TERMS OF REFERENCE (TOR)

SUPPLY, DELIVERY, INSTALLATION, TESTING, AND COMMISSIONING OF AIR QUALITY SENSOR WITH AUTOMATED WEATHER STATION

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 an air quality sensor with an automated weather station to the existing air quality network of the city, the CDRRMO can identify if the air quality status of a certain area is a source or a dispersion from nearby sources. This will provide a better understanding on what mitigation actions are needed to be done to further improve the current programs for higher air quality.

II. PROJECT DESCRIPTION

The concept of the project is to enhance the capabilities of CDRRMO by increasing the number of air quality sensors 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 sensor will be used to monitor air quality and know its relationship with other weather parameters such as wind speed, wind direction, temperature, and humidity.

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 and data management system (cloud-based and QCITDD).

III. PROJECT SCOPE OF WORK

The CDRRMO plans to install one (1) air quality sensor with automated weather station 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. Access to raw data pushed by sensors must be immediately accessible to the CDRRMO. The computation of air quality index (AQI) should follow the thresholds and protocols of national agencies (DENR-EMB) on Philippine AQI. Training should be conducted to CDRRMO personnel on completion.

System Output

- One (1) Operational Air Quality Sensor with Automated Weather Station
- Sensor Data Processing, Storage Integration, And Display System
 - Data Storage and Processing
 - Data Display
 - Data Backup/Redundancy into existing Data Display and Data Management System
 - Historical data
 - Integration to existing data display

Technical Specifications

Lot	Description	Delivery Time
1 Lot	ONE (1) AIR QUALITY SENSOR WITH AUTOMATED WEATHER STATION	Thirty (30) Calendar Days
	 PM2.5 Range: 0-1000 µg/m3 Resolution: 1 µg/m3 	
	 NO2 Range: 0-3000 ppb Resolution: 1 ppb 	
	 Wind Speed Range: 0 to 60 m/s Resolution: 0.01 m/s 	
	Wind DirectionRange: 0 to 359.9°	

٠	Resolution: 0.1°
Atmos	pheric Pressure
٠	Range: 300 to 1100 hPa
٠	Resolution: 0.02 hPa
Ambie	ent Temperature
•	Range: - 20° C to 75° C
•	Resolution: 0.1° C
Ambie	ent Relative Humidity
•	Range: 10% to 99.9%
٠	Resolution: 0.1%
Calcu	lated Parameters
•	Ambient Dewpoint Temperature
٠	Ambient Heat Index
Temp	oral Resolution
•	15 minutes, 1 hour, 6 hours, and 24
	hours
Techr	nical Requirements and
Stand	ards
•	QUANT Wider Participation Study Low
	Cost Sensor Evaluation
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SENSOR DATA PROCESSING, STORAGE INTEGRATION, AND DISPLAY SYSTEM

Data

•	Seamless integration of air quality
	(raw, corrected, and AQI) and
	weather data to existing IRiseUP data
	display and storage (cloud-based
	and QCITDD) systems.

- Follows the thresholds and protocols of national agencies (DENR-EMB) on the computation of Air Quality Index (Philippine AQI)
- Provision of integration to existing API endpoint containing all collected data (observed and modeled) at https://api.iriseup.ph/endpoint API endpoint system

Data Display

- GIS, Table, Graph and Threat Matrix display of realtime and historical of air quality and weather data
- GIS analysis overlaying data of air quality and weather
- 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 air quality risk analysis system

Alerts

 Integrated to existing Telegram alerts for group alerts

Data Backup/Redundancy

- Data dumps are to be performed every 15 minutes (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

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

One (1) Location

 Site Survey Installation and Calibration Engineering works 	
 TRAINING One (1) Day End User Training All training will have eight (8) hours per day with five (5) attendees. 	

IV. AREA OF COVERAGE

The sensor installation will cover one (1) location 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 one (1) field staff for the installation and three (3) years on-going support and maintenance of one (1) sensor. 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 two million pesos (P2,000,000).

ITEM	BUDGET (PHP)	
1. ONE (1) AIR QUALITY SENSOR WITH AUTOMATED WEATHER STATION	850,000	
2. SENSOR SERVICE REPLACEMENT, MAINTENANCE, WARRANTY AND DATA SUBSCRIPTION	300,000	
3. SENSOR DATA PROCESSING, STORAGE INTEGRATION, AND DISPLAY SYSTEM	550,000	
4. SENSOR INSTALLATION	250,000	
5. TRAINING	50,000	
TOTAL	2,000,000	

VIII. BASIS OF PAYMENT

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

ltem	Deliverables	Payment Percentage
Delivery & Installation of One (1) Air Quality Sensor with Automated Weather Station Set 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.

Prepared and recommended by:

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