

PLUGGING THE LEAKS!

Ranhill

JOHOR TO REACH 5% NON-REVENUE WATER BY 2025

EVERY DROP COUNTS

As a precious natural resource, water is an essential commodity that must be managed sustainably. Yet daily, there is loss of water, especially in the water service cycle, and the Federal Government is now aiming to reduce the national Non-Revenue Water (NRW) from 35% to 31% by the end of the 11th Malaysia Plan.

Managing NRW is not a simple matter. It involves significant operational effort and becomes more costly as NRW reduces. One of the main contributors to loss of water is aging pipes, many of which were likely installed decades ago. Due to this aging infrastructure, the pipes are prone to breakage under pressure which leads to leakage that results in NRW.

So what is NRW? It is the difference between the volume of treated water produced and the water billed. The loss of water can happen anywhere between water treatment plants (WTPs) and customer meters. The water losses contribute to wastages, inducing stress on water resources, unsustainability and result in inefficient water supply operations.

In Johor, RanhillSaj Sdn Bhd has been the sole provider of water supply services for close to 20 years, covering the complete cycle of water services, from raw water abstraction to water treatment, distribution and customer billing. Johor has the second largest water supply system in Malaysia, encompassing over 22,000 km of pipelines, 44 WTPs, more than 600 reservoirs and some 1.2 million customer accounts.

RanhillSaj is a subsidiary of Ranhill Holdings Berhad, a total solutions provider of source-to-source water services, ranging from source abstraction to wastewater treatment. Testament to its strong capabilities and expertise in the water business, the Group's operations also include water treatment and water reclamation plants in Thailand and China.

MEASURING NRW

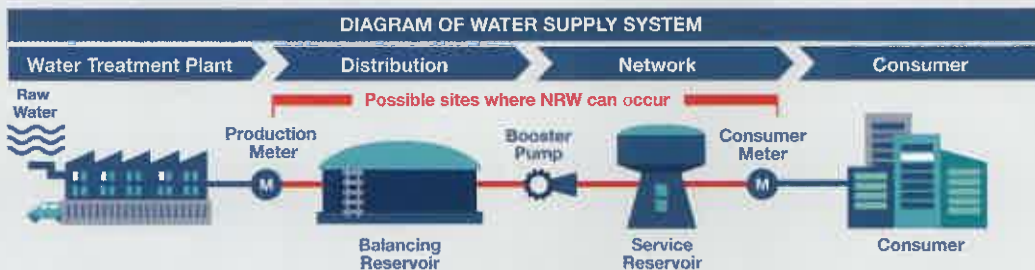
While Johor currently has the third lowest NRW percentage in Malaysia, when one looks at NRW, it must correlate to the size of water supply required which is dependent on the number of accounts and pipe length. Managing NRW of Johor's size needs a

holistic strategic approach and continuous effort to be effective.

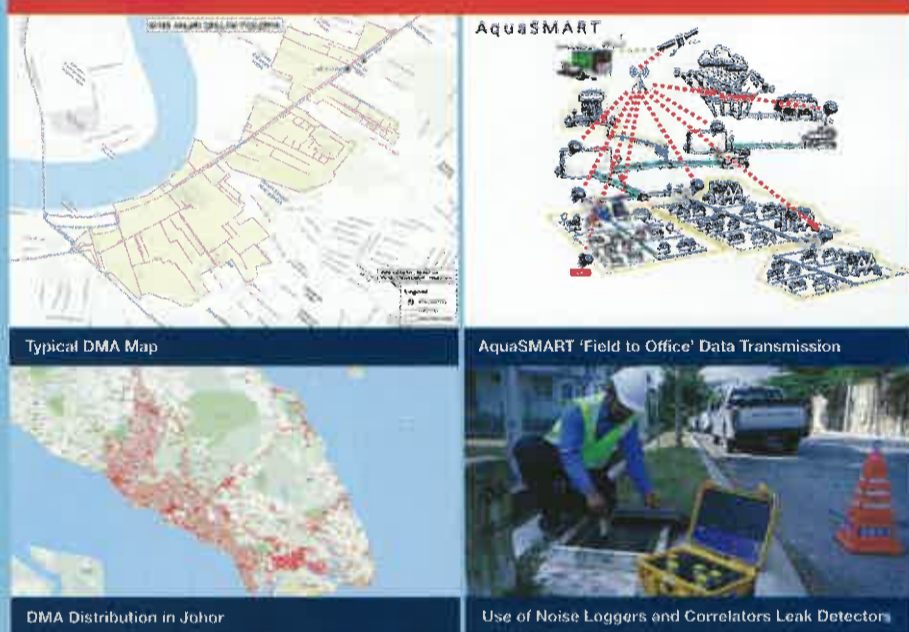
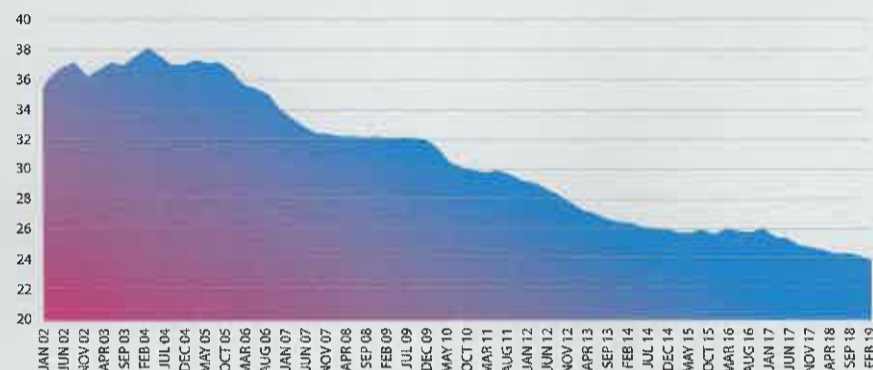
The best measurement to reflect the NRW efficiency of any water supply system is the losses per kilometre of pipe length per day. This measurement takes into account the total length of pipelines and the amount of water lost each day. Lower measurement indicates a higher NRW management efficiency. By these parameters, Johor has the lowest NRW per kilometre of pipe length in the country at

19 m³/km/day, or 0.019 MLD/km/day.

Most of the water pipes in Johor were installed in the 1950s and 1960s. To tackle NRW in Johor, RanhillSaj developed an NRW Strategy & Action Plan to curb and reduce water losses. Upon privatisation of Syarikat Air Johor in 2000, the first thing RanhillSaj did was draft a holistic roadmap covering immediate, medium- and long-term plans for NRW reduction and management.



PROGRESS OF JOHOR NRW REDUCTION OVER THE YEARS



Apart from the physical activities, RanhillSaj also makes sure that the administrative part of NRW reduction is not left out. This includes:

1. Strategy mapping and planning together with objectives and targets. This has to be done to ensure all the different activities are carried out in a concerted manner for effective reduction.
2. Organisation of State-wide campaign on NRW reduction for increased awareness on the importance of reducing water losses.

Due to these initiatives, RanhillSaj has managed to overcome the NRW Natural Rate of Rise, which is the natural rate of NRW increment if NRW reduction activities are not carried out, and reduced the NRW level to where it is now.



3. NRW capacity building through hands-on experience.
4. Development of Key Performance Indicators for constant monitoring.
5. Provision of budget for NRW activities.
8. Continuous drive through NRW task force committee.

Reducing NRW involves the right infrastructure and technology:

<ol style="list-style-type: none"> 1. Establishment of District Metering Areas (DMA), dividing the whole water supply system into smaller isolated zones for ease of monitoring and control. This allows NRW to be calculated in smaller zones to enable focus on problematic areas. Johor now has 1,088 DMAs with the highest coverage in the country at 95%. 	<ol style="list-style-type: none"> 2. Development of Geographical Information System to register water assets in Johor.
<ol style="list-style-type: none"> 4. Active Leakage Control, utilising state-of-the-art technology to detect and repair invisible leaks. On average, RanhillSaj finds 6,000 invisible leaks per month with 99.8% accuracy. 	<ol style="list-style-type: none"> 3. Annual customer meter replacement programme, and the use of electromagnetic meters for major customers for better accuracy.
<ol style="list-style-type: none"> 6. Installation of monitoring system and altitude valve at all reservoirs to avoid costly overflows. 	<ol style="list-style-type: none"> 5. Advanced Pressure Management to manage water supply pressure, as high pressure can break the pipes and too low pressure will impact service levels to customers.
<ol style="list-style-type: none"> 7. Installation of leak monitoring system on trunk main pipelines. 	<ol style="list-style-type: none"> 8. The use of automatic leak detection system through deployment of semi-permanent noise loggers which can detect and locate leakages.
<ol style="list-style-type: none"> 9. Introduced the AquaSMART DMA management system in 2010 to collect, integrate and analyse data from all DMAs in Johor and provide valuable information on potential leak locations. 	

THE WAY FORWARD TO 5% NRW IN JOHOR

Since the year 2000, RanhillSaj has successfully reduced the NRW level in Johor from 38% to 23.76% (as at April 2019), saving more than 300 Million Litres Per Day (MLD) in the process. This is equivalent to supplying some 300,000 households without having to invest on new treatment facilities. The reduction is significant, considering RanhillSaj has to manage aging assets and operational constraints.

In the quest for sustainable water supply operations in the future, Ranhill is committed towards its aim of 5% NRW in Johor by 2025. Achieving this target would mean saving 300 MLD of treated water which is vital to cater for increasing demand in Johor Bahru. The NRW reduction approach is opted for instead of increasing treatment capacity in order to cap further abstraction of raw water. Plans are underway to ensure sustainable water management and accelerate NRW reduction. This includes:

- Major pipe replacement programme involving 7,000 km of AC pipes aged more than 30 years old, using seamless HDPE welded pipes
- Replacement of 1 million customer connections
- Deployment of semi-permanent noise loggers for leak detection
- Expansion of Advanced Pressure Management and Control system
- Real-time reservoir monitoring for all reservoirs
- Updating Geographic Information System and on-line hydraulics models
- Customer meter replacement and the use of R800 Automatic Meter Reading
- Use of logger equipped electromagnetic meters for all major customers
- Upgrading of the AquaSMART NRW management system for more comprehensive monitoring and NRW measurement

As the NRW specialist in the country with a proven track record, Ranhill is certainly well-equipped to achieve its objectives.