

**For information  
on 21 July 2010**

**Legislative Council  
Panel on Environmental Affairs**

**District Cooling System at the Kai Tak Development**

**Introduction**

This paper summarizes the Administration's proposal as discussed at the Panel meeting on 28 June 2010 to change the procurement strategy of the District Cooling System (DCS) at the Kai Tak Development (KTD), and provides further information in response to Members' views for reference.

**Background**

2. On 5 June 2009, the Finance Committee (FC) approved the DCS at KTD at an estimated cost of \$1,671 million in money of-the-day prices.

**Review of Original Procurement Strategy**

3. Upon funding approval by FC, we initiated the tendering procedures in 2009. The returned tender prices of both the project costs and the operation costs far exceed the original estimates. Having critically assessed the tender returns, we consider that the tenderers might have included a very high risk premium in the tender price. Another contributing factor is the higher than originally estimated prices for meeting design development and construction requirements in interfacing works between the DCS and other underground utility facilities as well as reinforcement works to allow room for future developments on the ground level.

4. We consider that the setting up of a cooling system in KTD serving the whole district is in line with our environmental protection and low-carbon policy and should be taken forward. In view of the tender outcome, we have reviewed the original procurement strategy. Given the scale of KTD, there are bound to be adjustments not only in timing but also the design of various projects. As such, we consider it important to revise the original procurement arrangements so as to build in flexibility

to meet with future adjustments in the development of individual projects.

5. Specifically, we propose to adjust the procurement strategy in the following manner –

- (a) reducing the risk premium relating to the extended project period and the price adjustment in the contract which might be considered as inadequate; and
- (b) allowing more flexibility for adjusting the construction schedule to cater for the progress and changes in the development schedule of KTD.

### **Alternative Procurement Strategy**

6. The latest development programme of KTD is broadly grouped into three packages with reference to their scheduled completion dates, as follows –

- (a) Package 1 – scheduled for completion in 2013, including mainly the cruise terminal (CT) and non-domestic areas of a public housing estate;
- (b) Packages 2 and 3 – scheduled for completion in 2016 and thereafter, including the Tourism Node, hotels, private commercial and residential developments, etc.

7. In the light of the development programmes, we propose to commence with the overall design of the DCS to ensure the integrity of the system, but to implement the DCS with separate works contracts to better cater for progress of major development and infrastructural projects at KTD, as follows –

- (a) Phase I - to proceed urgently with a works contract to provide for part of the pipe laying works for certain Package 1 users in the North Apron. This seeks to match the ongoing roadwork construction programme in North Apron and avoid subsequent re-opening of newly completed road surface for installing DCS pipes at a later stage;

- (b) Phase II - to proceed in parallel with Phase I, covering –
- (i) the overall detailed construction design of the works project of the whole DCS of KTD, to be developed based on the scheme design by the Government;
  - (ii) the construction of building and engineering work for the core, underground civil works components of the whole DCS, namely a northern chiller plant room, a southern chiller plant room and a seawater pumphouse;
  - (iii) laying of chilled water distribution pipes not yet covered in Phase I, to serve Package 1 users;
  - (iv) electrical and mechanical (E&M) equipment (e.g. pumps and chiller plants) for meeting the cooling demand of developments arising from Package 1 users;
  - (v) the operation of DCS up to 2018/19 with an option of extending the operation period to end 2026/27. The Administration may appoint the same or different contractors for the two operation periods; and
- (c) Phase III – to procure in due course works contracts for the installation of additional E&M equipment and laying of chilled water distribution pipes to serve Packages 2 and 3 users when their development programmes are firmed up at a later date. We will take into account progress in the development programme and the tender outcome of Phase III, report to this Panel and seek approval from the PWSC and FC for taking forward the project.

8. We consider the revised phasing approach in procuring the DCS development and operation will provide fairer and more reasonable costs, and will also better tie in with the development plan of KTD. The actual project estimates will be subject to the outcome of tendering. An outline of the proposed scope of work is set out at **Annex A**, which is the same as the scope covered in the submission to the PWSC (vide PWSC(2009-2010)24) in May 2009. A layout plan on the physical

**A**

**B** coverage of the three Phases of works arrangements is at **Annex B**.

### **“Design, build and operate” model**

9. At the meeting last month, some Members remarked that the DBO model may, in the absence of a preliminary design, provide bidders with flexibility in design that would raise the tender price.

10. In fact, we have already prepared the scheme design of the DCS, covering key components of the system including the location of the northern and southern chiller plants and the seawater pumphouse, as well as the alignments of major pipelines. The contractor would mainly be responsible for the required detailed design for the construction work based on the scheme design by the Administration.

11. The contractor, being responsible for the detailed design (as mentioned above), building and operation, would enjoy a greater flexibility in revising the design during the construction stage in view of any change in circumstances. Moreover, as the contractor is responsible for both building and operation, the DBO model would prevent the constructor from shifting certain costs to the operator in order to reduce construction cost.

### **Financial Viability**

12. According to our latest review, taking into account the estimated increase in capital and operating cost and assuming that the tariff may be adjusted annually in the same pace with the price level changes of recurrent expenditure, DCS would stand a chance of breaking even within its service life (30 years) if it could attain an overall subscription rate of 58%. All public projects in KTD are mandated to subscribe to DCS service. These projects will account for up to 35% of the total air-conditioned floor area in KTD. In addition, it requires subscription from about 35% of the air-conditioned floor area of private developments in KTD to reach the overall subscription rate of 58%.

13. As for the tariff of the DCS, we have pledged to the Legislative Council that the tariff would be set at a competitive level comparable to the charge of individual water-cooled air-conditioning systems using cooling towers, which is one of the most cost-effective air-conditioning systems available in the market.

14. To maintain the competitiveness of the DCS, its tariff will be set at a level comparable to the charge of water-cooled air-conditioning systems despite any increase in the construction and operating costs. We will introduce legislation for the Government to charge tariff for the DCS services. Members could monitor the tariff level through the legislation.

15. The tariff aside, we believe that the DCS system would be very competitive as compared to alternative air-conditioning systems. From the perspective of individual user, the DCS would bring about the following benefits -

- (a) reduction in upfront capital cost for installing chiller plants at their buildings, estimated to be about 5 – 10% of the total building cost;
- (b) user buildings do not need to install chillers and the associated electrical equipment, thus allowing more flexible building designs;
- (c) the DCS is more adaptable than individual air-conditioning system to the varying demand for air-conditioning; and
- (d) the service quality and reliability will be overseen by the Electrical and Mechanical Services Department.

16. Taking the environment of KTD as a whole, as there is no need to install in the buildings subscribing to DCS heat rejection equipment and chillers of air-conditioning plants, noise and vibration level arising from the operation of such equipment would be substantially mitigated.

### **Requiring all non-domestic projects in the KTD to subscribe to the DCS service**

17. Members suggested that all private non-domestic projects in the KTD should be obliged to subscribe to the DCS service, in order to increase the subscription rate. While most overseas DCSes allow voluntary subscription by private projects and the responses are generally very positive, for environmental protection and energy efficiency reasons and to enhance the cost effectiveness of the infrastructure, we go along Members' view in principle. We are actively exploring how best to implement the requirement, including the appropriate avenue (e.g. through land lease conditions), means of enforcement (i.e. to ensure users

would not switch to individual air-conditioning system in future), and sanctions against any breach of relevant conditions.

18. The Administration estimated that if all air-conditioned floor area of private non-domestic projects in the KTD uses the DCS service, the DCS would stand a chance of breaking even within 21 years.

## **Way Forward**

19. The planning vision of KTD is to create a green web for sustainable development. Some projects in KTD have already commenced, including the CT and shopping arcade of the public housing estate. They have been designed on the basis that DCS will be available to provide air-conditioning services. They are also the first users of cooling services in KTD. We need to urgently proceed with relevant works in order to meet with the development schedules of various projects in KTD.

20. Moreover, the pipe laying works of Phase I is to tie in with the ongoing roadwork construction programme in North Apron. Any delay may result in subsequent delay in the roadwork construction programme or re-opening of the newly completed road surface.

21. We plan to implement the DCS project by phases and to invite tenders for the works under Phases I and II as soon as possible, so as to ensure that the DCS would be able to meet the cooling load of various developments in KTD in a timely manner.

22. Upon completion of the tender for Phases I and II, if the returned tender prices as well as the estimated contract sum for Phase III are expected to exceed the approved project estimate, we will report to this Panel on the tender returns and seek PWSC/ FC's approval for implementing Phases I and II before awarding the respective contracts. Upon completion of the tender for Phase III, as mentioned in paragraph 7(c), we will take into account progress in the development programme and the tender outcome of Phase III, report to this Panel and seek approval from the PWSC and FC for taking forward the project.

**Environment Bureau**  
**July 2010**

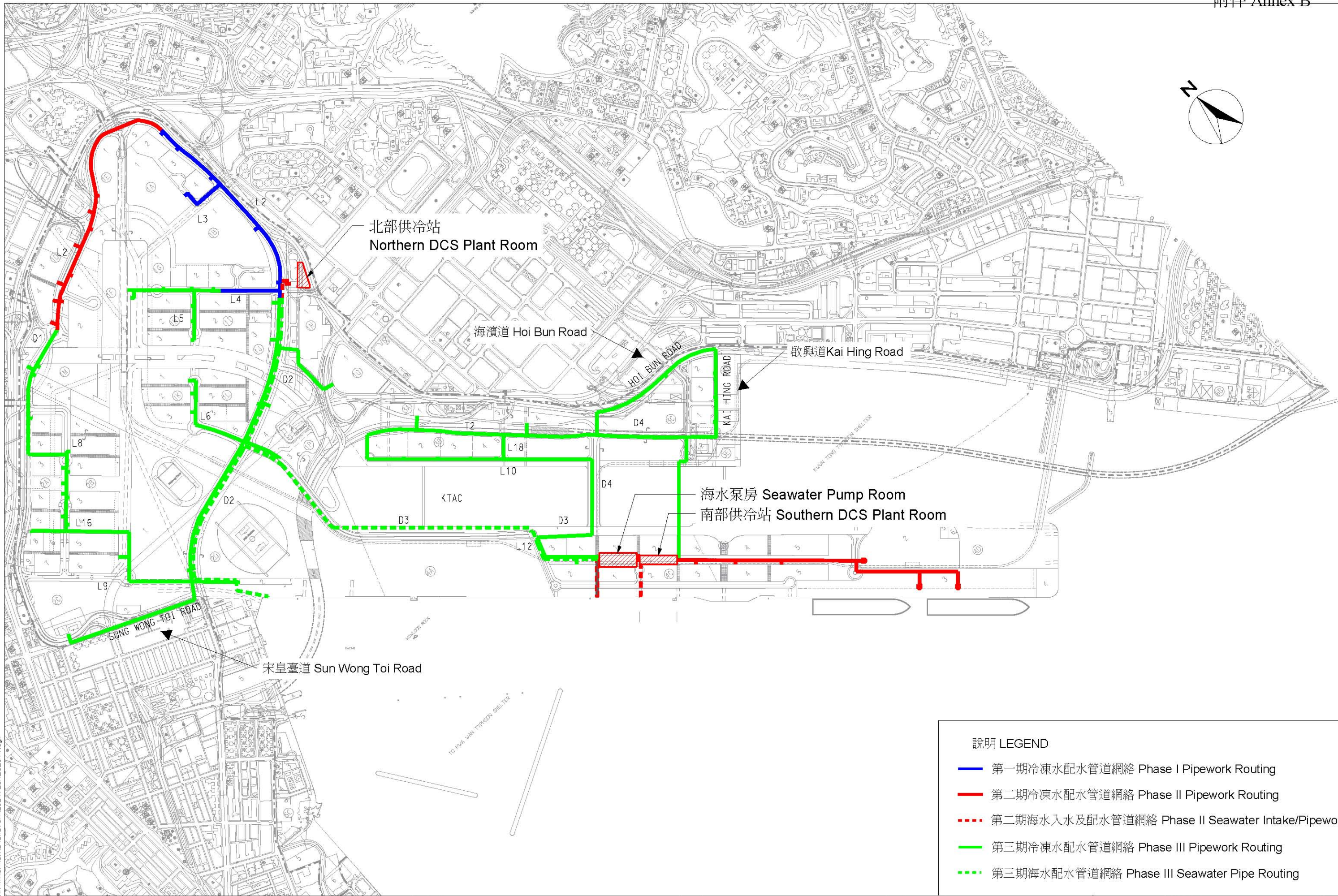
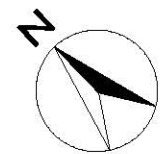
**Alternative Procurement Strategy  
Scope of Works under Various Phases**

<b>Phases</b>	<b>Period</b>	<b>Scope of Works</b>	<b>Operation Service</b>
<b>Phase I –</b> Works contract for the pipe laying work for part of KTD Package 1	2010/11 – 2012/13	<ul style="list-style-type: none"> <li>• Pipe laying from northern chiller plant room for provision of chilled water to public housing estate project etc. to meet the roadwork programme in the North Apron</li> </ul>	
<b>Phase II –</b> DCS core services under DBO arrangement	2011/12 – 2018/19 (8 years)  (with an option for extending the operation period for 8 years up to end 2026/27)	<ul style="list-style-type: none"> <li>• Design for the whole DCS</li> <li>• Building and engineering works, the northern chiller plant room , southern underground chiller plant room and the seawater pumphouse</li> <li>• Laying of chilled water distribution pipes not covered in Phase I for Package 1 users</li> <li>• E&amp;M equipment for KTD Package 1 users</li> </ul>	<ul style="list-style-type: none"> <li>• Operation of DCS up to 2018/19, and possibly up to 2026/27 (for users of all package) assuming extension of operation contract</li> </ul>

<b>Phases</b>	<b>Period</b>	<b>Scope of Works</b>	<b>Operation Service</b>
<b>Phase III –</b> E&M installation and pipe laying for KTD Packages 2 and 3 users	2013/14 – 2020/21 (Note)	<ul style="list-style-type: none"> <li>• Laying works of chilled water distribution pipes for KTD Packages 2 and 3 users</li> <li>• Provision of E&amp;M equipment for KTD Packages 2 and 3 users</li> </ul>	

Note – Commencement date of the works under Phase III is subject to the finalised timetables for projects under KTD Packages 2 and 3.






說明 LEGEND

- 第一期冷凍水配水管道網絡 Phase I Pipework Routing
- 第二期冷凍水配水管道網絡 Phase II Pipework Routing
- 第二期海水入水及配水管道網絡 Phase II Seawater Intake/Pipework
- 第三期冷凍水配水管道網絡 Phase III Pipework Routing
- 第三期海水配水管道網絡 Phase III Seawater Pipe Routing

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Consultants	Project title	Drawing title	Rev	Description	By	Date	<div>機電工程署 Electrical &amp; Mechanical Services Department</div>	Drawing no.	Rev.		
	45CG - 啟德發展計劃 區域供冷系統							25247/SK/C/044	-		
								Drawn CSK	Date 05/10	Checked PHL	Approved SL
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