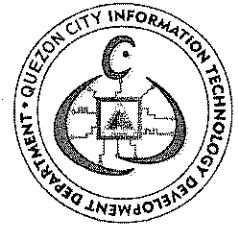


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PROJECT TERMS OF REFERENCE

**TITLE: SUPPLY, DELIVERY, INSTALLATION, CONFIGURATION, TESTING &
COMMISSIONING OF THE QUEZON CITY HALL COMPOUND FIBER BACKBONE
DATA NETWORK**

I. RATIONALE AND BACKGROUND

After having efficiently employed IT-based technologies since the previous decade, the Quezon City Government workforce has quantitatively increased its dependence on such technologies. However, connectivity has been the key component for the operational capability of using such technologies since and will be in the near future. Since the number of IT equipment users have exponentially grown since 2003, the requirement for a 10 gigabit fiber-optic cable-based data network backbone with its corresponding equipment is necessary to connect all buildings within the Quezon City Hall compound.

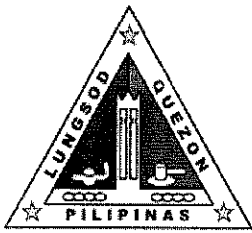
II. PROJECT DESCRIPTION

The Quezon City Hall compound fiber-optic backbone will connect every other building structure to the main building primarily for its data connectivity requirements using equipment and conduits that are fully compatible with existing installed equipment. It shall be composed of underground fiber optic cables with all cores properly terminated at each building at one end and at the ITDD datacenter (server room) at the other end. The actively employed fiber core shall, in turn, be connected to the corresponding network equipment at both ends. The cables and equipment on the other hand, shall be capable of handling the capacity of ten (10) gigabit bandwidth speeds in full-duplex mode.

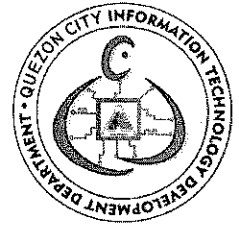
A bill of materials and quantities or any equivalent document which may or may not be attached with these terms of reference shall simply serve as a guide to accomplish whatever is required for the full completion of this project. Any deficiency that may arise from the said attachment shall bear no effect to the required accomplishment of this Project Terms of Reference unless such discrepancy shall amount to more than 20 percent of the total project cost.

III. SCOPE OF WORK

- A. Quezon City Hall compound site inspection
- B. Submission of proposed premise installation plans (part of PIP-Project Implementation Plan) and corresponding processes



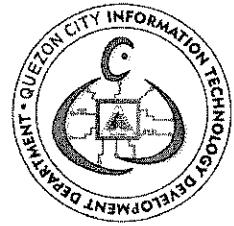
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1. A mapped layout where the cables and equipment are to be located and cables are to run inside structures relative to the respective 15 buildings (including main building) to be connected (to be submitted upon bid);
 2. A detailed diagram of the QC-LGU network as it is expected upon project completion (to be submitted upon bid);
 3. The outdoor equipment and its component cabling systems must be secure from environmental hazards such as weather, vehicular and human traffic;
 4. An additional unused sealed pipe parallel to the laid-out pipes for the purpose of future redundancy/expansion shall be installed (must appear in the layout that will be submitted upon bid);
 5. All equipment and conduits shall be fully compatible with existing infrastructure and equipment;
 6. The accompanying Electrical and Electronic and Data Network Plans requirements must be signed and sealed by a licensed Professional Electronics and Communications Engineer (PECE);
 7. Power outlets for active devices must be properly grounded, installed with the approval of CGSD, unless CGSD authorizes and assigns an existing power source at a given location; should the electrical system not have any available effective grounding, the contractor shall then provide such grounding to protect active devices;
 8. The cabling paths, manholes or hand-holes and equipment mounts must be protected from predictable damages by installing the necessary reinforcements such as reinforced concrete cover or steel post barriers and warning signs in designated pathways, when necessary for safety purposes;
 9. All cables (including power cables) are to be labeled on end-to-end, while labeling shall follow alphanumeric standard codes which shall be approved by ITDD, logged and supported with a separate diagram per building installation;
 10. Pipes, pull-boxes, manholes, concrete ground routes and other cable paths are similarly to be labeled properly for easy inspection and maintenance;
 11. A detailed schematic single line diagram showing all buildings of termination and detailed specific location on each building, shall be submitted in two (2) copies of print and digital format to ITDD for approval; and
 12. A detailed implementation document of the modular UPS in the server room.
- C. Approval of installation plans per building site from the corresponding CGSD and ITDD officers;



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- D. Installation, configuration, testing and commissioning of equipment, devices, and signed-off by a licensed network engineer and attested by an assigned ITDD and CGSD officer;
- E. Installation and implementation of VLAN (virtual LAN) with corresponding documentations and creation of a digital backup;
- F. Submission of a copy of the cabling map, cabling plans and pertinent documents to the Engineering and City Planning Departments for future reference and necessary clearances;
- G. Submission of equipment specifications with user and maintenance manuals;
- H. Technical training on equipment administration, configuration, VLAN deployment and maintenance; and
- I. Final testing and commissioning as attested by the contractor's Network Engineer, Professional Electrical Engineer and/or Professional Electronics and Communications Engineer, ITDD and CGSD officers.

IV. AREA OF COVERAGE

- A. The Quezon City Hall compound fiber-optic backbone cabling shall be installed on every IDF of each of the 15 buildings (MDF at main building) within the compound grounds. In the absence of which, an IDF has to be installed by the contractor in a location approved by CGSD and ITDD;
- B. CITY ASSESSOR's Local Departmental Network – The Quezon City Assessor's Office have an increased bandwidth requirement since their implementation of the layered geospatial based systems. Capped with the Unified GIS Systems in place, much of their workstations require access to a ten (10) Gigabit network throughput from within their local network and to their server-based connectivity. Hence, the following requirements:
 - 1. 10 Gigabit connectivity from the department of the City Assessor to ITDD server room;
 - 2. 10 Gigabit connectivity among the local network between and among network switches within the City Assessor's Department; and
 - 3. All workstations of the Assessor's office are to be connected to a gigabit port.

V. STANDARD AND REQUIREMENTS

- A. Contractor/Supplier Credentials as required:
 - 1. The contractor should be an authorized distributor or dealer or partner of an equipment manufacturer of network devices that utilizes fiber-optic cables;
 - 2. The contractor shall have an ISO 9001-2015 with any certifying body for a minimum of 2 years;



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3. The contractor must have at least one (1) Certified Network Administrator or Engineer, duly certified by the manufacturer of the equipment being offered;
4. The contractor must have at least one (1) Licensed Professional Electronics and Communications Engineer (PECE) who has been employed by the company for at least five (5) years;
5. The contractor must have an available service engineer capable of responding to a service call within two to three (2-3) hours during office hours, at least for the duration of the warranty;
6. A preferred contractor shall be one that has completed at least, data network installations for government or private companies in the last three (3) years.

B. Components and Equipment Specifications:

1. Single-Mode fiber-optic cables for the Inter-Building Connectivity
 - a. Minimum of 12 cores, armored jelly-filled of at least 9 microns (or smaller) per core or better, which is available in the market;
 - b. Cutoff wavelength \leq 1260 nm
 - c. Halogen free, flame free retardant low smoke HFFR-LS jacket
 - d. Capable of handling 10 gigabit or higher bandwidth at full-duplex mode
 - e. Minimum bending radius, unloaded: 55mm; loaded: 110mm;
 - f. Sheath: 1.5mm sheath, UV stabilized, IEC 50290-2-27
 - g. Loose tube: 2.8mm jelly filled loose tube
 - h. Strength member: E Glass yarns
 - i. Armouring: 0.15mm corrugated steel tape
 - j. Preferably made in Europe or North America
2. CORE SWITCH (Main Building)
 - a. Must be modular with at least 6 slots for useable I/O line cards
 - b. Modular with redundant management modules, quad power supply and fan tray
 - c. At least 2 available slots for expansion after project completion
 - d. At least 9.6TB switching capacity
 - e. Support for redundant power supply and fan tray
 - f. Must deliver at least 480Gbps fabric bandwidth per slot
 - g. At least 32 ports 10G SFP+ ports
 - h. At least 48 ports 100/1000 copper ports
 - i. Separate dedicated data, control and management planes architecture
 - j. Support for High-Availability with capabilities of Non-Stop Forwarding and Stateful switchover
 - k. Support at least 256,000 IPv4 / 256,000 IPv6 multicast routes



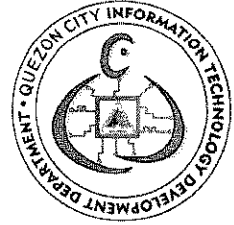
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- l. Must support configuration rollback and image rollback
 - m. Support multi-chassis link aggregation (MC-LAG) – Layer 2, Layer 3, VRRP, STP
 - n. Support MAC learning disable, persistent MAC learning (sticky MAC), MAC notification, MAC address filtering, Static MAC address assignment for interface, Per VLAN MAC learning (limit)
 - o. Quad power supply delivering up to at least 4831 watts AC on the chassis
 - p. Capable to integrate with SDN controllers such as VMWare NSX, Contrail Networking
 - q. Must support a technology that enables many switches deployed throughout a building/campus to be managed as a single, local device (stacking)
 - r. Manufacturer warranty period shall not be less than three (3) years.
 - s. Authorized reseller certificate from the Philippine office of the manufacturer brand
 - t. Preferably made from Europe or North America
3. LAYER 3 Distribution/Edge Switches (for each building)
- a. Support of 24-port 1G/10G-baseX SFP+ 4-port 40GBaseX QSFP+
 - b. Support 2 module slots for expansion with additional 10G and/or 40G ports
 - c. Support 1.07TBps Switching/Routing throughput
 - d. Support 1.44TBps Switching Capacity
 - e. Support dual redundant and hot-swappable power supplies
 - f. Supports cut-through and store-and-forward switching mode
 - g. Support back plane speed 960Gbps
 - h. Stacking configuration consisting of up to 10 switches
 - i. Supports IPv4 and IPv6
 - IPv4 unicast/multicast routes: 128,000/104,000
 - IPv6 unicast/multicast routes: 64,000/52,000
 - j. Support Control Plane Denial of Service (DoS) Protection
 - k. Support automation and orchestration, Puppet, Chef
 - l. Ability to execute scripts written in Python/TCL/Perl
 - m. Support configuration rollback and image rollback
 - n. Same brand as core switch
- Inclusive accessories-
- o. SFP+ Transceivers must be certified 100% compatible with CORE and Distribution Switches including existing distribution switches



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- p. Fiber-optic Patch cables must be Single-Mode full duplex fiber optic cables
- q. Manufacturer warranty period shall not be less than three (3) years.
- r. Authorized reseller certificate from the Philippine office of the manufacturer brand
- s. Preferably made from Europe or North America
- 4. Optical Distribution Frames (ODF)
 - a. Industry standard Fiber-Optic terminal cabinets at designated termination rooms
 - b. Standard Black powder coated finish and paint labeled for every building identification with ITDD logo
 - c. Minimum of 12 SC Fiber-optic terminals per panel
- 5. Modular Uninterruptible Power Supply System (MAIN Building)
 - a. Single-phase conventional UPS System – rack mountable
 - b. Power factor 1 for 5000-10000
 - c. VFI-111 on-line double conversion
 - d. User-friendly display
 - e. View of the status, system parameters, charging status of the battery and faults
 - f. 10kVA @ 10 minutes back-up time
 - g. Rail Kits
 - h. Battery cabinet
 - i. SNMP CS 141B SK Card (Slot)
 - j. Preferably made in Europe or North America
- 6. Uninterruptible Power Supply Systems (15 Buildings)
 - a. Single-phase conventional UPS System – rack mountable
 - b. Power factor 0.9 for 1000-3000
 - c. on-line double conversion
 - d. User-friendly display
 - e. View of the status, system parameters, charging status of the battery and faults
 - f. 1kVA @ 5-7 minutes back-up time
 - g. Rail Kits
 - h. Preferably made in Europe or North America
- 7. Automatic Voltage Switcher
 - a. Protects and prolongs the usefulness of electrical appliances
 - b. Eliminates the need to switch off appliances every time electric power fails
 - c. Built-in microprocessor which adds the advance feature TimeSave



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- d. Surge and spike protection are incorporated to ensure protection against harmful electrical noise
- e. Protection against power-backup surges commonly experienced after resumption of power in a power-cut situation
- f. Features a startup delay to prevent frequent switching on and off during power fluctuations
- g. Protects against over voltage and under voltage
- h. Preferably made in Europe or North America

Inclusion per set (Main Building)

AVS Protection against low voltage, high voltage, power back surges, power fluctuations and surges/spikes

- i. Max power: 25 Amps
- j. Wait time: 4 minutes intelligent time delay
- k. Over voltage disconnect: 264V
- l. Under voltage disconnect: 185V
- m. Over voltage reconnect: 262V
- n. Under voltage reconnect: 190V
- o. Reconnect wait: 4 mins
- p. Main disconnect response time: 0.5 sec
- q. High voltage hysteresis: 2V
- r. Low voltage hysteresis: 5V
- s. Main surge/spike response time: <10ns
- t. Main mas spike/surge discharge: 6.5kA
- u. Frequency: 50/60Hz
- v. Spike Protection: 160J

Inclusion per set (14 Buildings)

AVS Protection against low voltage, high voltage, power back surges, power fluctuations and surges/spikes

- a. Max power: 25 Amps
- b. Wait time: 4 minutes intelligent time delay
- c. Over voltage disconnect: 264V
- d. Under voltage disconnect: 185V
- e. Over voltage reconnect: 262V
- f. Under voltage reconnect: 190V
- g. Reconnect wait: 4 mins
- h. Main disconnect response time: 0.5 sec
- i. High voltage hysteresis: 2V
- j. Low voltage hysteresis: 5V
- k. Main surge/spike response time: <10ns



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VI. TRAINING, TESTING AND COMMISSIONING

A. Training of Key QC LGU Personnel

1. The training of personnel who shall manage the installed facility shall have to be conducted on or before the initial equipment and facilities testing BEFORE the FINAL Testing and Commissioning
2. Manuals and handouts must be prepared and evaluated by ITDD for substantial completeness on print and digital media for each participant
3. Participants are to be attended by not less than four (4) technical personnel from NTMD-ITDD (*Network & Technical Maintenance Division*) and at least one (1) technical personnel from BMD-CGSD (*Building Maintenance Division*) respectively but *non-exclusive* [personnel from other divisions/departments may join but shall be limited and with prior approval from the respective department heads and concurred by the head of ITDD]
4. Training is expected to be NOT LESS than four (4) days but shall be allowed to be conducted in two (2) days for separate weeks
5. The training venue shall have to be agreed by the attending parties as concurred by the contractor. On-site hands-on training shall be an integral component of the conducted training
6. Food and drinks during the training are to be decent enough as provided by the contractor for the ITDD and CGSD participants

B. Network Devices

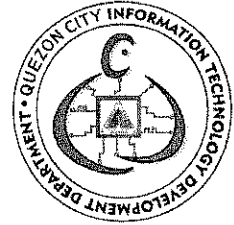
1. The Certified Network Engineer will conduct the commissioning of delivered devices that may include but not limited to:
 - a. Power-up
 - b. Configuration
 - c. Network connectivity
 - d. Performance testing

C. Electrical Systems

1. All areas with new network devices must undergo power quality measurement that includes high frequency beyond the 63rd order [this is to test for Electro Magnetic Interferences (EMI) which is detrimental to electronic devices as well as transmission quality]
2. Residual current evaluation – [test used to measure residual current leakages that causes intermittent tripping breaker to minimize downtime and minimize the risk of electric shock and fire]
3. Electrical systems test reports must be evaluated and signed by a licensed Professional Electrical Engineer/Professional Electronics and Communications Engineer



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VII. DURATION OF PROJECT

The whole project must be completed within a period of ninety calendar days inclusive of all items indicated in the above stated Scope of Work from the issuance of the Notice to Proceed.

VIII. APPROVED BUDGET ALLOCATION

The budget allocation for the said project is in the amount of Php 85,478,532.89

IX. SCHEDULE OF PROJECT PAYMENT

The payment of the project shall be settled under the following terms and conditions:

1. 15% of the bid amount upon delivery of the Project Implementation Plan, Network Cabling Map, Schematic Diagram as approved by the ITDD Head, together with the clearances of manpower who may be working on the premise, and other clearances as required by ITDD, CGSD and, if it would be deemed necessary, the respective officer of the department occupant of the building scheduled for installation;
2. 50% of the bid amount after delivery of all hardware components (excluding peripherals);
3. 20% of the bid amount upon full installation, commissioning, testing, documentations (printed and digital copy) and turn-over; and
4. 15% of the bid amount upon full completion of training and submission of finalized documentations (in case final modifications were made).

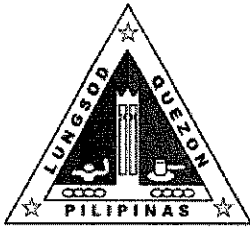
X. PENALTIES FOR CONTRACT BREACH

Failure to deliver the services according to the standards and requirements set by the City shall subject the contractor to penalties and/or liquidated damages pursuant to RA 9184 and its revised Implementing Rules and Regulations.

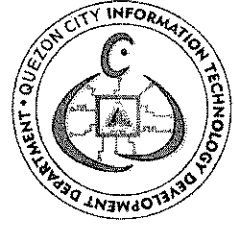
XI. CANCELLATION OR TERMINATION

Should there be any dispute, controversy or difference between the parties arising out of this Project TOR, the parties herein shall exert efforts to amicably settle such dispute. However, if any dispute cannot be resolved amicably to the mutual satisfaction of the parties, then the matter may be submitted for arbitration in accordance with EO 1008 under the existing law, without prejudice for the aggrieved party to seek redress before a court of competent jurisdiction.

The guidelines contained in RA 9184 and its revised IRR shall be followed in the termination of any service contract. In the event the City terminated the contract due



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to default insolvency, or for cause, it may enter into a negotiated procurement pursuant to section 53 (d) of RA 9184 and it's IRR.

XII. WARRANTY COVERAGE

The warranty coverage shall be as stipulated in the accompanying Purchase Request. Items that are not covered by the warranties stated in the Purchase Request shall be for a standard period of one (1) year after proper turn-over and acceptance which may commence prior to the completion of the training period.

Approved by:

PAUL RENE S. PADILLA
Officer-In-Charge
ITDD