

1. THE BANGKOK WATER WORKS DIVISION

1.1 Brief History The Bangkok Water Works Division established November 14, 1914, is now in its fifty - first year of existence. The following is a brief history of its organization and development.

In 1897 King Rama V made a decree setting up the Sanitation Department within the former Ministry of Interior. This newly established Department was to be responsible for all sanitation activities including the provision of safe drinking water. To carry out this latter part of its responsibilities the Department hired a French engineer by the name of de La Rotier. After the preliminary survey he recommended three possible ways of creating the water works:

1. By building a reservoir on low land.
2. By drawing water from a clean river, and distributing it without filtration.
3. By drawing water from the Chao Praya River, at a point where the sea tide did not reach and distributing it after filtration.

The report was sent to the then Ministry of Agriculture to be examined by the irrigation engineer. They recommended that the Department of Irrigation had its own project to build a dam somewhere along the River and draw water up to be distributed for agricultural purposes by means of irrigation canals which, they hoped, might be used jointly by Water Works in transferring water from the river to a filtration plant. The engineer of the Water Works, however, did not agree to this recommendation on the grounds

that the irrigation project was a huge one, requiring a long period of time before it could be completed, whereas the plans for the Water Works were urgently in need to be completed as soon as possible; and that works for both programs should, therefore, be carried out independently of each other.

Later on a survey was made to find out the possibility of exploiting ground water. Attempts were then being made in Nakorn Patom to bore for water, but it was found that the yield of ground water was completely unreliable and the boring process could be very costly. Thus the use of ground water should be confined only to water - scarce areas.

After a study of the reports, King Rama V agreed that the supply of water should come from the River .

The Department of Irrigation accordingly decided upon the digging of an intake canal branching from the Bangluang Chiengrak Canal, a canal with the advantage of being nearest to Bangkok and at the same time above the reach of seaside all the year round.

In 1907 the proposed digging of an intake canal was accepted, plans drawn up, and the expense estimated so that provision could be made for it from the National Budget.

On July 13, 1909, the digging was begun. The water comes from the river at a point near Patumtani into the River Noi where it is held, by closing a canal - gate at Chiengrak. From the River Noi, a canal was dug leading to the Filtration Plants at Samsen.

Other projects that had to be carried out included: the digging of 2 canals to shorten the canal traffic; the construction of 3 canal - gates; the building of a siphon pipe - line going under Rangsit Canal, Bangkhen Canal, and Premprachakorn Canal; the construction of a pumping station and a filtration plant; the laying of pipe - lines and the construction of elevated tanks. The total expense was estimated at 3,338,000 Bahts and the work was expected to be completed in three years.

1.2 Administration of the Bangkok Water Works.

The Bangkok Water Works is one of the many divisions within the Public and Municipal Works Department of the Ministry of Interior. There are nine sections in this division:

1.2.1 The General Office Section.

This section is in charge of correspondence; the filing of documents and records, including registration of personnel and employees; collection of all records and figures; and the making of reports.

1.2.2 The Accounting Section.

The section consists of the following units:

- The Bill - making Unit. This unit makes out water bills, including the meter - rent, to be sent to individual households. This unit is also in charge of the registration of all water - consuming households.

- The Revenue Unit This unit sees that what the public owes to the Water Works is duly paid, and in case of delay, sends reminders along. This includes the payment for the consumed water made by other government offices to the Water Works.

- The Cash Unit. This unit is in charge of the actual spending, e.g. for salaries, miscellaneous expenses, office supplies, construction materials. It takes in all the money coming in from various District Service Offices and puts it in the bank.

- The Book - keeping Unit. This unit makes cash accounts of the daily expenses and receipts, checks all receipts, makes requests from the budget money, and prepares balance sheets, and the petty - cash account.

1.2.3 The Supply and Storage Section.

The section consists of the following units:

- The Main Unit. This unit files all the official letters, receipts and requests for purchases; settles the accounts among the sections; draws up contracts with firms that deal in water works equipment, in office supplies, and in petrol; and controls the allowance of this equipment to which each division is entitled.

- The Purchasing Unit. This unit invites competitive bidding, from dealers whether in construction, repair, hiring or buying.

- The Storing Unit. This unit looks after all the water works equipment, cement, petrol, and engine oil; checks these when they come in and checks them out when requests are made to draw them out for use.

1.2.4 The Surveying Section.

The section consists of:

- The Reception Unit. This unit is in charge of all applications for water - consumption and advises the public concerning the **new** pipe - line to be installed.

- The Surveying Unit. This unit makes survey and **draws** up plans for the new pipe - lines to be installed, including the estimated cost.

- The Mapping Unit. This unit produces maps of the water pipe system, showing the layout of the main pipe - lines, and the possibility of extending the water service along main roads as well as lanes and backstreets.

- The General Office Unit. This unit prepares blue prints of the main pipe - line system and the distribution of water, and prints of other maps.

1.2.5 The Plumbing Section.

The section consists of:

- The General Office Unit. This unit fills out withdrawal forms for pipes and other equipment **to** be brought out from storage to be used for plumbing and repairing, and also the purchase of plumbing equipment, including spare parts for water meters. It also contacts other government offices such as the Telephone Organization, the Electricity Authority of Bangkok, and the Bangkok Municipality, when excavation for pipe laying must be done.

- The Improvement and Extension of Water Distribution Unit. This unit assists with the work of the various **Distric Service Offices** in Bangkok. It effects the changes in the route

of the pipe - lines which are made necessary in the case of roads and bridges being widened, and also the repair of broken main pipes.

- The Water Meter Unit. The unit is in charge of **everything** concerned with the installation of water meters.

- The Workshop Unit. This unit mend all equipment used for the laying of pipe - lines.

- The Road Repair Unit. This unit reconditions road surfaces after the plumbing and repairing of pipes.

- The Ground Water Unit. This unit is in charge of maintenance work of the ground water wells, such as cleaning and repairing pumping - motors, distributing chlorine, and scheduling the running of the pumping - motors.

1.2.6 The Water Distribution Section.

This section is in charge of the following:

- Drawing up plans for laying main pipes under roads and backstreets, yet without main pipes, to enlarge and extend the water distribution system,

- Planning to improve water pressure in the pipes running along lanes and backstreets

- Examining proposed plans for laying new pipes.

- Registering new requests for water consumption.

- Distributing water by trucks when necessary.

- Controlling the elevated tanks at Mansri Square and Rajadamri Road.

1.2.7 The Intake Canal Maintenance and Protection Section.

Apart from the maintenance work for the intake canal with a total length of 26 km., the Division also carries out the maintenance work for the canal-gates, the embankments along the canal, and the siphon pipes. It is also the duty of this Division to take action against those who violate the Intake Canal Protection Act of 1913.

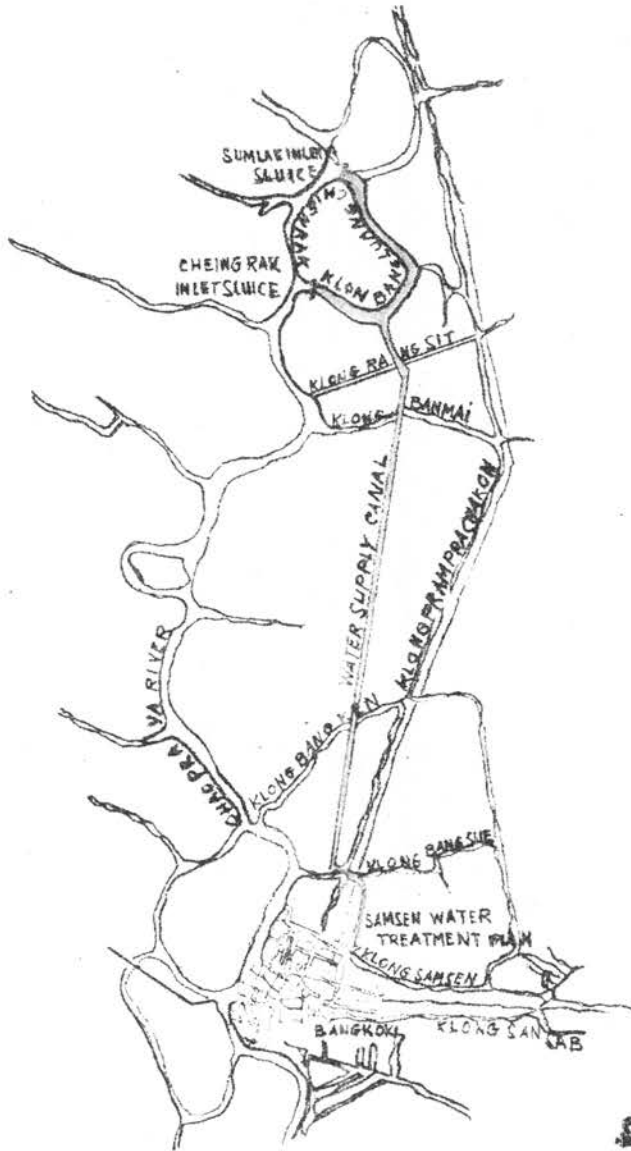
1.2.8 The Water Treatment Plant and Pumping Station.

This unit is in charge of the pumping of raw water from the intake canal up to the sedimentation tanks; the control of chemicals used with raw water to form floc; the control of the rate of filtration; and the control of chemicals used in the sterilization of filtered water to make sure that the water is pure and safe for drinking purposes. Examination of water quality for physical, chemical and bacteriological properties is also carried out to see whether **the water quality meets the** standard for drinking water or not while the water is being pumped into the distribution system.

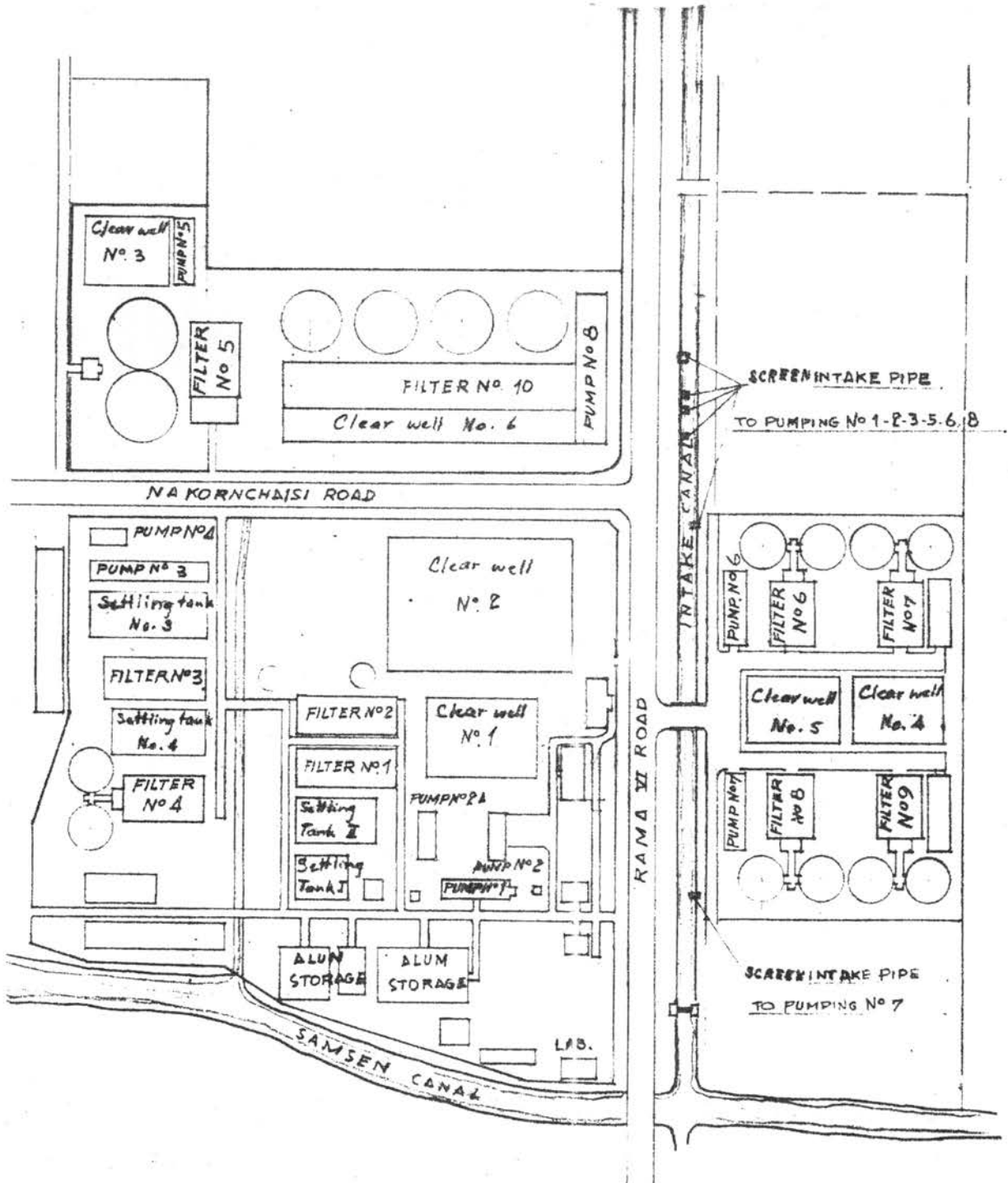
The Water Treatment Plant has been developed since 1914 as follows:-

In 1914 the first filter house began to operate. The filters were of rapid sand gravity filter type produced by Jewell Co., with filtration rate of about $1,200 \text{ m}^3/\text{hr}$. There were 12 beds, with total surface area of about 255 m^2 ; the rate of filtration being $4.85 \text{ m}^3/\text{m}^2/\text{hr}$.

RESERVOIR AND INTAKE CANAL



SCALE.
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SAMSEN WATER TREATMENT PLANT

BANGKOK WATER WORKS.

In 1951 and in 1952 the second and the third filter houses began to operate. The filters were of rapid sand gravity filter type produced by Jewell Co.; with filtration rate of about 1,800 m³/hr. There were 12 beds, with total surface area of about 412 m², the rate of filtration being 4.4 m³/m²/hr.

In 1954 the fourth filter house began to operate. The filters were of rapid sand gravity filter type produced by Jewell Co., with filtration rate of about 1,800 m³/hr. There were 6 beds, with total surface area of 360.0 m², the rate of filtration being 5.0 m³/m²/hr.

In 1958 the fifth filtration house began to operate. The filters were of rapid sand gravity filter type produced by Bamage Co., with filtration rate of about 1,800 m³/hr. There were 8 beds, with total surface area of about 413 m², the rate of filtration being 4.4 m³/m²/hr.

In 1960 and 1961 the sixth, seventh, and eighth filter houses were put into operation. The filters were of rapid sand gravity filter type produced by Paterson Co., each house with filtration rate of about - 1,800 m³/hr. There were 6 beds for each house, with total surface area of about 360 m², the rate of filtration being 5.0 m³/m²/hr.

In 1963 the ninth filter house began to operate. The filters were of rapid sand gravity filter type produced by Degremont Co., with filtration rate of about 1,500 m³/hr. There were 10 beds, with total surface area of about 365 m², the rate of filtration being 5.0 m³/m²/hr.

In 1963 the tenth filter house began to operate. The filters were of rapid sand gravity filter type produced by Degremont Co., with filtration rate of about $7,200 \text{ m}^3/\text{hr}$. There were 24 beds, with total surface area of $1,440 \text{ m}^2$, the rate of filtration being $5.0 \text{ m}^3/\text{m}^2/\text{hr}$.

Thus the total filter surface area at Samsen Water Treatment Plant is about $4,635 \text{ m}^2$, the rate of filtration being $4.85 \text{ m}^3/\text{m}^2/\text{hr}$.

From the year 1914 to 1963 there was also an extension of pumping houses and clear water reservoirs which were provided to collect all the water from different filter houses.

There are seven pumping houses, each consisting of low lift pumps that lift raw water up to the sedimentation tanks, and high lift pumps that deliver the treated water into the distribution system to the consumers. Six clear water reservoirs are provided. Their capacity being:-

Clear well	No. 1	Capacity	$6,000 \text{ m}^3$
Clear well	No. 2	"	$150,000 \text{ m}^3$
Clear well	No. 3	"	$32,000 \text{ m}^3$
Clear well	No. 4	"	$4,000 \text{ m}^3$
Clear well	No. 5	"	$4,000 \text{ m}^3$
Clear well	No. 6	"	<u>$18,000 \text{ m}^3$</u>
		Total Capacity	$214,000 \text{ m}^3$

At the present time the Samsen Water Treatment Plant supplies water at the rate of about $21,600 \text{ m}^3/\text{hr}$, with pressure

measured at the source(the high lift pumping stations) at about 2.52 to 2.75 kg/cm²

1.2.9 District Services Offices 1 - 11

To make the contact easy and quick between consumers and the Bangkok Water Works for the purposes of connecting water pipes to houses, repairing the broken pipes along the roads, and other related problems, the metropolitan area of Bangkok is divided into eleven districts, which give services directly to the consumers in that area. There are seven offices as follows:

1. The Office of The Bangkok Water Works for Districts No.1 and No.2 situated at Mansri Square.
2. The Office of The Bangkok Water Works for Disticts No.3 and No. 6 situated at Nakornchaisri Road, near the Samsen Railway Station.
3. The Office of The Bangkok Water Works for District No.4 situated at Techavanich Road.
4. The Office of The Bangkok Water Works for District No. 5 situated at Paholyotin Road.
5. The Office of The Bangkok Water Works for District No. 7 situated at Rajdamri Road.
6. The Office of The Bangkok Water Works for Districts No. 8 and No. 9 situated at SuanPlu Lane.
7. The Office of the Bangkok Water Works for Districts No.10 and No. 11 situated at Sukumvit Street.

