

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Salt water supply

45WS – Salt water supply for Northwest New Territories – remaining works

Members are invited to recommend to Finance Committee the upgrading of the remaining part of **45WS** to Category A at an estimated cost of \$808.4 million in money-of-the-day prices.

PROBLEM

There is at present no salt water supply system to provide salt water for flushing to Tuen Mun East areas¹, Yuen Long – Tuen Mun Corridor areas², Tin Shui Wai and Yuen Long Town in Northwest New Territories (NWNT).

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for Development, proposes to upgrade the remaining part of **45WS** to Category A at an estimated cost of \$808.4 million in money-of-the-day (MOD) prices to provide salt water supply for flushing to Tuen Mun East areas, Yuen Long – Tuen Mun Corridor areas, Tin Shui Wai and Yuen Long Town in NWNT.

/PROJECT

¹ Tuen Mun East areas cover Siu Lam, So Kwun Wat, Sam Shing Hui and San Hui.

² Yuen Long-Tuen Mun Corridor areas cover Ping Shan, Kiu Tau Wai, Shek Po Tsuen, Fui Sha Wai, Hung Shui Kiu, Tan Kwai Tsuen, Chung Uk Tsuen, Nai Wai and Lam Tei.

PROJECT SCOPE AND NATURE

3. The remaining part of **45WS** we now propose to upgrade to Category A comprises –

- (a) construction of a salt water service reservoir (SWSR) with a capacity of 18 100 cubic metres at Tan Kwai Tsuen;
- (b) construction of a salt water pumping station (SWPS) with a pumping capacity of 83 000 cubic metres per day at Lok On Pai;
- (c) upgrading of an intermediate booster chlorination plant at Tuen Mun water treatment works (WTW);
- (d) laying of approximately 55.4 kilometres (km) of salt water mains of sizes from 100 millimetres (mm) to 1 000 mm in diameter in Yuen Long – Tuen Mun Corridor areas, Tin Shui Wai and Yuen Long Town; and
- (e) associated greening works.

———— A site plan showing the proposed works is at Enclosure 1.

4. We plan to start the construction of the proposed works in May 2009 for completion in 2014. The construction will be supervised by in-house staff.

JUSTIFICATION

5. At present, about 750 000 cubic metres of sea water is used per day for flushing in the metropolitan areas and most of the new towns covering about 80% of the total population. Based on the findings of a study completed in early 2008 to examine the fresh water demand and supply situations in Hong Kong and

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evaluate water demand and supply management measures, we formulated a Total Water Management (TWM) strategy for the period up to year 2030. One of the key elements of the TWM strategy is to extend the use of sea water for flushing to achieve the TWM objective of water conservation. Our target is to save an additional 82 000 cubic metres of fresh water per day through conversion of fresh water flushing to sea water flushing in Disneyland, Pok Fu Lam³, Tuen Mun East, Yuen Long and Tin Shui Wai.

6. At present, Tuen Mun East areas, Yuen Long – Tuen Mun Corridor areas, Tin Shui Wai and Yuen Long Town in NWNT with a total population of about 700 000 use fresh water for flushing. To save precious fresh water, we propose to implement a salt water flushing supply system to serve these areas. Upon completion of the proposed works mentioned in paragraph 3 above, we estimate that about 66 800 cubic metres of fresh water will be saved per day in NWNT, representing about 81% of the target quantity of fresh water to be saved through conversion to salt water flushing in the TWM strategy.

7. The Lok On Pai SWPS will extract salt water from the sea for supply to the Tuen Mun East areas, Yuen Long – Tuen Mun Corridor areas, Tin Shui Wai and Yuen Long Town. Salt water will be pumped by the Lok On Pai SWPS for distribution direct to the Tuen Mun East areas. For the supply to Yuen Long – Tuen Mun Corridor areas, Tin Shui Wai and Yuen Long Town, the salt water will receive an intermediate chlorination boost at Fu Tei to maintain its disinfection level. It will then be delivered to the Tan Kwai Tsuen SWSR for distribution to the consumers.

FINANCIAL IMPLICATIONS

8. We estimate the capital cost of the proposed works to be \$808.4 million in MOD prices (see paragraph 9 below), made up as follows –

	\$ million
(a) Salt water service reservoir	69.2
	/(b)

³ The conversion works for Disneyland is in progress for completion in December 2009. The conversion works for Pok Fu Lam is planned to start in December 2008 for completion in 2011.

		\$ million	
(b)	Salt water pumping station	110.5	
	(i) civil works	61.0	
	(ii) electrical and mechanical works	49.5	
(c)	Upgrading of intermediate booster chlorination plant	2.1	
(d)	Mainlaying	443.8	
	(i) 11.5 km with diameter ranging from 600 mm to 1000 mm	212.3	
	(ii) 8.6 km with diameter ranging from 200 mm to 450 mm	81.1	
	(iii) 35.3 km with diameter of 150 mm or below	150.4	
(e)	Greening works	0.6	
(f)	Environmental mitigation measures	6.4	
(g)	Contingencies	62.0	
	Sub-total	694.6	(in September 2008 prices)
(h)	Provision for price adjustment	113.8	
	Total	808.4	(in MOD prices)

9. Subject to approval, we will phase the expenditure as follows –

Year	\$ million (Sep 2008)	Price Adjustment Factor	\$ million (MOD)
2009 – 2010	28.0	1.04000	29.1
2010 – 2011	110.7	1.08160	119.7
2011 – 2012	174.7	1.12486	196.5
2012 – 2013	151.8	1.16986	177.6
2013 – 2014	124.8	1.21665	151.8
2014 – 2015	78.4	1.26532	99.2
2015 – 2016	26.2	1.31593	34.5
	694.6		808.4

10. We have derived the MOD estimates on the basis of the Government's latest forecast of trend rate of change in the prices of public sector building and construction output for the period 2009 to 2016. We will implement the mainlaying works under a re-measurement contract because the quantities of works are subject to variation to suit the actual underground conditions.

11. We estimate the annual recurrent expenditure arising from this project to be about \$18.6 million.

12. The proposed works by itself would lead to an increase in production cost of water by 0.88% in real terms by 2015⁴.

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⁴ The increase in production cost of water is calculated at the present price level and on the assumption that the water demand remains static during the period from 2009 to 2015.

PUBLIC CONSULTATION

13. We gazetted the proposed works for a section of salt water main of diameter 1 000 mm across the So Kwun Tan Nullah and a sea water intake culvert of the SWPS at Lok On Pai under the Foreshore and Seabed (Reclamations) Ordinance on 11 May 2007 and 9 May 2008 respectively. There was no objection received in both cases. The proposed works were authorized on 3 August 2007 and 14 October 2008 respectively.

14. We consulted the Environment, Hygiene and District Development Committee (EHDDC) of Tuen Mun District Council (TMDC) on 21 September 2007. The Committee commented on the aesthetics and possible noise impact in respect of the proposed pumping station, and the possible traffic and environmental implications in respect of the proposed mainlaying work at Tsing Fat Street. In response, we have engaged an architect and a landscape architect to improve the aesthetics of the pumping station, and will follow up the details with the local residents. We have also arranged site visits to a similar SWPS at Hung Hom for members of TMDC and representatives of the local residents to enable them to understand the operation of and the noise mitigation measures adopted in the SWPS. As regards the concern about the proposed mainlaying works at Tsing Fat Street, we will adopt trenchless technique for laying of the salt water main. In addition, we have also set up an inter-departmental Joint Liaison Group to co-ordinate the mainlaying works to minimise traffic and environmental impacts. The EHDDC of TMDC subsequently discussed the foregoing actions on 28 March 2008 and 19 September 2008 and supported the proposed works.

15. We consulted the Town Planning and Development Committee of Yuen Long District Council on 23 July 2008. Members supported the proposed works.

16. A member of TMDC together with some local residents have written to the Complaints Division of the Legislative Council to object to the location of the proposed SWPS at Lok On Pai. A case conference was conducted by the Complaints Division on 17 July 2008. We explained the measures as described in paragraph 14 above at the case conference and received no adverse comment on the proposed salt water supply scheme.

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17. We circulated to the Legislative Council Panel on Development an information paper on the proposed works on 18 November 2008. Members raised no objection to the proposal.

ENVIRONMENTAL IMPLICATIONS

18. The project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We completed the Preliminary Environmental Review (PER) for the project in September 2008. The PER concluded that the proposed works would not have any long-term environmental impacts. We will incorporate the implementation of standard pollution measures to mitigate short-term construction impacts in the works contracts.

19. For short-term impacts during construction, we will control noise, dust and site run-off within established standards and guidelines through the implementation of mitigation measures, such as the use of temporary noise barriers and silenced construction plant to reduce noise generation and water-spraying to reduce emission of fugitive dust. We will incorporate a clause into the works contracts to require the contractors to carry out environmental mitigation measures as recommended in the PER to control pollution and disposal of contaminated soil in accordance with the relevant regulations during construction. We have included about \$6.4 million (in September 2008 prices) in the project estimate for the implementation of these mitigation measures.

20. We have considered the alignments of the mainlaying, the layout and foundation level of the proposed Lok On Pai SWPS and Tan Kwai Tsuen SWSR in the planning and design stages to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil) 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, as well as the use of non-timber formwork to further minimise the generation of construction waste.

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

21. We will also 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 construction waste and non-inert construction waste to public fill reception facilities and landfills respectively through a trip-ticket system.

22. We estimate that the project will generate in total about 198 200 tonnes of construction waste. Of these, we will reuse about 103 040 tonnes (52.0%) of inert construction waste on site and deliver 92 670 tonnes (46.8%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, we will dispose of 2 490 tonnes (1.2%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be \$2.8 million for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne⁶ at landfills).

TRAFFIC IMPLICATIONS

23. To minimize possible disruption to traffic during construction, we have completed a traffic impact assessment (TIA) for the proposed works. The TIA has concluded that the proposed works would not cause any significant traffic impact. During construction, we will maintain smooth traffic flow through implementing temporary traffic management measures and will display notice boards on site to explain the reasons of temporary traffic arrangements and indicate the expected completion dates of the concerned sections of works. In addition, we will set up telephone hotlines for public enquiries or complaints. We will carry out construction works in busy road sections during non-peak hours. At busy road junctions or where crossing the Light Rail routes is unavoidable, we will employ trenchless method as far as practicable.

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⁶ This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m³), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

24. We will establish a Traffic Management Liaison Group (TMLG) under the works contracts to discuss, scrutinize and agree on the proposed temporary traffic management measures. We will invite representatives from Transport Department, Hong Kong Police Force, Highways Department, the relevant District Offices and public transport operators to attend the TMLG before implementing the works. The TMLG will take into account all relevant factors such as site restrictions, existing/future traffic conditions, pedestrian safety, access to buildings/shop fronts, and provision of emergency vehicle access in considering the temporary traffic arrangements.

HERITAGE IMPLICATIONS

25. The proposed works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, site of archaeological interest and Government historic sites identified by the Antiquities and Monument Office.

LAND ACQUISITION

26. The proposed works does not require any land resumption.

BACKGROUND INFORMATION

27. **45WS** was originally included in Category B in October 2004 for provision of a salt water supply system to serve Tuen Mun East areas and Tin Shui Wai. In July 2007, Finance Committee approved the upgrading of part of **45WS** to Category A as **49WS** entitled “Salt water supply to Northwest New Territories – stage 1” at an estimated cost of \$188.0 million in MOD prices. The scope of **49WS** comprises –

- (a) laying of approximately 8.4 km of salt water mains of diameter 1 000 mm along Castle Peak Road from Tsing Fat Street, Lok On Pai to Fu Tei, Tuen Mun; and
- (b) construction of an intermediate booster chlorination plant at Tuen Mun water treatment works.

The works of **49WS** commenced in February 2008 for completion in December 2010.

28. The original scope of the remaining part of **45WS** comprises the construction of a SWPS at Lok On Pai, a SWSR at Tan Kwai Tsuen and laying of approximately 8.4 km of salt water mains between Tuen Mun water treatment works at Fu Tei and Tin Shui Wai.

29. We extended the scope of the remaining part of **45WS** in September 2008 to cover the works of **48WS** – “Salt Water Supply to Yuen Long”, which was included in Category B in February 2006 for provision of a salt water supply system for Yuen Long Town and the Yuen Long – Tuen Mun Corridor areas. The extension of scope is for the advancement of the implementation of the works of **48WS** in conjunction with those under **45WS**. The extended scope of **45WS** is detailed in paragraph 3 above.

30. We have completed the detailed design of the proposed works to be upgraded to Category A using in-house resources.

31. The proposed works will not involve removal of any tree.

32. We will implement greening measures as part of the project. Photomontages showing the proposed greening measures for the proposed SWSR and the proposed SWPS are at Enclosure 2.

33. We estimate that the proposed works will create about 366 jobs (317 for labourers and another 49 for professional/technical staff) providing a total employment of 14 668 man-months.

Development Bureau
November 2008

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元朗市區
YUEN LONG TOWN

擬建丹桂村海水配水庫
PROPOSED TAN KWAI TSUEN SALT WATER
SERVICE RESERVOIR

擬建樂安排海水抽水站
PROPOSED LOK ON PAI SALT WATER
PUMPING STATION

擬提升中途加氯站容量
PROPOSED UPRATING OF INTERMEDIATE
BOOSTER CHLORINATION PLANT

天水圍
TIN SHUI WAI

橋頭圍
KIU TAU WAI

丹桂村
TAN KWAI TSUEN

青山公路
CASTLE PEAK ROAD

小欖
SIU LAM

青發街
TSING FAT STREET

掃管笏
SO KWUN WAT

樂安排
LOK ON PAI

石埗村
SHEK PO TSUEN

鐘屋村
CHUNG UK
TSUEN

泥圍
NAI WAI

洪水橋
HUNG SHUI KIU

藍地
LAM TEI

虎地
FU TEI

新墟
SAN HUI

三聖墟
SAM SHING HUI

青山公路
CASTLE PEAK ROAD

SCALE 比例尺 1 : 50 000

圖例 LEGEND :

-  擬敷設的海水管道
PROPOSED SALT WATER MAINS
-  1000
水管直徑(毫米)
DIAMETER OF WATER MAINS
(MILLIMETRES)
-  在49WS敷設的海水管道
SALT WATER MAINS TO BE
CONSTRUCTED UNDER 49WS
-  海水供應範圍
SALT WATER SUPPLY ZONE
-  接駁配水網絡
CONNECTIONS TO LOCAL
DISTRIBUTION NETWORKS

核准 APPROVED

總工程師/設計 CE / DES

13 / 11 / 2008

(甲級工程)
(CAT 'A' Submission)

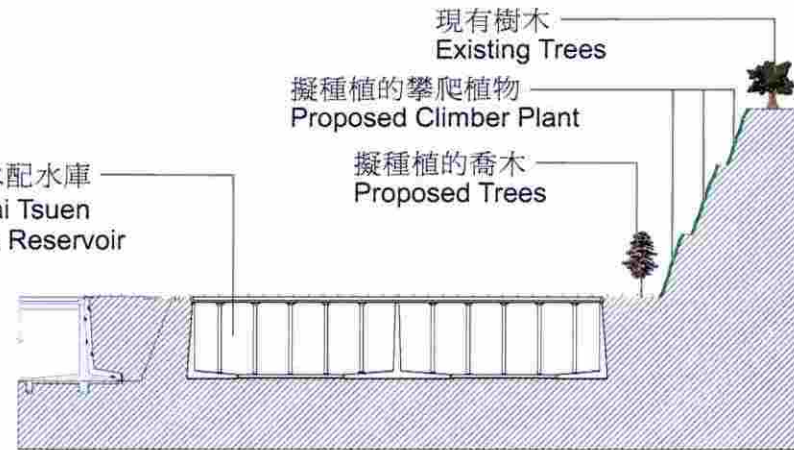
工務計劃項目 45WS 號 - 新界西北區海水供水計劃 - 餘下工程
P.W.P. Item No. 45WS - Salt water supply for Northwest New Territories - remaining works

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WATER SUPPLIES DEPT.

草圖編號 SK 62008 / 086 / 001
SKETCH NO.



平面圖
PLAN



剖面圖
SECTION



立視圖
ELEVATION

核准 APPROVED

總工程師/設計 CE / DES

13 / 11 / 2008

(甲級工程)
(CAT 'A' Submission)

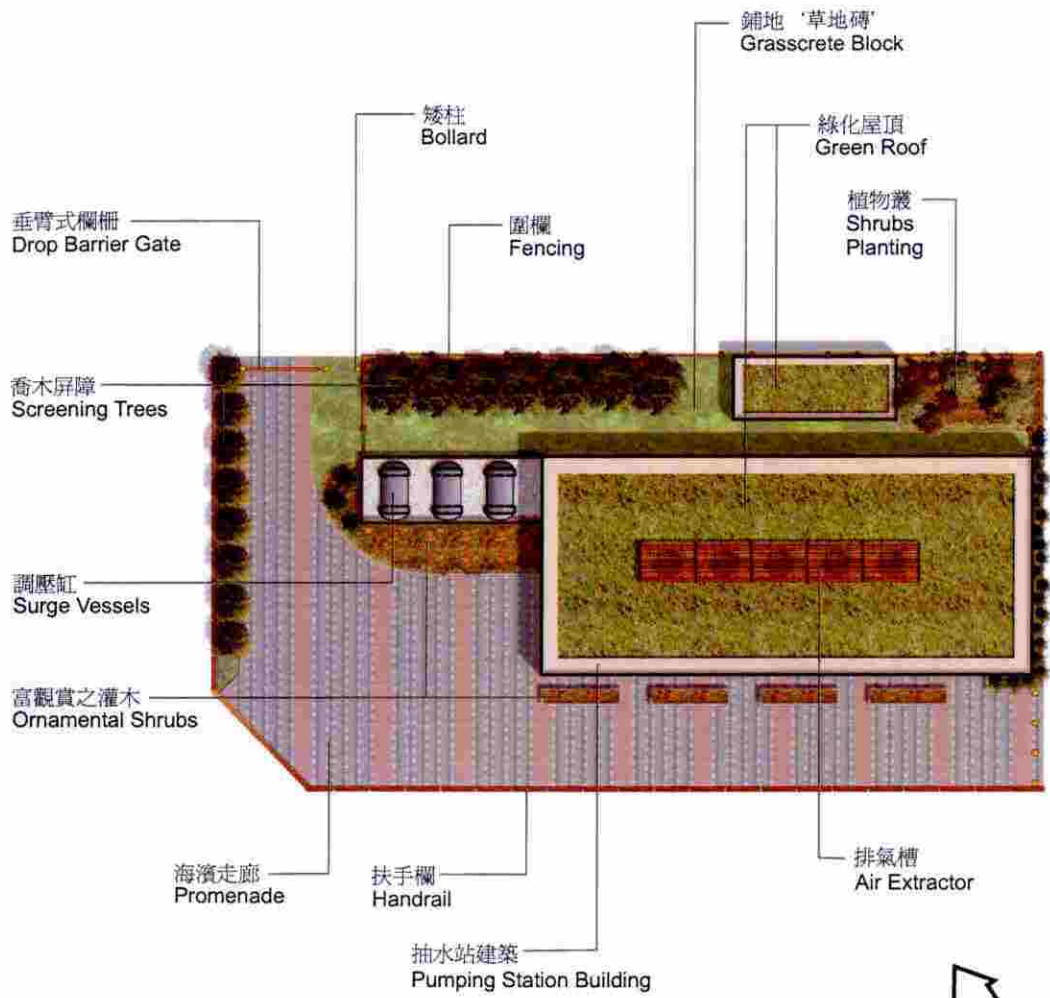
工務計劃項目 45WS 號 - 新界西北區海水供水計劃 - 餘下工程
P.W.P. Item No. 45WS - Salt water supply for Northwest New Territories - remaining works

在丹桂村海水配水庫之綠化措施
Greening Measures at Tan Kwai Tsuen Salt Water Service Reservoir

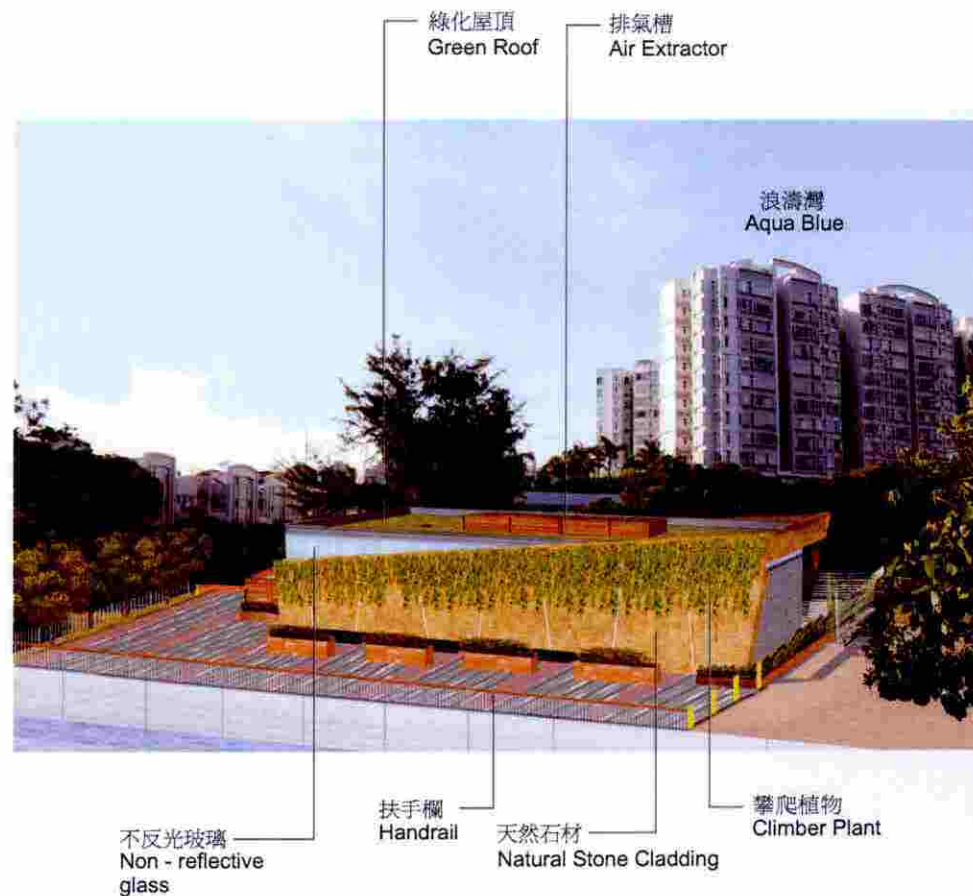


水務署
WATER SUPPLIES DEPT.

草圖編號
SKETCH NO. SK 62008 / 086 / 002



平面圖
PLAN



透視圖
PERSPECTIVE VIEW


核准 APPROVED

 總工程師/設計 CE / DES

13 / 11 / 2008

(甲級工程)
(CAT 'A' Submission)

工務計劃項目 45WS 號 - 新界西北區海水供水計劃 - 餘下工程
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 在樂安排海水抽水站之綠化措施
 Greening Measures at Lok On Pai Salt Water Pumping Station

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草圖編號 SK 62008 / 086 / 003
 SKETCH NO.