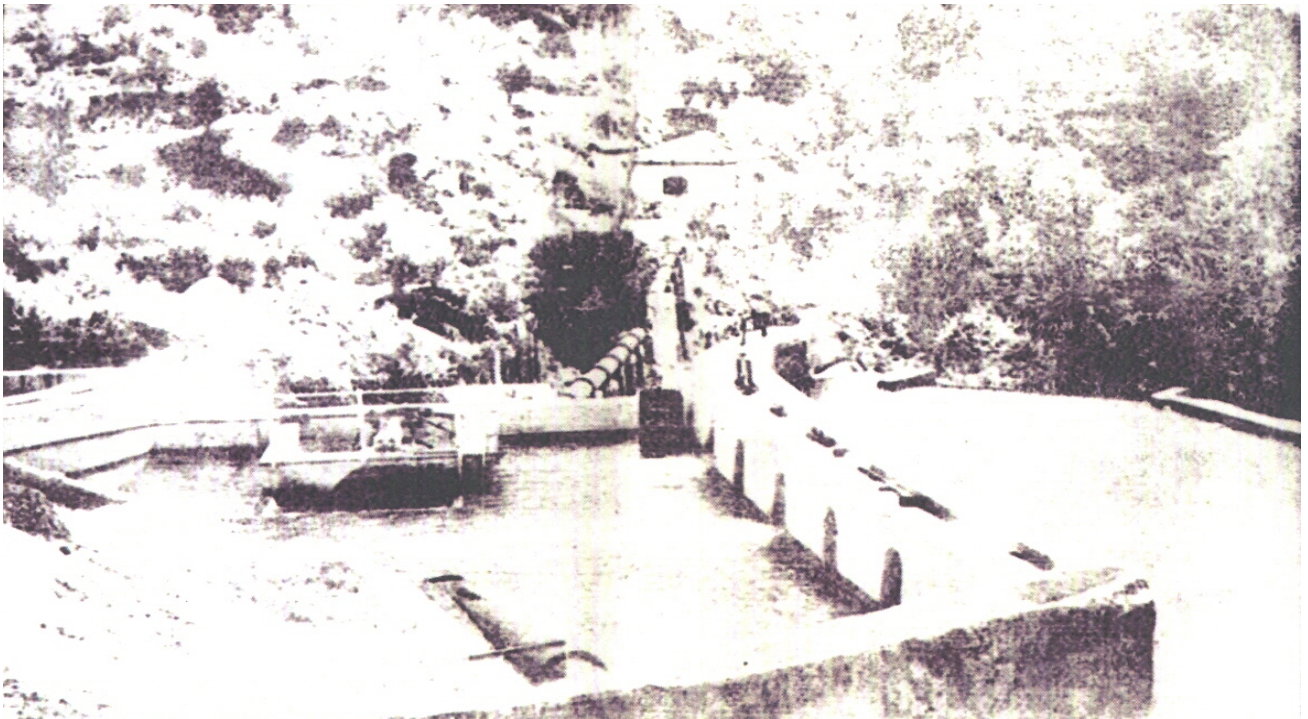


A GLIMPSE AT WATER SUPPLY IN MALAYSIA (PAST & PRESENT)

Malaysia is blessed with high abundant rainfall, averaging 3,000mm annually, the equivalent of 990 billion cubic meters of water over the country, thanks to its equatorial climate. It is also blessed with an extensive river system consisting of more than 150 river that provide the country with more than 25,000 cubic meters of renewable water per capita per year according to an Edge report in June 2002. Renewable water is water that comes down as rain and flows down rivers every year. The amount of renewable water that Malaysia receives far exceeds that of many other parts of the world.

Over the past **200 years**, Malaysia has harnessed this abundant resource for agriculture and water supply to industries and homes, where consumers have the convenience of running water at the turn of a tap. Wells have since been relegated to the annals of history and stand-pipes where villagers washed, bathed and collected water for cooking and drinking are a rarity. Water delivery tankers, once not an uncommon sight, are now only contingency measures to tide over prolonged periods of drought.

The foundation for piped water supply was laid down by the British, shortly after they had set themselves up in Penang, their first base in Malaysia. When the population of their new colony breached the 10,000 mark, they drew up the first formal arrangement for a water supply system in **1804**. Convict labour was to construct an aqueduct of brick to transport clear stream water from the hills to town. Earthen pipes were laid under the streets and water taken from them through tin pipes to homes. The bricks in the aqueduct were often dislodged and the aqueduct was eventually replaced with a cast iron main in **1877**.



Old Ayer Itam Intake, Penang 1889



The overflow / scour tunnel of a dam under construction

This cast iron main is on record as the first water main in Malaysia and traces of it can still be found in the Penang water supply network. Sarawak was the next British colony to have water mains in Kuching in **1887** to provide water to 8,000 households. Kuala Lumpur was next line in to have water at the turn of a tap, followed by Melaka in **1889** and the rest of the Federated Malay States as they came under British colonial administration. Piped water was soon available to urban households and from stand pipes throughout the country.

Prior to 2004 Water supply was the responsibility of the Public Works Department. Its 1911 report on water supply in Penang and Dindings states :

“ \$462 were expended in maintaining the water supply at Balik Pulau. \$3,839 were expended in completing the Reservoir Dam and pipe line of the Lumut water supply. The Reservoir Dam at the Quarantine Station, Pulau Jerejak, was raised 4 feet to increase the storage at a cost of \$4,940 and a Jewell Pressure Filter was fixed for \$4,235. This filter appears to work well and gives no trouble.

In Province Wellesley, the raising of the dam at Bukit Seraya Reservoir was completed. The dam has been raised 25 feet and the capacity of the Reservoir increased from an inadequate supply of 5,850,000 gallons to over 24,000,000 gallons.”

By early **1900s**, water was no longer delivered untreated directly from the source to homes. Water began to be treated before distribution. This came about as a result of an International movement in developed nations that required the treatment of drinking water to prevent the outbreak of water-borne diseases such as cholera, typhoid, and dysentery. As a British colony, Malaya and the Borneo territories, Malaysia now, benefited from this development in water supply. It paved the way for water treatment engineers to design and construct filtration and water treatment plants. Initially, slow sand filters, which were inexpensive and easy to build, were adopted. They were later replaced with modern rapid gravity filtration plants. The slow sand filter of Ampang Intake built in **1906** for Kuala Lumpur and Penang’s first treatment plant,



Batu Ferringhi Aqueduct : constructed between 1926-1929 – 6km long, of which 1.4km is in tunnel

with rapid gravity filter, built in Ayer Hitam in **1934** are still in service today. Disinfection technology using hypochlorite and later, gaseous chlorine made its appearance by 1915.

By **1939**, households in the major towns of Malaya were well-served with piped water. Many water installations, however, deteriorated from neglect during the war years of the Japanese Occupation (1941-45). Post-war rehabilitation was slow and painful, with a shortage of treatment chemicals and demand overtaking supply. A Public Works Department report said:

“Malaya had a water supply system and a standard of technical service second to none in the colonial Empire; it was regrettable if this should fail to meet the needs of tomorrow owing to pre-war financial methods.”

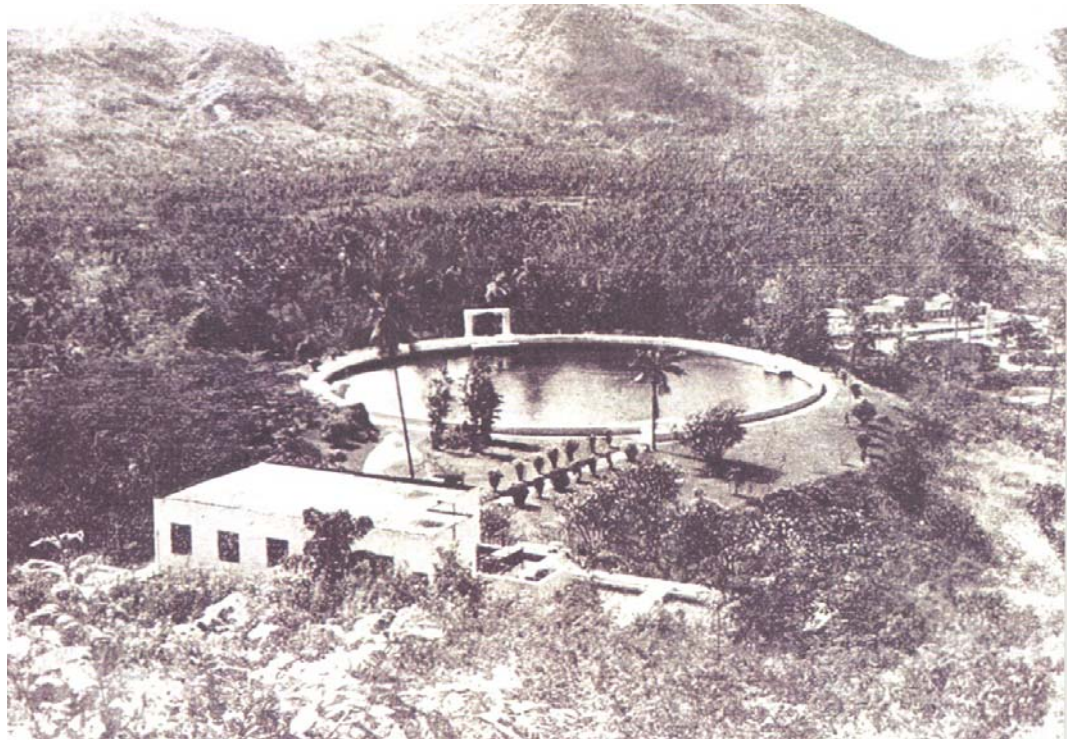
One of the most difficult supplies to operate then was the Kuala Lumpur supply which had reached the limit of its capacity before the war and was now required to provide water to a swollen civilian population and heavy troop concentration. A number of small schemes were hastily implemented around Kuala Lumpur to meet the demand of the burgeoning population.



Handling and laying pipes in pre-War days

By **1950**, Malaya had 100 treatment plants producing 195 million litres of water per day to supply a population of 1.15 million. Then, as now, water shortages were not uncommon, caused in part by drought but mainly by rapid population growth. Demand for water increased sharply in the years after Independence in **1957**, especially in the capital city in the Kuala Lumpur, which was the focal point of the rural-urban drift that occurred in the newly independent nation. To cope with rising demand, building the Klang Gates Dam and the Bukit Nanas Treatment Plant was put in hand and commissioned in **1959**, ending a long period of water shortage and water rationing.

Water development has since figured prominently in Malaysia Plans. During the colonial period, the focus was mainly on urban and suburban supplies. It was under the **3rd Malaysia Plan (1976-1980)**, which attempted to redress the inequalities of earlier policies, that rural water supply received a much needed boost. The investment in rural water supply before 1975 was insignificant but under the 3rd Malaysia Plan, the state of Sarawak alone received an allocation of RM4,139,876 to convey piped water to remote areas. The success for this and subsequent five year plans was reflected in the number of households in Peninsular Malaysia receiving treated water in both urban and rural areas – the figure rose sharply from 23% of all household in 1950 to 85% in 1990.



Air Itam Reservoir, Penang



Klang Gates Dam, Kuala Lumpur : completed in 1959 for water supply and raised 3 metres (10 feet) in late 1979 for flood mitigation



Lorry Tanker : a vanishing breed.....sighted only during prolonged drought



Caring and sharing piped water in the outskirts of Kuala Lumpur



Larger-than-life size pipes are in common usage today



Drinking water transport cart, Malacca

By the mid-1980s, when the country embarked on a programme of industrialisation, there was a high demand for water from a new sector : industries. Water demand for industrial and domestic use rose from 0.8 billion cubic metres in 1980 to 3.5 billion cubic metres in 2000– a 437% increase ! In comparison, water for irrigation remained the same at 7.4 billion cubic metres each year throughout the 20-year period.

The influx of industries has given rise to a high-growth industrial belt along the west coast of Peninsular Malaysia. The increasing demand for water by industries is fast using up the water resources west of the Main Range and calls for water transfer from state on the other side of the Range, which are generally better endowed with water resource and also less industrialised. Though interstate water transfers in small quantities over short distances and easy terrain are not new, the transfer from Sungai Muar in Johor to the Durian Tunggal Dam in Melaka in the 1990s was a very mega project by comparison, and will be followed by other even bigger transfers including the pending transfer from Pahang to Selangor. This Pahang-Selangor raw water transfer will truly be a mega project involving a dam in Kelau, an intake and pumping station in Semantan, both in Pahang, a 44.6km transfer tunnel through the Main Range and kilometers of very large, more than man-sized, diameter steel pipes.

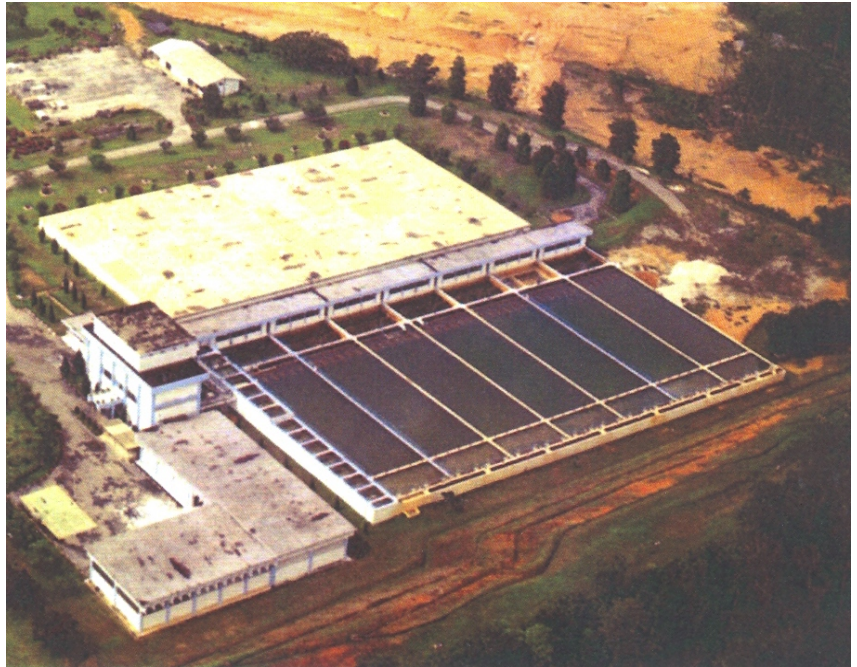
The Pahang-Selangor water transfer will be very costly, but essential given the scale and types of industries that are being established in the country. The food and beverage sector requires large amounts of water as raw material as well as for industrial coolers. Cathode ray tube manufacturers require up to 4.55 million litres of water a day! A textile factory needs as much water as the town of Kuala Kangsar in Perak did in the early 1970s. High-tech industries such as water fabrication require not just water but very clean water. And to make matters

worse, Malaysia, like many other countries in the world, suffers from the El Nino phenomenon, which wreaks havoc on the weather – bringing prolonged periods of dry spells which dries up reservoirs created by dams.

At the end of **1999**, there was a total of 69 dams in operation in Malaysia. Of these, 35 dams have been developed for water supply, 16 are multi-purpose while the rest are for irrigation and hydro-power generation. The large dams among them include the Temenggor Dam in Perak, the Kenyir

Dam in Terengganu and the Pedu Dam in Kedah, whose combined Storage capacity exceeds 20,000 million cubic metres.

Recently completed projects include the Kinta Dam in Perak and the Jus Dam in Melaka. Others projects include the regulating dam on Sungai Selangor and treatment plants in Rasa and Bukit Badong in Selangor. And in the offering is the mega Pahang-Selangor raw water transfer scheme-crucial for meeting demand in the very near future, but stumped over problems of financing arising from objections from environmentalist to its implementation. Nevertheless, this crucial project is kicking off and expected to be completed in 2013.



An example of modern day water treatment plant

Dam design and safety will continue to challenge engineers. At the federal level, the Jabatan Bekalan Air in this Ministry formed a Dam Safety Unit headed by civil engineers to supervise the inspection and surveillance of dams.



Batu Dam, Kuala Lumpur

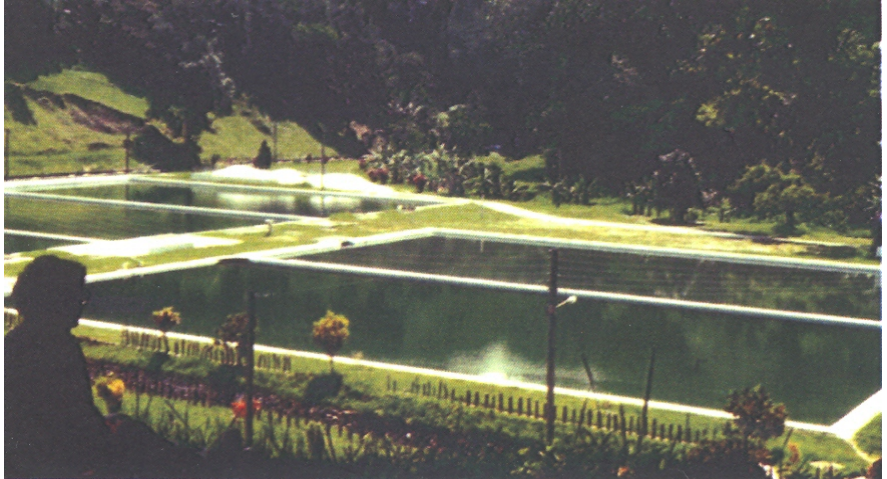
In line with government policy of turning over the running of public utilities to the private sector through privatization, Terengganu corporatised its water supply operation in 1995, while Kelantan, Johor and Selangor chose to privatise theirs. Penang went a stage further from corporatisation in 1990 to listing on the Kuala Lumpur Stock Exchange in 2002 while Selangor's water supply operation was corporatised the same year.

The 8th Malaysia Plan (2001-2005) projects water demand to increase by 5.4% per annum from 2001 to 2005. To ensure

that, there is ample supply to meet the nation's needs, the Federal Government has allocated RM4 billion for water supply projects under the 8th Malaysia Plan. This is almost double the allocation under the 7th Malaysia Plan.

The 8th Malaysia Plan also recommends Water-Demand Management as a tool to 'stretch' existing supplies and delay the development of large capital-intensive projects.

To this end engineers are expected to be engaged in replacing existing asbestos pipes as a major means of reducing water loss which is currently averaged at around 38% of production.



Ampang Intake :slow sand filters built in 1906 and still in service today

Looking beyond the current 8th Malaysia Plan, the Water Resources Master Plan sees the development of water resources for the country up to 2050 as involving 62 major water projects, including new dams, raising existing ones, new treatment plants, inter-state water transfer and identifying catchments area for development.



Bukit Nanas Treatment Plant high above Kuala Lumpur when commissioned in 1959, now in the shadow of tall buildings

Now in the **9th Malaysia Plan (2006-2010)**, under this Ministry Of Energy, Water and Communications a total of RM 8.1 billions will be spent on water supply related projects and of which RM 2.7 billions will be focused on new water projects.