

## **The design of a large groundwater supply system and water distribution system in Sakae Raj Subdistrict, Pak Thongchai District, Nakhon Ratchasima Province**

Mr. Somphop Luepongpatana<sup>1</sup>; Mr. Pichakorn Borisut<sup>1</sup>

<sup>1</sup> Department of Groundwater Resources, The Bureau of Groundwater Resources Region 5 (Nakhon Ratchasima) Nakhon Ratchasima 30000, Thailand.

**Corresponding Author(s):** somphop.me18@gmail.com, Pichakorn1991@gmail.com

The Bureau of Groundwater Resources, Region 5 (Nakhon Ratchasima) is implementing a project titled "The Investigation of High Potential Groundwater for Strengthening Water Security in Sakae Raj Subdistrict, Pak Thongchai District, Nakhon Ratchasima Province (Phase I)." According to the study, Khok Sakae Raj village 3 has a high groundwater potential, and four production wells with a groundwater yield of more than 40 m<sup>3</sup>/hour were developed. Additionally, it was an artesian and freshwater aquifer. Therefore, they were sufficient for supplying the population's needs at a production rate of 1000 m<sup>3</sup>/day with a pumping rate of 25 m<sup>3</sup>/hour to avoid exceeding groundwater extraction. Also, a large groundwater supply system, water distribution system, and drinking water service point were designed in preparation for Phase II construction.

From an engineering survey and design point of view, since it is essential to concern the population's needs, the submersible pumps with a specification of 7.5 horsepower and a pumping rate greater than 1,600 m<sup>3</sup>/day were installed at four production wells. There are several processes in a large groundwater supply system. Firstly, the groundwater is pumped by a submersible pump to be stored in the two storage water tanks with a 750 m<sup>3</sup> capacity. Next, the two surface pumps (vertical multistage types of 20 horsepower) raise the water to an elevated water pressure tank type of 300 m<sup>3</sup> capacity. Based on the gravitational force, this tank can deliver water to the water distribution system from at least 30 kilometers away. It is carefully designed based on the local topographic terrain. Lastly, because the water pressure must be sufficient to transport water across most of the subdistrict, the High-Density Polyethylene (HDPE) water pipes (radius of 12, 10, and 8 inches) are installed with a total length of 3 kilometers. The Subdistrict Administrative Organization of Sakae Raj will connect the remaining water distribution system to the existing one and expand it to adjacent villages with greater water demands. In addition, there is a tap water service point, a groundwater learning center, and a drinking water service point for water distribution and consumption. In conclusion, the people would appreciate a cost-effective improvement in the quality of life and strengthened water security.