AuM Systems Online Demonstration

24x7 Metering Concepts For DMAs

Higher Demand, Better Measurement, Improved Management

PRAKASH MUTHUSWAMY
MANAGING DIRECTOR

www.aumsystems.com

The Speaker: Mr. Prakash Muthuswamy
Managing Partner, AuM Systems

PMP Certified. Project and Construction Management (EPC and DBO projects) including supervision of consultants and contractors, in terms of safety, technical and financial aspects. Experience of over 3 decades in Water & Waste Water Sectors, particularly on state-of-the-art RO Desalination Plants for potable water and MBR Plants for waste water treatment. Experienced in Master Planning, Project Management, Design, Installation, Testing, Commissioning and Maintenance of Plants and Controls and related Asset Management Systems. Environment compliance monitoring.

Specialist in developing strategies for sustainable energy efficient Asset Management in the water industry. Experienced in Master Planning & Development of systems such as SCADA & CMMS to meet the business process needs.

AGENDA

- Our Water Industry Competence
- Systems Approach With Application Notes
- Bulk Water Supply Metering At Key Locations
- Smart Digital Consumer Metering
- Network Pressure Meters
- Water Quality Monitoring
- Pressure Regulating Valves
- SCADA System
- Live Demo

Our Water Industry Competence

ABOUT US

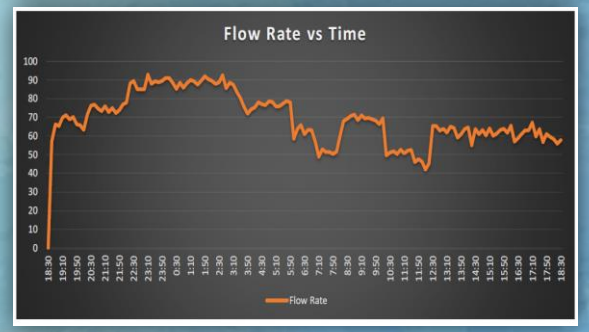
Global Competency and Local Availability in water measurement:

- Water Industry monitoring and management expertise.
- Cost-Effective Permanent Metering solutions suitable for your application.
- High accuracy in data measurement.
- Maintainable solutions.
- State-of-the-art visualization.
- Data analysis and reporting.
- Water Audit studies for Municipalities and Process Industry.

“Measure Better To Manage Better”

Our Water Industry Competence

- Citywide Water Network Monitoring & NRW Assessment Using Smart Metering, SCADA & Billing Application Under AMRUT Scheme
- Municipal Water Network Audit Study For Two Cities In Southern India Under World Bank Funded 24x7 Water Supply Project
- Conducted Municipal Water Audit Study For 27 AMRUT Cities and 2 Smart Cities In Tamilnadu
- Water Network Audit Study For 10 Grama Panchayaths, 17 Schemes In Kerala Under JICA Assisted Water Supply Project
- Water Audit Study Annual Contract Awarded By Municipal Corporation Of Greater Mumbai
- High Accuracy Permanent Bulk Water Metering For The City Of Mumbai
- Wastewater Flow Studies In Different Cities Across India
- India's Largest Flowmeter, 6 Meter Dia Pipe

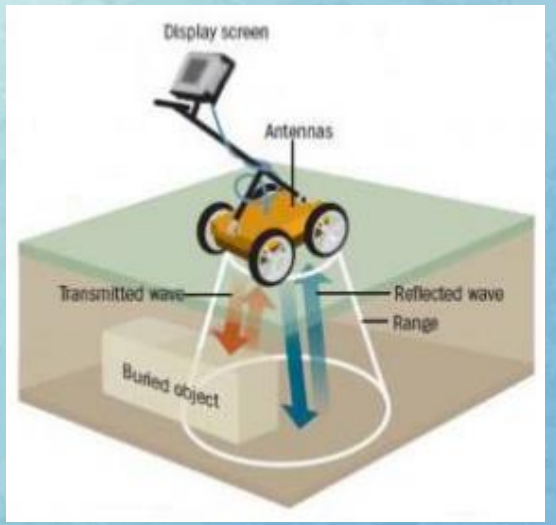


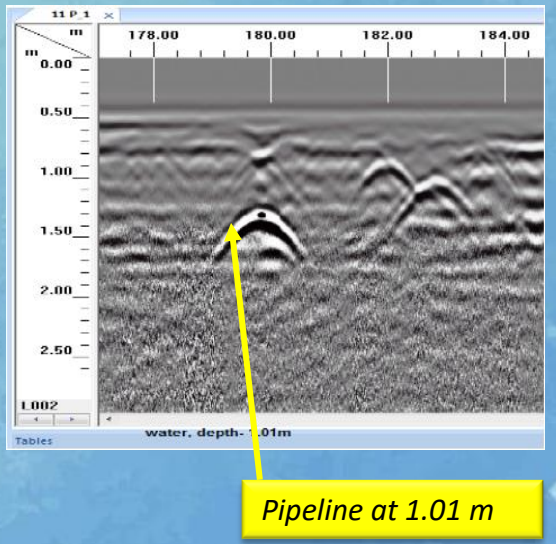
Ultrasonic Level Sensor

SYSTEMS APPROACH

DIGITAL INFORMATION FOR TRANSFORMATION

- Good metering and reliable continuous data are essential pre-requisites for modern day water management and reduction of non-revenue water
- Following guidelines given in 'Manual on Water supply and Treatment Systems' issued by MoHUA
- Leveraging technology to analyze, optimize and provide rapid response to catastrophic situations
- Continuous and online based assessment of NRW driven by real-time data
- Assessing and benchmarking of present conditions is essential for making improvements
- Study including aspects such as supply, availability, pressure regulation and water quality needs





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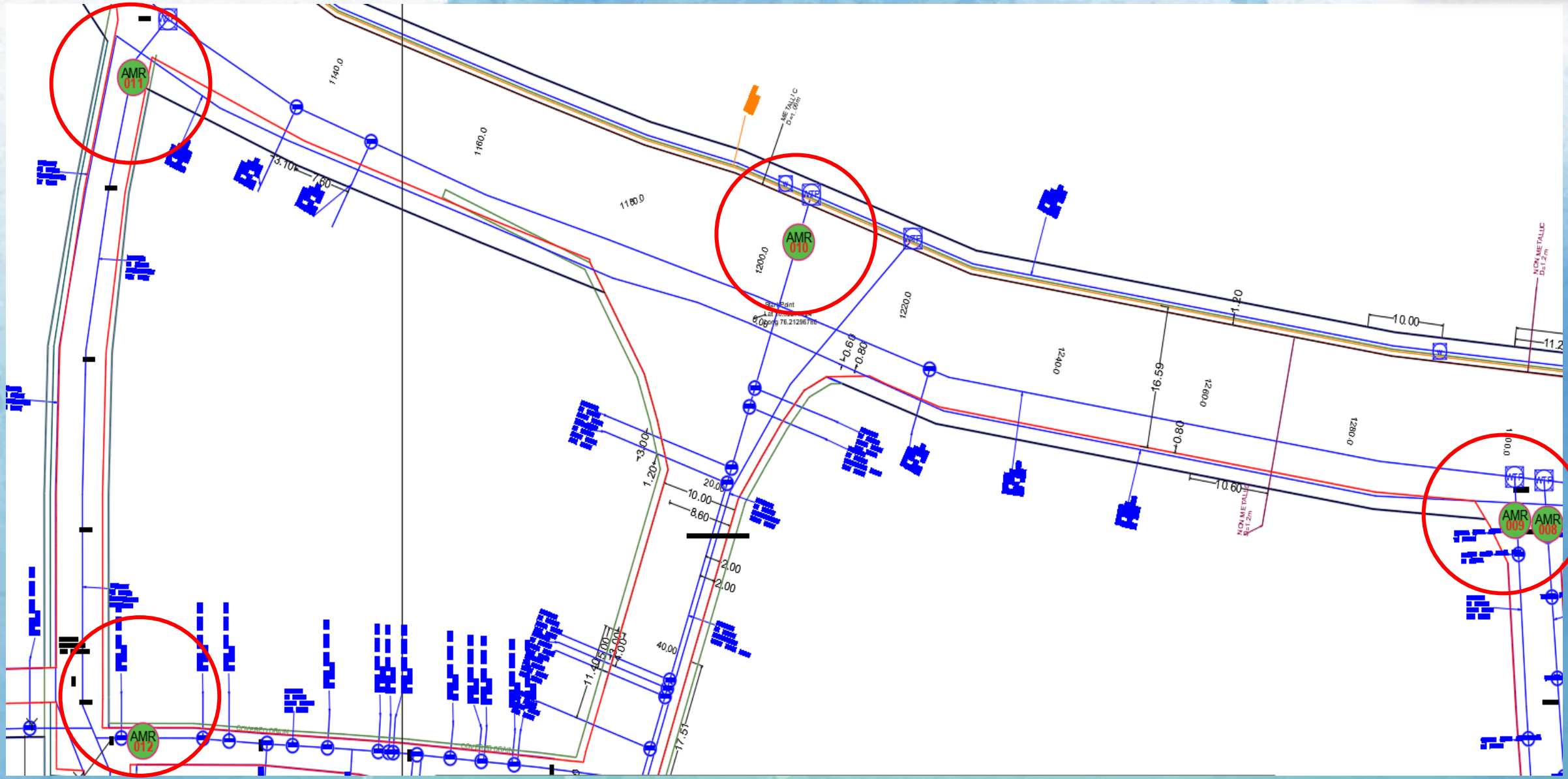


APPLICATION NOTES

Performance Verification of Mechanical Water Meters

- Case Study 1

Mechanical Water Meter reading

Start reading

Final reading

Ultrasonic Water Meter reading

Start reading

Final reading

On measuring for 4 hours in a 15mm pipe line, totalised flow of existing water meter was found to be **4.7% higher** than that of our Ultrasonic Water meter

Performance Verification of Mechanical Water Meters

- Case Study 2

Mechanical Water Meter reading

Start reading

Final reading

Ultrasonic Water Meter reading

Start reading

Final reading

On measuring for an hour in 200 mm pipe line, totalised flow of existing water meter was **7% higher** than that of our Ultrasonic Water meter

Performance Verification of Mechanical Water Meters

- Case Study 3

Mechanical Water Meter reading

Start reading

Final reading

Ultrasonic Water Meter reading

Start reading

Final reading

On measuring for an hour in 600 mm pipe line, totalised flow of existing water meter was **14% higher** than that of our Ultrasonic Water meter

BENCHMARKING OF EXISTING WATER NETWORK

The following points shall be considered for the measurement:

Verification of Existing Consumer Meter: Existing mechanical type consumer water meters at HSCs shall be verified using Ultrasonic Clamp-On flow meters. This shall assert the performance of the existing water meters and indicate the percentage of error in the volume of flow measured.

Bulk Water Supply Lines In to The DMA: Measurement of flow, pressure and quality shall be done at the DMA source points. Flow measurement and pressure measurement shall be recorded for 24 hours duration.

Distribution Lines: For approximately every 100 consumers one flow measurement shall be installed. A DMA with about 2000 consumers, 20 measurement points would need to be monitored with flow measurement.

Pressure Measurement: Pressure measurement shall be carried out at about 15 to 20 House Service Connection (HSC) points.

Quality Measurement: Water sample shall be collected from one single point in the DMA and tested for parameters like pH, Residual Chlorine and TDS from a laboratory.

COST EFFECTIVE NRW MANAGEMENT SOLUTIONS

FLOW ELEMENT	: ULTRASONIC FLOWMETER (CLAMP ON)		
SIZE	: 4" NB	SL.NO.(TRANSMITTER)	: 19012873
MAKE	: TAOSONIC-AUM	FLOW RANGE	: 80 m3/hr
SERIAL NO.(Sensor)	: TM00109724	CALIBRATING FLUID	: Water
MODEL NO.(SENSOR)	: TM-1	K FACTOR	: 1.0000 CHANGED TO 1.1224
MODEL NO.(TRANSMITTER)	: TUF2000B	DATE OF CALIBRATION	: 17.04.2023

Sl. No.	Pup bar	W_1 kg	W_2 kg	t s	T deg C	Density kg/m^3	Qa m^3/h	Qi m^3/h	%Dev. in Qi	Meter Factor	Repeatability (%)	Uncertainty (%)
1	1.80	629.800	941.550	60.292758	33.10	994.750	18.732	15.9560	-14.821	1.0000		
2	1.80	485.150	681.800	79.941021	33.11	994.750	8.912	7.0500	-20.893	1.0000		
3	1.80	682.000	1045.600	40.751731	33.12	994.750	32.324	28.3700	-12.233	1.0000		
4	1.80	1045.600	1532.500	41.437217	33.12	994.740	42.570	37.8250	-11.146	1.0000		
5	1.80	188.850	838.600	40.539782	33.14	994.740	58.065	51.8180	-10.759	1.0000		
6	1.80	280.250	794.400	50.546521	33.31	994.680	36.853	37.0620	0.566	1.1224		
7	1.80	794.400	1392.150	58.813151	33.31	994.680	36.823	36.9960	0.469	1.1224		
8	1.80	1008.450	1442.850	42.730386	33.32	994.680	36.833	37.0740	0.655	1.1224	0.054	0.227
9	1.80	404.450	1041.500	47.445041	33.34	994.670	48.648	48.8490	0.413	1.1224		
10	1.80	1041.500	1568.000	39.219039	33.35	994.670	48.639	48.9970	0.736	1.1224		
11	1.80	503.600	1126.300	46.372070	33.35	994.670	48.653	48.8510	0.408	1.1224	0.109	0.295
12	1.80	599.250	1328.100	44.086729	33.35	994.670	59.898	60.2540	0.594	1.1224		
13	1.80	804.400	1604.000	48.364941	33.36	994.660	59.900	60.2860	0.644	1.1224		
14	1.80	631.700	1533.450	54.583707	33.36	994.660	59.856	60.1490	0.489	1.1224	0.046	0.220
15	1.80	415.000	807.300	55.804567	33.37	994.660	25.470	25.4910	0.081	1.1224		
16	1.80	807.300	1169.600	51.463241	33.37	994.660	25.507	25.5790	0.282	1.1224		
17	1.80	1169.600	1447.800	39.559398	33.39	994.660	25.480	25.4110	-0.270	1.1224	0.161	0.380
18	1.80	530.000	1511.500	44.596511	33.38	994.650	79.741	79.7690	0.035	1.1224		
19	1.80	155.450	1235.250	49.058056	33.39	994.650	79.749	79.7910	0.053	1.1224		
20	1.80	256.800	1193.400	42.550660	33.39	994.650	79.752	79.8070	0.069	1.1224	0.010	0.201
								Repeatability	=	0.161	%	

Witnessed By

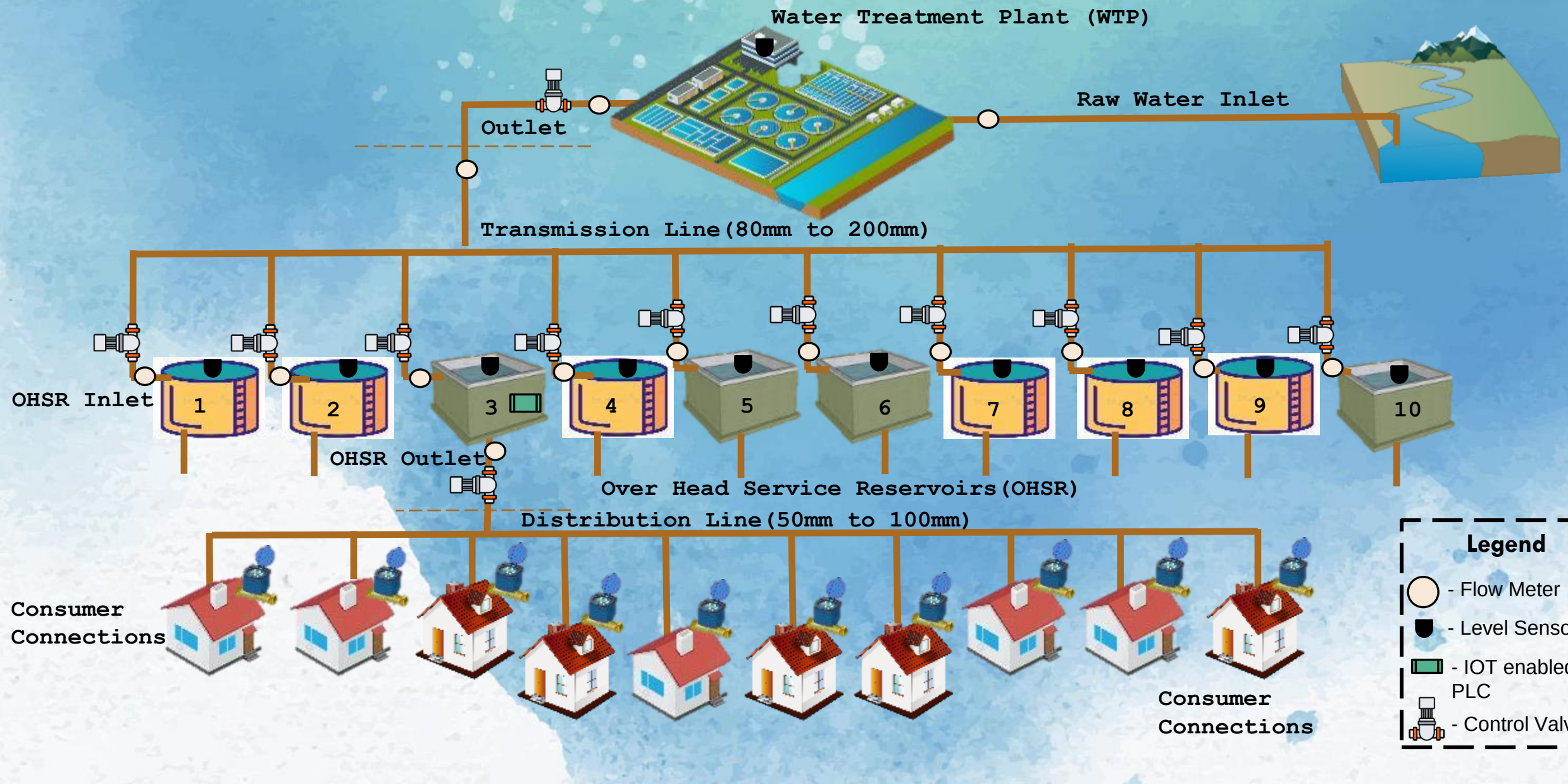
Mr. Vignesh KV
M/s AUM SYSTEMS

FCRI Certificate

0.2% to 0.3% Accuracy.

HIGHLY ACCURATE

TYPICAL WATER NETWORK



BULK WATER SUPPLY METERING AT KEY LOCATIONS

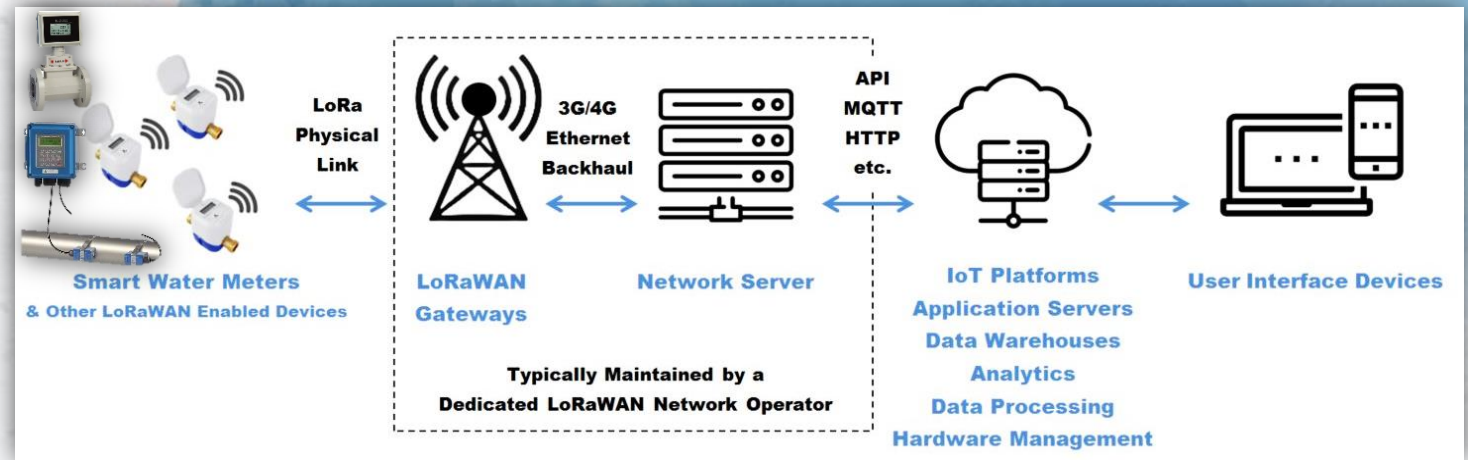
BULK METERING

- Ultrasonic Clamp-on type bulk water meters at all supply points and discharge points
- One bulk meter for about 100 consumers in a DMA
- No risk on damage to pipeline while installation or maintenance
- Can measure very low flow velocities
- Not impacted by any entrained air in the pipe line
- Serves to identify burst pipelines, blocked pipeline conditions, minimizing maintenance response times
- Ultrasonic Clamp-On Meters are independent of line size variations
- Forward, reverse and net flow data help record volumes of water supplied
- **Source Metering**: All water sources to be metered and the data effectively used for NRW identification and reduction
- Consistent with 'Manual On Water Supply and Treatment Systems' issued by MoHUA Chapter 13, Water Meters and Table 2.7: Capital Works, Point No. 24

SMART DIGITAL CONSUMER METERING FOR REVENUE WATER

DIGITAL CONSUMER METERING

- Accurate data on Revenue Water is essential for determining NRW losses
- Cost effective and accurate Ultrasonic Consumer Water Meters for online and automated assessment of NRW.
- Can be calibrated to have accuracy of 0.5% to 1%
- Not impacted by presence of entrained air in the medium
- Consistent with 'Manual On Water Supply and Treatment Systems' issued by MoHUA Chapter 13, Water Meters and Table 2.7: Capital Works, Point No. 15



NETWORK PRESSURE METERS

NETWORK PRESSURE METERS

- Ensuring positive pressure within a DMA is important to to avoid ingress of ground water
- IP68 pressure transmitters for below ground installations
- Measurement range: 0 to 4 Bar
- Signal transmission to SCADA through IoT for continuous monitoring
- Alerts during low pressure conditions

WATER QUALITY

WATER QUALITY

- Parameters: pH, Turbidity, Residual Chlorine & TDS
- Monitor these within a DMA to help ensure the quality of water
- Monitored data to be transferred periodically via IOT to a central SCADA

PRESSURE REGULATING VALVES

MECHANICAL PRESSURE REGULATING VALVES

- Balancing and maintaining network pressures is important
- Using mechanical pressure regulating valves will help maintain pressure without requiring electrical operation
- Selection of valves based on network line sizes and flow rates

SCADA SYSTEM

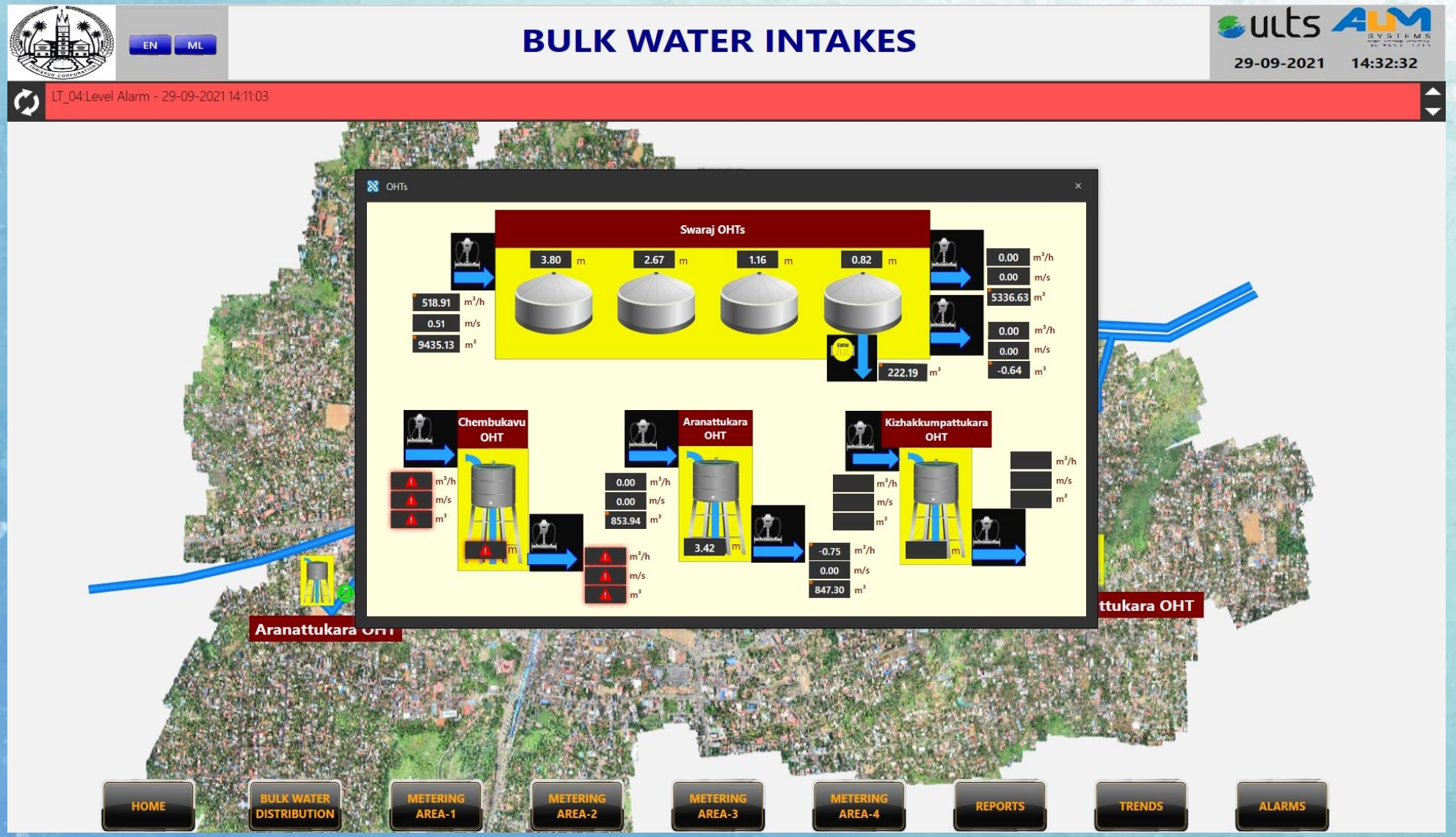
REMOTE MONITORING, EARLY WARNING AND DATA ACQUISITION THROUGH STATE-OF-THE-ART SCADA SYSTEM

Central Water Management Center:

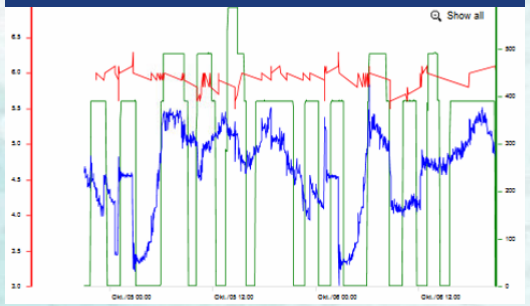
- Automated reports to assess bulk water supplies
- Integration of consumer metering data and NRW assessments
- Direct web based access for online monitoring
- Intuitive display, alarm and analysis
- Early warning – Low Pressure, High Flow Rate (Pipe Burst), Daily Consumption Limit
- Asset Management Module
- Geo spatial mapping
- KPI reporting

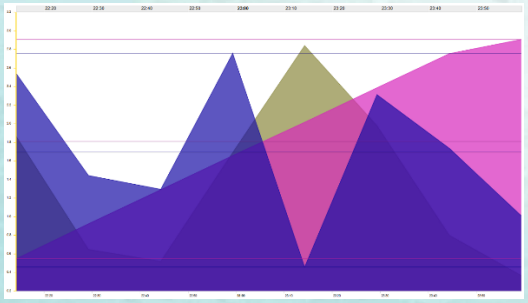
MONITOR, MANAGE YOUR WATER & GAIN KEY INSIGHTS

➢ Intuitive Water Network Displays



Trends





Alarms & Events

i. Abnormal rate of increase in flows, like a burst pipe condition.
ii. Increase in NRW above threshold levels.
iii. Communication status of field devices.
iv. Deviation in water consumption patterns.
v. Tank high level/ low level alarms.
vi. Continuous low flow velocities for a period of time.

SUMMARY

SUMMARY

- Existing investments in this regard should be very effectively utilized and integrated.
- National guidelines and lessons learned should be incorporated.
- Technology deployed should comply with International Open Standards to facilitate integration of all DMAs into a comprehensive system.
- For ease of implementation and maintenance installation should be as non-invasive as possible.
- Metering technology selected should be appropriate and cost-effective for prevailing site conditions.
- Accuracy of measured data and online analysis are significant for modern management.
- Standardization in terms of spares will ease maintenance burden.

LIVE DEMO