

**STANDARD SPECIFICATIONS**

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## **SECTION 1:**

### **STANDARD SPECIFICATIONS**

#### **GENERAL REQUIREMENTS**

##### **1. GENERAL:**

- 1.1. This Standard Technical Specification describes the general requirements with regard to material, equipment and workmanship and should be read together with the General Conditions of Tender, Contract and Order, Detail Specifications and Schedules.
- 1.2. Where any conflict exists, the relevant clauses of the Detail Specification shall take preference over the clauses of the Standard Technical Specification.
- 1.3. Should any conflict arise between the requirements of this standard specification and the General Conditions of Contract, Contract and Order, the General Conditions of Contract, Contract and Order would take preference.
- 1.4. The works and services required in terms of this specification shall comply with all the requirements of this specification, read together with the detail specification.
- 1.5. The Manufacturers Certificate of Compliance for each item offered must be supplied as part of the Bid Document in order for the Evaluation Panel to confirm compliance or non-compliance.
- 1.6. The Bidder shall be deemed to have examined all the constituent parts of this document carefully before the contract was submitted. Any doubts as to the meaning of any terms, phrases or clauses of the document, or any missing pages, shall be submitted to the Department in writing before a contract is submitted. No claims traceable to non-compliance with this clause will be considered.
- 1.7. If it is found at any stage of this contract that the Bidder has deviated from the requirements of this specification without the written consent of the Department, then the Department shall have the right to order the Bidder to remove the item(s) in question and to supply and/or install the exact equipment specified without any adjustment in the contract price.
- 1.8. Definitions:
  - 1.7.1. For the purposes of this contract all terms used shall be as defined in section 2 of SABS code 0142-1981, Article 1 of the Machinery and Occupational Safety Act, No 6 of 1983 and other relevant SABS specifications.

##### **2. ENVIRONMENTAL CONDITIONS:**

- 2.1. Except when otherwise specified, all equipment and material shall be designed and selected for the following climatic and environmental conditions:
  - 2.1.1. Operating temperature range: - 10° C to + 70° C.
  - 2.1.2. Relative humidity: maximum 95% below 35° C; maximum 75% above 35° C.
  - 2.1.3. Height above sea level: 0 - 3000 metres.
  - 2.1.4. All the equipment shall operate satisfactorily in the presence of a fair amount of water and dust and shall comply with rating IP 54 as defined in IEC 144.
- 2.2. Metal work exposed to the elements shall be of a suitable stainless-steel type or shall be painted or protected against corrosion to the standards specified by the SABS and as approved by the Department. Samples shall be submitted for approval before installation is commenced with.
- 2.3. Contact between dissimilar metals shall be avoided wherever possible. The following electrode potentials shall not be exceeded:

- 2.3.1. For connections exposed to the weather or salt water - 0,25V
  - 2.3.2. For connections of interior parts exposed to condensation but not contaminated by salt - 0,5V.
- 2.4. In addition to the normal operating conditions specified above, the equipment should also be capable of operating under temporary adverse periods. If additional protection is required for the equipment and installation under these conditions, then it shall be provided by the Bidder, at his cost, until conditions have improved to the point where additional protection is no longer required.

### **3. REGULATIONS AND STANDARDS:**

- 3.1. The manufactures facility must be in existence of at least 5 years with an established agent's office registered in the Republic of South Africa and employ technical personnel for support.
- 3.2. The equipment must be Hydrometry dedicated and be field proven for at least 2 years. The Department may request the Bidder for any proof in this regard before the contract is awarded.
- 3.3. All material and equipment supplied shall be new and of an acceptable quality.
- 3.4. The work shall be carried out strictly in accordance with the latest revision and amendments of the following:
  - 3.4.1. SABS 0142: "Code of practice for the Wiring of Premises" hereinafter called the "Wiring Code".
  - 3.4.2. The "Machinery and Occupational Safety Act 1983", Act no 6 of 1983, hereinafter called the "Act".
  - 3.4.3. The Municipal By-laws and any special requirements of the Local Supply Authority.
  - 3.4.4. The Local Fire Office Regulations.
  - 3.4.5. The regulations of the Department of Post and Telecommunications.
- 3.5. All work shall comply with the relevant SABS specifications for workmanship and material. Where no SABS specification exists, the applicable BS, DIN or IEC specification shall be followed.
- 3.6. Any conflict that should arise between any of the above mentioned regulations and this specification shall forthwith be referred to the Department in writing for his ruling. Under no circumstances shall the Bidder modify any part of the works to comply with amended regulations that may come in force during the construction period before the matter has been cleared with the Department.
- 3.7. The manufacturing company must preferably adhere to ISO 9001 standards.

### **4. DESCRIPTION OF THE PROJECT:**

- 4.1. The project is completely detailed in **SECTION 3, Detail Specification**. Should the Bidder require any further information, then this shall be referred to the Department in writing.

### **5. PRICING SCHEDULE:**

- 5.1. Bidders are required to complete price for items that they are only bidding for. The pricing schedule must be completed in full for each item that the bidder is bidding for. Bidders who do not adhere to this request will be disqualified and their bids will not be considered.

### **6. SUB-CONTRACT WORK:**

- 6.1. All work as specified shall only be performed by the Bidder's own personnel and shall under no circumstances be sub-contracted.

### **7. DELIVERY OF EQUIPMENT:**

- 7.1. The Bidder shall make the necessary arrangements to get all equipment delivered to site / office in accordance with the program and in an undamaged condition. The Bidder shall be responsible for the acquisition of any insurance cover that may be required for equipment in transit and temporary storage.
- 7.2. The delivery point will be Department of Water and Sanitation – George Office on the listed address below and therefore bidders should consider that, and the delivery price be included in their prices.

**Delivery Point:**

- Lower York Street, Behind York Boulevard, George, 6530

**8. HANDBOOK AND INSTRUCTION MANUALS:**

- 8.1. The Bidder shall keep accurate records of all tests carried out and the results achieved, all meter readings taken after installation of the equipment, etc. A comprehensive instruction shall be built up by the Bidder and shall be considered to be part of the equipment offered. This manual shall provide complete equipment schematics; Complete equipment layout drawings; All manufacturer's handbooks having reference to the equipment; installation, test and alignment procedures; All inter connection and inter cabling diagrams; All parts and spares lists; Complete trouble shooting procedures and any other information deemed necessary to permit rapid and efficient maintenance of any part of the equipment by a qualified technician. Three copies of all test results, amendments and readings, together with three copies of the instruction manual, built-up as indicated above shall be handed to the Department before he will accept any equipment supplied to meet this specification. All the above shall be fully updated to include whatever final modifications are required to be made by the Bidder to his equipment in order for it to gain acceptance by the Department as being to specification.
- 8.2. The Bidder shall provide complete operating instructions and operating manuals that will enable staff to operate and understand the equipment and systems and to utilize the equipment to its full extent.

**9. TESTS:**

- 9.1. All materials and workmanship shall be of the respective kinds described in the contract and in accordance with the Department's instructions and shall be subjected from time to time to such tests and by such persons as the Department may direct at the place of manufacture or fabrication or on the site or at all or any of such places. Excepts as otherwise provided in the specification the Bidder shall supply such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing of any work and the quality, mass or quantity of any materials used and shall supply samples of material before incorporation in the works for testing as may be selected and required by the Department.
- 9.2. All samples shall be supplied by the Bidder at his own cost if the supply thereof is clearly intended by or provided for in the specification but if not, then at the cost of the Department.
- 9.3. The cost of making any test shall be borne by the Bidder if such test is clearly intended by or provided for in the specification and (in the case only of a test under load or a test to ascertain whether the design of any finished or partly finished work is appropriate for the purposes which it was intended to fulfil) if such is particularised in the specification in sufficient detail to enable the Bidder to price or allow for the same in his contract.
- 9.4. If any test is ordered by the Department which is either-
- a) not so intended by or provided for; or
  - b) not so particularised; or
  - c) though so intended by or provided for is ordered by the Department to be carried out by an independent person or body at any other place than the site or the place of manufacture or fabrication of the materials or equipment tested;  
then the cost of such test shall be borne by the Bidder if the test shows the workmanship of materials not be in accordance with the provisions of the Contract or the Department's instructions, but otherwise by the Department.

**10. TEST EQUIPMENT AND SPARES:**

- 10.1. It is a requirement of this contract that the Bidder shall have available all the test equipment that would be required to allow the Department's staff to commission any part of any system provided in terms of this contract.
- 10.2. The exact test equipment required will depend on the systems supplied and the Bidder shall submit a complete list of the test equipment to be used.
- 10.3. The Bidder shall recommend spares that would be required on site for emergency repairs, complete with unit costs for consideration by the Department.

# GENERAL SPECIFICATION FOR SOFTWARE DOCUMENTATION

## 1. SCOPE:

- 1.1 This specification covers the design and documentation requirements for software supplied under this contract.

## 2. SYSTEM DESIGN:

- 2.1 The system shall make use of a well defined, standard, tested, debugged and field-proven operating system to control other programme modules which handle the user functional requirements. The operating system shall be capable of handling all input/output organization, scheduling, time-keeping, power failure procedures and to control communications with field hardware and operator devices, process system outputs and command requests.
- 2.2 The operating system shall initialize software upon restart conditions and allocate memory usage of application programmes. Furthermore, the operating system shall enable the system operator to create, store and run application and user programmes while operating system is busy controlling the real time application system. This user programme modifying facility should be menu driven under operating system control to enable operations to easily effect user system changes.
- 2.3 The operating system shall preferably reside in firmware and the software shall be task orientated, with linking and synchronisation possible between tasks. Tasks shall be allocated priorities and shall be able to control themselves relative to real-time so that the complete system is not "hung-up" by a faulty input device, such as chattering alarm relay.

## 3. DOCUMENTATION:

The successful Bidder shall supply full software documentation with the delivery of the equipment.  
Four copies of each of the following shall be provided:

- 3.1 A system manual containing detailed description of the operating system and the drivers of each software module, task or sub-module used. This description shall clearly specify the functions and structure of each module and the interfaces and links between them. This manual shall also describe how new software modules can be added, running under the same operating system.
- 3.2 A manual containing a complete set of programme listings.
- 3.3 An operator's manual, specifying all the system operating procedures in detail, for each system forming part of this contract.
- 3.4 A software user's manual (for each system) providing detailed information on how additions to the system can be generated, for instance the addition of an out-station, creation of a new access control category etc., or how system parameters can be changed or deleted. This manual should avoid the use of computer system jargon, shall include a definition of terms used and shall be written in such a way that operators without formal computer hardware or software training will be able to effect the changes as far as possible.

**4. DATA BASE COMPILATION AND BUILDING:**

- 4.1 The successful Bidder shall create, edit, debug and put into operation the initial data base required for each system to be supplied in terms of this document. The data base shall be compiled and built from the specified parameters and from information which will be supplied by the Department where applicable.
- 4.2 Bidders are, therefore, required to allow for the compilation of the required data basis in their contracts.



## **SECTION 2:**

## **DETAIL SPECIFICATIONS**

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#### **GENERAL REQUIREMENTS:**

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2. Standards and Specifications
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4. Purpose of the equipment
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8. Manuals
9. Technical Schedules
10. General Technical Requirements

## **MULTI CHANNEL DATA LOGGING EQUIPMENT AND GSM TRANSMISSION:**

1. Multi-channel data logger with a connector box and connecting cable for external sensors: 4-20 mA (vented pressure transducer) and digital pulse (rainfall); Submersible with internal battery and internal GSM modem;

1.1. USB converter communication cable to enable configuration of the equipment via laptop-, palmtop or Smart Device

### **MULTI-CHANNEL DATA LOGGERS WITH EUMETSAT SATELLITE REAL-TIME LOGGERS, TRANSMITTERS AND ACCESSORIES**

2. Multi-Channel Data Logger with EUMETSAT satellite real-time logger, transmitter and Accessories: EUMATSET Logging Modem

The following are the required accessories:

- 2.1. Satellite Antenna
- 2.2. Satellite Antenna Surge Protector
- 2.3. Power Source
- 2.4. USB communication cable enable configuration of the equipment via laptop-, palmtop or Smart Device

## **SENSORS:**

3. Sensor for Water Level Measurement: Pressure Transducer: Piezo resistive sensor (Ceramic) with 4-20mA output.

4. Sensor for Water Level Measurement: Radar Sensor 15 m or 30 m Measuring Range and 4-20 mA output.

**GENERAL REQUIREMENTS:****1. SCOPE**

This contract makes provision for the supply and delivery of electronic GSM data logging equipment, Satellite data logging equipment, sensors and power supply equipment for mentioned equipment and application software for mainly the Directorate Hydrological Services of the Department of Water and Sanitation Western Cape. Other Directorates within the Department (Government Water Schemes, Water Quality, etc.) could also make use of some of the equipment. The equipment will be used to collect and transmit hydrological data from river gauging stations, dam gauging stations situated throughout the western Cape, for transfer to various Databases.

## 2. STANDARDS AND SPECIFICATIONS:

- 2.1 The offered equipment with regard to its operational performance is to be in strict accordance with each and every term of the documents listed below:
- 2.1.1 The Standard Specifications - Section 3.
  - 2.1.2 The Detail Specifications - Section 4.
  - 2.1.3 The information provided in the Technical Schedules - Section 5.
- 2.2 Next to each detail specification a block is provided for the bidder to complete the following:
- 2.2.1 Offered equipment / item to specification - ☐ Y or ☒
  - 2.2.2 Offered equipment / item not to specification - ☐ N or ☒ X  
(Refer to Paragraph 3, below.)

## 3. DEPARTURES FROM THE SERVICES TO BE RENDERED:

- 3.1 If, in their offers to meet these specifications, there are any departures whatsoever from any of the provisions, or from any of the terms set out in paragraph 2 (Standards and Specifications), then Bidders shall list each and every departure in Section 1. (Annexure A). The list, which shall accompany the bid offer, shall be so numbered as to correlate each departure from the relative paragraph contained in the documents listed at 2.1. above.
- 3.2 **Failure on the part of any Bidder to meet this requirement in full shall signify compliance with the terms and conditions of the contract.**

## 4. PURPOSE OF THE EQUIPMENT:

- 4.1 The data loggers will be automatic, self-powered and required to sample selected parameters at different locations at a gauging site, parameters being: water level, conductivity, water temperature, pH, air temperature, precipitation, net radiation, wind speed, wind direction, turbidity, humidity and air temperature. The parameters will be sampled at predefined intervals and the data logger needs to store the collected data in the form of analogue values or digital signals.
- 4.2 At regular intervals, typically 30 to 60 days, the stored data will be read out via an USB, infrared interface or RS 232 and/or USB port with a laptop-, palmtop or Smart Device. The data will then be read out at the data processing facilities at George and Worcester Regional Offices.
- 4.3 The data loggers should have the capability of interfacing with either a transmitter to send data via satellite, national telephone link or cellular telephone link to the processing facilities at George, Tzaneen and Head Office in Pretoria.

## 5. TESTING OF EQUIPMENT:

- 5.1 The Department reserves the right to instruct the successful Bidder to submit a complete data logging system to the SABS to be tested for the following, before final awarding of the contract:
- 5.1.1 Compliance with the limits on the emission of radio frequency interference, as controlled in terms of the Radio Act.

- 5.1.2 Satisfactory operation of the equipment at the extremes of the ambient operation conditions specified.  
The cost for the performance of these tests shall be for the Bidder's account.

## 6. INSTALLATION:

- 6.1 The equipment shall be designed to allow installation by relatively unskilled staff. No special precautions shall be applicable and connectors shall be so configured that damage will not result should devices be swapped around. Equipment shall be cross polarity protected.
- 6.2 It is a condition of this contract that the Bidder shall assist the Department with the installation of the equipment, in order to ensure proper operation thereof. Installation procedures shall be incorporated in the user manual and all wiring diagrams and information for the proper installation shall be given. Physical installation on site will however be undertaken by Departmental staff.

## 7. TRANSPORT:

- 7.1 The equipment shall be designed and packaged to withstand transport by vehicle over rough, unmade dusty roads. All printed circuit boards and modules shall be securely mounted using nuts, bolts, stand-offs and PC board sliding tracks. No components shall be glued to the cabinet or other parts.

## 8. MANUALS:

- 8.1 The Bidder shall provide complete sets of user manuals, in English, included into the unit price, for each system and sub-system to be provided in terms of this contract. The user manual shall include the following:
- Equipment specifications.
  - Assembly and operation details.
  - Wiring diagrams.
  - Troubleshooting.
  - Explanation of error codes and possible remedial action.
  - Maintenance.
  - Contact details and the representative of the supplier.

## 9. TECHNICAL SCHEDULE:

Bidders are advised that it is in their own interest to provide accurate and detailed information in answer to all the questions asked in the Technical Schedules, which appear in Section 5 of this specification. **Failure to comply with this request will invalidate the bid offer.**

## 10. GENERAL TECHNICAL AND OTHER REQUIREMENTS:

- 10.1 All submersible instrumentation shall function reliably in water with a high saline content as well as a high silt content, including various chemical pollutants (including sulphates and phosphates) originating from agricultural run-off and other human sources.
- 10.2 Only high quality equipment capable of offering extended service under arduous, hostile conditions in a long-term installation, on unmanned sites, shall be offered.
- 10.3 All instrumentation shall fully comply or exceed the specifications laid down in this Section. No deviation from the specified standards will be accepted.
- 10.4 Only microprocessor-controlled, frequency-synthesis instrumentation incorporating the latest in surface mount technology shall be acceptable.

- 10.5 Bidders shall not offer instrumentation that has been superseded by later models or that will be discontinued in the near future. All instrumentation offered shall be of the most recent design. Should the Bidder be aware of any impending modifications or new equipment he / she shall state the expected implications of such in his / her offer.
- 10.6 All equipment offered shall have a high reliability and shall have a proven record (case history) of usage in the field of Hydrometry / hydrological measurement.
- 10.7 Except when otherwise specified, all equipment shall be suitably protected against lightning and surge damage, up to 2 kV; the relevant test certificates should preferably accompany the bid offer or shall be made available on request to the Department.
- 10.8 **Labels:**  
The instrumentation shall have durable, clearly legible labels, indicating the make, model, serial number, ratings and other relevant information.
- 10.9 **Mounting Brackets:**  
The mounting brackets for the instrumentation must be robust and not sensitive to impact and vibration. Where possible, it should be manufactured from corrosion-resistant material, preferably stainless steel, or the equivalent thereof.
- 10.10 Various makes, models, manufacturers' equipment will be used and therefore the Bidder will at all times make the offered equipment's protocol available to the Department for the compatibility to other equipment offered on this contract.
- 10.11 All data logger software updates will be supplied free of charge during the contract period. These upgrades will be delivered / sent / emailed by the Bidder to the relevant offices, which make use of the Bidder's equipment.

#### **ADMINISTRATIVE COMPLIANCE**

Bidders are required to comply with the following listed below:

<b>No</b>	<b>Criteria</b>	<b>Yes</b>	<b>No</b>
1	Companies must be registered with the National Treasury's Central Supplier Database. Provide proof of print out from CSD.		
2	Tax compliant with SARS (to be verified through CSD and SARS).		
3	Complete, sign, submit SBD 1, SBD 3.3 SBD 4, SBD 6.1		
4	Active registration with Company Intellectual Property Commission (to be verified through CSD and CIPS) Attach copy of CIPC/CIPRO Certificate		
5	The service provider (and in the case of a consortium or joint venture – at least one member of such consortium or joint venture) should submit a		
6	CERTIFICATE OF AUTHORITY FOR SIGNATORY (bidders to complete the relevant form)		
7	Copy of an Identity document of the authorised individual to represent the Service Provider as per the CERTIFICATE OF AUTHORITY FOR		

## **11. EVALUATION CRITERIA**

Department of Water and Sanitation will evaluate all proposals in terms of the Preferential Procurement Regulations (PPR's) 2022. In accordance with the PPR's 2022, submissions will be adjudicated on 80/20 points system and the evaluation criteria. A three phase evaluation criteria will be considered in evaluating the bid

**Phase 1: Mandatory Requirement**

**Phase 2: Functional / Technical Evaluation**

**Phase 3: Points awarded for Price and Specific goals (80/20 Preferential System)**

## Phase 1: Mandatory compliance

Please note that all bidders must comply with the following mandatory requirements-

No	Criteria	Yes	No
1	Attach manufacturer Certificate of compliance		
2	Compulsory Briefing session. Bidders must ensure that they sign the Attendance register.		

## Phase 2: Functional / Technical Evaluation

The bidders will be evaluated per item offered and therefore may bid for one or more items listed below. Bidders are required to tick next to the item they are bidding for. Bidders must note that they will be evaluated only on items that they have indicated to be bidding for:

Item No.	Item Description	Tick for item bidding for:
1 1.1	<b>Multi-channel data logger</b> with a connector box and connecting cable for external sensors: 4-20 mA (vented pressure transducer) and digital pulse (rainfall); Submersible with internal battery and internal GSM modem;  <b>Accessory: USB converter communication cable</b> to enable configuration of the equipment via laptop-, palmtop or Smart Device	
2 2.1 2.2 2.3 2.4	<b>Multi-Channel Data Logger with EUMATSAT satellite real-time logger, transmitter and Accessories: EUMATSET Logging Modem</b>  <b>Accessories:</b> Satellite Antenna Satellite Antenna Surge Protector Power Source USB communication cable enable configuration of the equipment via laptop-, palmtop or Smart Device	
3	<b>Sensor for Water Level Measurement:</b> Pressure Transducer: Piezo resistive sensor (Ceramic) with 4-20mA output.	
4	<b>Sensor for Water Level Measurement:</b> Radar Sensor: 15 m or 30 m Measuring Range and 4-20 mA output	



The specification questionnaire below is the 2<sup>th</sup> phase evaluation of the proposals to be in compliance with the specification.

11.1. Next to each detail specification a block is provided for the bidder to complete the following:

- 11.1.1. Offered equipment / item to specification - ☐ Y or ☒
- 11.1.2. Offered equipment / item not to specification - ☐ N or ☐ X  
(Refer to Paragraph 10.3.3, below.)
- 11.1.3. The bidder must initialise each page, he/she has filled and completed.

Suppliers are required to indicate accordingly. Failure to indicate such will result in your bid being disqualified.

**Note: All suppliers who meet the requirements in terms of Phase 1 above, will be considered further for evaluation under phase 2 as provided below.**

## DATA LOGGING EQUIPMENT - DETAIL SPECIFICATIONS

### 12. SCOPE:

- 12.1 This part of the specification covers the detail hardware and software requirements for the Data logger equipment.
- 12.2 The data loggers will be utilised at remote measuring stations to collect data. Operation will be in a totally unattended mode, with inspections by staff on a 30 to 60 day cycle.
- 12.3 The installed logger shall be designed and built for minimum maintenance and maximum life expectancy of 10 years or more - and shall be completely fit for the intended purpose. The product is intended to be permanently installed and will be designed for long term unattended operation and minimal maintenance. The long term reliability of the product whilst operating in harsh environments and the product battery life will be considered as very significant factors in the product selection.
- 12.4 The equipment will be mounted in recorder huts, either from mild steel, concrete or brick, with a minimum size of 800 x 800 x 1 800 mm high or mounted in pipes with diameters from 100 mm to 300 mm and will be subjected to a harsh environment.
- 12.5 Enclosures, if available, should be offered for this equipment under "Accessories". These enclosures can be offered in Fibreglass, Robust Plastic, Mild Steel, Stainless Steel, etc.
- 12.6 Preference shall be given to enclosures that include anti-vandalism systems.
- 12.7 Each bidder shall offer complete power supply system/s with the logger offered and should be listed under "Accessories" in the Price Schedule.
- 12.8 Each bidder shall offer a suitable USB converter to enable configuration of the equipment via laptop-, palmtop or Smart Device. The item should be listed under "Accessories" in the Price Schedule.

The logger and the associated meter interfaces must be able to be installed in an underground chamber, which could be flooded from time to time.

**13. MULTI-CHANNEL DATA LOGGER WITH CONNECTOR BOX FOR EXTERNAL SENSORS:  
4-20 MA (VENTED PRESSURE TRANSDUCER) AND DIGITAL PULSE (RAINFALL);  
SUBMERSIBLE DATA LOGGER WITH INTERNAL BATTERY AND INTERNAL GSM MODEM**

13.1 Application: ☐

- a) The submersible multi-channel GSM data logging system would be installed at remote gauging stations and used for primary or secondary real-time or backup data collection applications where water levels and rainfall is measured.

13.2 Design and technical details: ☐

- a) The equipment shall be designed to function satisfactorily under the following conditions:

- Operating temperature range: -20°C to 50°C;
- Relative humidity: 100%;
- Submersible: IP67 (or higher):
  - Solid particle protection: Dust tight; and
  - Liquid ingress protection: Immersion, up to 1-meter depth for 30 minutes;

13.3 Multi-channel data logger: ☐

- a) Data Processing:

- Only intelligent data loggers, equipped with a microprocessor will be considered.
- The data logger shall be equipped with a CPU watchdog circuit that will automatically restart the system in case of a severe electrical or electromagnetic disturbance.
- The multi-channel GSM data logger must have at least eight channels that can be user configurable to simultaneously record 4-20mA inputs from water level sensors, digital pulse inputs from tipping bucket rain gauges and internal battery voltage of the data logger.
- Build options for up to two pressure, eight (user programmable) digital or analogue inputs and two individually switched 12 Volt outputs for powering 4-20mA loop.
- High frequency pressure transient detection critical to extending asset life and network modelling.
- Facilitates closed loop control of pressure reducing valves, pressure sustaining valves and variable speed pumps.
- Integral movement detection aiding preventative maintenance routines, asset tracking and enhanced data integrity critical for reporting.

- b) Real time clock: ☐

- The data loggers shall be equipped with battery backed hardware real time clock system.
- The real time clock system shall provide time (24-hour system) and date information.
- Crystal controlled calendar clock with leap year adjustment Option to synchronise clock to local network at regular intervals

- c) Memory: ☐

The data loggers shall be provided with the following types of memory systems:

- Solid state, non-volatile memory for system and station parameters and user defined variables allocable between channels as required (max 64K per channel).
- The memory size: 512K.
- Recording Interval programmable between 1 second and 1-hour.
- Data storage: Rotating store or store until full.
- Supports average and statistical recording of pressure (min, max, mean, standard deviation) over logging interval.
- Battery backed RAM for intermediate data storage and processing. (Minimum 128 KB) Stored data at 12minute intervals more than 2 years if not downloaded.

- d) Power supply: ☐
- Each data logger shall be provided with an internal source that would prevent equipment shutdown or loss of data when the main battery is either disconnected for a short period or exchanged. ( $\pm 12$  minutes)
  - Power for all the sensors will be derived from the internal main battery via the data logger for more than 2 years at an interval of 12 minutes.
  - The logger must have low power consumption on standby mode.
  - The user replaceable internal battery must have a battery life of at least 5 years at an hourly logging interval under the specified operating temperatures.
  - Optional: high capacity external lithium battery pack, user replaceable.
  - The logger should be fitted with an external power input connector where external DC voltage can be supplied if required;
  - The data logger must be reverse polarity protected.
  - The logger must be programmable to log at a fixed rate or multiple logging intervals from 1 minute to 12 hours.
  - High accuracy battery monitoring optimising maintenance and asset management programmes.
- e) Input functions and interfacing: ☐
- Programmable Input range:
    - 0 - 100m (0 - 10 bar); or
    - 0 - 200m (0 - 20 bar):
  - Resolution:
    - $\pm 0.5\%$  or  $\pm 0.1\%$ .
  - In order to conserve power, the data logger shall control the power supply to each sensor. Sensors shall be switched on in sequence and readings taken under processor control. Sufficient warm-up and stabilization time for sensors must be controlled by the logger.
  - During non-measurement periods power supply to the sensors and signal converter units shall be interrupted for all the analogue channels.
  - Full calibration procedures shall be provided for each sensor / signal conditioning unit.
  - Input connectors for sensors shall be clearly labelled, shall be polarized to prevent mismatching of connectors and shall be configured so that no damage can occur if a unit is accidentally or intentionally connected to the wrong input channel. Each connector shall make provision for all the necessary signal lines, earth, 0V and 12V (switched) supplied lines.
  - The data logger will feature an optional integral pressure sensor for connection to the water pressure.
- f) Enclosure and Housing: ☐
- **Only** compact data loggers will be accepted, therefore all electronic components, wiring, etc., will be fixed / mounted inside the logger housing. **No** logger will be considered should the operator need to open the housing to access the keypad, LC Display, Connectors, etc.
  - The data logger shall be enclosed in wall mounted / standing enclosures, for installation in a recorder hut.
  - The data logger shall be designed to operate without degradation under dusty or condensing conditions experienced at sites.
  - The housing shall be manufactured of corrosion resistant material.
  - The data logger / communication unit housing shall not exceed the following dimensions:
    - Height: less than 150 mm;
    - Width: less than 150 mm;
    - Depth: less than 150 mm.
  - The data logger will feature a local full duplex serial communication port for programming the data logger, and for manual downloading of data. The data-logger local communication port should operate at an asynchronous data rate of between 1200 to 38400 Bps.
  - Proven bidirectional communication with automatic gap filling ensuring high level data reliability and

supporting remote product configuration

13.4. Transmission:

13.4.1. GSM Modem ☐

- The data logger shall incorporate a built-in GSM Modem for the purpose of transmitting and receiving data to and from the network.
- The GSM modem shall be a scalable machine to machine (M2M) solution reducing user operating and capital costs.
- The GSM modem shall be easily set-up using innovative optional Wi-Fi communication interface.

13.4.2. GSM Modem Frequency Band ☐

- The GSM Modem shall be dual band and should be capable of operating at frequencies of 900 MHz/1800 MHz or 850 Hz/1900 MHz.

13.4.3. External GSM Modem Antenna: ☐

- The GSM antenna shall be integral to the data logger.
- An external SMA connector must be available for attaching an optional external GSM antenna to the logger to support 2G or 3G frequencies.
- GSM Modem options;
  - External GSM antenna 1:
    - Support 2G and 3G frequencies.
    - Frequency range: 824 – 960 / 1710 – 2170 MHz
    - Gain: 2dBi
    - Impedance: 50 Ohm
    - Cable: 6mm diameter (price per meter), 0 to 10m cable length
    - Connector: SMA.
    - Mounting method: Screw.
  - Or
  - External GSM antenna 2:
    - Support 2G and 3G frequencies.
    - Frequency range: 800 – 2500 MHz
    - Gain: 11dBi
    - Impedance: 50 Ohm
    - Cable: 6mm diameter (price per meter), 0 to 10m cable length
    - Connector: SMA.
    - Mounting method: 38 to 52 mm diameter pole.

13.5. SIM Card Compatibility and Replacement: ☐

- The data logger will permit the fitting and replacement of the SIM card by the user. It should support all current forms of SIM cards in common use by GSM operators.

13.6. Signal Strength Measurement: ☐

- To carry out an installation, the installer will be required to measure the signal strength from the various operators with the product mounted in-situ. In the case of underground locations, this will involve placing the data logger in its anticipated position and measure signal strength with the chamber covers replaced, or in anticipated position in a basement.
- The data logger should therefore have a facility to carry out the unattended recording of signal strength. Subsequent downloading and analysis of the signal strength data then reveals the adequacy of the mounting position, the choice of provider and so on.

13.7. Choice of Operator: ☐

- The data logger will operate with any of the GSM operators' networks.

13.8. Transmission of Data:

☐

- Remote set-up compatibility monitoring and control through locally deployed PMAC software in use by the Hydrology Section for the last 10 years
- The data logger will be programmed to initiate data transmission hourly, daily, weekly or monthly at a user selected time. The logger will assemble the data to be transmitted in the form of packets of suitable length and format to be transmitted as a number of SMS's.
- Data to be transmitted will be any data, which has not been previously sent, or, at the request of the data centre any data recorded from a particular date and time.
- Advanced channel profile and threshold alarms.
- High frequency pressure transient detection critical to extending asset life and network modelling.

## 14. MULTI-CHANNEL DATA LOGGERS WITH EUMETSAT SATELLITE REAL-TIME LOGGER, TRANSMITTER AND ACCESSORIES

14.1 METEOSAT DATA LOGGING MODEM:

- 14.1.1 The data-transferring network shall provide the required services for 24-hours per day. The offered satellite Transceiver must have an international certificate of approval. ☐
- 14.1.2 The Eumetsat Telemetry System should provide the user with a simple method of recording, storing, and transferring data recorded by field loggers back to a central computer for integration into the Departments software programmes. ☐
- 14.1.3 The system should consist of two basic components, namely a "Eumetsat" Logging Modem and a Central Data Base. ☐

14.2 General Description:

"EUMETSAT" LOGGING MODEM:

- 14.2.1 The Eumetsat logging modem System should comprise of a combined low powered data logger and a satellite transceiver module. ☐
- 14.2.2 The Eumetsat logging modem should be able to be connected to a minimum of four (4) sensors up to a maximum 32 inputs via standard sensor cables. ☐
- 14.2.3 The system should be designed around receiving data from the sensor with a sample period of at least 12 minutes. ☐
- 14.2.4 The following indications should be available on the front of the unit:

- Power Fail.
- Transmit (Tx).
- In Test Mode.
- Unit is OK.
- Set up error.
- WIFI active.
- WIFI ON, not connected.
- Multi-function button pressed.
- USB thumbs drive ON or FAIL

☐

- 14.3 In standard operation the system rests in "sleep" mode until the predetermined time when it powers itself up, reads the data from the sensors, saves them and powers down. At predetermined intervals, the modem should "wake up" to send the data package to the Control Centre Server. ☐
- 14.4 The following protection should be built into the design of the electronic
- Circuit board (PCB)
  - Reverse Polarity Protection

- Voltage Clamping
- DC filtering
- Lightning protection

☐

#### 14.5 CONFIGURATION OF THE FIELD UNIT:

- 14.5.1 The field unit is to include a Bluetooth communication between operator and device.  
14.5.2 Communication is activated via a Link button on the front of. The transmitter housing.

☐

- 14.5.3 Communication is made between the modem and the operator's mobile (Android or iPhone), or PC or MAC, using a Link App. The App is available and downloadable through the web.

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- 14.5.5 Configuration of the field unit and the connection to the satellite platform to be performed by the operator.

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- 14.2.6 The operator should be able to configure various parameters of the system as listed below.

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- 14.2.7 Changes to field modem settings.

☐

- 14.2.8 Export Data in predefined formats.

☐

- 14.2.9 Export Data in predetermined time intervals.

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- 14.2.10 View all Data stored in the unit.

☐

- 14.2.11 Alarm if data not received within prescribed times.

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#### 14.6 PERFORMANCE:

- 14.6.1 Must function as an integral Data Logger and Satellite Transmitter.

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- 14.6.2 Must have built-in WIFI for communications, and a USB connection port.

☐

- 14.6.3 Must have a USB Micro AB port, USB Host port and SD Memory (internal).

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- 14.6.4 Must support up to 32 measurements: SDI-12, Analogue, Digital, RS485 & 4-20mA, all with lightning protection.

☐

- 14.6.5 Must include 6 Analogue Inputs (2 Single ended, 3 Differential, and 1 x 4-20mA), 2 Digital and 2 Digital Outputs, and Tipping Bucket input.

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- 14.6.6 Must have analogue input voltage range of 0 to 5 volts, differential range of 78Millivolts ad 625 Millivolts, and 0.02% FS at 25°C, +-0.03% FS accuracy when transmitting.

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- 14.6.7 Must save Logged Data and Transfer Data at set time intervals.

☐

- 14.6.8 Configuration changes must be field programmable.

☐

- 14.6.9 Extended connectivity and configurations possible with Python scripting.

☐

- 14.6.10 Must allow for Alarm logs and reports.

☐

- 14.6.11 Optional cell/Iridium modem cards for redundant 2-way communications must be available.

☐

- 14.6.12 Must have three-level password protection.

☐

- 14.6.13 Must have equation processing and multiple level averaging capabilities.

☐

- 14.6.14 Must have a mathematical equation editor and front panel programming.

☐

- 14.6.15 Data information can be transmitted in several formats such as SHF, SHEFIX, ASCII, Binary

☐

and Pseudo Binary.

14.6.16 Logs up to 1,000,000 readings.

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#### 14.7 Alarms and Monitoring:

The Logger Modem should initiate the following parameters:

14.7.1 Records of logged sensor values.

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14.7.2 Site data including battery strength, GPS status, Signal Strength graph.

☐

14.7.3 High, Low level and Rate of Change alarms.

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#### 14.8 Physical Characteristics:

14.8.1 The combined mass of the unit should not exceed 1.5 kg.

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14.8.2 The dimensions of the "METEOSAT" logger with modem should not exceed: 155 mm  
Wide x 235 mm Deep x 55 mm High

☐

14.8.3 The enclosure should preferably be manufactured from anodised aluminium, or better.

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14.8.4 The unit should include 2 terminal connecting strips with removable connectors, for ease of wiring.

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14.8.5 The equipment shall be designed to operate without degradation under dusty conditions experienced at exposed sites.

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14.8.6 The equipment shall function satisfactorily between -40°C and +70°C.

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14.8.7 The logger housing shall be dust and water spray protected.

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14.8.8 The equipment must be compact, robust and corrosion resistant.

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14.8.9 The input voltage to the system shall preferably be 9-20 V DC.

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14.8.10 The unit must be manufactured to ISO 9001 Quality Standards.

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13.8.11 The transmitter must operate on the HRDCP at 3kHz spacing, at 1200bps.

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#### 14.9 ENVIRONMENTAL CONDITIONS:

14.9.1 Field unit shall operate under the following conditions.

14.9.2 Temperature -40°C to +70°C

14.9.3 Humidity (non-condensing) 90% RH at 35°C

14.9.4 IP rating of electronic enclosure IP63

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#### 14.10 CURRENT CONSUMPTION:

14.10.1 The Current Consumption should be as follows:

14.10.2 Standby Current: 1.1mA

14.10.3 Measuring Current: 6-15mA depending on number of sensors

14.10.4 Wake up Current: 50mA for 107 seconds

14.10.5 Transmitting Current: 1.5 – 3.5A for 2-60 seconds

13.10.6 WIFI ON: 11mA

☐

#### 14.11 SATELLITE OPERATOR'S AUTHORITY:

14.11.1 The Tenderer must submit proof from the supplier for the Satellite Operator of accreditation and authorization to use the said **EUMETSAT** satellite system.

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**14.12 WARRANTY:**

14.12.1 The unit should be supplied with 3-year warranty.

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**14.13 SATELLITE ANTENNA:**

14.13.1 5.2 dBi Gain Geostationary Antenna with integral GPS antenna, with

14.13.2 5m UHF RF and GPS cables

14.13.3 Connectors; Type-N Female (RF Antenna), SMA Female (GPS Antenna)

14.13.4 Weatherproof aluminium pole mounting bracket

14.13.5 Dimensions: cylindrical, 338.6mm H x 162.8mm Dia.

14.13.6 Weight: 794gms antenna only

☐

**14.14 SATELLITE ANTENNA SURGE PROTECTOR:**

14.14.1 Coax Surge Protector Kit (Panel Mount) with 0.9m cable.

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**14.15 POWER SOURCE:**

14.15.1 Battery 12Vdc 24AH Gel Cell battery with 1m fused power cable.

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14.15.2 Regulator 3 AMP Solar Charger Regulator, temperature compensated.

☐

14.15.3 Solar Panel 30W Solar Panel with mounting bracket and 3m cable including vandalized protection.

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**15. SENSOR FOR WATER LEVEL MEASUREMENT: PRESSURE TRANSDUCER: PIEZO RESISTIVE SENSOR (CERAMIC) WITH 4-20MA OUTPUT.**

15.1. Application

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- a) The submersible pressure transducer will be used for hydrostatic water level measurement and will be measuring pressure using a vented cable.
- b) Pressure transducers must be capable of measuring water levels from 0 - 100 m, the range of each transducer being determined by the Department and pre-set in the factory. Typical ranges could be: 0 - 1 m; 0 - 2.5 m; 0 - 5 m; 0 - 10 m; 0 - 20 m, 0 - 30 m and >40 m on request.
- c) The pressure transducers must have a high reliability and ensure a large range of application for pressure measurement in all fields of water level measurement.

15.1.1. Design and Technical Details:

☐

a) Pressure Transducer housing:

- The housing must be in an all-sealed enclosure and the pressure port must be vented to the atmosphere using a vented cable.
- The transducer housing must be robust, corrosion-resistant, insensitive to impact and vibration and watertight up to at least 70 m of water column. (>70 m on request).
- The opening to the sensor must be protected by a removable threaded cap to allow for maintenance.
- The transducer housing shall preferably not exceed the following dimensions and weight:
  - Length: 500 mm
  - Diameter: 50 mm
  - Weight: 1 kg
- The transducer housing can be fitted with a watertight plug for connection to the transducer cable.

b) Pressure Transducer sensor:

☐

- The submersible pressure transducer sensor must be based on a piezo-resistive ceramic pressure sensor element.



- The measuring cell must be chemically and thermally resistant.
- The pressure sensor must have a compensated operating temperature range of -5°C to +70°C.
- The sensor should be calibrated, temperature compensated and provide amplified analogue output signals for 4-20mA output.
- The sensor should have a supply voltage of between 9 to 32V and must have reverse polarity protection.
- The sensor must have a response time of maximum 35 ms with a power consumption not exceeding 250mW. Typical sensor warm-up time must not exceed 2 seconds.
- The sensor proof pressure must be two times the rated pressure range. Proof pressure is the maximum pressure which may be applied without causing damage to the sensing element.
- The pressure sensor must have surge immunity according to EN 61000-4-5 for current output devices with cable lengths longer than 10m.

c) Measuring Accuracy of the Pressure Transducer Sensor: ☐

- The sensor's Non-linearity (Best Straight Line fit), hysteresis (maximum output difference at any point within the operating pressure range for increasing and decreasing pressure) and repeatability must be 0.1 % FSO (Full Scale).

d) Vented transducer cable: ☐

- The vented cable is factory fitted to the submersible pressure transducer housing and the length of cable for each submersible pressure transducer are being determined by the Department during procurement.
- The pressure transducer and transducer cable shall be designed to function satisfactorily with a cable length of up to 250 m.
- Flexible with Polyurethane jacketing material for corrosive media and maximum outer diameter 12 mm.
- Double sheathing with interposed tinned copper- braiding shielding with polyester with polyester film to cover the vented tube and all connectors.
- There must be filler between the conductors and vent tube and all conductors must be of tin copper.
- As the transducer cable shall be used as the carrying rope, it shall preferably feature, for longitudinal stability, an internal Kevlar core assembly, or equivalent.
- A polyamide pressure-compensation capillary tube for measuring the reference pressure, with an inside diameter of preferably 3 mm, but not less than 1,0 mm.
- End of cable connected by terminal box with hydrophobic filters and exchangeable humidity absorber.
- A fixing clamp for exact positioning of the pressure probe in a stilling well or tube must be available, manufactured of non-corrosive material.

## 16. WATER LEVEL SENSOR - RADAR WITH 4 - 20MA OUTPUT AND 15M RANGE (2MM ACCURACY) AND 5M CABLE

### 16.1 Design and technical details:

- |    |                          |   |                          |
|----|--------------------------|---|--------------------------|
| a. | Measuring range:         | maximum 15 meters.                                    | <input type="checkbox"/> |
| b. | Deviation:               | maximum 2 millimetres.                                | <input type="checkbox"/> |
| c. | Beam angle:              | 8 degrees.  | <input type="checkbox"/> |
| d. | Measuring frequency      | 80 GHz technology.                                    | <input type="checkbox"/> |
| e. | Output signal            | 4 ... 20 mA   | <input type="checkbox"/> |
| f. | Ambient temperature      | -40 ... +80 °C.                                       | <input type="checkbox"/> |
| g. | Communication interface: | Bluetooth version 5.0. with 25-meter effective range. | <input type="checkbox"/> |

- |    |  |                |                          |
|----|--|----------------|--------------------------|
| h. | Operating voltage  | 12 ... 35 V DC | <input type="checkbox"/> |
| i. | Protection rating:   | IP66/IP68      | <input type="checkbox"/> |
| j. | Detailed technical brochure or specification sheet included in bid document. |                | <input type="checkbox"/> |

**17. WATER LEVEL SENSOR - RADAR WITH 4 - 20MA OUTPUT AND 30M RANGE (2MM ACCURACY) AND 5M CABLE**

**17.1 Design and technical details:**

- |    |  |   |                          |
|----|--|---|--------------------------|
| a. | Measuring range:   | maximum 30 meters.                                    | <input type="checkbox"/> |
| b. | Deviation:   | maximum 2 millimetres.                                | <input type="checkbox"/> |
| c. | Beam angle:  | 4 degrees.  | <input type="checkbox"/> |
| d. | Measuring frequency  | 80 GHz technology.                                    | <input type="checkbox"/> |
| e. | Output signal  | 4 ... 20 mA   | <input type="checkbox"/> |
| f. | Ambient temperature  | -40 ... +80 °C.                                       | <input type="checkbox"/> |
| g. | Communication interface:   | Bluetooth version 5.0. with 25-meter effective range. | <input type="checkbox"/> |
| h. | Operating voltage  | 8 ... 30 V DC   | <input type="checkbox"/> |
| i. | Protection rating:   | IP66/IP68   | <input type="checkbox"/> |
| j. | Detailed technical brochure or specification sheet included in bid document. |   | <input type="checkbox"/> |

### PHASE 3: POINTS AWARDED FOR PRICE AND SPECIFIC GOALS

The 80/20 Preferential Procurement System will be used in evaluating these bids:

SPECIFIC GOALS	20
PRICE	80
<b>Total</b>	<b>100</b>

#### Price

A maximum of 80 points are allocated for price on the following basis:

$$P_s = 80 \left( 1 + \frac{P_t - P_{\max}}{P_{\max}} \right)$$

Where:

$P_s$  = Points scored for comparative price of bid under consideration

$P_t$  = Comparative price of bid under consideration

$P_{\max}$  = Comparative price of **highest** acceptable bid

#### Preference point system

SPECIFIC GOALS	NUMBER OF POINTS TO BE ALLOCATED
Women	5
People with disability	5
Youth (35 and below)	5
Location of enterprise	2
B-BBEE status level contributors from level 1 to 2 which are QSE or EME	3
<b>Total points for SPECIFIC GOALS</b>	<b>20</b>

Documents Requirement for verification of Points allocation: -

Procurement Requirement	Required Proof Documents
Women	Full CSD Report
Disability	Full CSD Report
Youth	Full CSD Report
Location	Full CSD Report
B-BBEE status level contributors from level 1 to 2 which are QSE or EME	Valid BBBEE certificate/sworn affidavit. Consolidated BEE certificate in cases of Joint Venture Full CSD Report

The definition and measurement of the goals above is as follows:

#### Women, disability, and youth:

This will be measured by calculating the pro-rata percentage of ownership of the bidding company which meets this criterion. E.g., Company A has five shareholders each of whom own 20% of the company. Three of the five shareholders meet the criterion, i.e. they are women/disability/youth. Therefore, this bidder will obtain 60% of the points allowable for this goal.

#### Location of enterprise

Local equals province. Where a project cuts across more than one province, the bidder may be located in any of the relevant provinces to obtain the points.

**B-BBEE status level contributors from level 1 to 2 which are QSE or EME**

Measured in terms of normal BBEE requirements.

**Note: Formula for calculating points for specific goals**

Preference points for entities are calculated on their percentage shareholding in a business, provided that they are actively involved in and exercise control over the enterprise. The following formula is prescribed:

$$PC = \frac{Mpa \times P\text{-own}}{100}$$

Where

Where

**PC**= Points awarded for specific goal

**Mpa**= The maximum number of points awarded for ownership in that specific category

**P-own** = The percentage of equity ownership by the enterprise or business

**Description of quantities required**

Item Nr	Description	Quantity
1.	<b>Multi-channel data logger with connector box and cable</b> for external sensors: 4-20 mA (vented pressure transducer) and digital pulse (rainfall); <b>Submersible data logger with internal battery and internal GSM modem</b>	34
1.1.	<b>Accessory: USB converter communication cable</b> to enable configuration of the equipment via laptop-, palmtop or Smart Device	6
1.2.	<b>4 Channel junction box</b> (M16 glands with breather) and <b>CBL006 Input Cable with compatible connectors</b>	34
1.3.	<b>Standard wall mounting bracket</b>	34
2.	<b>Multi-Channel Data Logger with EUMATSAT satellite real-time logger, transmitter and Accessories: EUMATSET Logging Modem</b>	3
2.1.	<b>Satellite Antenna with GPS Antenna, 5m dual cable and mounting kit</b>	3
2.2.	<b>Satellite Antenna Surge Protector with cable</b>	3
2.3.	<b>Power Source including Gel battery and 1m fused cable</b>	3
2.4.	<b>USB communication cable</b> enable configuration of the equipment via laptop-, palmtop or Smart Device	6
3.	<b>Sensor for Water Level Measurement:</b> Pressure Transducer: Piezo resistive sensor (Ceramic) with 4-20mA output.	
3.1.	Sensor for Water Level Measurement: <b>Pressure Transducer:</b> Piezo Resistive Sensor (Ceramic) with 4-20mA Output ( <b>0-10m</b> range)	20
3.2.	Sensor for Water Level Measurement: <b>Pressure Transducer:</b> Piezo Resistive Sensor (Ceramic) with 4-20mA Output ( <b>0-30m</b> range)	8
3.3.	Sensor for Water Level Measurement: <b>Pressure Transducer:</b> Piezo Resistive Sensor (Ceramic) with 4-20mA Output ( <b>0-40m</b> range)	2
3.4.	<b>Vented Transducer Cable</b> (Total meters required)	540
4.	<b>Sensor for Water Level Measurement:</b> Radar Sensor 15 m or 30 m Measuring Range and 4-20 mA output	
4.1.	Sensor for Water Level Measurement: <b>Radar Sensor 15 m</b> Measuring Range and 4-20 mA output	14
4.2.	Sensor for Water Level Measurement: <b>Radar Sensor 30 m</b> Measuring Range and 4-20 mA output	8
4.3.	Radar Sensor: <b>Stainless Steel mounting bracket for Ceiling mount</b>	22

**Conditions:**

- Bidders are kindly requested to submit original only
- Bidders are required to submit a copy of the valid B-BBEE Status Level Verification Certificates together with their bids, to substantiate their B-BBEE rating claims.
- Fraudulent practices shall result in immediate disqualification.
- It is a requirement that bidders who do business with government must comply to the relevant tax legislations and bidders are required to ensure that their Tax Matters are in order and up to date. The Department may invalidate your bid should it find that your Tax Compliant Status (TCS) is not in order.
- .
- DWS reserves the right to not award the bid should suitable bidders not be identified.
- It is a condition that the DWS further reserves the right to award the bid to multiple service providers for the respective items. The awarding of the bid is not limited to a single bidder. The awarding can be done to different bidders for different items offered.

**For technical enquiries contact:** Mr Neil van Wyk, 044-802-2724 | 082 800 2510 Email: Vanwykn2@dws.gov.za