

**TERMS OF REFERENCE
(TOR)**

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

1. 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.

2. 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).

3. PROJECT SCOPE OF WORK

The CDRRMO plans to install eighteen (18) 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

- Eighteen (18) 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	<p>EIGHTEEN (18) AUTOMATED RAIN GAUGE</p> <ul style="list-style-type: none"> • 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% <p>SENSOR SERVICE REPLACEMENT, MAINTENANCE, WARRANTY AND DATA SUBSCRIPTION</p> <p>Quarterly checking and calibration of station every January, April, July and October such as:</p> <ul style="list-style-type: none"> • Rain Gauge • Data logger • Battery • Solar Charge Controller • Solar Panel • Three (3) years coverage <p>Replacement of devices and accessories such as:</p> <ul style="list-style-type: none"> • Rain Gauge • Data logger • Battery • Solar Panel • Solar Charge Controller • Three (3) years coverage <p>Emergency Repair and Maintenance</p> <ul style="list-style-type: none"> • 24/7 Availability of Personnel • Three (3) years coverage. <p>Data Connectivity Subscription</p> <ul style="list-style-type: none"> • Three (3) years coverage <p>SENSOR DATA PROCESSING, STORAGE INTEGRATION, AND DISPLAY SYSTEM</p> <p>Data</p> <ul style="list-style-type: none"> • Seamless integration of rain gauge data to existing iRISE UP 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 	Thirty (30) Calendar Days

	<p>Data Display</p> <ul style="list-style-type: none"> • GIS, Table, Graph and Threat Matrix display of real time, 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 <p>Alerts</p> <ul style="list-style-type: none"> • Integrated to existing Telegram alerts for group alerts <p>Data Backup/Redundancy</p> <ul style="list-style-type: none"> • Data dumps are to be performed every 15 minutes or shorter (all details pertaining to access to the QCRRMO database such as address or URL to a management console, user id and password are to be given to QCRRMO). • Perform redundant data writes to an ITDD database • Historical data must be stored in the existing QCRRMO database with redundancy on the ITDD database. 	
	<p>License</p> <ul style="list-style-type: none"> • 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 	
	<p>SENSOR INSTALLATION</p> <ul style="list-style-type: none"> • Eighteen (18) Locations • Site Survey • Installation and Calibration • Engineering works 	
	<p>TRAINING</p> <ul style="list-style-type: none"> • 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. 	

Automated Monitoring and Notification System

The Service Provider shall implement an automated monitoring and notification mechanism to ensure proactive detection and reporting of any sensor-related incidents.

The system shall be capable of:

- **Real-Time Monitoring:** Automatically track the operational status, power levels, data transmission, and connectivity of each weather station.

- **Automated Alerts:** Generate and transmit automated notifications to the designated QCRRMO contact persons (via SMS, email, or secured messaging platform) in the event of:
 - Communication loss or downtime exceeding 15 minutes;
 - Abnormal or missing data readings;
 - Low power or connectivity failure;
 - Hardware malfunction or calibration errors.
- **Incident Log and Summary Reports:** Maintain an auditable log of all automated alerts, response actions, and system recovery records, which shall be accessible to QCRRMO and ITDD.
- **Monthly Automated Status Reports:** The system shall automatically generate and transmit summary performance and uptime reports to QCRRMO and ITDD-designated email addresses for monitoring and validation purposes.

The automated notification system shall be active 24/7, integrated with the Service Provider's monitoring dashboard, and aligned with the Service Level Agreement (SLA) response and resolution timeframes.

Service Level Agreement (SLA)

Severity Level	Description/Impact	Required Timeframe
Critical	Complete system outage or total data communication failure affecting all sensors.	Response: Within 2 hours Resolution: Within 4 hours
Severe	Major degradation affecting multiple sensors or data reporting from several locations.	Response: Within 4 hours Resolution: Within 8 hours
Major	Partial disruption affecting a limited number of sensors; workarounds available.	Response: Within 8 hours Resolution: Within 16 hours
Minor	Minor issue affecting a single unit or non-critical function.	Response: Within 16 hours Resolution: Within 32 hours

4. AREA OF COVERAGE

The sensor installation will cover eighteen (18) locations within Quezon City and will be identified by the Emergency Operations Center (EOC) during the start of implementation.

5. PROJECT STANDARDS AND REQUIREMENTS

- All datasets generated, collected, or processed by the installed sensors—including meteorological, environmental, analytical, and operational data—shall remain the sole and exclusive property of the Quezon City Government. The service provider shall act solely as custodian of such data for the duration of the contract and shall ensure full compliance with Republic Act No. 10173, otherwise known as the Data Privacy Act of 2012, and its implementing rules and regulations.
- The system shall include standardized data export functionality to enable seamless transmission and ingestion of sensor data into the Quezon City Government's Central Data Warehouse and Unified Analytics Platform, as managed by the Information Technology Development Department (ITDD).[2]
- The entire system—including the sensor data processing, storage integration, and display components—shall undergo Vulnerability Assessment and Penetration Testing (VAPT) to be conducted by the Information Technology Development Department (ITDD) and/or the Department of Information and Communications Technology (DICT).

Equipment replacement shall be permitted solely under the following verified circumstances: (i) theft of the equipment, provided a police report or equivalent official documentation confirming the incident is submitted within 24 hours of discovery; (ii) damage to the equipment resulting directly from impacts of natural hazards (such as floods, earthquakes, storms, or other force majeure events beyond the Contractor's reasonable control), substantiated by photographic evidence, meteorological reports, or expert assessments; or (iii) destruction of the equipment occurring within the designated project area due to unforeseen events, accompanied by an incident report detailing the location, time, and cause. All replacement requests must be submitted in writing to the Project Coordinator within 48 hours of the incident, including comprehensive supporting documentation (e.g., photographs, witness statements, insurance claims if applicable, and any relevant site logs), and shall be subject to review, verification, and prior written approval by the Project Coordinator or designated authority. The Contractor remains responsible for implementing all reasonable preventive measures to safeguard the equipment, and any replacement shall be limited to equivalent specifications and quantities, contingent upon availability of project funds and adherence to procurement guidelines outlined elsewhere in this Terms of Reference. Unauthorized or unsubstantiated requests may result in denial of replacement and potential liability for the Contractor.

- All identified vulnerabilities shall be addressed and remediated by the service provider in accordance with the corrective timelines and resolution standards defined under the Service Level Agreement (SLA). Validation and clearance from ITDD shall be mandatory prior to system acceptance and final turnover.[3]
- 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 eighteen (18) 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.

6. PROJECT DURATION

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

7. APPROVED BUDGET FOR THE CONTRACT

The approved budget for the contract amounts to **twenty-eight million nine hundred thousand pesos (P28,900,000.00)**.

ITEM	BUDGET (PHP)
1. EIGHTEEN (18) AUTOMATED RAIN GAUGES	
2. SENSOR SERVICE REPLACEMENT, MAINTENANCE, WARRANTY AND DATA SUBSCRIPTION	
3. SENSOR DATA PROCESSING, STORAGE INTEGRATION, AND DISPLAY SYSTEM	
4. SENSOR INSTALLATION	
5. TRAINING	
TOTAL	

8. BASIS OF PAYMENT

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

Item	Deliverables	Payment Percentage
Delivery & Installation of eighteen (18) 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%

9. PENALTIES FOR BREACH OF CONTRACT


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

Due to the nature of the system, technical support on the cloud-based application must be readily available for emergency repair and maintenance works.

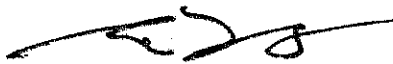
10. CANCELLATION FOR OR TERMINATION OF CONTRACT

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.

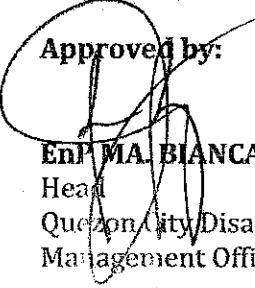
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