QCDRRMO-24-EHSE-1725

TERMS OF REFERENCE
(TOR)

SUPPLY, DELIVERY, INSTALLATION, TESTING, AND COMMISSIONING OF AUTOMATED RAIN GAUGES FOR LOCALIZED RAIN MONITORING AND NOWCASTING

I. RATIONALE AND BRIEF BACKGROUND

The Republic Act No. 10121 known as the Philippine Disaster Risk Reduction and Management Act of 2010 defines Early Warning System as the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.

A people-centered early warning system necessarily comprises four (4) key elements: knowledge of the risks; monitoring, analysis and forecasting of the hazards; communication or dissemination of alerts and warnings; and local capabilities to respond to the warnings received. The expression "end-to-end warning system" is also used to emphasize that warning systems need to span all steps from hazard detection to community response.

Given that Quezon City is highly susceptible to evolving disaster risks due to multiple hazards, it is therefore a must to continuously improve on this matter and invest on modern technologies that will promote knowledge building, awareness raising, and disaster preparedness not just for the CDRRMO but to the citizens of Quezon City.

By installing additional automated rain gauges to the existing automated rain gauge network of the city, the CDRRMO can fully monitor and analyze the impact of rain on flood-prone areas at Quezon City which in turn will further capacitate disaster preparedness of the city along with faster decision making.

II. PROJECT DESCRIPTION

The concept of the project is to enhance the capabilities of CDRRMO by further increasing the number of automated rain gauges installed in the city and combining it with a science-based data driven analysis system to improve decision making and early warning to the public. The additional sensors will be used to monitor rain which has a more direct impact on citizens specially on cancellation of school and work.

Since these are critical systems for disaster preparedness, the CDRRMO recommends a system that is already existing and proven working by other Local Government Units in Metro Manila. The CDRRMO is aiming to have a system aligned with SMART CITY models or solutions that are automated, faster to implement, easy to manage, and more cost effective. In addition, the datasets of the sensors should be seamlessly integrated to the existing iRise UP data display (web and mobile application) and data management system (cloud-based and QCITDD).

III. PROJECT SCOPE OF WORK

The CDRRMO plans to install four (4) automated rain gauges within the City identified by CDRRMO. The datasets will then be integrated into the existing data display and data management system (cloud-based and QCITDD) of CDRRMO along with the previously procured sensors.

System Output

- Four (4) Operational Automated Rain Gauges
- Sensor Data Processing, Storage Integration, And Display System
    - Data Storage and Processing
    - Data Display
    - Data Backup/Redundancy
    - Historical data
    - Integration to existing data display

Technical Specifications

Lot	Description	Delivery Time
1 Lot	**FOUR (4) AUTOMATED RAIN GAUGE** • Power supply through solar • Plug and play • No programming and complex wiring • Real-time access to data from any web browser • Enables to monitor data 24/7 via web browser or smartphone • Alarm capabilities via text/email • LCD display for easy field deployment • Cloud-based data access option • Smart Sensor Connectors: 10 inputs • Logging Rate: Configurable for as low as one (1) second • Accuracy: 0-250mm/hr: +/-2% • Accuracy: 250-500mm/hr: +/-3%	Thirty (30) Calendar Days
	SENSOR SERVICE REPLACEMENT, MAINTENANCE, WARRANTY AND DATA	

	SUBSCRIPTION **Quarterly checking of station such as:** • Rain Gauge • Data logger • Battery • Solar Charge Controller • Solar Panel • Three (3) years coverage **Replacement of devices and accessories such as:** • Rain Gauge • Data logger • Battery • Solar Panel • Solar Charge Controller • Three (3) years coverage **Emergency Repair and Maintenance** • 24/7 Availability of Personnel • Three (3) years coverage **Data Connectivity Subscription** • Three (3) years coverage	
	SENSOR DATA PROCESSING, STORAGE INTEGRATION, AND DISPLAY SYSTEM **Data** • Seamless integration of rain gauge data to existing IRiseUP data display and storage (cloud-based and QCITDD) systems. • Integration to iRISE UP application • Provision of integration to existing API endpoint containing all collected and modeled (observed and forecast rain) data at https://api.iriseup.ph/endpoint API endpoint system **Data Display** • GIS, Table, Graph and Threat Matrix display of realtime, nowcast (next 6 hours), and historical of rain sensor data • GIS analysis overlaying data of rain sensor and rain nowcast (next 6 hours) • Menu & Settings to display clustered view and per sensor view • Consolidation of existing and new sensors into one seamless and unified risk analysis system • System provision for spatial rain risk analysis system	

	Alerts • Integrated to existing Telegram alerts for group alerts **Data Backup/Redundancy** • Data dumps are to be performed every 15 minutes or shorter (all details pertaining to access to the QCDRRMO database such as address or URL to a management console, userid and password are to be given to QCDRRMO). • Perform redundant data writes to an ITDD database • Historical data must be stored in the existing QCDRRMO database with redundancy on the ITDD database. **License** • Perpetual integration license with three (3) years technical support and maintenance • One (1) Meteorologist, Two (2) Data Scientists, and Two (2) field staffs for technical support and training	
	SENSOR INSTALLATION • Four (4) Locations • Site Survey • Installation and Calibration • Engineering works	
	TRAINING • One (1) day end user orientation for processing of datasets, and analysis of datasets. • All training will have eight (8) hours per day with five (5) attendees.	

IV. AREA OF COVERAGE

The sensor installation will cover four (4) locations within Quezon City and will be identified by the Emergency Operations Center (EOC) during the start of implementation.

V. PROJECT STANDARDS AND REQUIREMENTS

Bidders should have completed, a single contract that is similar to this Project or related to Supply, Installation and Maintenance of meteorological devices and data processing systems, equivalent to at least fifty percent (50%) of the ABC three (3) years from the date of submission and receipt of bids, a contract similar to the project.

Bidders should have at least three (3) field staff for the installation and three (3) years on-going support and maintenance of four (4) sensors. Bidders should have demonstrated experience and capacity to manage community based early warning systems in a highly urbanized city (HUC) in Metro Manila.

Bidders should have at least one (1) Meteorologist and one (1) IT-Data Science resources for Training and continuous consultation within the project as this is a science-based data driven project.

VI. PROJECT DURATION

The delivery period of the Project shall be within **thirty (30) calendar days** after the issuance of the Notice to Proceed.

VII. APPROVED BUDGET FOR THE CONTRACT

The approved budget for the contract amounts to **six million four hundred thirty two thousand two hundred seventy five pesos (P6,432,275).**

ITEM	BUDGET (PHP)
1. FOUR (4) AUTOMATED RAIN GAUGES	2,200,000
2. SENSOR SERVICE REPLACEMENT, MAINTENANCE, WARRANTY AND DATA SUBSCRIPTION	1,200,000
3. SENSOR DATA PROCESSING, STORAGE INTEGRATION, AND DISPLAY SYSTEM	2,200,000
4. SENSOR INSTALLATION	800,000
5. TRAINING	32,275
TOTAL	**6,432,275**

VIII. BASIS OF PAYMENT

Below are the deliverables that will be used as the basis for full payment.

Item	Deliverables	Payment Percentage
Delivery & Installation of four (4) Automated Rain Gauge Set with Data Logger, Solar Panel and Data Connectivity	Project Acceptance Document: Receipt, Inventory, Installation Completion and Maintenance & Warranty Certificate	15%
Delivery of Sensor Data Processing, Storage Integration, And Display System	Project Acceptance Document: Fully delivered system and documentation	75%
Training	Training Certificate	10%

IX. PENALTIES FOR BREACH OF CONTRACT

Incomplete and delayed delivery will result in penalties based on standard Government implementing rules and regulations.

Likewise, failure to carry out emergency repair or maintenance works on any part of the system upon the documented and written request of the end-user shall result in penalties based on the standard government implementing rules and regulations or may serve as grounds for incomplete delivery of services.

X. CANCELLATION FOR OR TERMINATION OF CONTRACT

Incomplete and delayed delivery and non-performance of services will result in penalties and termination of contract based on standard Government implementing rules and regulations.

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