No		Specification	Compliance with Specification
1	**Site Control**		
1.1	**RTU (Remote Terminal Unit)**		
	1.1.1	The RTU will be capable of long-term data telemetry,data collection,monitoring of Real Time Data Management and Telemetry System. Enable SCADA Control Features using local GSM & Data Control Center	
	1.1.2	The RTU shall be a high-reliability,**Industrial Grade Controller capable** of Data acquisition,Control and Communication.The RTU shall come with **LCD keypad.**	
	1.1.3	The RTU should be proven reference for interface to all type of common communication equipment available in the market today. Reference for such installation shall be submitted together with tender proposal	
	1.1.4	The RTU Controller equipment shall be designed for continuous operation with 12VDC power source.The RTU Controller should be designed with minimum power consumption,which preffered to be less or around 50mA to achive reliable operation	
	1.1.5	The RTU shall be capable of monitoring the **incoming power supply** (battery voltage). The RTU shall automatically recover from a power loss condition without affecting RTU operation.	
	1.1.6	The RTU shall,in general,be of a single module type to facilitate ease of field service. It shall be possible and easy to remove the RTU board for replacement,without disturbing the field wiring and without breaking any current loops in the RTU	
	1.1.7	**The RTU shall be able to transmit data to Master Station** by using GPRS/GSM communication or any equivalent communication.The RTU shall have the ability to Time-Stamp and Log Data/Alarm in its Internal Memory Buffer,for block transmission to the **Master Station.**	
	1.1.8	The RTU shall utilize non-volatile memory for storing the logged event or time triggered logged data complete with event timestamp (up to every minutes). The logged data shall be at any changes of state on digital input, every pulse input captured, controller reset or any controller fault/error	
	1.1.9	The data logging facilities inclusive of the following data logging mode	
		i. Time event logging such as record of all sensor parameter in configuring the interval	
		ii Alarm event logging such as alarm due to sensor threshold setting or hardware such as lost of power, reset or software failure,enter/ 'TEST' mode,etc	
	1.1.10	The time event logging shall inclusive of the following parameter as minimum requirements but not limited as following:	
		i. Date (DD/MM/YYYY)	
		ii Time (HH:MM:SS)	
		iii Battery status	
		iv RTU alarm-battery low	
		v RTU alarm- enclosure breached	
		vi RTU alarm-other alarm	
	1.1.11	For time triggered data logging,the logging interval shall be able to set by user from the RTU and shall range from 1 minutes to 24 hours. The time triggered data logging shall be able to be stopped, restart by user when required	
	1.1.12	The RTU shall store all logged data into data logging buffer on every logging interval **(default 5 minutes)** regardless of what is the Master station. All time event logged data in the RTU buffer shall be transferred to the Master Station once it is being interrogated. Pre-caution shall be made to limit the amount of data to be transferred in every interrogation to avoid the communication channel to be congested due to a particular RTU.	
	1.1.13	Windows based data retrieval software for the tenderer shall supply installation on data extraction terminal software. The data retrieved shall be saved in database format (SQL,CSV or others)	

	1.1.14	The minimum features of the RTU Controller shall be as follows:	
		i. 512KB system base memory or more with Compact Flash upgrade capability or at least memory capacity for 3 month data storage	
		ii. Minimum 2 channel of RS232/RS485 serial communication port for interface to MODEM and other communication device	
		iii Wide supply voltage range (12 to 24VDC)	
		iv Ability to Time-Stamp and Log Data internally up to a period of minimum 1 months	
		v Ring Data Logging Buffer	
		vi Alarm report by Exception	
		vii Ability to Accept Control Commands	
		viii Multiple Programmable Communications Channels	
		ix Multiple Protocol Communications	
		x Multiple Alarm Reporting Number of Tries	
		xi Rugged Operating Limits	
		xii Configuration Program using **MySMS Format**	
	1.1.15	The minimum specification shall comply but not limited as following:	
		i Minimum 6 Digital 24 VDC outputs	
		a) Digital Outputs:	
		All software controller	
		ii operating voltage: 7-30Vdc,50mA	
		iii Communication Interfaces: -1 RS-232,RS485, USB 1.1	
		vi Operating Temperature: - -40 to 60'C	
	1.1.16	**The RTU should built in function of local data transfer through USB thumb drive whereby the user only need to plug in USB thumb disc to RTU and select date range required and press on data retrieve button. The system will then automatically transfer the data to USB thumb drive.** This great function will enable user to retrieve data at site easily without using any special equipment but only USB thumb drive required	
	1.1.17	SMS text data acquisition(current sensor status ,AC and Battery voltage and current PUMP operation status) SMS text SCADA contro PUMP operation SMS text update system configuration SMS text Remote Reset system SMS text Remote Reset GSM Modem or via Internal Timer	
1.2	**Master PLC**		
	1.2.1	Supply install of programmable logic controller module unit (master PLC) 16 DI. 10DO, 1 port RS485 including automatic programming pump operation system for 6 pumps. Able to support MySMS® protocol	
1.3	**Power Supply System**		
	1.3.1	Switching power supply 240 VAC to 24 VDC	
1.4	**Lightning protection Unit**		
	1.4.1	Incomming AC lightning protection unit (LPU) for incoming AC power supply	
1.5	**GSM Modem**		
	1.5.1	GSM Network shall be utilized as main link for communication between RTU and Master Station through suitable GSM MODEM module	
		The GSM Modem Equipment shall be versatile,sensitive,reliable and able to operate for long hours at at-and-by-mode	
		The minimum specification shall comply but not limited as following:	
		Quad Band (EGSM900/1800 MHS)	
		Input Voltage: 5V-32 V	
		Operating temperature:-20 to 55C	
		Interfaces: RS232	
		Sliding SIM holder (3V/5V SIM Interface)	
	1.5.2	The Master Station shall be able to communicate satisfactory with RTU using GSM network even in low signal strength coverage. If the signal stregth is too low, an outdoor high gain GSM antenna shall be supplied and installed outdoor with antenna support of sufficient height and shall be safely anchored to the roof top or side of the Master office building	

1.6	**Ruggedised Enclosure**		
	1.6.1	The tenderer shall supply primary and secondry enclosure.The primary enclosure shall be wall-mounting type and must be able to house RTU,communication equipment,solar charge controller and other related accessories.The secondary enclosure must be able to house battery banks and other related accessories for the battery banks	
	1.6.2	The primary and secondry enclosure shall be built from galvanized metal. The primary enclosure shall be minimum IP55 for indoor usage and IP 65 for outdoor usage. It shall equip with lockable-hinged door. The deninsion of primary enclosure shall have suitable size to ease the maintenance.The secondary enclosure shall be minimum IP55 and ventilated	
	1.6.3	The enclosure shall design to operate in an ambient temperature range of 10-60 degrees C and ambient humidity range of 10-95% RH 9non-condesing)	
	1.6.4	In the event no housing available at the station,and outdoor weatherproof freestanding cabinet shall be supply. The weaterproof housing shall be house all necessary equipment inclusive of Remote Terminal unit (RTU),communication equipment,Solar Charger Controller,Maintenance Free Batteries, and(if any)	
	1.6.5	The weatherproof housing shall have hinged,lockable front doors for easy access.All components,wiring and terminal blocks shall be accessible from the front of cabinet.the enclosure shall of IP65 standard and designed to operate in an ambient temperature range of 10-60 degrees C and ambient humidity range of 10-95% RH (non -condensing)	
	1.6.6	The weatherproof housing shall be equiped with canopy rooftop of suitable size to protect enclosure from rainwater.Air ventilation hole covered with wire mesh shall be available on the top of the enclosure beneath the canopy to allow airflow as well as protect against insect from entering into the enclosure.	
1.7	**PLC Enclosure**		
	1.7.1	Interconnecting cabling,internal relays & terminal blocks including IP 55 wall mounted enclosure	
2	**Upgrade Existing existing telemetry Pump Station to Automated SCADA**		
2.1	**Upgrading Firmware and Configuration**		
	2.1.1	Existing programable RTU have to be UPGRADED Firmware to enable the SCADA Control Functions on the Sites With MySMS Firmware Enabled.	
3	**3.1 Intergrated to Existing Data Control Center**		
	3.1.1	The tenderer shall upgrade exixiting Management Data Control Center application software and design the SCADA/ telemetry system for server located at master station,which shall be links and communicates effectively with RTU. The universal system telemetry application software package shall govern and suitable for monitoring and control with interactive Graphical user interface (GUI) which supports point and click mouse operation	
	3.1.2	It shall be designed in the modular concept using object oriented approach,multitasking environment and can be easily modified and upgradeable in the future to suit changing needs of the control centre for the newly upgraded stations from Site to the existing Master Software. ABLE to Link with Existing Software Retriaval system	
	3.2 Module upgrade to SCADA Control Features		
	3.2.1	It shall be designed in the modular concept using object oriented approach,multitasking environment and can be easily modified and upgradeable in the future to suit changing needs of the control centre.	
	3.2.2	The software communication protocol shall be of standard communication mode only	
	3.2.3	The operating system shall be industrial standard windows based software software.it shall be real-time,multi-tasking and pre-emptive scheduling operating system	
	3.2.4	the universal software package plays a vital role in the monitoring and control system and is the key to operational efficiency and effectiveness.The trend has shown that software constitutes an increasingly large percentage of the total system cost and therefore,the investment of software must be preserved	

	3.2.5	The software shall consist of an array of applications that will perform the monitoring and control functions.If shall offer a very simple and user-friendly operator/system interface	
	3.2.6	The software shall include but not limited to the following features:	
		i. On line control for: - with Scada Control of the Site by SMS using MySMS Protocol -ad-hoc interrogation of RTUs data and status -Data processing capability for extracted data from RTU -	
		ii Database -Local Database	
		iii Graphical User Interface -site diagram in suitable form -Display of real-time and historical at user specified interval	
		iv Alarm management -Detection and processing of alarms -Alarm event recording with related data	
		v Communications with RTUs -Automatic print out or upon request -Access/security features	
		vi Remote Access/Reporting -Local statistical report generation -Dial-in access from remote computers -password protection	
		vii ABLE to Link with Existing Software Retriaval system	
	3.3 WEB MODULE		
	3.3.1	It shall be designed in the modular concept using object oriented approach,multitasking environment and can be easily modified and upgradeable in the future to suit changing needs of the control centre.	

4.0	**PRE-TEST,TESTING AND COMMISSIONING**		
	4.1	Tenderers must also conduct nationwide testing and commissioning activity at all sites upon completion of installation	
	4.2	Testing and commissioning of the entire system shall be performed	
	4.3	The tenderer shall provide all necessary terting procedure,testing form,testing schedule,necessary equipment and instruments for the testing and commissioning.	