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Ground water and surface water utilization via bank infiltration method: A case study along the riverbank of Langat River, Selangor

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This study was initiated due to potential public water supply shortage in the Klang Valley in the near future resulted in inadequate volume of raw water sources. Bank infiltration (BI) is seen as one of the solutions in providing the required volume of raw water. Groundwater and surface water utilisation via BI technique provide improvement on quality and quantity for both surface water and groundwater.BI offers a good practice to treat and protect the surface water as well as groundwater. The practice uses the bed of a reservoir, lake or river and an adjacent sand and gravel aquifer as natural filter and this technology can be applied directly to the existing surface water reservoirs, streams, lakes and rivers, and now it is often a guiding factor in the hydrogeological investigation of new source supplies. BI is the influx of river water to the aquifer induced by a hydraulic gradient. Pumping wells located on the banks at a certain distance from the river creates a pressure head difference between the river and aquifer, which induces the water from the river to flow downward through the aquifer. By applying this technique of drinking water extraction, two different water resources are used simultaneously. On the one hand, surface water from the river moves towards the well and groundwater of the surrounding aquifer is utilised. Currently BI study is not well studied and documented in Malaysia. The development is deterred by big project such as inter basins water transfer. As more rivers are getting polluted, more BI scheme could be developed in the near future. In view of the needs emphasizing on raw water abstraction, the BI study in riverbank of Langat River is carried out as a pilot project to develop a better understanding of the potential and sustainable source of water abstraction, and will provide a good platform to introduce this technique in Malaysia. Areas along Langat River were chosen due to the high water demand in the area for public water supply and groundwater is perceived as one of the source with very high potential to be developed as supplementary source to meet the demand. The objective of this study is to determine the effectiveness of BI and improving the quality of river water, and to determine the effective rate of water abstraction from the alluvial aquifer. Fifty (50) monitoring wells and 4 test wells were constructed at the Jenderam Hilir and Sungai Serai village located at the riverbank of the Langat Rivers. From the boreholes in the study area, it can be deciphered that this area is rich in alluvial soil which is a good potential as an aquifer and filter materials. Resistivity surveys were also conducted to improve the understanding of the subsurface soil stratification. In order to ascertain the potential of these locations for water source abstraction, pumping tests have been carried out. Water samplings during the 72 hours pumping tests show that test wells were able to produce better quality and quantity of water with very low drawdown from the original static water level in the pumping wells. The distance between the river and the test wells depends very much on hydrogeological characteristics of the study area. In the study area the distance between the river and the test wells is less than 35 m. Water quality analyses was carried out during the pumping test and the results shows a decreasing trends in some parameters in BI method which were very high in the Langat river. Initial results from this study, has shown the light at the end of the tunnel. Riverbank of Langat Rivers in Selangor has great potential for riverbank/bed filtration for water resource abstraction. The players in drinking water industry should embark on the utilisation of this BI technique as a new technology of using natural filtration system. The study on the effectiveness of BI is a proactive effort of NAHRIM to improve surface water quality as a source for domestic water in a modern urbanised area and conjunctively utilised with groundwater.

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