Purpose of this example: Demonstrate the application of a comprehensive asset assessment and rehabilitation strategy within a water network	
General information on the water utility or project	
Name of town/project/utility	Coimbatore, Tamil Nadu, India
Type of project	24x7 drinking water supply
Scope of project	Design, construction and operation
Contact (optional)	SUEZ
Asset manager/project manager	Concessionaire for design, construction and operation over 25 years.
Service contractor	Concessionaire.
Population (people served)	1 500 000
Length of network and age of system	1427 km / ~27 years (distribution) 111 km / ~36 years (feeder mains)
Number of service connections	150 000
Number of pumping stations	3
Special conditions	Intermittent supply (between once in a day and once in every 13 days) and low residual pressure. Unstable power supply
Project related ISO standard	24516-1
GIS in use, since when?	Yes, 2018
Main methods and tools	Asset and customer surveys (see below) Comprehensive asset assessment (see below) Hydraulic and operability design for 24x7 Strategic & tactical works planning Works execution Meter and customer management
Initiation and main features of the project (AM/water loss)	
Objectives and policy/regulation, if relevant?	
Comprehensive assessment of the existing system, and water demand forecast until 2044. Rehabilitation and upgrading of the system (network, reservoirs) to progressively meet the 2044 demand and enable 24x7 operation with 15% of water losses.	
What are the main actions in the recent past (lengths of rehabilitated network, acquisition of knowledge, active leakage control, pressure management, DMA…)?	
1 DMA was entirely rehabilitated (30km of new pipes, 5000 service connections). Smart meters are being assessed, for better NRW monitoring	
What are the tools, criteria, performance indicators, technologies, used to implement the project (see e.g. ISO 24523 or ISO 24528)?	
Main design criteria, performance indicators and tools: -Gravity-fed system, minimum 7m pressure at the ferrule point or critical measurement points -UfW: 20% (until 10th year) and 15% (11th year onwards) -SCADA for monitoring of flows and pressure, supervision for monitoring UfW (planned) -CPHEEO Manual on Operation and Maintenance of Water Supply System (2005).	
Project activities	
Main activities (leak repair, pipe renewal, special techniques, …): (include figures or volumes if available)	
Asset and customer registers: satellite image processing + paperless surveys. **Condition assessment:** statistical inspection strategy using non-destructive tools • Statistical definition of degradation clusters using machine/deep learning processes and selection	

of best representative samples using artificial intelligence.
- Scanner (SmartCAT®) from AES UK Ltd for metallic pipes.
- ePulse® from Echologics for cement and metallic pipes.

Design of target system: rezoning to enable 24x7 operability, resizing using WaterGems and OPTIMIZER™, to optimize of network design/cost by iterating the hydraulic model.
Works planning: prioritization based on risk assessment. Multicriteria likelihood of failure. Criticality based on flow and sensitive customers.
Works: Rehabilitation of 36 service reservoirs, construction of 32 new service reservoirs. Strong monitoring of works quality, specially HDPE laying and welding.
Operations & maintenance: Leak repair on existing assets: ~5000 leaks / year

Outcomes of the asset management policy

Results. What are the main outcomes in terms of impact on the assets, the operation, the planning of works, etc.?

Design: enhanced hydraulic capacity (+11% in volume) with optimized CAPEX (lower diameters, -20% renewal) and +400km of extensions. 101 DMA with flowmeters, 3 critical pressure measurements, data logger & centralized SCADA.
Material specification and selection: small diameter HDPE was over-sized to optimize the lifetime in adverse conditions (high water temperatures, …).
Operation: reduction of water losses of the existing assets: 600 Ml/y recovered.

Setbacks, failures, upcoming activities (optional):

The hydraulic model was made for the target system. It would be useful to have it for the existing system, to better understand the weaknesses and manage the transition to 24x7.

Financial aspects

How is the project budget defined? What are the constraints? What is the impact on tariff? Is there a specific budget dedicated to asset management policy, on top or instead of usual budgets (OPEX and CAPEX)? For what duration?

Dedicated CAPEX budget, co-funded by government agencies and concessionaire.
The rehabilitation and upgrading must occur within 4 years. Afterwards, maintenance is covered by OPEX. The asset management policy is defined during the design, hence financed by CAPEX.

Impact on the operational costs quantified or analyzed and which method is used?

Total cost of ownership approach for decision making related to HDPE pipes specification.

Indicate financial criteria (e.g. return on investment), give figures

How was the capex budget set? Has customer tariff been maintained? Will opex increase due to more water consumed?

Method for the estimation of the value of assets (optional)? Depreciation method used

New assets are valued at their design + construction cost.

Recommendations for a good management of assets

Conclusions, return of experience (lessons learned)

-The context of PPP was a strong driver to perform a precise inventory of assets, prior to initial take-over by the concessionaire.
-AI can help to better target condition data acquisition, which is key to plan renewal works.
-Network design can be optimized by iterating the traditional hydraulic modelling with Optimizer™
-Risk based prioritization of works budget limitations to be met while focusing on works having the highest impact on the level of service.

Possible improvements

CAPEX budget should be spread over more than 4 years (10-15 ideally), which would allow the retention of assets having a residual lifetime and to renew them more progressively.

Outlook and suggested improvements

-Accelerate network design by automating the network drawing in GIS.
-Use big data (from neighbour utilities) and AI to accelerate the condition assessment.