AuM Systems
Specialist In Water Monitoring & Management
Recent Success Stories

PRAKASH MUTHUSWAMY
MANAGING DIRECTOR

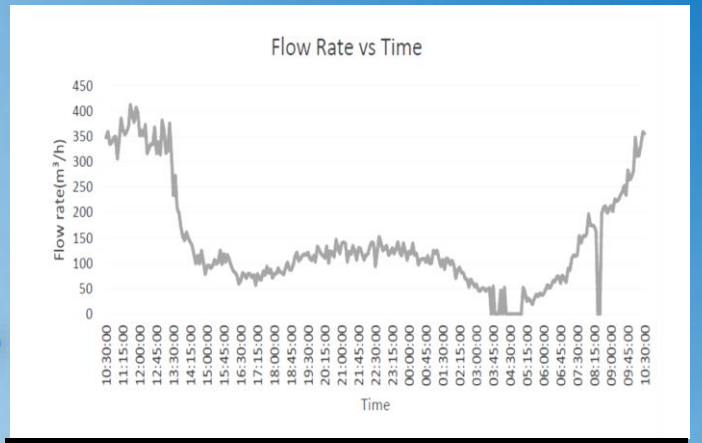
www.aumsystems.com

Demonstrating Our Water Industry Competence

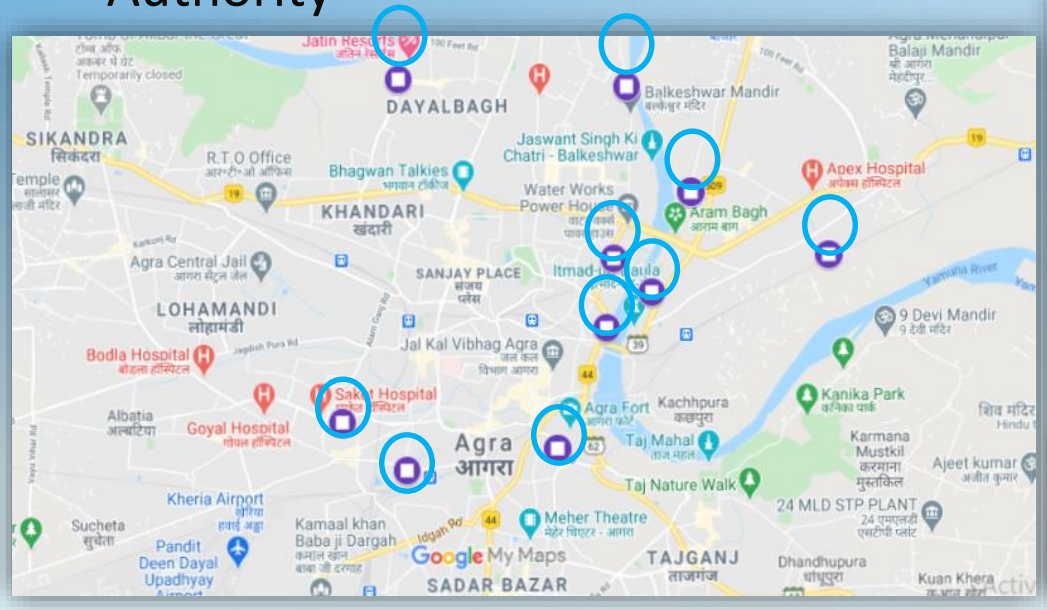
- Citywide wastewater flow study in Northern India
- Municipal Water Network audit study for two cities in Southern India
- Flow monitoring study of treated effluent usage for irrigation purpose in a Metro City in Southern India
- River flow monitoring study in Southern India
- Cooling water intake & outlet (from irrigation canal) open channel flow metering in a Thermal Power Station
- AMRUT citywide water network monitoring & NRW assessment using Smart Metering, SCADA & Billing Application
- Water Management for IISc Bangalore
- Calibration of 4-Path insertion ultrasonic flow meters at FCRI NABL accredited laboratory

Citywide wastewater flow study in Northern India

- Measurement of raw sewage before intake to treatment plant to reassess the capacity of treatment plant
- Measurement was carried out in open channel locations for 24Hrs
- 10% to 50% higher inflow than the designed capacity was observed at these location
- After the completion of study, permanent metering for wastewater channels is under consideration by the Authority

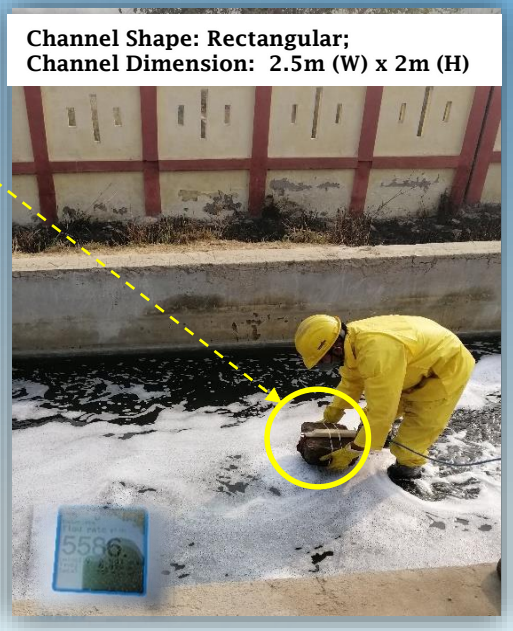


Typical graphical representation of flow data



Channel Shape: Rectangular;
Channel Dimension: 1900 mm (w) x 1500 mm (H)

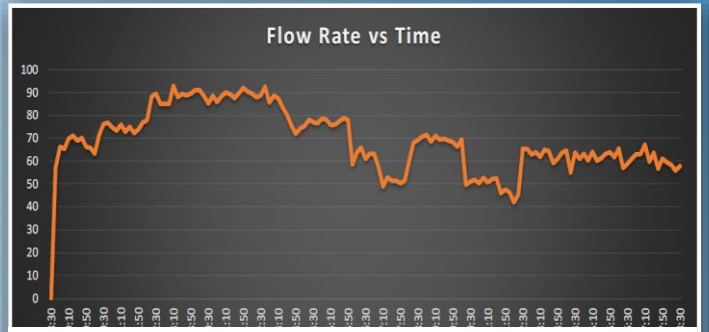
Channel Shape: Trapezidal;
Channel Dimension: 800 mm (b) x 1480 mm (B) x 2000 mm (H) x 250 mm (h)



Channel Shape: Rectangular;
Channel Dimension: 2.5m (W) x 2m (H)

Municipal Water Network audit study for two cities in Southern India

- A total of 101 points were measured, each for a duration of 24 hrs.
- The measured points include WTP inlets, WTP outlets, feeder lines, distribution lines and OHT inlets
- Very low velocities (less than 0.5 m/s) were recorded for several hours a day
- Significant losses in the transmission line / feeder line network were noticed from our data analysis



Typical graphical representation of flow data

800mm, WTP Outlet
Concrete Lined Mild Steel Pipe

350mm, OHT Inlet
HDPE Pipe

700mm, Transmission Line
Concrete Lined Mild Steel Pipe

900mm, Raw Water Pumping Station Outlet
Mild Steel Pipe

650mm, WTP Inlet
Mild Steel Pipe

550mm, Transmission Line
Concrete Lined Mild Steel Pipe

Flow monitoring study of treated effluent usage for irrigation purpose in a Metro City in Southern India

- Wastewater from the city is treated at four treatment plants with different capacity
- The treated water is then supplied to a distant town for groundwater rejuvenation
- Flow measurements were done in open channels and fully filled pipes at the inlets and outlets of the sewage treatment plants (STP) & jackwells

STP Inlet; Channel Shape: Custom Shape;
Dimension: 3m (W) x 2.8m (w) x 1.4m (H)

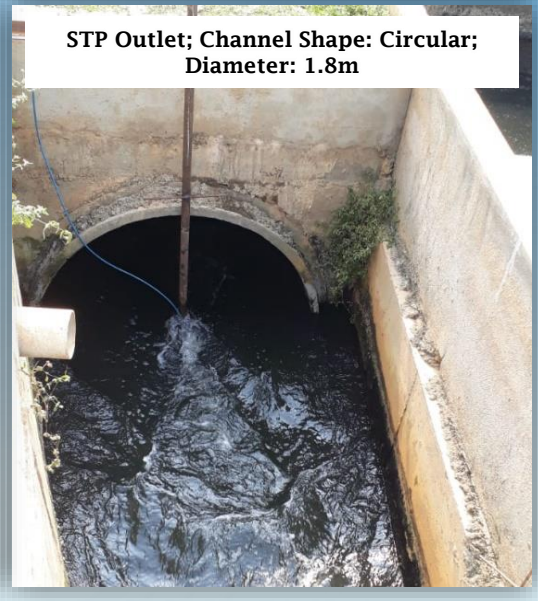
STP Treated Water Outlet;
Channel Shape: Trapezoidal;
Dimension: 11.3m (W) x 5m (w) x 3.7m (H)

STP Inlet; Pipe Size: 700mm;
Ductile Iron Pipe

STP Outlet; Pipe Size: 2m;
Mild Steel Pipe with Concrete Lining

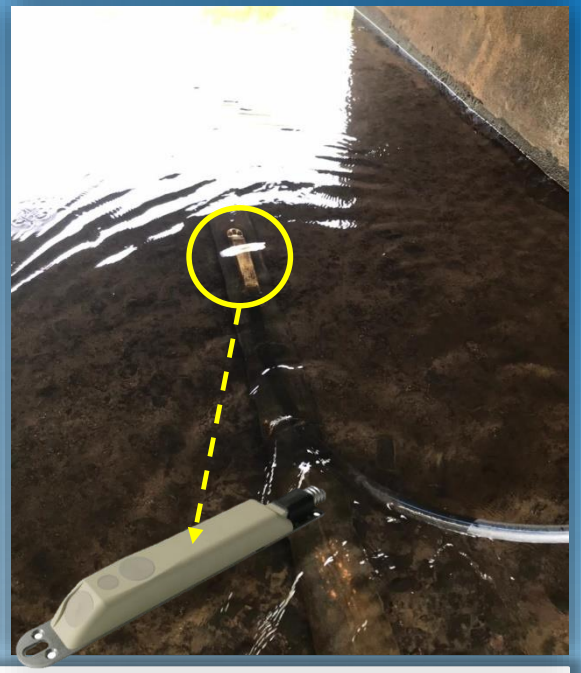
STP Outlet; Pipe Size: 1.6m;
Mild Steel Pipe

STP Outlet; Channel Shape: Circular;
Diameter: 1.8m



River flow monitoring study in Southern India

- Flow profiling of the river was carried out before installing the sensor
- Continuous flow measurement of river water for a duration of one year
- The flow transmitter powered by solar panels was programmed to measure continuously the velocity and depth to calculate the flow



Section wise flow profiling data

3.91 m

v_{15}= 0.428 m/s h_{15}= 0.093 m q_{15}= 541.4 m³/h	v_{14}= 0.423 m/s h_{14}= 0.101 m q_{14}= 624.1 m³/h	v_{13}= 0.433 m/s h_{13}= 0.095 m q_{13}= 565.3 m³/h	v_{12}= 0.399 m/s h_{12}= 0.091 m q_{12}= 512.5 m³/h	v_{11}= 0.423 m/s h_{11}= 0.083 m q_{11}= 469.8 m³/h

4.00 m

v_{45}= 0.406 m/s h_{45}= 0.085 m q_{45}= 522.62 m³/h	v_{44}= 0.415 m/s h_{44}= 0.094 m q_{44}= 547.3 m³/h	v_{43}= 0.466 m/s h_{43}= 0.088 m q_{43}= 610.2 m³/h	v_{42}= 0.431 m/s h_{42}= 0.121 m q_{42}= 727.5 m³/h	v_{41}= 0.397 m/s h_{41}= 0.110 m q_{41}= 594.1 m³/h

Cooling water intake & outlet (from irrigation canal) open channel flow metering in a Thermal Power Station

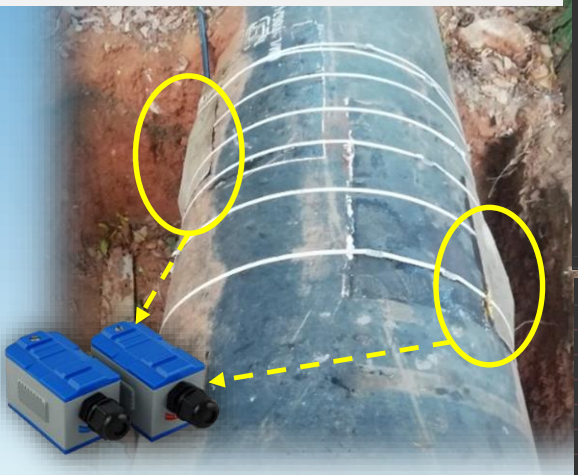
- Radar based Surface Velocity & Depth Measurement Systems are installed at the cooling water intake point and return water outlet point
- The difference in flow from the two measurements gives an indication of the consumption in the power station
- Measurement disturbances due to the cross currents caused by hot water return flows were eliminated

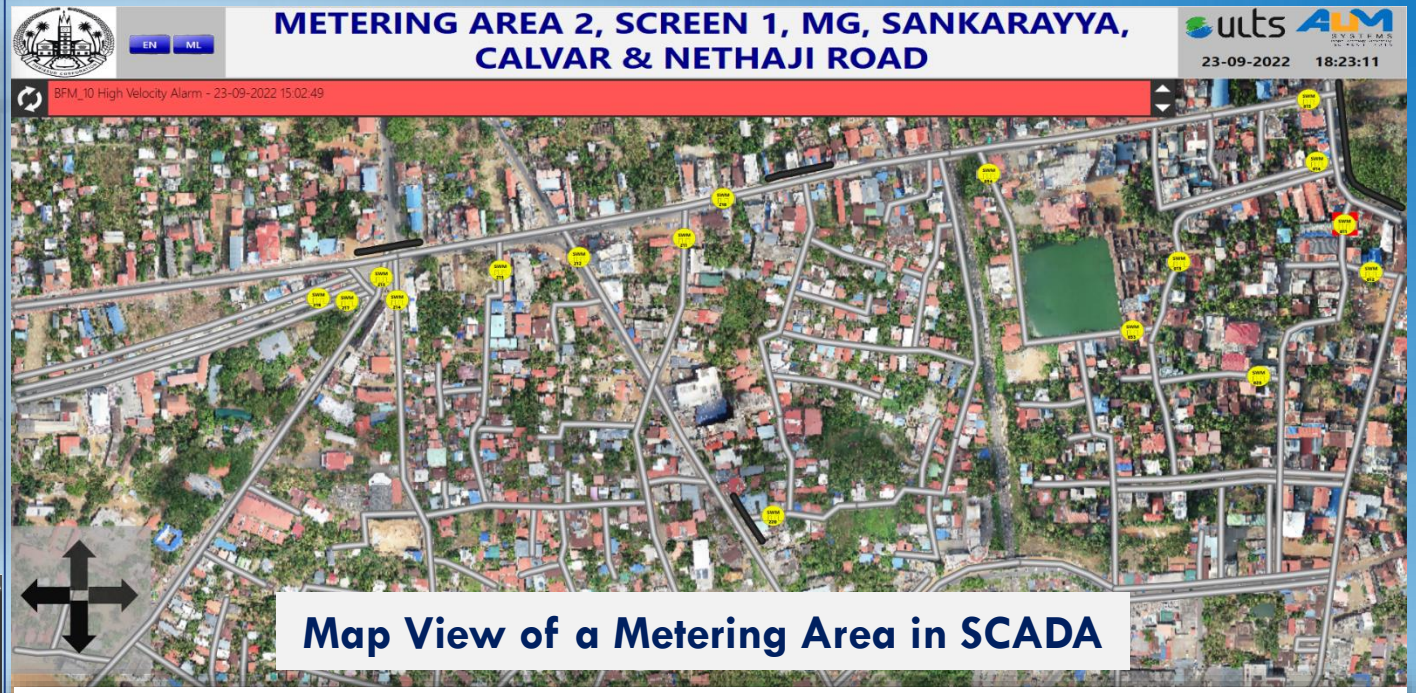
AMRUT citywide water network monitoring & NRW assessment using Smart Metering, SCADA & Billing Application

Ultrasonic Flow Transmitter

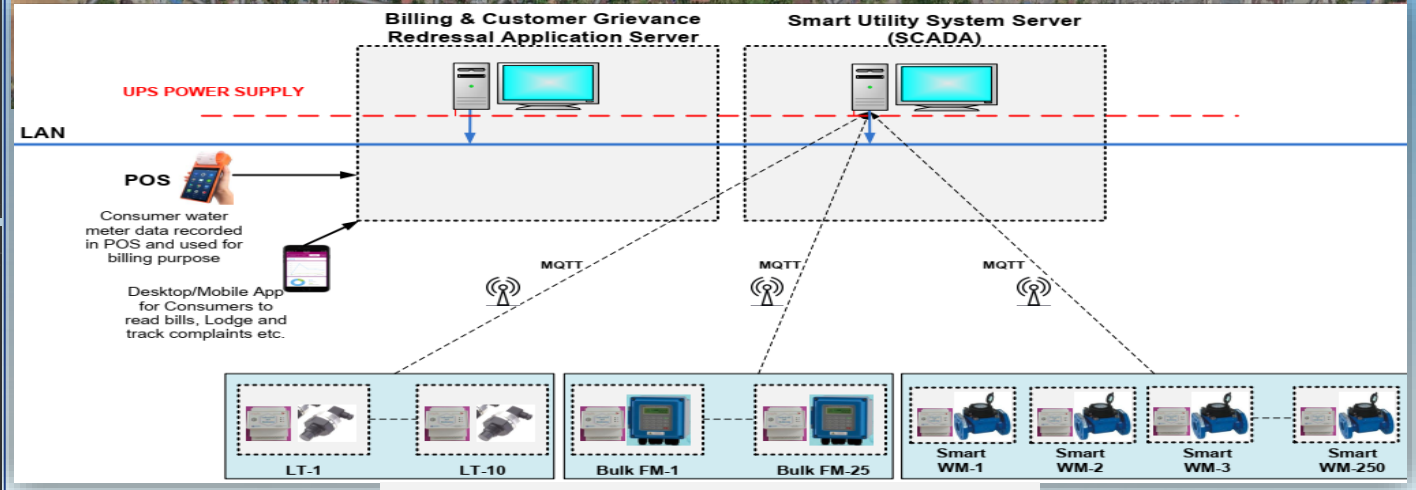
Ultrasonic Level Sensor

Ultrasonic Clamp-On Flow Sensor





Map View of a Metering Area in SCADA



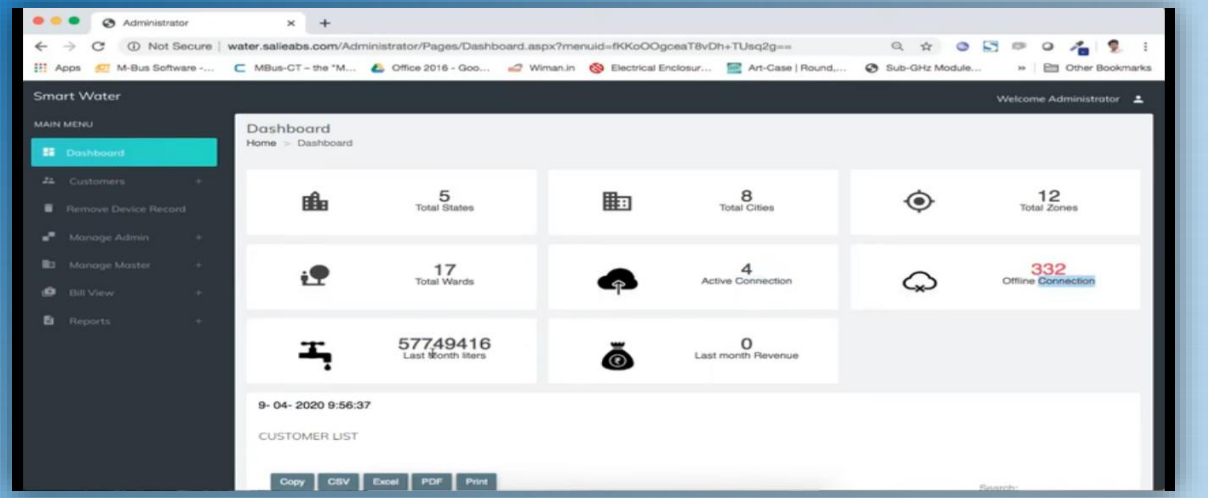
Monitoring System Architecture

Metering & Water Management Concepts

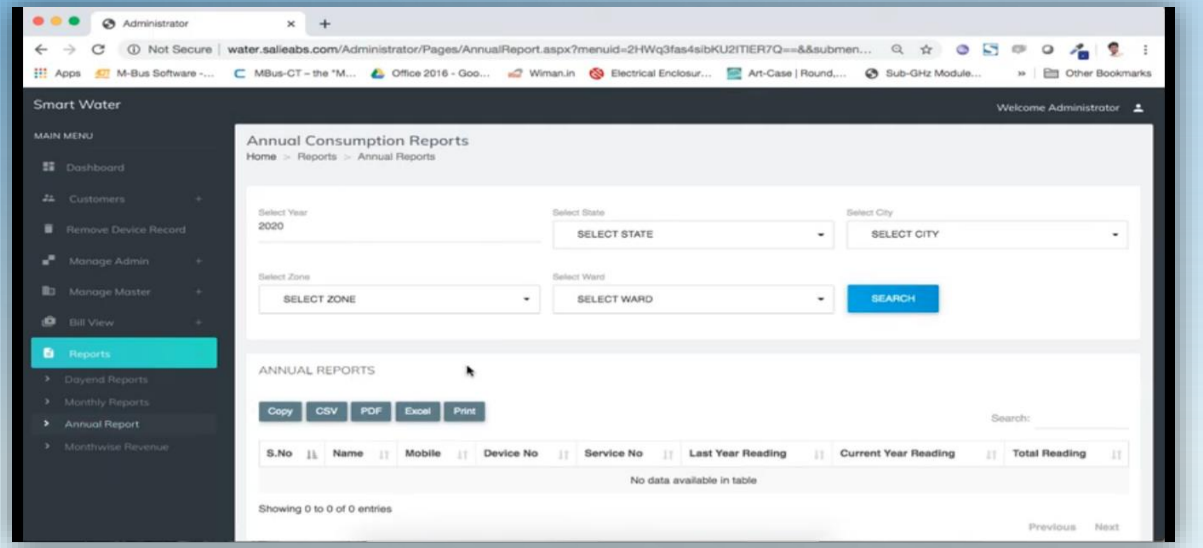
- Bulk Water Source (BWS) metering using Ultrasonic Clamp-On Flow Meters will record volume of water taken and help identify supply line deficiencies.
- Bulk Water Distribution (BWD) metering using Ultrasonic Clamp-On Flow Meters will track volume of water given from OHTs and also to specific areas. These will track area-wise consumption and help detect abnormal conditions such as pipe breakages by monitoring flow velocities.
- Local Distribution (LD) metering helps to track local area supplies and record consumption in each ward.
- Local Distribution (LD) meters are also deployed to track consumptions by the major consumers like shopping malls, hotels, other commercial establishments.
- Bulk Discharges (BD) are also metered to account for water leaving the Municipality or Corporation boundary.
- Water Accounting is done on the basis of specific Metering Areas, where the supplied water as recorded by the LD meters are compared against the revenue water data based on billing cycle.
- Revenue Recording is done by recording actual consumption by consumers. This is done by POS devices and a billing software application.
- Data from all the metering devices are sent to the centralised server by means of GPRS enabled IOT devices for online analysis and accounting

AMRUT citywide water network monitoring & NRW assessment using Smart Metering, SCADA & Billing Application

Billing Application with Reports and Analytics

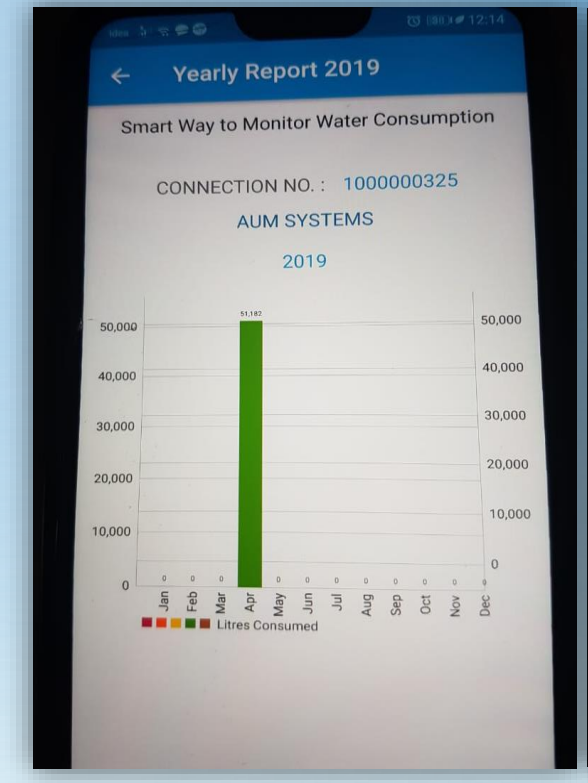


Billing Application Dashboard Home Screen

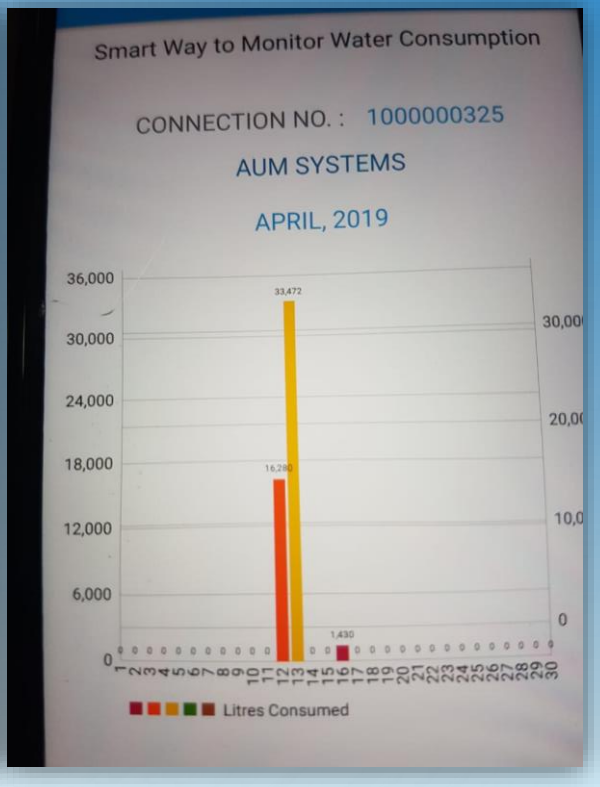


Billing Application Annual Report Screen

Mobile App for consumers to see and manage their water usage in a better manner

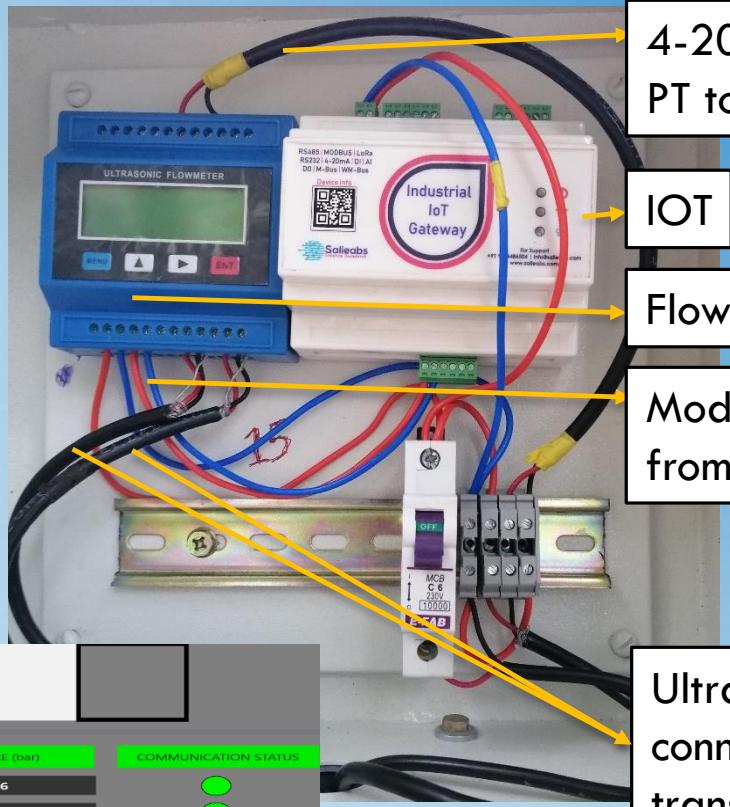


Monthly Water Consumption



Daily Water Consumption

Water Management for IISc, Bangalore



4-20 mA wiring from PT to Flow transmitter

IOT

Flow transmitter

Modbus wiring to IOT from Flow transmitter

Ultrasonic sensors connected to flow transmitter

IISc FLOW AND PRESSURE MONITORING

FLOW METER LOCATION NAME	FLOW RATE (m³/h)	FLOW TOTAL (m³)	PRESSURE (bar)	COMMUNICATION STATUS
FM01	7.44	11.82	2.26	
FM02	40.42	2076.57	-1.99	
FM03				
FM04	0.00	220.16	0.36	
FM05	8.74	635.12	0.20	
FM06	-2.94	-316.47	1.77	
FM07	4.29	120.77	1.43	
FM08	17.53	798.16	-0.11	
FM09				
FM10	42.18	3630.66	-2.49	
FM11				
FM12	-9.46	-703.94	1.69	
FM13	33.18	2158.40	1.71	
FM14	5.66	-47.38	0.74	
FM15	37.63	2803.29	2.10	

Dashboard | Trends & Report

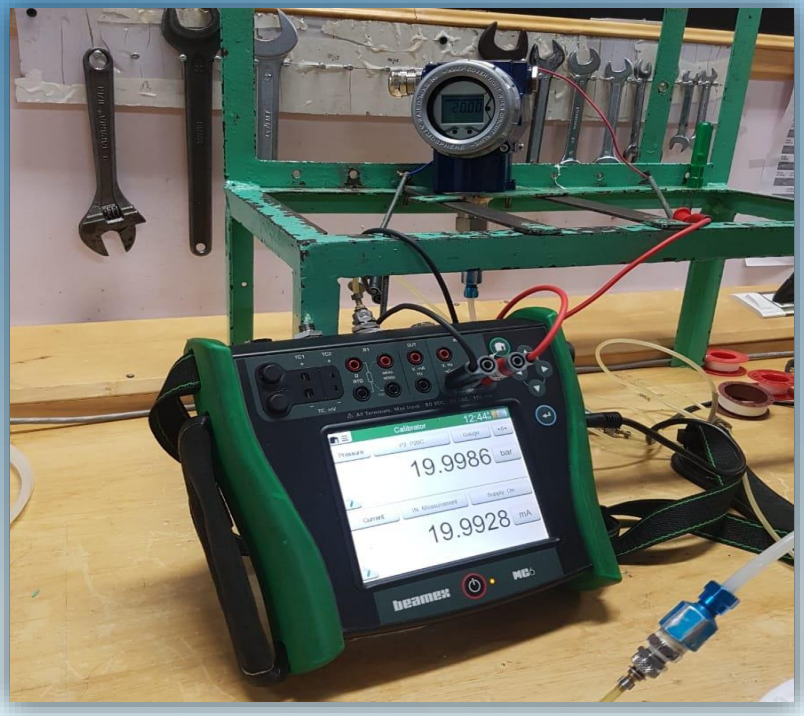
Calibration of 62 Sets of 4-Path insertion ultrasonic flow meters at FCRI NABL accredited laboratory

- Four Path Insertion Type Ultrasonic Flow Meters were calibrated on pipe sizes DN300 to DN1200
- The flow meters calibrated are to be installed in bulk water network of a metropolitan city
- 310 calibration points. The performance accuracy for all was significantly better than +/-0.5%
- Pressure transmitters were also calibrated to 0.01% accuracy

0.4686	7.7576	0.4697	0.234
0.4684	7.7547	0.4693	0.206
0.46		0.4686	0.021
			-0.104
0.		0.9818	-0.224
1.2329	13.8775	1.2347	0.146
1.4661	15.7156	1.4645	-0.115
1			-0.193

% Deviation

Sample Calibration Certificate Table



Our Services

- Cost-effective industry proven sensor technology that we partner with and provide factory trained competent technical support
- Flexible and scalable metering solutions per industry standards
- Optimized measurement technology for long term reliability, data accuracy, reducing project costs and improving payback
- Metering solutions based on water industry best practices and long term experience
- KPIs for operational efficiency, NRW analysis and performance evaluation
- Accurate audit to help evolve water industry operations strategies

“Seeds Of Today Are Flowers Of Tomorrow”

Thank You !

Contact us:

www.aumsystems.com

info@aumsystems.com