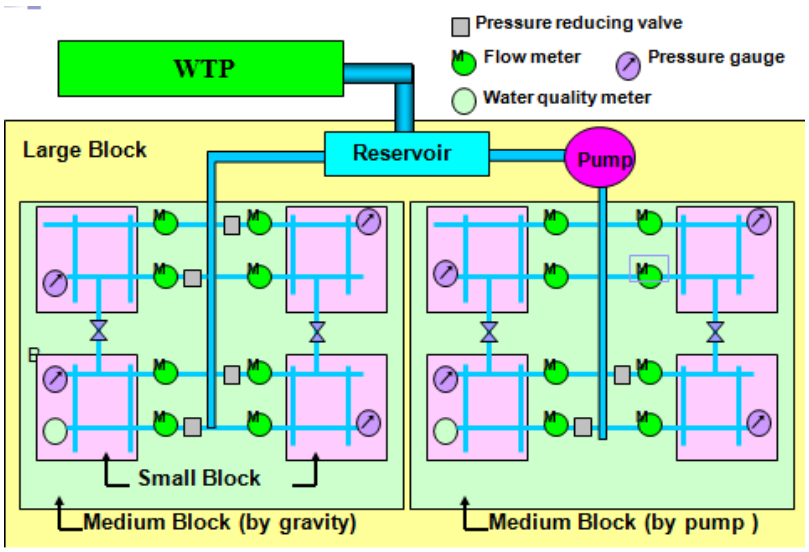
Q&A

31Q4: I heard that "Block Distribution System" is effective for measures of leakage reduction and water pressure control. I would like to know the block distribution system. (Mr. R.T. India)

A1: The Block Distribution System (BDS) is the distribution system to regulate the distribution pressure centering on each distribution reservoir. In Yokohama Waterworks Bureau, this system has been adopted since 1971. Distribution block contains a large, medium and small block. Large block is an entire area where water is supplied from a distribution reservoir. Large block is divided into two blocks, pump system area and gravity flow system area, by the difference of the way to distribute water from a distribution reservoir. We call them medium blocks. Moreover, medium blocks are divided into small blocks by the distribution pressure and population in the block. In the small blocks, distribution pressure and population are stably kept within a defined range so that it makes water distribution easily controlled. Additionally, connection pipe between the blocks can make mutual backup of water supply. Since influence of suspension area or suspension time by pipe construction work and accidents can be kept to a minimum, we can supply water stably anytime 24 hours. In Yokohama, though it's undulating landscape because of many hills and valleys, we ensure stable 24 hours water supply because we innovated the BDS before the rest of Japan.



Example of Block Distribution System
(*Source: Training reference of Yokohama WWB*)

*In many developing countries, District Metered Area (DMA) is often used to supply water. This system is as same as small block of BDS. DMA means the divided area to control the amount of water by the meter. We can know the amount of water loss by the deduction of the total amount of water consumption in each house inside the area from the amount of influent water into the area.

(amount of the water loss[m3] = amount of the influent water[m3] – total amount of the water consumption [m3])
By this account, we can know the percentage of non-revenue water.
(percentage of non-revenue water [%] = amount of the water loss[m3] / amount of the influent water[m3] ×100)

We can't know the amount of water consumption in each house at the same time because it is measured when the meter is read. Thus, there is a little bit of lag time between the amount of the influent water and water consumption, accurate percentage of non-revenue water can't be calculated. But it is enough to recognize the trend of the non-revenue water.
For accounting the accurate amount of water loss, we should set up the meter with data-logger which can measure the small amount of water. In order to know the amount of water loss, we conduct minimum night flow test which measures the minimum night flow in the DMA and defines the moment when no water is used, in the DMA. The amount of water flow of the moment means water loss. (sampling interval is about 2 sec.).

This method requires measuring the minimum night flow for more than a week to know the accurate minimum flow. So, we should set up bypass pipe or switchover equipment to shift from an ordinary flow meter used in the daytime to a more accurate minimum flow meter in the night. When we divide the DMA, we have to consider the ground height. Because the water pressure for the high ground is reduced and one for the low ground is raised, DMA should be divided in the case of extreme difference in the height.

(Answerer: Mr. NAKANOSONO Kenji, Yokohama Water Co.,Ltd, 2014)