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15 May 2015

Mr Anthony CHU
Clerk
Public Accounts Committee
Legislative Council Complex
1 Legislative Council Road,
Central, Hong Kong

Dear Mr. CHU,

Public Accounts Committee
Consideration of Chapter 4 of the Director of Audit's Report No. 64
Management of Water Supply and Demand

Thank you for your letter dated 8 May 2015. Please find below our responses to the issues raised in your letter according to the paragraph numbering of your Appendix.

Paragraph 1

As indicated in paragraph 1.3 in Chapter 4 of Report No. 64 of the Director of Audit, unmetered water consumption includes leakages in government and private water mains, water consumed during water treatment processes and for operational purposes, unauthorised water consumption and water consumed but not metered due to inaccurate metering. The leakage in government water mains accounts for about 17% of the fresh water consumption in 2013 and other components add up to about 15%.

For leakage in private water mains, most of them come from the underground private water mains in housing estates. The Water Supplies Department (WSD) has been progressively installing bulk meters at these housing estates to measure the water inflow to the estates. By comparing the water inflow to the estate with the aggregated metered water consumption of individual customers, the leakage of the private water mains within the estate can be estimated. With more and more bulk

meters installed, we will be able to have a more accurate estimate of the leakage of the private water mains in the territory and hence formulate the appropriate follow-up actions.

Water consumed during water treatment processes and for operational purposes includes water consumed in water treatment works, flushing of water mains, cleansing of service reservoirs, testing of new water mains, provision of emergency temporary water supply, augmentation of the salt water flushing supply when the quality of seawater becomes unacceptable (e.g. during red tide) or during breakdown of the salt water supply system, operational uses by other departments (e.g. firefighting, training and testing of fire hydrants by Fire Services Department), cleansing of roof tanks and testing of fire services systems by estates management, etc. We are conducting a review of these types of water consumption, including liaison with relevant departments, to enhance the recording of the water consumption in more details with a view to arriving at a more accurate estimate of the quantity of water consumed.

Regarding the unauthorized water consumption (i.e. unlawful taking of water), WSD has strengthened the investigation, prosecution, promotion and education to curb the unlawful taking of water. The amount of unauthorized water consumption is estimated with reference to relevant data of other cities and regions similar to Hong Kong conditions. We are reviewing the latest data and their basis to review the estimation of unauthorized water consumption.

For water consumed but not metered due to inaccurate metering, we have carried out regular study on meter accuracy and conducted tests continuously on customer meters of different ages on their inaccuracies. From 2011 to 2014, we have replaced about 770,000 customer meters and the overall meter accuracy has been improved from 95.3% to 96.7% during this period.

Paragraph 2

At the moment, WSD does not have unmetered water consumption data at district level. However, with the progressive establishment of the Water Intelligent Network (WIN), WSD can collect data of the water inflow into each District Metering Area (DMA) for analysis with a view to monitoring the unmetered water consumption within the DMA. We have set out more details about WIN in the paragraphs below.

Paragraph 3

In the 1990s, the aging water supply networks had become increasingly difficult and costly to maintain. The number of bursts and leaks of water mains continued to increase. In 2000, the number of water main bursts had risen to a high level of 2500; and the leakage rate of water mains exceeded 25%. In view of the aging and deteriorating condition of the water supply networks, replacement and rehabilitation

of water mains was the most effective way to rejuvenate the water supply networks and to arrest the rising trend of water main bursts and leakage. In 2000, WSD embarked on the Replacement and Rehabilitation of Water Mains Programme (R&R Programme) to replace and rehabilitate about 3 000 km of aged water mains. The R&R Programme is very large in scale and complex in nature. At the peak of the implementation stage of the R&R Programme, there were more than 1 000 work fronts at the same time over the territory. Its impacts on traffic and environment had almost reached the tolerable limit. Up to March 2015, we have successfully replaced or rehabilitated about 2 750 km of aged water mains. In 2014, the number of water main bursts has been drastically reduced to about 170 and the leakage rate of water mains drops to 16%. Owing to the hilly terrain of Hong Kong, the water supply networks need to be operated at a relatively high water pressure in order to provide water supply to premises situated at different altitudes. In spite of this operational constraint, Hong Kong's current leakage rate of water mains is lower than the 24.7 % of London, United Kingdom and is comparable to the 16.7% of the nearby Taipei.

The R&R Programme has significantly improved the healthiness of the water supply networks. Upon substantial completion of the R&R Programme in end 2015, we will no longer need to continue such a large scale R&R Programme to maintain the healthiness of the water supply networks. With reference to the overseas advanced technology and experience, we plan to progressively establish WIN by setting up some 2 000 DMAs over the territory with sensors installed in the water supply networks of individual DMAs to collect network data. We will make use of an intelligent management system to analyse the data collected for monitoring the conditions of the water supply networks. We will also explore the latest data mining technique in predicting burst of water mains, and coupled with WIN, for assisting in the early identification, treatment and improvement of water mains in poor conditions. When WIN is fully implemented, it will help us determine the most effective network management measures (including pressure management, active leak detection, replacement of deteriorated water mains, etc.) according to the network conditions of individual DMAs, thereby help further reduce the leakage rate of water mains.

Should you have any inquiry, please contact our Assistant Director/Development, Mr LAM Ching Man at 2829 4361.

Yours faithfully,

(C L WONG)
for Director of Water Supplies

c.c. Secretary for Development (Fax: 2810 8502)
Secretary for Financial Services and the Treasury (Fax: 2147 5239)
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