

**For discussion
on 24 April 2018**

Legislative Council Panel on Development

357WF – Design and Construction for First Stage of Desalination Plant at Tseung Kwan O

PURPOSE

This paper briefs Members on our proposal to upgrade the remaining part of **357WF**, entitled “Design and construction for first stage of desalination plant at Tseung Kwan O” (the Project), to Category A at an estimated cost of \$9,077.5 million¹ in money-of-the-day (MOD) prices for the construction of the proposed desalination plant at Tseung Kwan O (TKO) Area 137.

PROJECT SCOPE

2. The remaining part of **357WF** which we propose to upgrade to Category A comprises –

- (a) construction of the seawater treatment components for the first stage of the proposed desalination plant with a water production capacity at 135 000 cubic metres (m³) per day with provision for future expansion to the ultimate water production capacity up to 270 000 m³ per day when necessary, and associated facilities²;
- (b) formation of an 8-hectare site in TKO Area 137 for the construction of the proposed desalination plant and associated facilities with the ultimate water production capacity at 270 000 m³ per day;

¹ This figure represents the latest estimates of capital cost. We will finalise the cost estimates before submission to the Public Works Subcommittee.

² The associated facilities include administration building, laboratory, maintenance workshop, etc. which are common facilities for the first stage and the ultimate stage of the proposed desalination plant.

- (c) construction of the intake and outfall facilities of the proposed desalination plant with capacities catering for the ultimate water production capacity of the proposed desalination plant at 270 000 m³ per day; and
- (d) associated works including engineering, environmental mitigation works and landscaping works.

The location of the proposed desalination plant is shown on the plan at **Enclosure 1**.

JUSTIFICATION

3. A reliable fresh water supply is of paramount importance in sustaining Hong Kong's development and economic growth. However, our fresh water resources, which come from the yield collected from local gathering ground and raw water imported from Dongjiang (DJ) in Guangdong Province, are both vulnerable to climate change. That aside, the reliability of fresh water supply to Hong Kong is also facing other challenges such as increasing water demand arising from population and economic growth and keen competition for DJ water resource due to the rapid economic development in the Pearl River Delta Region.

4. With the increasing water demand and the unforeseen extremely dry weather brought about by climate change, we need to develop the strategic alternative water resource by seawater desalination which is not susceptible to climate change to safeguard water security in Hong Kong.

5. An 8-hectare site in TKO Area 137 has been reserved for the construction of a medium-sized desalination plant. The planning and investigation study for the proposed desalination plant confirmed that TKO Area 137 is a suitable location for siting the proposed desalination plant in terms of the quality of nearby seawater. The use of the reverse osmosis technology³ for the proposed desalination plant has also been proved technically feasible with an estimated unit water production cost at about

³ Reverse osmosis has become a mature technology and is used in most of overseas desalination plants in recent years. According to the International Desalination Association, there are over 17 000 desalination plants worldwide with a total water production capacity of more than 80 000 000 m³ per day and reverse osmosis technology accounts for approximately 60 per cent of the installed capacity. The number of desalination plant using reverse osmosis technology is on the increase.

\$12 to \$13 per m³ at 2017 price level⁴.

6. We now propose to take forward the construction of the proposed desalination plant. Subject to the funding approval of the Finance Committee (FC), we plan to commence the construction of the proposed works by end 2018 for completion in the third quarter of 2022.

FINANCIAL IMPLICATIONS

7. We estimate the cost of the proposed works to be \$9,077.5 million in MOD prices.

PUBLIC CONSULTATION

8. We consulted the Sai Kung District Council on 6 January 2015 and 5 July 2016. Members supported the Project in principle.

ENVIRONMENTAL IMPLICATIONS

9. The Project is a designated project (DP) under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) which requires an environmental permit (EP) for its construction and operation. The Director of Environmental Protection approved the EIA report in November 2015 and issued an EP for the construction and operation of the Project in December 2015. With implementation of the recommended mitigation measures and an environmental monitoring and audit programme, the approved EIA report concluded that the Project will not cause any adverse environmental impacts. We shall implement these measures which include deployment of silt curtains during marine works and pollution control measures during construction. The pollution control measures include frequent watering of site, provision of wheel washing facilities, covering of materials on trucks, use of silenced construction plant, temporary noise barriers and acoustic enclosures for noisy construction

⁴ The estimated unit production cost of the proposed desalination plant in Hong Kong covers the energy cost, capital cost, treatment cost, distribution cost and customer service cost. The unit cost for producing fresh water by seawater desalination using reverse osmosis technology overseas ranges from \$2.9/m³ to \$50.5/m³ (at 2017 price level) according to the International Desalination Association. The unit water production costs in Hong Kong and other countries cannot be compared directly as they are affected by various factors such as the energy cost, the seawater quality and temperature, intake arrangement, environmental measures, financing details, and specific details of the water purchase agreement, etc.

activities. We have included in the project estimate the cost for the implementation of the environmental mitigation measures.

10. At the planning and design stages, we have considered the design of the proposed works to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities⁵. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

11. At the construction stage, we will require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

12. We estimate that the proposed works will generate in total 235 184 tonnes of construction waste. Of these, we will reuse 3 192 tonnes (1%) of inert construction waste on site and deliver 192 566 tonnes (82%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 39 426 tonnes (17%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at public fill reception facilities and landfill sites is estimated to be \$21.6 million for the proposed works (based on a unit charge rate of \$71 per tonne for disposal at public fill reception facilities and \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

⁵ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

HERITAGE IMPLICATIONS

13. The proposed works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

14. The Project does not involve resumption of private land.

TRAFFIC IMPLICATIONS

15. We have carried out a Traffic Impact Assessment (TIA) for the Project. The TIA concluded that the Project would not cause any significant impact on the traffic.

BACKGROUND

16. We upgraded **357WF** to Category B in September 2014.

17. On 8 June 2012, we upgraded **345WF** “Planning and investigation study of desalination plant at TKO” (the Study) to Category A with an Approved Project Estimate (APE) of \$34.3 million in MOD prices. In December 2012, we engaged consultants to commence a planning and investigation study for the proposed desalination plant in TKO Area 137. The study scope comprises detailed investigation of the feasibility and cost-effectiveness, preliminary design, formulation of the implementation strategy and programme, and impact assessments for the proposed desalination plant. We completed the Study in 2015.

18. On 26 June 2015, we upgraded part of **357WF** to Category A as **359WF** “Design and construction for first stage of desalination plant at TKO – investigation study review, design and site investigation” at an APE of \$154.5 million in MOD prices. In November 2015, we engaged consultants to carry out the investigation study review, design and associated site investigation works for the first stage of the proposed desalination plant. The consultants have completed the investigation study

review, site investigation works and a reference design⁶ for the first stage of the proposed desalination plant.

19. On 13 October 2017, we upgraded part of **357WF** to Category A as **364WF** “Design and construction for first stage of desalination plant at TKO – mainlaying” at an APE of \$720.5 million in MOD prices for laying of about 10 kilometres of fresh water main for connecting the proposed desalination plant to the existing TKO Fresh Water Primary Service Reservoir. The mainlaying works commenced in November 2017 and will be completed by April 2022.

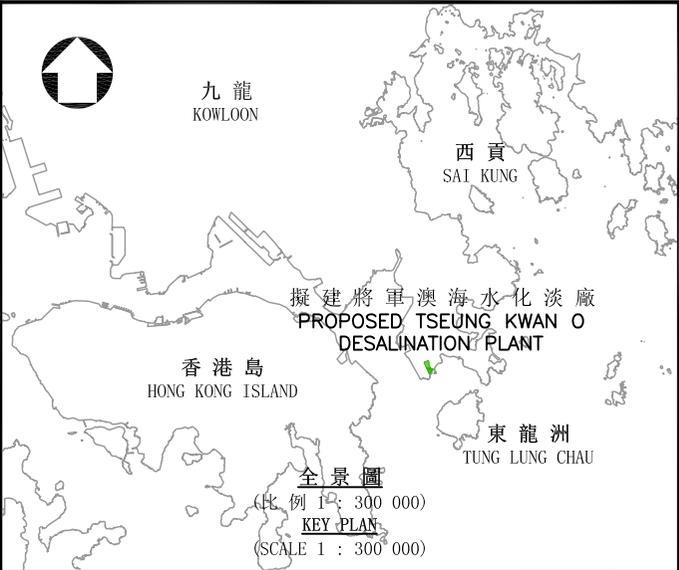
20. A 0.79 hectare of mixed woodland with low to moderate ecological value will be affected by the proposed works. With the implementation of the recommended mitigation measures in the approved EIA report, no adverse residual impact is expected. The relevant government guidelines on tree preservation will also be observed.

WAY FORWARD

21. We will seek support of the Public Works Subcommittee for the approval from the FC to upgrade remaining part of **357WF** to Category A. We will invite tenders in parallel to enable early commencement of the proposed works and will only award the contract after obtaining FC’s funding approval.

Development Bureau
Water Supplies Department
April 2018

⁶ We will implement the works for the first stage of the desalination plant via a “Design-Build-Operate” approach in which the contractor will be responsible for the detailed design of the proposed works. The reference design completed by the consultants has been used to establish the project requirements and will be used as a reference for the detailed design.



工務計劃項目第357WF號 - 將軍澳海水化淡廠第一階段設計及建造
**P.W.P. ITEM NO. 357WF - DESIGN AND CONSTRUCTION FOR
 FIRST STAGE OF DESALINATION PLANT AT TSEUNG KWAN O**

 **水務署**
 Water Supplies Department

草圖編號 SKETCH NO. SK 52008 / 13