumptions)** with their cost impact. Review those before contract execution.

Document layout:

- **Sections 1–4:** Cover letter, executive summary, project background, scope understanding.
- **Sections 5–7:** Technical — system architecture, per-subsystem descriptions, equipment list, network design, power provisions, programming and HMI, cabling philosophy.
- **Sections 8–9:** Project execution — schedule, manpower, inter-discipline coordination, quality and commissioning.
- **Section 10:** Commercial — Bill of Quantities, payment milestones, validity, acceptance terms.
- **Sections 11–13:** Risks, stated assumptions, inclusions/exclusions/clarifications matrix.
- **Appendices A–F:** Working documents (full BOQ line items, equipment takeoff, cable schedule, panel schedule, RFI list) for your engineering and commercial teams.

Our project team is available for clarification at your convenience.

We thank you for the opportunity and look forward to your favourable consideration.

Sincerely yours,

[Authorised signatory]

Project Director

[BMS Contractor Company Name]

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2. Executive Summary

This proposal addresses the design, supply, installation, programming, testing, commissioning, and one-year warranty support for a complete Building Management System covering the mechanical (HVAC and ventilation), plumbing/sanitary (hot water generation), boiler/laundry, casino MVAC (mechanical ventilation and air conditioning), and electrical-metering subsystems of the Kingsford Hotel Bacolod project.

2.1 Headline figures

Metric	Value
BMS I/O points (in scope)	**744**
BMS-monitored equipment instances	**109**
Unique equipment classes	26
BMS field panels	**8**
Estimated DDC controllers	19
Network drops (BACnet/IP + Modbus)	42
Total cable footage (estimated)	**5,173 m**
Programming objects	1,352
Operator graphic pages	38
Commissioning test items	678
Total project effort	**4,648 hr** (581 person-days)
Project duration	**16 weeks** from PO to handover
Peak on-site headcount	11 personnel (project weeks 9–10)
Grand total proposal value (VAT-inclusive)	**PHP 22,036,702**

2.2 Approach summary

Our proposal is structured around four design principles:

1. **Compliance with the project-specific specification.** Every BMS-monitored point in our proposal traces back directly to the TUEC BMS Points list (sheets BMS-01, BMS-02, BMS-03) or, where TUEC is silent, to the Megaworld MC Standards baseline. The traceability matrix is provided in Appendix A.

2. **Open standards and interoperability.** All controllers, head-end servers, and network equipment are based on BACnet/IP and Modbus open protocols. This avoids vendor lock-in, supports future integration with hotel building systems (PMS, FDAS, security), and aligns with Megaworld's portfolio standards for BMS.

3. **Operational reliability.** The head-end runs in redundant primary–standby configuration with 30-minute UPS protection. The network is logically isolated from the hotel's corporate LAN to protect availability. Energy-savings algorithms (chiller plant sequencing, demand control, peak shaving) are pre-engineered for hotel operating profiles.

4. **Auditable engineering.** This proposal is supported by a structured engineering basis (Bill of Quantities, equipment takeoff, cable schedule, panel schedule, programming object inventory, commissioning point inventory, manpower loading, risk register). Each is reproducible from the underlying source documents and is provided as appendices for transparent review.

2.3 Commercial summary

Item	PHP
Base proposal cost	15,468,260
Overhead and margin (20%)	3,093,652
Contingency reserve (7.5%)	1,113,715
Sub-total before VAT	19,675,627
VAT (12%)	2,361,075
GRAND TOTAL (VAT-inclusive)	** 22,036,702**

3. Project Background

3.1 The Kingsford Hotel Bacolod project

Kingsford Hotel Bacolod is a Megaworld Corporation development located at Manhattan Street, The Upper East, Bacolod City, Negros Occidental. The project is a mixed-use hotel and amenity facility with the following salient characteristics, as inferred from the available technical documentation:

- **Occupancy types:** hotel guestrooms (above the 3rd Floor), casino at the 2nd Level, amenity facilities at the 3rd Floor, food and beverage outlets with kitchen scope distributed from Basement to 3rd Floor, and standard hotel back-of-house operations.

- **Vertical extent:** Basement, Lower Ground Floor, Ground Floor, 2nd Floor, 3rd Amenity & Guestroom Floor, guestroom levels above, and Roofdeck.
- **Mechanical services:** centralised chilled-water plant at Ground Floor (3 chillers), condenser-water pumps and chilled-water headers at 2nd Floor pump room, cooling towers at Roofdeck, hot-water generation plants at Lower Ground and Roofdeck, steam boilers for the laundry at Lower Ground, dedicated outdoor air systems for both casino and guestroom service, precooled air handling units at Roofdeck, and air-handling units in the basement-podium back-of-house zone.
- **Electrical services:** main switchgear with multiple incoming feeders (utility, generator, automatic transfer switch), distributed sub-feeders to chiller plant, AHU plant, kitchens, lighting, hot-water plant, lifts, BMS UPS, mechanical pumps, boiler/laundry, and fire pump.
- **Project stage:** new construction, currently in detailed design and pre-procurement, with construction bulletins issued on a rolling basis (the latest electrical bulletin being No.8 dated 5 November 2025).

3.2 Project consultants and parties

Based on the documents provided to us, the project parties identified are:

Role	Entity	Reference
Owner / Developer	Megaworld Corporation	Title-block stamps + bulletin recipient
BMS-discipline engineer of record	R.J. Calpo & Company (Engr. Reynaldo J. Calpo, PME)	Author of the BMS Points list
Electrical-discipline consultant	Mario A. Alix Philippines, Inc.	Author of EE Plan revisions
Architect	Design Alliance Architecture & Planning	Title block on EE drawings
Customer representative	Mr. Rome Amiel P. Gonzales	EE bulletin recipient

3.3 Note on the term ‘Rehabilitation’

Your enquiry letter (Requirement.rtf) describes the project as the *Rehabilitation of Building Management System for the Kingsford Hotel Bacolod project*. Our review

of the supporting documents — both the BMS Points list and the EE Plan — confirms that they are stamped *Construction Bulletin* with dates of October–November 2025, and that the EE revisions reference *adjusted mechanical layout* and *added power provisions for kitchen layouts*. These are characteristic of a greenfield new-construction project at active design stage, not of a retrofit on an operating building. Our proposal is therefore costed on a greenfield basis and excludes any demolition, hot-cutover, or after-hours work that would be required for retrofit scope.

Should our reading of the project stage be incorrect, or should there be any retrofit elements within the scope, we will gladly revise our proposal accordingly. The clarification request is item Q-018 in our **Section 13 (Inclusions / Exclusions / Clarifications)** matrix.

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4. Our Understanding of the BMS Scope

Our scope analysis is summarised in the following matrix, which lists each subsystem covered by the BMS Points list along with the equipment count, the I/O point count attributable to that subsystem, and the field panel(s) serving it.

4.1 Subsystem coverage matrix

Subsystem	Equipment instances	I/O points	Reference
AC	34	365	A1 + A2
VENT	60	343	A1 + A2
HWL	8	20	A1 + A2
EL	6	12	A1 + A2
FDAS	1	4	A1 + A2
Total	**109**	**744**	

4.2 Subsystem narratives

4.2.1 Chilled Water Plant

The chilled-water plant comprises **three packaged water-cooled chillers** (CH-1, CH-2, CH-3) located at Ground Level in the chiller plant room. Each chiller is BMS-monitored via its native BACnet/IP gateway, exposing approximately twenty-four

data points covering compressor status, motor load current, energy consumption, refrigerant pressures and temperatures (evaporator and condenser sides), oil pump status and oil-sump conditions, winding temperature, and the approach delta temperature and pressure for both heat exchangers.

The plant interfaces with **four primary chilled-water pumps** (PCHWP-1 through PCHWP-4, comprising three duty units plus one standby per A-CHW-001) located in the 2nd Floor pump room, each driven by a variable-frequency drive that reports speed and accepts speed command via BACnet HLI. The plant is hydraulically separated from the secondary loop by a CHW header set with supply/return temperature and pressure sensors, a differential-pressure sensor across the bypass line, and a BMS-supplied motorised bypass valve.

Heat rejection is via **three condenser-water pumps** (COMP-1 through COMP-3) at the 2nd Floor pump room, sequenced to the chillers, and **three cooling towers** (CT-1, CT-2, CT-3) at Roofdeck. Cooling-tower fan staging is controlled per condenser-water leaving temperature; basin-level alarms and motorised blowdown valves are BMS-supervised. The cooling-tower area shares a common outdoor-air temperature and humidity sensor for control of the wet-bulb-driven sequence.

A plant-level BTU meter (BTU-CHWS-MAIN) provides cumulative energy and instantaneous flow on the supply leg, integrated via Modbus.

4.2.2 Air Handling Units

Air handling unit scope comprises:

- **Basement-Podium Back-of-House Air Handling Units (CHWP-1.1 / 1.2 / 1.3 at Ground Level):** Three units, each chilled-water-served with VFD-driven supply fan, modulating CHW valve (ME-supplied), outdoor and return-air motorised dampers (ME-supplied), and BMS-supplied sensors for supply/mixed/return air temperature, supply air humidity, and indoor return-air CO_2 (for demand-controlled ventilation). Each unit has a BACnet/IP-native VFD interface for fan speed and control.
- **Casino-serving Air Handling Units (AHU-2M.1 / 2M.2 at 2nd Level):** Two units of similar architecture to the BOH AHUs, but with modulating dampers (position feedback as analogue input) and additional CO/CO_2 sensors at the return duct to manage indoor air quality in the casino environment. Each AHU is paired with an air-treatment ozonizer (OZ-

2M.1 / OZ-2M.2) which BMS monitors for status, trip alarm, and downstream VOC level.

Note: The TUEC tabulation indicates a total of ten BOH air handling units, of which only the three at Ground Level (CHWP-1.1/1.2/1.3) are explicitly tag-listed in the points list provided to us. The remaining seven units are identified by aggregate point counts but not by individual tag or location. The base proposal covers the three confirmed units; the additional seven are excluded pending receipt of the complete BOH AHU schedule. Refer to clarification Q-021.

4.2.3 Dedicated Outdoor Air Systems

Three DOAS units are in scope:

- **DOAS-2W (Casino MVAC at 2nd Level):** Provides conditioned outdoor air to the casino with energy recovery, modulating CHW coil, motorised dampers, and full BACnet/IP integration. Includes upstream ozonizer monitoring.
- **DOAS-RD.1 and DOAS-RD.2 (Hotel/Roofdeck DOAS serving guestroom-level fresh air):** Two units at Roofdeck providing outdoor-air supply to the upper guestroom levels with similar control architecture.

Each DOAS unit is treated as a single equipment instance with twenty-five points covering supply and exhaust fan status/HOA/trip/VFD speed/control, outdoor-air dry-bulb temperature and flow and humidity sensors, indoor mixed-air temperature and humidity, supply-air temperature, exhaust-air temperature, outdoor-air motorised damper status and command, CHW modulating valve status and command, and exhaust-fan static-pressure transmitter.

4.2.4 Precooled Air Handling Units (Roofdeck)

Two PAHU units at Roofdeck (PAHU-RD.1, PAHU-RD.2) condition outdoor air upstream of distribution to other AHUs/DOAS within the building. Each PAHU has a single-direction airflow path (no exhaust), VFD-driven fresh-air fan, modulating CHW coil and outdoor-air damper, and standard fan status/trip/HOA monitoring. Each provides a BACnet/IP gateway connection to the BMS.

4.2.5 General Ventilation

The general ventilation system comprises **sixty-eight exhaust fans** distributed across five building zones:

Zone	Fans	Composition
Ground Floor — Main Lobby	9	4 toilet exhaust + 5 general exhaust (LPG, mechanical room, storage, main rest room, etc.)
2nd Floor	13	3 toilet + 4 general (basement service, GS) + 6 general (chiller room, EF-2.x)
3rd Floor — Amenity & Guestroom	27	25 toilet exhaust (3A×2, 3B, 3C×2, 3D×20 for guestroom-block toilets) + 2 general exhaust
Basement zone	16	2 toilet + 7+7 general (mechanical room, heat-pump room, pump rooms, MFP)
Roofdeck zone	3	3 general exhaust

Each fan is monitored for motor status, hand/off/auto status, and trip alarm via auxiliary contacts at the fan starter. The TUEC tabulation indicates 181 digital inputs across the ventilation scope, while a strict 3-DI-per-fan pattern would yield 204; this 23-DI variance is reconciled by assuming that some smaller basement-zone and roofdeck fans use a 2-DI pattern (motor status + trip, no HOA) — refer to assumption A-VENT-001.

4.2.6 Plumbing / Sanitary Hotwater System

The hotwater system comprises six **calorifiers** (HWT-LZ-1/2/3 at Lower Ground and HWT-HZ-1/2/3 at Roofdeck), each monitored for tank temperature; six **heat pumps** providing primary heating (HP-LZ-1/2/3 + HP-HZ-1/2/3); and six **recirculating pumps** (RP-LZ-1/2/3 + RP-HZ-1/2/3) maintaining hotwater circulation. Each pump set is monitored for motor status, hand/off/auto status, and trip alarm. The Lower Ground and Roofdeck plants each have a hot-water header set with supply/return/make-up cold-water temperature monitoring.

Per assumption A-PL-001 — supported by the TUEC tabulation showing eighteen digital inputs and eighteen high-level interface points across the eighteen pump status types — Lower Ground pumps are wired as hardwired digital inputs to the local BMS panel (PNL-PL-LZ), while Roofdeck pumps are routed via an equipment-supplier-provided high-level interface gateway to the local BMS panel at Roofdeck (PNL-PL-HZ). This assumption matches the project's I/O totals exactly and may be revised when the equipment vendor's panel architecture is confirmed.

4.2.7 Boiler / Laundry System

Two steam boilers (SB-1, SB-2) at Lower Ground supply steam to the laundry. Each boiler has sixteen monitored points: BMS-supplied steam pressure transmitter and feedwater temperature sensor, fluegas temperature sensor, fluegas oxygen sensor, plus equipment-supplier-provided auxiliary contacts for low/high water level, burner power, small/big fire control signals, waterfeed pump status, burner status and burner-running status, blower motor status, and fuel-oil pump status. The BMS-supplied motorised blowdown valve is commanded by digital output from the boiler-room BMS panel.

4.2.8 Electrical Metering

The electrical metering scope follows the project's *Electrical Maximum Demand Control* requirement (BMS general specification) and assumption A-EE-001:

- **Three multifunction main-switchgear meters** (MTR-MAIN-1/2/3) at the main switchgear room, covering utility, generator, and ATS/bus-tie incomers
- **Ten sub-feeder meters** (MTR-FDR-01..10) at major distribution panels covering the chiller plant, AHU plant, kitchen, lighting, hotwater plant, lifts, BMS UPS, mechanical/pumps, boiler/laundry, and fire pump

Each meter is integrated via Modbus RTU/IP and exposes five high-level interface sub-points to the BMS: instantaneous active power (kW), cumulative energy (kWh), reactive power (kVAR), three-phase RMS-average voltage (V), and three-phase RMS-average current (I). Two Modbus serial-to-IP gateways aggregate the meters at the main switchgear and distribution rooms respectively.

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5. Technical Proposal

5.1 System architecture

The BMS is implemented as a three-tier architecture aligned with the BMS general specification on sheet BMS-01:

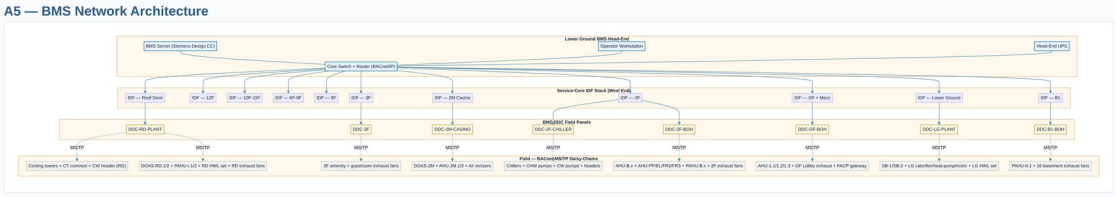
Tier 1 — Head-End (server room): - Redundant primary–standby BMS server pair hosting the BMS application, point database, alarm and event management, trending, scheduling, reporting, and graphics rendering - Two operator workstations (chief engineer and front-desk / shift staff) - One graphics PC driving

a 55-inch commercial display for control-room situational awareness - Online double-conversion 3 kVA UPS providing 30 minutes of full-load runtime - Server-room peripherals: KVM switch, console monitor, color laser network printer (alarm printer per spec), 19-inch equipment rack

Tier 2 — Network: - One managed Layer-2/Layer-3 core switch at the server room, providing BACnet routing, VLAN, SNMP, NTP, and the single uplink to the customer's corporate LAN - Six edge managed Layer-2 switches at the floor / zone IDFs (Lower Ground, Ground, 2nd Floor, 3rd Floor, Basement, Roofdeck) - Riser fibre — OM3 multimode 6-strand armoured — totalling 300 m across six risers, with 14 fibre transceivers (paired) - Cat6 patch and permanent links to BMS panels and BACnet/IP-native equipment (chillers, AHUs, DOAS, PAHU, BTU meter)

Tier 3 — Field: - 18 BMS field panels distributed across plant rooms and floor-level zones - ~30 DDC controllers (1 per ~40 physical I/O, plus network gateway controllers where panels host BACnet/Modbus integration) - BMS-supplied sensors, BMS-supplied modulating valve actuators where applicable, and termination of equipment-supplier-provided auxiliary contacts and ME-supplied valve/damper actuators

5.2 Network architecture and switch schedule



BMS Network Architecture

Star-and-tree topology centred on the BMS Server Room core switch, with riser fiber to floor/zone edge switches and Cat6 drops to BMS panels and BACnet/IP equipment. Source-of-truth: `05-working-docs/A5-network-architecture.md`.

The detailed switch schedule (count, locations, port counts, panel and equipment assignments) is documented in working-doc A5 — see Appendix A.5 / `05-working-docs/A5-network-architecture.md`. Network architecture summary: 1 core switch + 2 edge switches (counts derived from A4 panel locations and A5 zoning).

The IP plan uses a flat /24 BMS subnet (10.10.50.0/24) with static-block allocation: servers .10–.19, switches .20–.29, controllers .50–.99, BACnet/IP equipment .100–.199, power-meter gateways .200–.219. The BMS LAN does not

route to the corporate LAN; remote access is via VPN through the customer's firewall (subject to clarification Q-012).

5.3 Head-End hardware and software

The head-end equipment list is summarised below. Detailed specifications are provided in Appendix B.

ID	Description	Qty
HE-01	BMS server — Tier-1 rack server (Dell PowerEdge R650 or equivalent), Xeon-class CPU, 64 GB RAM, dual SSD RAID-1 + 2 TB HDD storage, redundant PSU, Windows Server licensed for Siemens Desigo CC supervisor	1
HE-02	Operator workstation — Dell OptiPlex desktop or equivalent, i5-class, 16 GB RAM, dual 27" monitors, Windows 11 Pro, Desigo CC client license	1
HE-03	Head-end UPS — APC Smart-UPS SRT 3 kVA online double-conversion, 30-minute runtime at full load, network management card for BMS health monitoring	1
HE-04	BMS server rack — 12U enclosed cabinet, lockable, with managed PDU, cable management, blanking panels	1
HE-05	Graphics engineering PC — Dell Precision workstation or equivalent for trend analysis + report customization (used by Megaworld FM team post-handover)	1
HE-06	Network laser printer — A4/A3 colour, network-attached, for alarm log + commissioning report printing	1
HE-07	Wall-mount status display — 55" 4K LED for BMS-FOC plant status overview	1
HE-08	KVM switch — 4-port for server/workstation/graphics PC console sharing	1
HE-09	Hot-standby supervisor server (warm standby	1

ID	Description	Qty
	— manual failover) — same Dell PowerEdge spec as HE-01 for Desigo CC failover per Megaworld DRC-004 “Backups” requirement	

Total head-end items: 9 line items, 9 units. Total continuous power: 2,150 W (head-end) + 75 W (core switch) = 2,225 W; UPS-protected.

5.4 BMS Field Panel Schedule

8 BMS field panels are deployed as follows. Each panel summary lists I/O density, controller count, and approximate power consumption.

Panel	Location	Equipment Served	Physical I/O	HLI	Net	Controllers	Power (W)
DDC-2F-BOH	2nd Floor / 2nd Floor BOH / 2nd Floor BOH Toilet / 2nd Floor General Service / 2nd Floor OHR / 2nd Floor Toilet / 2nd Level AHU MCC / 2nd	25 units	165	25	13	5	190

Panel	Location	Equipment Served	Physical I/O	HLI	Net	Controllers	Power (W)
	Level BOH / 2nd Level Executive Lounge / 2nd Level Function Room 2 / 2nd Level Function Room 3 / 2nd Level Function Rooms / 2nd Level Pre-Function						
DDC-2F-CHILLER	2nd Level Chiller MCC / 2nd Level Chiller Room	16 units	72	65	9	2	95
DDC-2M-CASINO	2nd Mezzanine (Casino)	5 units	47	8	5	2	75
DDC-	3rd	12 units	36	0	0	1	25

Panel	Location	Equipment Served	Physical I/O	HLI	Net	Controllers	Power (W)
3F	Floor / 3rd Floor Amenity Toilet / 3rd Floor BOH / 3rd Floor Toilet						
DDC-B1-BOH	Basement / Basement Battery Room / Basement FOST Room / Basement Garbage Lobby / Basement Main Fire Riser / Basement Mech / Pump / Basement Pump Room / Basement Service /	17 units	57	2	1	2	55

Panel	Location	Equipment Served	Physical I/O	HLI	Net	Controllers	Power (W)
	Basement Toilet / Basement Wash Service						
DDC-GF-BOH	GF Main Lobby Toilet / Ground Floor AHU MCC / Ground Floor BOH / Ground Floor Fire Command Center	9 units	48	10	5	2	75
DDC-LG-PLANT	Lower Ground Boiler Room / Lower Ground HWL Room / Lower Ground Lighting Panel A / Lower Ground Lighting	9 units	26	19	5	2	75

Panel	Location	Equipment Served	Physical I/O	HLI	Net	Controllers	Power (W)
	Panel B / Lower Ground Main Switchroom						
DDC-RD-PLANT	Roof Deck / Roof Deck CT Area / Roof Deck HWL Area	16 units	110	12	4	3	95
Totals		109 units	**561**	**141**	**42**	**19**	**685**

Each panel is housed in an IP54 wall-mount metal enclosure with internal DIN-rail-mounted DDC controllers, I/O modules (16-channel AI/AO/DO and 32-channel DI), 24 VDC switching power supply, terminal blocks, signal-level surge protection, and standard cable management. Plant-room critical panels (six panels) include redundant power supplies.

5.5 Cable Schedule Summary

The cable schedule is generated from the panel-to-device topology assuming a 30 m average panel-to-device run length and an 80 m horizontal-trunk-per-floor allowance (per assumption A-001). Refinement is expected against architectural and mechanical layouts.

Cable category	Count	Length (m)
Field cables (panel ↔ device)	205	4,293
Network/MS-TP backbone trunks	7	800

Cable category	Count	Length (m)
240V panel power feeds	8	80
Grand total	**220**	**5,173**

Cable type breakdown (field cables only):

Cable type	Length (m)
4C × 1.5 mm² FRLS (equipment auxiliary contacts — status/HOA/trip/start-stop)	2,097
4C × 1.5 mm² shielded FRLS (BMS signal — BMS-supplied sensors)	802
Cat6 4P × 23 AWG U/UTP, FRLS jacket (BACnet/IP)	796
4C × 1.5 mm² FRLS (ME-supplied valves/dampers — status + control)	598

All control and signal cables are FRLS (Fire Retardant, Low Smoke) per Philippine fire-safety code. Approximately 30 % of the total cable runs are in BMS-installed branch conduit; the remainder uses ME-contractor-provided cable trays in plant rooms (subject to Q-008).

5.6 Power Provisions Schedule

Twenty-five 240 V single-phase circuits are required to be provided by the Electrical Contractor for energising the BMS scope:

- 18 circuits to the BMS field panels (field-panel total estimated load: 715 W)
- 1 circuit at 32 A to the head-end UPS input (head-end total estimated load: 1500 W, UPS-protected)
- 6 circuits to the network edge switches (edge total estimated load: 220 W)

Total estimated continuous BMS load: 2435 W. A detailed power-provisions schedule is included with our submittal package, listing the source panelboard, breaker rating, and circuit identification expected per BMS panel.

5.7 Programming and Configuration Approach

The programming scope is structured around the following object inventory derived from the I/O list and the description-of-operations text in the points list:

Object class	Count
Point database objects (per AI/AO/DI/DO/HLI)	702
Control loops (one per equipment with active control)	41
Alarm definitions (with priority, routing, and message)	71
Trend logs	520
Schedules (occupancy, system on/off, setbacks)	8
Scheduled reports (daily / weekly / monthly)	10
Total programmable objects	**1,352**

Estimated programming effort: 234 hours (29 person-days). This is delivered by a single BMS engineer working in parallel with site installation during weeks 4–13.

Control logic for each piece of equipment is built directly from the *Description of Operations* narrative in the points list — for example, the chilled-water plant sequencing follows the BMS-03 Process and Instrumentation Diagram for Primary Chilled Water and Condenser Water, and the cooling-tower fan staging follows BMS-03's Cooling Tower P&ID with its 14 monitor & record items, alarm definitions, and runtime/status reporting.

5.8 Operator Graphics and Reports

A total of **38 graphic pages** are developed: 6 simple (alarm summary, trend, dashboards), 24 medium (per-floor, per-system, equipment-popup templates), and 8 complex (home page, full chiller-plant overview, full AHU/DOAS popup templates, full Boiler popup, energy-savings dashboard).

Navigation principles: - The home page provides at-a-glance KPIs and click-through to floor or system pages. - Per-floor pages display building plans with equipment overlays at their physical locations. - Per-system pages display Process and Instrumentation Diagram-style flows with all equipment in the system. - Equipment-popup templates are reused across instances (e.g., one Chiller template instantiated for CH-1, CH-2, CH-3) to ensure consistency and minimise

programming duplication. - Consistent colour coding is used: green = running normal, yellow = warning, red = alarm/fault, grey = stopped or in auto.

Estimated graphics development effort: 252 hours (31.5 person-days), delivered by a graphics engineer during weeks 4–13.

5.9 Testing and Commissioning Approach

Testing and commissioning is delivered in five sequential layers:

1. **Pre-commissioning** (week 12): cable-continuity testing, megger testing where applicable, panel power-up smoke tests on all 18 panels.
2. **Point-to-point (P2P) testing** (week 13, ~84 hr): every one of the 561 physical I/O points is verified for calibration, range, polarity, and database scaling. P2P is conducted panel-by-panel to localise issues.
3. **Functional testing** (week 14, ~164 hr): each of the 109 equipment instances is verified against its description-of-operations sequence (e.g., CHW valve modulation maintains supply-air temperature).
4. **Integrated commissioning** (week 15, ~32 hr): 8 cross-system sequences are validated together — chiller plant staging, CHW differential-pressure control, AHU supply-air temperature loops, DOAS demand-controlled ventilation, hotwater system sequencing, boiler firing rate, cooling-tower fan staging, and energy-savings algorithm verification.
5. **Owner T&C / SAT** (week 15) and **Snagging / Punch-list** (weeks 15–16): formal Site Acceptance Test with the Owner's representative, followed by punch-list resolution and as-built documentation.

Total T&C effort: 280 hours (35 person-days). Plus 80 hours allocated for as-built documentation (panel general arrangements, cable schedule, riser, network architecture, O&M manuals, point database export, programming and graphics archive).

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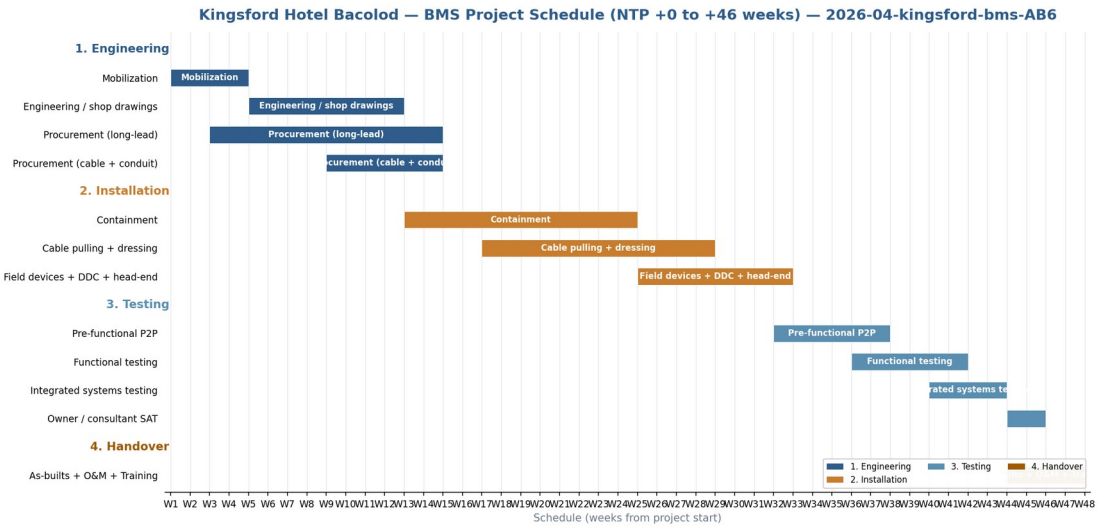
6. Project Schedule

The proposed schedule covers 16 weeks from Purchase Order to Handover, with critical milestones at weeks 4, 6, 12, 15, and 16. The visual Gantt below is auto-generated from the structured schedule (D1) and re-renders on every refresh:



Project schedule — visual Gantt

Sections colour-coded by lifecycle phase (PM & Engineering, Supply, Installation, Programming, T&C, Handover); milestones shown as diamonds. Source-of-truth: `05-working-docs/D1-schedule.md`.

Wk	Phase	Key activities
1	Mobilization + Engineering	Site mobilization, kick-off meeting, engineering team starts, first MEP coordination meetings
2	Engineering	Panel layouts, IO list submittal, control sequence design, network design
3	Engineering	Continued; submittals package #1 (head-end + network) issued
4	Engineering / Supply	Engineering wraps; submittals package #2 (panels + sensors); long-lead supply orders placed
5	Supply / FAT	Standard supply orders placed; FAT preparation; head-end FAT in vendor facility
6	Supply	Cables, conduit, sensors arrive on site; staging
7	Installation	First-fix containment in plant rooms; head-end server-room build-out begins
8	Installation	Plant-room cable pulling; head-end installation continues; network core switch in place

Wk	Phase	Key activities
9	Installation	Plant-room device installation + termination; floor-level first-fix on multiple floors
10	Installation	Floor-level cable pulling (all floors); plant-room pre-comm checks begin
11	Installation	Floor-level device install + termination; head-end software config
12	Installation / T&C	Final installation tasks; pre-commissioning sweeps; programming + graphics nearing completion
13	T&C	Point-to-point testing per panel; programming + graphics complete; integration tests start
14	T&C	Functional testing per system
15	T&C	Integrated commissioning; Owner T&C / SAT
16	Handover	Operator training (16 hrs over 2 days); as-built drawings + O&M handover; warranty start

Critical milestones:

- **Week 4:** Engineering complete, all submittals issued.
- **Week 6:** All supply on site.
- **Week 7:** Site installation start (mobilization).
- **Week 12:** Installation complete (mech-ready for T&C).
- **Week 14:** Functional testing complete.
- **Week 15:** SAT complete.
- **Week 16:** Handover, warranty start.

7. Manpower Plan

Total project effort: **4,648 hours (581 person-days)** across the project duration. Manpower is loaded as follows, with peak headcount of 11 personnel on site during weeks 9–10:

Wk	PM	Eng	Wireman	Tech	Graphics	Total
1	1	2	0	0	0	3

Wk	PM	Eng	Wireman	Tech	Graphics	Total
2	1	2	0	0	0	3
3	1	2	0	0	0	3
4	1	2	0	0	0	3
5	1	1	0	0	0	2
6	1	1	0	0	0	2
7	1	1	4	0	0	6
8	1	1	6	1	1	10
9	1	1	6	2	1	**11**
10	1	1	6	2	1	**11**
11	1	1	4	2	1	9
12	1	1	2	3	1	8
13	1	1	1	3	1	7
14	1	1	0	3	0	5
15	1	2	0	2	0	5
16	1	1	0	1	0	3

Effort budget by phase:

Phase	Hours	Person-days
Engineering & Design (1.2)	320	40
Project Management (1.1, 3.1)	720	90
Submittals & FAT (1.3, 1.4)	120	15
Installation (3.0)	3532	441
Programming (4.1)	234	29
Graphics (4.2)	252	32
Testing & Commissioning (5.x)	280	35
SAT + Documentation + Training (5.5–5.7,	200	25

Phase	Hours	Person-days
6.x)		
Total	**~4,648**	**~581**

8. Inter-Discipline Coordination

BMS scope interfaces with multiple disciplines on the project. The following matrix summarises the demarcation points and the items requiring coordination meetings:

BMS ↔️ Mechanical Contractor: - BMS supplies wiring and termination of motorised iso valves on chillers and cooling towers (CHW + COW R&S); ME supplies the valves and actuators. - BMS supplies wiring, termination, and AO command for AHU modulating CHW valves; ME supplies the valves and actuators. - BMS supplies wiring and AO/DI for AHU and DOAS dampers (OA, RA); ME supplies the dampers and actuators. - BMS supplies HLI integration to AHU/DOAS/PAHU VFDs; Equipment Supplier supplies the VFDs with BACnet/Modbus interface cards. - BMS reads pump/fan/heat-pump auxiliary contacts (motor status, HOA, trip); Equipment Supplier provides aux contacts at the equipment terminal block. - BMS supplies thermowells and temperature sensors on CHW pipework; ME provides pipe bosses for the thermowells.

BMS ↔️ Electrical Contractor: - EE Contractor provides 25 dedicated 240 V single-phase circuits to BMS panels and head-end UPS input per A7 power schedule. - BMS supplies multifunction power meters (13 units) and CTs (39 units); EE provides switchgear cutouts and CT installation coordination. - BMS supplies internal panel distribution (DIN-rail breakers, terminal blocks, surge protection); EE supplies the feeder cables and breakers.

BMS ↔️ IT / Customer Network: - BMS LAN is logically isolated from the customer's corporate LAN. - Single 1 Gbps uplink at the core switch to a customer-provided network drop in the customer's IT closet, subject to firewall configuration. - Customer IT provides DNS allocation, NTP source (or time synchronization to local Internet time), and any VPN access for vendor remote support.

BMS ↔️ Civil / Architectural: - BMS provides panel and equipment locations in submittal drawings. - Civil provides wall penetrations, fire-stopping, panel-room

access doors, and the server-room build-out (walls, finishes, cooling, fire suppression).

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9. Quality Management

9.1 Quality framework

Our quality framework follows industry standards expected by Megaworld for hotel projects:

- **Engineering quality:** all submittals pass internal peer review prior to issuance; all panel general arrangement drawings are signed off by the BMS engineer of record before fabrication.
- **Material quality:** Tier-1 brand selection, factory-tested controllers, FRLS-compliant cabling per fire code, IP54 indoor enclosures.
- **Installation quality:** site supervision by a BMS technician at all times during cable pulling and panel installation; daily quality logs maintained.
- **Commissioning quality:** P2P testing 100 % coverage of physical I/O; functional testing 100 % coverage of equipment; integrated commissioning of all cross-system sequences.
- **Documentation quality:** as-built drawings, O&M manuals, point database export, and programming/graphics archive delivered before handover acceptance.

9.2 Factory Acceptance Test

Prior to site mobilization, a Factory Acceptance Test is conducted at the BMS vendor's facility (week 5). The FAT covers:

- Demonstration of controller programming with simulated I/O
- Demonstration of representative graphics pages (home page, sample equipment popup, alarm summary)
- BACnet integration with a sample equipment vendor's panel (typically a chiller controller demo)
- Validation of redundancy failover at the head-end
- Acceptance signed by the customer's engineering representative

9.3 Site Acceptance Test

After integrated commissioning at week 15, the Site Acceptance Test (SAT) is conducted. The SAT covers:

- Full operator walkthrough of all graphic pages with the customer's chief engineer
- Live demonstration of three random equipment functional sequences
- Live demonstration of one cross-system integrated sequence (typically chiller plant staging)
- Demonstration of energy-savings algorithm with sample scenarios
- Alarm propagation and acknowledgment workflow
- Acceptance signed by the Owner's representative; warranty period commences

9.4 Warranty

The warranty period is **one year from manufacturer (per equipment vendor warranty)** plus **one year of on-site defect liability** by ourselves. During the on-site defect liability period:

- Site visits in response to fault calls within 24 hours of report
- Replacement of any defective BMS-supplied component at no charge
- Programming or graphics adjustments at no charge
- Software updates to the BMS server software within the manufacturer's release schedule
- Telephone support during business hours

Optional 1-year preventive-maintenance contract is available as an extension after the warranty period.

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10. Commercial Proposal

10.1 Pricing summary

Item	PHP
Base proposal cost (material + labor + services)	15,468,260
+ Overhead and margin (20%)	3,093,652

Item	PHP
+ Contingency reserve (7.5%)	1,113,715
Sub-total before VAT	19,675,627
+ VAT (12%)	2,361,075
GRAND TOTAL (VAT-inclusive, PHP)	** 22,036,702**

10.2 Cost breakdown by section

WBS	Section	Subtotal (PHP)	% of base
1.0	Project Management & Engineering	1,688,000	10.9%
2.0	Material Supply	10,829,165	70.0%
3.0	Installation	1,845,295	11.9%
4.0	Programming & Configuration	557,880	3.6%
5.0	Testing & Commissioning	456,720	3.0%
6.0	Training & Handover	91,200	0.6%
	Base total	** 15,468,260**	**100.0%**

10.3 Cost pool breakdown

Pool	Subtotal (PHP)	% of base
Material	9,883,165	63.9%
Labor	4,419,095	28.6%
Service/Lot	1,166,000	7.5%

10.4 Optional items (priced separately on request)

Item	Pricing basis
1-year preventive maintenance contract (post-	Quote on request

Item	Pricing basis
warranty)	
FDAS integration (subject to FDAS vendor specs)	Quote on request
PMS integration (guestroom occupancy → FCU control)	Quote on request, subject to FCU scope confirmation
Additional administrator training (8 hr session)	~PHP 30,000 per session
Vendor factory training (overseas)	Quote on request, varies by vendor and location
Spare-parts inventory beyond warranty stock	5% of critical-replacement items, quote on request

10.5 Payment milestones

We propose the following payment schedule (subject to customer's commercial terms):

Milestone	%	Trigger
Mobilization advance	10%	Upon PO + signed contract
Engineering complete	15%	Submittals approved (Week 4)
Long-lead materials delivered	25%	Site delivery (Weeks 5–6)
Standard materials delivered	20%	Site delivery (Weeks 6–7)
Installation complete	15%	Mech-ready at Week 12
T&C complete + SAT	10%	Customer SAT signed (Week 15)

Milestone	%	Trigger
Handover + warranty start	5%	Documentation accepted (Week 16)
Total	**100%**	

10.6 Validity and acceptance

This proposal is valid for **90 days** from the date of issue (2026-04-28).

To accept this proposal, please countersign the acceptance block in **Section 14** or issue your standard Purchase Order referencing this proposal document.

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11. Stated Assumptions

The following assumptions form the basis of this proposal. We have tagged them with their cost-impact-if-wrong so that you may readily identify which ones materially affect pricing or schedule. Should any need to be revised, we will gladly amend the proposal.

Project context assumptions:

1. **Project stage — Greenfield (new construction).** Our base proposal is priced for new-construction scope. *If retrofit elements are included, pricing is revised — typically +30% for demolition, hot cutover, and after-hours work.*
2. **Required project duration — 16 weeks from Purchase Order to Handover.** *If a shorter duration is required, we re-plan with augmented crew and overtime — typically +20–30% on labor.*
3. **Working hours — Standard daytime construction (8 am–5 pm Mon–Sat).** No night-work or special-access premium has been priced.
4. **Site mobilization access:** unobstructed access to all plant rooms and floors as MEP installation progresses, per standard greenfield sequencing.

Scope assumptions:

5. **BMS scope coverage — Per the project-specific points list (TUEC).** Items not in the points list (e.g., per-guestroom Fan-Coil Unit controls, domestic cold-water booster pumps) are *not* in our base scope. *If FCU scope is confirmed in scope, +30–40% on BMS scope.*

6. **Brand selection — Tier-1 BACnet/IP equipment per the BMS general specification.** *Specific brand will be selected per Megaworld portfolio standardization once confirmed.*
7. **Cable lengths — Estimated at 30 m average panel-to-device run plus 80 m horizontal trunk per floor.** Refinement is expected when complete architectural and mechanical layouts are made available.
8. **Quantity of BOH AHUs — Three units (CHWP-1.1/1.2/1.3) at Ground Level.** The TUEC tabulation indicates a total of ten BOH AHUs but only three are tag-listed. *Additional AHUs, if confirmed, are priced separately.*
9. **Plumbing pump status routing:** Lower-Ground pumps wired as hardwired DI, Roofdeck pumps via equipment-panel HLI. Total point count is unaffected; if assumption is revised, panel I/O module sizing may shift.
10. **Power metering — 13 multifunction meters (3 main + 10 sub-feeder).** *Refined upon receipt of complete electrical drawing set.*

Network and integration assumptions:

11. **Network architecture — Isolated BMS LAN, flat /24 subnet, single uplink to customer's corporate LAN.** No VLAN segmentation in base proposal.
12. **Integration scope — None with PMS / FDAS / CCTV / ACS in base proposal.** Each integration is available as a priced option.
13. **Customer LAN uplink:** Customer IT provides one 1 Gbps drop into the BMS server room with appropriate firewall rules.

Commercial assumptions:

14. **Payment terms:** 30-day net.
15. **Retention:** 10% retention released at handover.
16. **Warranty:** 1-year manufacturer warranty + 1-year on-site defect liability.
17. **Liquidated damages:** none included in base.
18. **Currency:** PHP-denominated.
19. **VAT:** 12% applied to the grand total per Philippine tax code.

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12. Risk Management

Our risk register identifies thirteen project risks, of which five are scored Medium/High likelihood × High impact (score 6/9). Our mitigation strategies are summarised below:

Risk	Likelihood × Impact	Mitigation
Scope expansion via FCU confirmation	M × H	Explicit FCU exclusion in inclusions; if confirmed, priced as discrete add-on with separate WBS branch and BOQ
Long-lead chiller controller / equipment delivery slip	M × H	Day-1 PO ordering; expedite premium budgeted as contingency; Tier-2 alternative supplier identified during RFQ
Existing BOH AHU schedule incomplete	H × M	Base scope covers 3 confirmed AHUs; 7 additional priced as option pending confirmation
MEP contractor sequencing delays	H × M	Weekly coordination meetings from Week 1; MEP hand-over dates submitted with engineering submittals; 1-week internal slack embedded in installation phase
Customer schedule pressure	M × H	Q-007 surfaced immediately; if shorter required, propose with

Risk	Likelihood × Impact	Mitigation
(< 16 weeks required)		explicit overtime + crew premium
Site survey discovers unforeseen conditions	L × H	Site survey before T&C; if retrofit, contingency reserve 5% in BOQ
FAT failure (programming bug)	L × M	Internal pre-FAT in vendor facility; 1-2 week recovery if needed
Brand standardization affects supplier lock-in	L × M	Multi-brand RFQ in Phase 9 (parallel quotes); flexibility in pricing
Commercial terms tighter than assumed	M × M	LD risk priced as 1–2% contingency
Insufficient cable length per A-001	L × M	Material BOQ +10% safety margin
Network/ IT firewall delays	M × L	IT coordination meeting in Week 4–5; BMS LAN can operate isolated for T&C if needed
Insufficient contingen	(always present)	7.5% contingency baked into the proposal

Risk	Likelihood × Impact	Mitigation
cy reserve		
FDAS / PMS / CCTV / ACS integration scope creep	M × M	Explicit exclusion in proposal; each integration offered as discrete priced option

13. Inclusions / Exclusions / Clarifications

13.1 Inclusions

Per Sections 4–9 (Project Understanding, Technical Proposal, Project Execution). All material supply, installation, programming, testing, commissioning, training, and warranty support for the BMS system as described.

13.2 Exclusions

The following are NOT in our base proposal scope. They are either supplied by other contractors, civil works, or hotel building systems beyond the BMS perimeter:

Item	Reason for exclusion
Mechanical equipment supply (chillers, cooling towers, pumps, AHUs, DOAS, PAHU, fans, calorifiers, heat pumps, recirculating pumps, boilers, ozonizers)	Mechanical Contractor / Equipment Supplier scope
Mechanical valves and	Mechanical Contractor scope

Item	Reason for exclusion
dampers (motorised iso valves, modulating CHW valves on AHUs/DOAS, OA/RA dampers)	
VFDs and motor starters	Equipment Supplier scope
Switchgear, MCCs, panelboards, breakers	Electrical Contractor scope
240 V power circuits to BMS panels and head-end UPS input	Electrical Contractor scope (per A7 schedule provided to EE)
Civil works (panel plinths, core drilling, server-room build-out, finishes)	Civil Contractor scope
FDAS integration	Excluded pending integration scope confirmation
PMS / CCTV / ACS integration	Excluded pending integration scope confirmation
Per-guestroom FCU controls	Excluded pending FCU scope confirmation
Domestic cold-water booster pump monitoring	Excluded pending Q-020
Demolition /	N/A for greenfield

Item	Reason for exclusion
removal of existing equipment	
1-year preventive maintenance contract	Available as priced option
Vendor factory training (overseas)	Available as priced option
Spare-parts inventory beyond warranty stock	Available on request

13.3 Clarifications (open items)

The following items have been assumed in this proposal at industry-standard practice; customer confirmation will refine the proposal. Each is listed with its priority and the default assumed.

P1 — Critical (cost-swing potential > 10%):

ID	Subject	Default assumed
Q-018	Project stage (greenfield vs. retrofit)	Greenfield, per technical documents
Q-007	Required completion duration	16 weeks from PO

P2 — Important (refines pricing):

ID	Subject	Default assumed
Q-001	Contracting entity	Megaworld Corporation
Q-005	Architectural floor plans	Cable lengths estimated per typical density
Q-008	Mechanical (HVAC) layout drawings	Equipment locations inferred from points list
Q-011	Complete electrical	Metering count assumed per construction-

ID	Subject	Default assumed
	drawing set	bulletin scope
Q-009	Working-hour constraints	Standard daytime greenfield construction

P3 — Useful (refines pricing precision):

ID	Subject	Default assumed
Q-003	TUEC project / contract code	Confirmed via document title
Q-004	Construction-bulletin completeness	Latest ‘for construction’ set assumed
Q-012	Integration scope (PMS, FDAS, CCTV, ACS)	None — isolated BMS LAN with single uplink
Q-013	Brand standardization / Megaworld portfolio	Tier-1 BACnet/IP brand per BMS spec
Q-014	Commercial terms	Standard local market
Q-015	Training scope	16-hr operator training included
Q-016	Maintenance contract scope	Not included; offered as option
Q-017	CONDOTELS standard vs. hotel-specific spec	CONDOTELS standard governs unless silent
Q-019	Per-guestroom FCU scope	Not in scope
Q-020	Domestic cold-water booster pump scope	Not in scope
Q-021	Complete BOH AHU schedule	Three confirmed at GND Level

14. Acceptance

We thank you for the opportunity to bid for this important project. Should you wish to accept this proposal, please countersign below or issue your standard Purchase Order referencing this document.

The undersigned acknowledges and accepts the terms and conditions stated in this proposal, including the stated assumptions in Section 11 and the inclusions/exclusions/clarifications in Section 13.

For [BMS Contractor]	**For Megaworld Corporation**
Signed: _____	Signed: _____
Name:	Name:
Title:	Title:
Date:	Date:

Appendix A — Detailed Bill of Quantities

This appendix provides the complete itemised Bill of Quantities, comprising **86 line items** across the seven WBS sections. Items flagged 'RFQ' are subject to refinement based on supplier quotations.

A.1 1.0 Project Management & Engineering

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
1.1	Project management (off-site, full duration, 16 weeks)	640	hr	1,500	960,000	
1.1	Site mobilization (week 1)	80	hr	1,500	120,000	
1.2	Engineering & design (system architecture, panel layouts, IO list, sequences,	320	hr	1,200	384,000	

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	network)					
1.3	Submittals & approvals administration	80	hr	1,200	96,000	
1.4	Factory Acceptance Test (FAT) delivery	1	lot	80,000	80,000	
1.4	FAT support hours (BMS engineer)	40	hr	1,200	48,000	
	Section subtotal				** 1,688,000**	

A.2 2.0 Material Supply

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
2.1.1	BMS Server (Primary) — dual-CPU, 16+ GB RAM, redundant PSU	1	each	350,000	350,000	Yes
2.1.1	BMS Server (Standby, redundancy)	1	each	350,000	350,000	Yes
2.1.2	Operator Workstation	2	each	80,000	160,000	Yes
2.1.3	Graphics PC + 55-inch Display	1	set	150,000	150,000	Yes
2.1.4	Head-End UPS (3 kVA, 30-min	1	each	90,000	90,000	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	runtime)					
2.1.5	Software licenses (server + 3 client + energy module + graphics editor)	1	lot	600,000	600,000	Yes
2.1.6	Server-room peripherals (KVM, console monitor, color laser printer, 19-inch rack)	1	lot	80,000	80,000	Yes
2.2.1	Core managed L2/L3 switch (24-port + 4 SFP)	1	each	120,000	120,000	Yes
2.2.2	Edge managed L2 switch (16-port + 2 SFP)	3	each	35,000	105,000	Yes
2.2.2	Edge managed L2 switch (8-port + 2 SFP)	3	each	18,000	54,000	Yes
2.2.3	Riser fiber, OM3 multimode 6-strand armored	300	m	280	84,000	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
2.2.3	Fiber transceivers (1G SX/LX, paired)	14	each	8,000	112,000	Yes
2.2.4	IDF wall-mount enclosures (9U)	6	each	18,000	108,000	Yes
2.3.1+2.3.2+2.3.3+2.3.4	BMS field cabinet (small, IP54 wall-mount)	10	each	40,000	400,000	Yes
2.3.1+2.3.2+2.3.3+2.3.4	BMS field cabinet (medium, IP54 wall-mount)	6	each	80,000	480,000	Yes
2.3.1+2.3.2+2.3.3+2.3.4	BMS field cabinet (large, IP54 wall-mount)	2	each	150,000	300,000	Yes
2.3.5	DDC controllers (incl. network gateway controllers)	30	each	90,000	2,700,000	Yes
2.3.5	AI input modules (16-channel)	16	each	40,000	640,000	Yes
2.3.	AO output	5	each	45,000	225,000	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
5	modules (16-channel)					
2.3.5	DI input modules (32-channel)	11	each	30,000	330,000	Yes
2.3.5	DO output modules (16-channel)	2	each	35,000	70,000	Yes
2.3.5	24VDC switching power supplies (5A, redundant for 6 critical panels)	24	each	8,000	192,000	Yes
2.3.5	Terminal blocks (push-in 2.5 mm²)	900	each	80	72,000	Yes
2.3.5	Surge protection (signal-level SPD)	36	each	5,000	180,000	Yes
2.3.5	Cable management hardware (DIN rail, ducts, ferrules) per panel	18	lot	8,000	144,000	Yes
2.4.1	Temperature sensor — immersion/thermowell (water-side)	12	each	4,500	54,000	Yes
2.4.	Temperature	50	each	3,000	150,000	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
1	sensor — duct insertion					
2.4.1	Temperature sensor — outdoor (weatherproof)	1	each	6,000	6,000	Yes
2.4.2	Humidity sensor (duct/outdoor)	24	each	6,500	156,000	Yes
2.4.3	Pressure sensor — water-side	6	each	8,000	48,000	Yes
2.4.3	Differential pressure sensor (CHW header)	1	each	12,000	12,000	Yes
2.4.3	Pressure sensor — duct static	4	each	8,000	32,000	Yes
2.4.4	Flow sensor — water (insertion)	9	each	25,000	225,000	Yes
2.4.4	BTU meter (ultrasonic, Modbus)	1	each	80,000	80,000	Yes
2.4.5	Modulating valve actuator (BMS-supplied for CHW bypass)	1	each	12,000	12,000	Yes
2.4.	CO2 sensor	5	each	8,000	40,000	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
8	(duct return)					
2.4.8	CO sensor (duct return, casino)	2	each	10,000	20,000	Yes
2.4.8	VOC sensor (ozonizer return)	2	each	12,000	24,000	Yes
2.4	Mounting brackets, thermowells, valve fittings	1	lot	2,000	2,000	Yes
2.5.1	Tank temperature sensor (calorifiers)	6	each	3,500	21,000	Yes
2.5.2	HW header temperature sensors (supply/return/MUCW)	6	each	4,500	27,000	Yes
2.5.3	Pump aux-contact wiring kits (heat pumps + recirc pumps)	12	each	1,500	18,000	Yes
2.5.4	Boiler steam pressure sensor	2	each	12,000	24,000	Yes
2.5.4	Boiler feedwater temperature sensor	2	each	4,500	9,000	Yes
2.5.4	Boiler fluegas temperature	2	each	8,000	16,000	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	sensor (high-temp)					
2.5.4	Boiler fluegas O2 sensor (zirconia)	2	each	30,000	60,000	Yes
2.5.4	Boiler motorized blowdown valve (BMS-supplied actuator)	2	each	18,000	36,000	Yes
2.6.1	Multifunction power meter (Main switchgear class)	3	each	90,000	270,000	Yes
2.6.1	Multifunction power meter (Sub-feeder class)	10	each	35,000	350,000	Yes
2.6.2	Current transformers (split-core, sized per ampacity)	39	each	4,000	156,000	Yes
2.6.4	Modbus serial-to-IP gateway	2	each	25,000	50,000	Yes
2.6	Modbus shielded TP cable	300	m	80	24,000	Yes
2.7.1	4C × 1.5 mm² shielded FRLS control/signal	3949	m	95	375,155	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	cable					
2.7.1	6C × 1.5 mm² shielded FRLS (where conductor count > 4)	343	m	130	44,590	Yes
2.7.2	BACnet MS/TP shielded TP cable (low-cap)	150	m	90	13,500	Yes
2.7.3	Cat6 4P × 23 AWG U/UTP FRLS cable	700	m	90	63,000	Yes
2.7.5	Conduit (PVC HW 25 mm)	1551	m	120	186,120	Yes
2.7	3C × 2.5 mm² FRLS panel power feed cable	80	m	110	8,800	Yes
2.7.6	Cable identification (labels, ferrules, marker tags) — full project lot	1	lot	30,000	30,000	Yes
2.7.5	Cable management (junction boxes, cable ties) per panel field	18	lot	5,000	90,000	Yes
	Section subtotal				** 10,829,165**	

A.3 3.0 Installation

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
3.0	Installation labor — Wireman / Electrician (cable pulling, conduit, panel install, terminations)	2295.5	hr	350	803,425	
3.0	Installation labor — BMS Technician (testing, pre-comm)	882.9	hr	700	618,030	
3.0	Installation labor — Engineer / Supervisor (oversight, fault resolution)	353.2	hr	1,200	423,840	
	Section subtotal				** 1,845,295**	

A.4 4.0 Programming & Configuration

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
4.1	Controller programming (point database, control loops, schedules, alarms, reports,	233.9	hr	1,200	280,680	

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	trends)					
4.2	Graphics development (35 pages: navigation, floor, system, popups, alarm, trend, reports)	252	hr	1,100	277,200	
	Section subtotal				** 557,880**	

A.5 5.0 Testing & Commissioning

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
5.1	Pre-commissioning (cable continuity, megger, panel power-up smoke test) — covered in B4	0	lot	0	0	
5.2	Point-to-point (P2P) testing	84.1	hr	700	58,870	
5.3	Functional testing per equipment	163.5	hr	700	114,450	
5.4	Integrated commissioning (cross-system sequences, energy	32	hr	1,200	38,400	

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	savings)					
5.5	Owner T&C / SAT support (1 week)	40	hr	1,200	48,000	
5.6	Snagging / punch-list resolution	30	hr	700	21,000	
5.7	As-built documentation package (drawings, O&M, point database, programming archive)	1	lot	80,000	80,000	
5.7	As-built documentation engineer hours	80	hr	1,200	96,000	
	Section subtotal				** 456,720**	

A.6 6.0 Training & Handover

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
6.1	Operator training — on-site, 16 hours over 2 days, up to 6 operators	1	lot	60,000	60,000	
6.1	Training delivery hours (1 trainer × 16	16	hr	1,200	19,200	

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	hr)					
6.3	Documentation handover (formal, with sign-off)	8	hr	1,500	12,000	
	Section subtotal				** 91,200**	

A.7 7.0 Optional / Out-of-scope

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
7.1	[OPTION] 1-year preventive maintenance contract (post-warranty)	1	yr	0	0	Yes
7.2	[OPTION] Additional administrator training (8 hr session)	0	lot	30,000	0	
7.3	[OPTION] FDAS integration (BACnet/Modbus from fire panel + smoke control sequences)	0	lot	0	0	Yes
7.4	[OPTION] PMS integration	0	lot	0	0	Yes

WBS	Description	Qty	Unit	Unit Price (PHP)	Extended (PHP)	RFQ
	(guestroom occupancy → BMS for FCU control)					
	Section subtotal				** 0**	

Appendix B — Equipment Takeoff

The complete equipment takeoff below lists each of the **109 BMS-monitored equipment instances** with location, panel assignment, primary supplier, and BMS-side I/O point counts.

B.1 Summary

Equipment Class	Count
Exhaust Fan (General)	32
Exhaust Fan (Toilet)	15
AHU (Chilled-Water-Served)	12
Precooled Air Handling Unit	8
Multifunction Power Meter (Feeder)	5
Chiller (Package Water-Cooled)	3
Condenser Water Pump	3
Cooling Tower	3
Secondary CHW Pump	3
Air Ionizer (Casino)	2
DOAS Unit	2
Heat Pump	2
Hot Water Header Set	2
Calorifier (Hot Water Storage Tank)	2
Primary CHW Pump	2

Equipment Class	Count
Recirculating Pump	2
Steam Boiler	2
CHW Bypass Header	1
CHW Return Main Header	1
CHW Supply Main Header	1
Cooling Tower (Common)	1
Condenser Water Header	1
DOAS Unit (Casino — with CO/VOC)	1
FACP Gateway	1
Multifunction Power Meter (Main)	1
Primary CHW Pump (Standby)	1
Total instances	**109**

B.2 Detailed equipment list

ID	Equipment Class	Location	Panel	Primary C/O	I/O
AHU-1.1	AHU (Chilled-Water-Served)	Ground Floor BOH	DDC-GF-BOH	Equipment Supplier	15
AHU-1.2	AHU (Chilled-Water-Served)	Ground Floor BOH	DDC-GF-BOH	Equipment Supplier	15
AHU-1.3	AHU (Chilled-Water-Served)	Ground Floor BOH	DDC-GF-BOH	Equipment Supplier	15
AHU-2M.1	AHU (Chilled-Water-Served)	2nd Mezzanine (Casino)	DDC-2M-CASINO	Equipment Supplier	15
AHU-2M.2	AHU (Chilled-Water-Served)	2nd Mezzanine (Casino)	DDC-2M-CASINO	Equipment Supplier	15

ID	Equipment Class	Location	Panel	Primary C/O	I/O
AHU-B.1	AHU (Chilled-Water-Served)	2nd Level BOH	DDC-2F-BOH	Equipment Supplier	15
AHU-B.2	AHU (Chilled-Water-Served)	2nd Level BOH	DDC-2F-BOH	Equipment Supplier	15
AHU-B.3	AHU (Chilled-Water-Served)	2nd Level BOH	DDC-2F-BOH	Equipment Supplier	15
AHU-EL	AHU (Chilled-Water-Served)	2nd Level Executive Lounge	DDC-2F-BOH	Equipment Supplier	15
AHU-FR2	AHU (Chilled-Water-Served)	2nd Level Function Room 2	DDC-2F-BOH	Equipment Supplier	15
AHU-FR3	AHU (Chilled-Water-Served)	2nd Level Function Room 3	DDC-2F-BOH	Equipment Supplier	15
AHU-PF	AHU (Chilled-Water-Served)	2nd Level Pre-Function	DDC-2F-BOH	Equipment Supplier	15
AIR-ION-2M.1	Air Ionizer (Casino)	2nd Mezzanine (Casino)	DDC-2M-CASINO	Equipment Supplier	4
AIR-ION-2M.2	Air Ionizer (Casino)	2nd Mezzanine (Casino)	DDC-2M-CASINO	Equipment Supplier	4
CH-1	Chiller (Package Water-Cooled)	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	28

ID	Equipment Class	Location	Panel	Primary C/O	I/O
CH-2	Chiller (Package Water-Cooled)	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	28
CH-3	Chiller (Package Water-Cooled)	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	28
CHW-DIFF	CHW Bypass Header	2nd Level Chiller Room	DDC-2F-CHILLER	BMS Contractor	3
CHW-RET-HDR	CHW Return Main Header	2nd Level Chiller Room	DDC-2F-CHILLER	BMS Contractor	2
CHW-SUP-HDR	CHW Supply Main Header	2nd Level Chiller Room	DDC-2F-CHILLER	BMS Contractor	2
COWP-1	Condenser Water Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	4
COWP-2	Condenser Water Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	4
COWP-3	Condenser Water Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	4
CT-1	Cooling Tower	Roof Deck	DDC-RD-PLANT	BMS Contractor	9
CT-2	Cooling Tower	Roof Deck	DDC-RD-	BMS Contractor	9

ID	Equipment Class	Location	Panel	Primary C/O	I/O
			PLANT		
CT-3	Cooling Tower	Roof Deck	DDC-RD-PLANT	BMS Contractor	9
CT-COMMON	Cooling Tower (Common)	Roof Deck	DDC-RD-PLANT	BMS Contractor	4
CW-HDR	Condenser Water Header	Roof Deck CT Area	DDC-RD-PLANT	BMS Contractor	2
DOAS-2M	DOAS Unit (Casino — with CO/VOC)	2nd Mezzanine (Casino)	DDC-2M-CASINO	Equipment Supplier	22
DOAS-RD.1	DOAS Unit	Roof Deck	DDC-RD-PLANT	Equipment Supplier	25
DOAS-RD.2	DOAS Unit	Roof Deck	DDC-RD-PLANT	Equipment Supplier	25
EF-1	Exhaust Fan (General)	Roof Deck	DDC-RD-PLANT	Equipment Supplier	3
EF-2.1	Exhaust Fan (General)	2nd Floor	DDC-2F-BOH	Equipment Supplier	3
EF-2.2	Exhaust Fan (General)	2nd Floor	DDC-2F-BOH	Equipment Supplier	3
EF-2.3	Exhaust Fan (General)	2nd Floor	DDC-2F-BOH	Equipment Supplier	3
EF-2.4	Exhaust Fan (General)	2nd Floor	DDC-2F-BOH	Equipment Supplier	3
EF-	Exhaust Fan (General)	2nd Floor	DDC-2F-	Equipment	3

ID	Equipment Class	Location	Panel	Primary C/O	I/O
2B.1		BOH	BOH	Supplier	
EF-2B.2	Exhaust Fan (General)	2nd Floor BOH	DDC-2F-BOH	Equipment Supplier	3
EF-3.1	Exhaust Fan (General)	3rd Floor	DDC-3F	Equipment Supplier	3
EF-3.2	Exhaust Fan (General)	3rd Floor	DDC-3F	Equipment Supplier	3
EF-3.3	Exhaust Fan (General)	3rd Floor	DDC-3F	Equipment Supplier	3
EF-3.4	Exhaust Fan (General)	3rd Floor	DDC-3F	Equipment Supplier	3
EF-3B-G	Exhaust Fan (General)	3rd Floor BOH	DDC-3F	Equipment Supplier	3
EF-3C.1-G	Exhaust Fan (General)	3rd Floor	DDC-3F	Equipment Supplier	3
EF-B.1	Exhaust Fan (General)	Basement	DDC-B1-BOH	Equipment Supplier	3
EF-B.2	Exhaust Fan (General)	Basement	DDC-B1-BOH	Equipment Supplier	3
EF-BR.1	Exhaust Fan (General)	Basement Battery Room	DDC-B1-BOH	Equipment Supplier	3
EF-BR.2	Exhaust Fan (General)	Basement Battery Room	DDC-B1-BOH	Equipment Supplier	3
EF-BS.1	Exhaust Fan (General)	Basement Service	DDC-B1-BOH	Equipment Supplier	3
EF-BS.2	Exhaust Fan (General)	Basement Service	DDC-B1-BOH	Equipment Supplier	3

ID	Equipment Class	Location	Panel	Primary C/O	I/O
EF-FOST.1	Exhaust Fan (General)	Basement FOST Room	DDC-B1-BOH	Equipment Supplier	3
EF-GL.1	Exhaust Fan (General)	Basement Garbage Lobby	DDC-B1-BOH	Equipment Supplier	3
EF-GL.2	Exhaust Fan (General)	Basement Garbage Lobby	DDC-B1-BOH	Equipment Supplier	3
EF-GS.1	Exhaust Fan (General)	2nd Floor General Service	DDC-2F-BOH	Equipment Supplier	3
EF-GS.2	Exhaust Fan (General)	2nd Floor General Service	DDC-2F-BOH	Equipment Supplier	3
EF-MFR.1	Exhaust Fan (General)	Basement Main Fire Riser	DDC-B1-BOH	Equipment Supplier	3
EF-MP.1	Exhaust Fan (General)	Basement Mech / Pump	DDC-B1-BOH	Equipment Supplier	3
EF-OHRv2	Exhaust Fan (General)	2nd Floor OHR	DDC-2F-BOH	Equipment Supplier	3
EF-PR.1	Exhaust Fan (General)	Basement Pump Room	DDC-B1-BOH	Equipment Supplier	3
EF-PR.3	Exhaust Fan (General)	Basement Pump Room	DDC-B1-BOH	Equipment Supplier	3
EF-RD.1	Exhaust Fan (General)	Roof Deck	DDC-RD-PLANT	Equipment Supplier	3
EF-RO.	Exhaust Fan (General)	Roof Deck	DDC-RD-	Equipment Supplier	3

ID	Equipment Class	Location	Panel	Primary C/O	I/O
2			PLANT		
EF-WS.1	Exhaust Fan (General)	Basement Wash Service	DDC-B1-BOH	Equipment Supplier	3
FACP-GW	FACP Gateway	Ground Floor Fire Command Center	DDC-GF-BOH	EE Contractor	4
HP-HZ	Heat Pump	Roof Deck HWL Area	DDC-RD-PLANT	Equipment Supplier	3
HP-LZ	Heat Pump	Lower Ground HWL Room	DDC-LG-PLANT	Equipment Supplier	3
HWH-HZ	Hot Water Header Set	Roof Deck HWL Area	DDC-RD-PLANT	BMS Contractor	3
HWH-LZ	Hot Water Header Set	Lower Ground HWL Room	DDC-LG-PLANT	BMS Contractor	3
HWT-HZ	Calorifier (Hot Water Storage Tank)	Roof Deck HWL Area	DDC-RD-PLANT	BMS Contractor	1
HWT-LZ	Calorifier (Hot Water Storage Tank)	Lower Ground HWL Room	DDC-LG-PLANT	BMS Contractor	1
MPM-AHU-2F	Multifunction Power Meter (Feeder)	2nd Level AHU MCC	DDC-2F-BOH	BMS Contractor	2
MPM-AHU-	Multifunction Power Meter (Feeder)	Ground Floor AHU MCC	DDC-GF-BOH	BMS Contractor	2

ID	Equipment Class	Location	Panel	Primary C/O	I/O
GF					
MPM-CHILLER	Multifunction Power Meter (Feeder)	2nd Level Chiller MCC	DDC-2F-CHILLER	BMS Contractor	2
MPM-LIGHT-A	Multifunction Power Meter (Feeder)	Lower Ground Lighting Panel A	DDC-LG-PLANT	BMS Contractor	2
MPM-LIGHT-B	Multifunction Power Meter (Feeder)	Lower Ground Lighting Panel B	DDC-LG-PLANT	BMS Contractor	2
MPM-MAIN	Multifunction Power Meter (Main)	Lower Ground Main Switchroom	DDC-LG-PLANT	BMS Contractor	2
PAHU-0.1	Precooled Air Handling Unit	Basement	DDC-B1-BOH	Equipment Supplier	12
PAHU-B.1	Precooled Air Handling Unit	2nd Level BOH	DDC-2F-BOH	Equipment Supplier	12
PAHU-B.2	Precooled Air Handling Unit	2nd Level BOH	DDC-2F-BOH	Equipment Supplier	12
PAHU-B.3	Precooled Air Handling Unit	2nd Level BOH	DDC-2F-BOH	Equipment Supplier	12
PAHU-FR	Precooled Air Handling Unit	2nd Level Function Rooms	DDC-2F-BOH	Equipment Supplier	12
PA	Precooled Air	2nd Level	DDC-2F-	Equipment	12

ID	Equipment Class	Location	Panel	Primary C/O	I/O
HU-PF	Handling Unit	Pre-Function	BOH	Supplier	
PA HU-r.1	Precooled Air Handling Unit	Roof Deck	DDC-RD-PLANT	Equipment Supplier	12
PA HU-r.2	Precooled Air Handling Unit	Roof Deck	DDC-RD-PLANT	Equipment Supplier	12
PC HW P-1	Primary CHW Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	8
PC HW P-2	Primary CHW Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	8
PC HW P-3	Primary CHW Pump (Standby)	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	4
RP-HZ	Recirculating Pump	Roof Deck HWL Area	DDC-RD-PLANT	Equipment Supplier	3
RP-LZ	Recirculating Pump	Lower Ground HWL Room	DDC-LG-PLANT	Equipment Supplier	3
SB-1	Steam Boiler	Lower Ground Boiler Room	DDC-LG-PLANT	Equipment Supplier	17
SB-2	Steam Boiler	Lower Ground Boiler Room	DDC-LG-PLANT	Equipment Supplier	17
SC HW P-1	Secondary CHW Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	7
SC HW P-2	Secondary CHW Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	7

ID	Equipment Class	Location	Panel	Primary C/O	I/O
SCHWP-3	Secondary CHW Pump	2nd Level Chiller Room	DDC-2F-CHILLER	Equipment Supplier	7
TEF-1.1	Exhaust Fan (Toilet)	GF Main Lobby Toilet	DDC-GF-BOH	Equipment Supplier	3
TEF-1.2	Exhaust Fan (Toilet)	GF Main Lobby Toilet	DDC-GF-BOH	Equipment Supplier	3
TEF-1.3	Exhaust Fan (Toilet)	GF Main Lobby Toilet	DDC-GF-BOH	Equipment Supplier	3
TEF-1.4	Exhaust Fan (Toilet)	GF Main Lobby Toilet	DDC-GF-BOH	Equipment Supplier	3
TEF-2.1	Exhaust Fan (Toilet)	2nd Floor Toilet	DDC-2F-BOH	Equipment Supplier	3
TEF-2.2	Exhaust Fan (Toilet)	2nd Floor Toilet	DDC-2F-BOH	Equipment Supplier	3
TEF-2B.3	Exhaust Fan (Toilet)	2nd Floor BOH Toilet	DDC-2F-BOH	Equipment Supplier	3
TEF-30.20	Exhaust Fan (Toilet)	3rd Floor Toilet	DDC-3F	Equipment Supplier	3
TEF-3A.1	Exhaust Fan (Toilet)	3rd Floor Amenity Toilet	DDC-3F	Equipment Supplier	3
TEF-3A.2	Exhaust Fan (Toilet)	3rd Floor Amenity Toilet	DDC-3F	Equipment Supplier	3
TEF-3B	Exhaust Fan (Toilet)	3rd Floor Toilet	DDC-3F	Equipment Supplier	3
TEF-	Exhaust Fan (Toilet)	3rd Floor Toilet	DDC-3F	Equipment Supplier	3

ID	Equipment Class	Location	Panel	Primary C/O	I/O
3C.1					
TEF-3C.2	Exhaust Fan (Toilet)	3rd Floor Toilet	DDC-3F	Equipment Supplier	3
TEF-B.1	Exhaust Fan (Toilet)	Basement Toilet	DDC-B1-BOH	Equipment Supplier	3
TEF-B.2	Exhaust Fan (Toilet)	Basement Toilet	DDC-B1-BOH	Equipment Supplier	3

Appendix C — Cable Schedule Summary

Total cable footage: **5,173 m** across 205 field cables, 7 trunks, and 8 power feeds.

C.1 Field cable summary by panel

Panel	Field cable length (m)
DDC-2F-BOH	61
DDC-RD-PLANT	34
DDC-2F-CHILLER	29
DDC-B1-BOH	20
DDC-GF-BOH	18
DDC-2M-CASINO	18
DDC-LG-PLANT	13
DDC-3F	12

C.2 Trunk and backbone cabling

ID	From	To	Cable type	Length (m)
T0206	BMS Server Room (head-end)	All BMS panels at 2nd Floor	Cat6 4P × 23 AWG U/UTP, FRLS jacket (BACnet/IP) — riser fibe…	80
T0207	BMS	All	Cat6 4P × 23 AWG	80

ID	From	To	Cable type	Length (m)
	Server Room (head-end)	BMS panels at 3rd Floor	U/UTP, FRLS jacket (BACnet/IP) — riser fibe…	
T0208	BMS Server Room (head-end)	All BMS panels at Basement	Cat6 4P × 23 AWG U/UTP, FRLS jacket (BACnet/IP) — riser fibe…	80
T0209	BMS Server Room (head-end)	All BMS panels at Ground	Cat6 4P × 23 AWG U/UTP, FRLS jacket (BACnet/IP) — riser fibe…	80
T0210	BMS Server Room (head-end)	All BMS panels at Lower Ground	Cat6 4P × 23 AWG U/UTP, FRLS jacket (BACnet/IP) — riser fibe…	80
T0211	BMS Server Room (head-end)	BMS panel controllers (per topology id mstp_field_backbone)	BACnet MS/TP shielded twisted-pair trunk, 1pr × 22 AWG low-c…	250
T0212	BMS Server Room	BMS panel contro	BACnet MS/TP shielded twisted-pair trunk, 1pr × 22 AWG low-c…	150

ID	From	To	Cable type	Length (m)
	(head-end)	llers (per topology id bacnet_ip_backbone)		

Appendix D — Programming Object and Commissioning Inventory

D.1 Programming object summary

Object class	Count	Programming hours
Point database	702	70.2
Control loops	41	82.0
Alarms	71	10.7
Trends	520	52.0
Schedules	8	4.0
Reports	10	15.0
Total	**1,352**	**233.9**

D.2 Control loop inventory

Equipment instances requiring programmed control sequences:

Equipment	Class	Location
AHU-1.1	AHU (Chilled-Water-Served)	Ground Floor BOH
AHU-1.2	AHU (Chilled-Water-Served)	Ground Floor BOH
AHU-1.3	AHU (Chilled-Water-Served)	Ground Floor BOH
AHU-2M.1	AHU (Chilled-Water-	2nd Mezzanine

Equipment	Class	Location
	Served)	(Casino)
AHU-2M.2	AHU (Chilled-Water-Served)	2nd Mezzanine (Casino)
AHU-B.1	AHU (Chilled-Water-Served)	2nd Level BOH
AHU-B.2	AHU (Chilled-Water-Served)	2nd Level BOH
AHU-B.3	AHU (Chilled-Water-Served)	2nd Level BOH
AHU-EL	AHU (Chilled-Water-Served)	2nd Level Executive Lounge
AHU-FR2	AHU (Chilled-Water-Served)	2nd Level Function Room 2
AHU-FR3	AHU (Chilled-Water-Served)	2nd Level Function Room 3
AHU-PF	AHU (Chilled-Water-Served)	2nd Level Pre-Function
CH-1	Chiller (Package Water-Cooled)	2nd Level Chiller Room
CH-2	Chiller (Package Water-Cooled)	2nd Level Chiller Room
CH-3	Chiller (Package Water-Cooled)	2nd Level Chiller Room
CHW-DIFF	CHW Bypass Header	2nd Level Chiller Room
COWP-1	Condenser Water Pump	2nd Level Chiller Room
COWP-2	Condenser Water Pump	2nd Level Chiller Room
COWP-3	Condenser Water Pump	2nd Level Chiller Room
CT-1	Cooling Tower	Roof Deck
CT-2	Cooling Tower	Roof Deck
CT-3	Cooling Tower	Roof Deck

Equipment	Class	Location
DOAS-RD.1	DOAS Unit	Roof Deck
DOAS-RD.2	DOAS Unit	Roof Deck
HP-HZ	Heat Pump	Roof Deck HWL Area
HP-LZ	Heat Pump	Lower Ground HWL Room
PAHU-0.1	Precooled Air Handling Unit	Basement
PAHU-B.1	Precooled Air Handling Unit	2nd Level BOH
PAHU-B.2	Precooled Air Handling Unit	2nd Level BOH
PAHU-B.3	Precooled Air Handling Unit	2nd Level BOH
PAHU-FR	Precooled Air Handling Unit	2nd Level Function Rooms
PAHU-PF	Precooled Air Handling Unit	2nd Level Pre-Function
PAHU-r.1	Precooled Air Handling Unit	Roof Deck
PAHU-r.2	Precooled Air Handling Unit	Roof Deck
PCHWP-1	Primary CHW Pump	2nd Level Chiller Room
PCHWP-2	Primary CHW Pump	2nd Level Chiller Room
PCHWP-3	Primary CHW Pump (Standby)	2nd Level Chiller Room
RP-HZ	Recirculating Pump	Roof Deck HWL Area
RP-LZ	Recirculating Pump	Lower Ground HWL Room
SB-1	Steam Boiler	Lower Ground Boiler Room
SB-2	Steam Boiler	Lower Ground Boiler Room

D.3 Commissioning point inventory

Test category	Count	Commissioning hours
P2P (point-to-point)	561	84.1
Functional tests	109	163.5
Integrated sequences	8	32.0
Total	**678**	**279.6**

Appendix E — Panel Schedule (Detailed)

Per-panel I/O density, controller count, network drops, and equipment instances served:

DDC-2F-BOH — 2nd Floor / 2nd Floor BOH / 2nd Floor BOH Toilet / 2nd Floor General Service / 2nd Floor OHR / 2nd Floor Toilet / 2nd Level AHU MCC / 2nd Level BOH / 2nd Level Executive Lounge / 2nd Level Function Room 2 / 2nd Level Function Room 3 / 2nd Level Function Rooms / 2nd Level Pre-Function

- **Equipment served:** 25 instances — AHU-B.1, AHU-B.2, AHU-B.3, AHU-EL, AHU-FR2, AHU-FR3, AHU-PF, EF-2.1, …
- **System scope:** AC, EL, VENT
- **I/O summary:** 165 physical · 25 HLI · 13 Network · 203 total
- **Controller estimate:** 5 DDC + 1 gateway = 5 controllers
- **Power estimate:** 190 W
- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

DDC-2F-CHILLER — 2nd Level Chiller MCC / 2nd Level Chiller Room

- **Equipment served:** 16 instances — CH-1, CH-2, CH-3, CHW-DIFF, CHW-RET-HDR, CHW-SUP-HDR, COWP-1, COWP-2, …
- **System scope:** AC, EL
- **I/O summary:** 72 physical · 65 HLI · 9 Network · 146 total
- **Controller estimate:** 2 DDC + 1 gateway = 2 controllers
- **Power estimate:** 95 W

- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

DDC-2M-CASINO — 2nd Mezzanine (Casino)

- **Equipment served:** 5 instances — AHU-2M.1, AHU-2M.2, AIR-ION-2M.1, AIR-ION-2M.2, DOAS-2M
- **System scope:** AC, VENT
- **I/O summary:** 47 physical · 8 HLI · 5 Network · 60 total
- **Controller estimate:** 2 DDC + 1 gateway = 2 controllers
- **Power estimate:** 75 W
- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

DDC-3F — 3rd Floor / 3rd Floor Amenity Toilet / 3rd Floor BOH / 3rd Floor Toilet

- **Equipment served:** 12 instances — EF-3.1, EF-3.2, EF-3.3, EF-3.4, EF-3B-G, EF-3C.1-G, TEF-30.20, TEF-3A.1, …
- **System scope:** VENT
- **I/O summary:** 36 physical · 0 HLI · 0 Network · 36 total
- **Controller estimate:** 1 DDC + 0 gateway = 1 controllers
- **Power estimate:** 25 W
- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

DDC-B1-BOH — Basement / Basement Battery Room / Basement FOST Room / Basement Garbage Lobby / Basement Main Fire Riser / Basement Mech / Pump / Basement Pump Room / Basement Service / Basement Toilet / Basement Wash Service

- **Equipment served:** 17 instances — EF-B.1, EF-B.2, EF-BR.1, EF-BR.2, EF-BS.1, EF-BS.2, EF-FOST.1, EF-GL.1, …
- **System scope:** VENT
- **I/O summary:** 57 physical · 2 HLI · 1 Network · 60 total
- **Controller estimate:** 2 DDC + 1 gateway = 2 controllers
- **Power estimate:** 55 W
- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

DDC-GF-BOH — GF Main Lobby Toilet / Ground Floor AHU MCC / Ground Floor BOH / Ground Floor Fire Command Center

- **Equipment served:** 9 instances — AHU-1.1, AHU-1.2, AHU-1.3, FACP-GW, MPM-AHU-GF, TEF-1.1, TEF-1.2, TEF-1.3, …
- **System scope:** AC, EL, FDAS, VENT
- **I/O summary:** 48 physical · 10 HLI · 5 Network · 63 total
- **Controller estimate:** 2 DDC + 1 gateway = 2 controllers
- **Power estimate:** 75 W
- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

DDC-LG-PLANT — Lower Ground Boiler Room / Lower Ground HWL Room / Lower Ground Lighting Panel A / Lower Ground Lighting Panel B / Lower Ground Main Switchroom

- **Equipment served:** 9 instances — HP-LZ, HWH-LZ, HWT-LZ, MPM-LIGHT-A, MPM-LIGHT-B, MPM-MAIN, RP-LZ, SB-1, …
- **System scope:** EL, HWL, VENT
- **I/O summary:** 26 physical · 19 HLI · 5 Network · 50 total
- **Controller estimate:** 1 DDC + 1 gateway = 2 controllers
- **Power estimate:** 75 W
- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

DDC-RD-PLANT — Roof Deck / Roof Deck CT Area / Roof Deck HWL Area

- **Equipment served:** 16 instances — CT-1, CT-2, CT-3, CT-COMMON, CW-HDR, DOAS-RD.1, DOAS-RD.2, EF-1, …
- **System scope:** AC, HWL, VENT
- **I/O summary:** 110 physical · 12 HLI · 4 Network · 126 total
- **Controller estimate:** 3 DDC + 1 gateway = 3 controllers
- **Power estimate:** 95 W
- **Enclosure:** Wall-mount IP54 metal cabinet, sized per controller count + 30% spare

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Appendix F — Customer Clarification Request List (RFI)

The following clarifications, if answered, will allow us to refine our proposal further. Items are grouped by priority and tagged with the recipient discipline.

P1 — Critical (cost-swing potential > 10%, please prioritize):

ID	Question	Default assumed
Q-018	Confirm project is greenfield (cover letter said ‘rehabilitation’).	Greenfield, per technical documents
Q-007	What is the required project completion date or duration?	16 weeks from PO

P2 — Important (refines pricing):

ID	Question	Default assumed
Q-001	Confirm contracting entity (cover letter does not name requesting party).	Megaworld Corporation
Q-005	Please share the complete architectural floor-plan set.	Cable lengths per typical density
Q-008	Please share the mechanical (HVAC) layout drawings.	Plant-room cable runs and control wiring estimated
Q-011	Please share the complete electrical drawing set.	Power metering per A-EE-001
Q-009	Confirm working-hour constraints.	Standard daytime construction

P3 — Useful (refines pricing precision):

ID	Question	Default assumed
Q-003	Confirm ‘TUEC’ project / contract code.	Confirmed via document title

ID	Question	Default assumed
Q-004	Confirm complete latest ‘for construction’ set.	Bulletin No.8 + standard set
Q-012	Network/IT integration scope.	None in base; integrations as options
Q-013	Brand preferences / Megaworld portfolio standardization.	Tier-1 BACnet/IP
Q-014	Commercial terms (payment, retention, warranty, LD, currency).	Standard local market
Q-015	Training scope.	16-hr operator training included
Q-016	Maintenance contract scope.	Not included; offered as option
Q-017	Hotel scope vs. CONDOTELS standard.	CONDOTELS governs
Q-019	Per-guestroom FCU scope.	Not in scope
Q-020	Domestic cold-water booster pump scope.	Not in scope
Q-021	Complete BOH AHU schedule (only 3 of 10 location-tagged in points list).	3 confirmed

End of proposal. Editable BOQ and supporting working documents are in the accompanying Excel and Word files.