For discussion on
22 January 2013

Legislative Council Panel on Development

PWP Item No. 45CG - District Cooling System at the Kai Tak Development

PURPOSE

This paper seeks Members' support for the proposal on Phase III (Package A) of **45CG** – District Cooling System (DCS) at the Kai Tak Development (KTD), at an estimated cost of about $1,300 million in money-of-the-day (MOD) prices, to tie in with the latest progress of infrastructure and building developments at Kai Tak.

DCS

2. DCS is a large-scale centralized air-conditioning system. It produces chilled water at the central chiller plants and distributes the chilled water to user buildings for air-conditioning purpose. As compared to traditional air-cooled air-conditioning system and individual water-cooled air-conditioning system, DCS is 35% and 20% more energy-efficient respectively. To promote energy efficiency and conservation, and with the support of the Legislative Council (LegCo), the Government is constructing a first-of-its-kind DCS at KTD – a region which has a planned total of about 1.73 million square meters of non-domestic air-conditioned gross floor areas requiring about 284 megawatt of refrigeration (MW_r) cooling capacity. Funding approval for DCS Phases I and II has been granted on 18 February 2011 and the construction work is now underway.

SCOPE OF PHASE III (PACKAGE A)

3. The DCS Phase III (Package A) project aims to provide chilled water supply from DCS to a number of public developments in KTD, including the Trade and Industry Tower (TI Tower) (to be completed by

end 2014), as well as two primary schools and the Centre of Excellence in Paediatrics (CEP) (to be completed by 2015 and 2017 respectively).

4. The scope of works under Phase III (Package A) comprises –

(a) laying part of chilled water distribution pipe networks at sections of Cheung Yip Street, sections of Road D1, sections of Road L2 and sections of Road D2;

(b) laying of seawater pipe networks under a section of Road D2;

(c) supply and installation of electrical and mechanical equipment at the northern and southern chiller plant buildings and the seawater pumphouse; and

(d) provision of connection facilities (including heat exchangers) at user buildings including the TI Tower, two primary schools, and the CEP.

An outline of the scope of work and a layout of DCS pipe networks under various Phases are set out at **Annex 1** and **Annex 2** respectively.

5. The pipe laying works under Phase III (Package A) will have to match with the programme of ongoing and upcoming road construction including sections of Cheung Yip Street, sections of Road D1, sections of Road L2, sections of Road D2 due to the need for co-ordinating with the installation of other underground utilities and to minimize the need for having diversion of completed or existing utilities services, and / or subsequent re-opening of newly completed road for installing DCS pipes at a later stage.

6. We are planning to entrust the DCS pipe laying works at sections of Road D2 (a portion of works as described in paragraph 4(a)) to the Civil Engineering and Development Department (CEDD) for implementation together with **469CL** "Kai Tak development – infrastructure at north apron area of Kai Tak Airport", of which CEDD plans to seek endorsement and funding approval from the Public Works Subcommittee (PWSC) and the Finance Committee (FC) in 2013-Q2 and

has made a separate submission to this Panel. The proposed entrustment works to CEDD will be funded separately under the capital cost of the proposed works for Phase III (Package A) as described in paragraph 12 below.

7. For details about the locations of the concerned roadwork and DCS pipeworks of Phase III (Package A), please refer to **Annex 2**.

8. In order to meet the ongoing and upcoming programmes on the developments and infrastructure works at Kai Tak, we invited tenders for Phase III (Package A) works (except the works entrusted to CEDD as set out in paragraph 6 above) in December 2012. The construction of Phase III (Package A) works is tentatively scheduled to commence in 2013-Q3 for completion in phases by 2017-Q4 to tie in with the scheduled commissioning of relevant DCS user buildings or facilities.

9. We estimate that the proposed implementation of the DCS Phase III (Package A) works will create about 326 jobs (260 for labourers and another 66 for professional / technical staff), providing a total employment of 15 980 man-months.

JUSTIFICATION

10. Implementation of a DCS in the KTD will bring about significant environmental benefits. Due to better energy efficiency, the maximum annual saving in electricity consumption is estimated to be 85 million kilowatt-hour (kWh), with a corresponding reduction of 59,500 tonnes of carbon dioxide emission per annum. As such, DCS is expected to contribute to air quality improvement and carbon reduction.

11. Apart from energy saving, the DCS would bring about the following benefits for individual users –

(a) reduction in upfront capital cost for installing chiller plants at their buildings estimated at about 5% to 10% of the total building cost;

(b) more flexible building designs for user buildings as they do not need to install their own chillers and the associated electrical equipment;

(c) a more adaptable air-conditioning system to the varying demand as compared to individual air-conditioning systems; and

(d) service quality and reliability to be overseen by the Electrical and Mechanical Services Department.

FINANCIAL IMPLICATIONS

12. We estimate the capital cost of proposed works for Phase III (Package A) to be about $1,300 million in MOD prices. Based on the tender prices to be received, we will seek endorsement and funding approval from PWSC and FC in May and June 2013 respectively.

13. The DCS tariff will be set at a competitive level comparable to the cost of individual water-cooled air-conditioning systems (WACS) using cooling towers, which is one of the most cost-effective air-conditioning systems available in the market. We also intend to recover both the capital and operating costs from users over the project life, which is estimated to be 30 years, as taxpayers should not subsidise such air-conditioning charges.

PUBLIC CONSULTATION

14. We have consulted the following parties which supported the implementation of DCS at the KTD –

(a) the Energy Efficiency and Conservation Sub-committee of the Energy Advisory Committee on 24 October 2008; and

(b) the Environment and Hygiene Committee of the Kwun Tong District Council on 2 December 2008.

15. In addition, we consulted the following parties which had no objection to the DCS at the KTD –

(a) Wong Tai Sin District Council on 18 November 2008;

(b) the Housing and Infrastructure Committee of the Kowloon City District Council on 11 December 2008; and

(c) the Habour-front Enhancement Committee on 15 December 2008.

We obtained funding approval of the FC of the LegCo on the implementation of Phases I and II of the DCS on 18 February 2011.

16. The Town Planning Board (TPB) approved on 13 February 2009 the planning application for the underground DCS, including chiller plant cum seawater pump house and above-ground operational facilities as proposed public utility installation within the "Open Space", "Commercial (4)"; and "Residential (Group C)" zones at the middle section of the ex-Kai Tak Airport runway shown in the then approved Kai Tak Outline Zoning Plan No. S/K22/2. On 31 August 2012, the TPB approved a minor amendment to the approved application regarding the change in gross floor area and disposition of the above-ground facilities of chiller plant which was made to suit the design of the road situated above the related facilities.

ENVIRONMENTAL IMPLICATIONS

17. **45CG** is not a Schedule 2 designated project requiring environmental permit under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499). However, the DCS forms part of the overall KTD which is a Schedule 3 designated project under the EIA Ordinance. The KTD EIA report approved by the Director of Environmental Protection on 4 March 2009 concluded that the DCS would not cause adverse long term environmental impact.

18. For short term construction impacts, we will control noise, dust and site run-off nuisances to within established standards and guidelines,

through the implementation of mitigation measures recommended in the KTD EIA report, such as the use of quiet construction plant, water-spraying and proper pre-treatment of site run-off. We will also carry out site inspections to ensure that these recommended mitigation measures and good site practices are properly followed and implemented.

19. At the planning and design stages, we have considered the alignment, design level and construction method of the proposed works to reduce the generation of construction waste where possible. In addition, the contractor will be required to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimize the disposal of inert construction waste at public fill reception facilities[1]. We will encourage the contractor to maximize the use of recycled / recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

20. 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 construction waste and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

HERITAGE IMPLICATIONS

21. The project will not affect any heritages sites, i.e. all declared monuments, proposed monuments, graded historic sites / buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

---

[1] 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.

LAND ACQUISITION

22. The proposed works do not require any land acquisition.

BACKGROUND INFORMATION

23. With the support of the Panel on Environmental Affairs, the Government sought FC's funding approval for implementing DCS Phases I and II on 18 February 2011 at an approved project estimate (APE) of $1,861.8 million in MOD prices[2]. The construction work for Phases I and II is now underway and is targeted for completion in 2013-Q1 and 2014-Q3 respectively. We also informed PWSC / FC that subject to the progress and development programme of KTD, we would invite tenders for Phase III works in due course. Based on the outcome of such tender exercise, we would then seek approval from PWSC and FC for further increasing the APE to cover Phase III works.

WAY FORWARD

24. With Members' support to our funding proposal for Phase III (Package A) works, and based on the outcome of the tender exercise, we will seek endorsement from the PWSC and funding approval from the FC in May and June 2013 respectively for the DCS Phase III (Package A) works, in tandem with **469CL** "Kai Tak development – infrastructure at north apron area of Kai Tak Airport".

Environment Bureau
January 2013

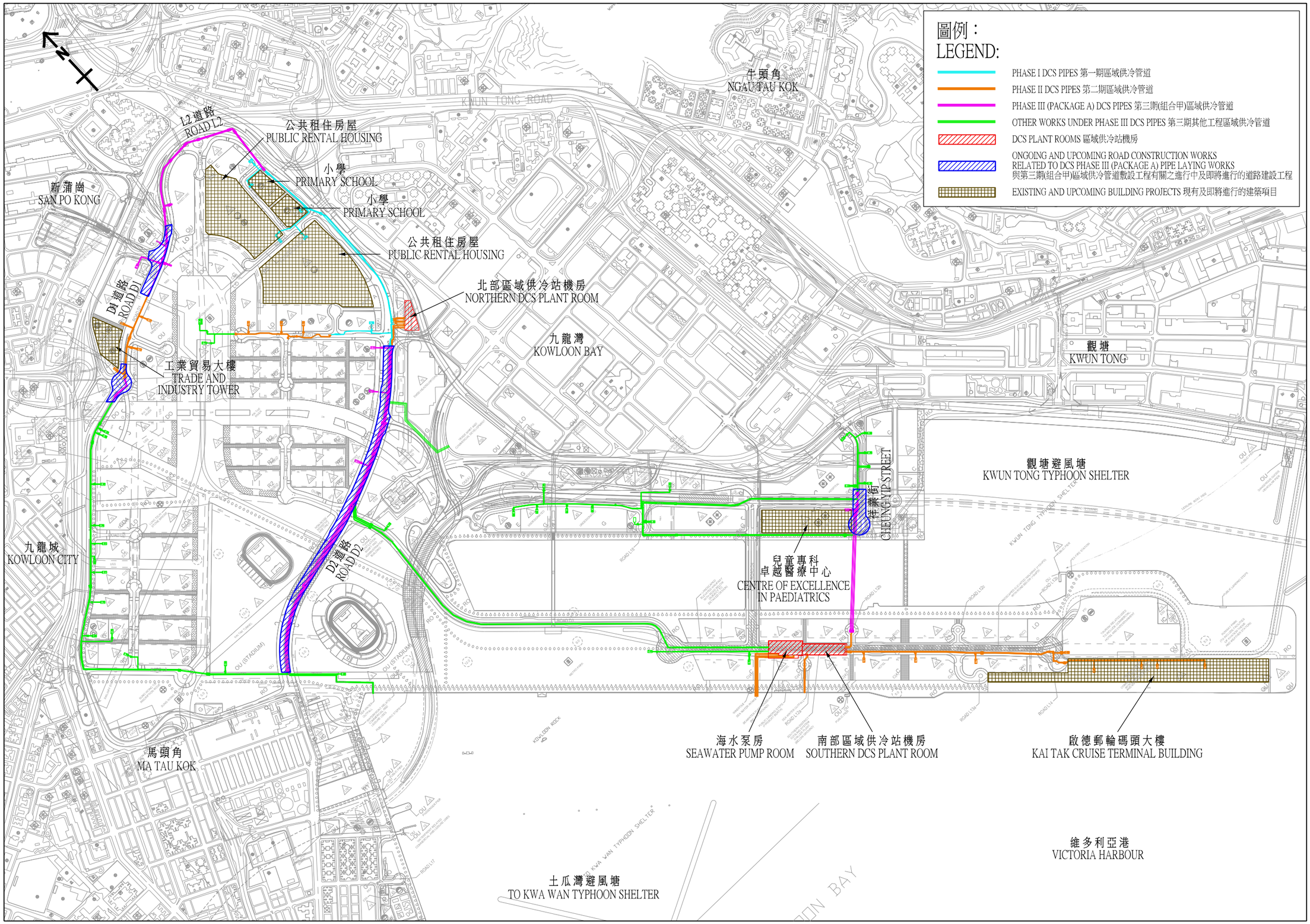
[2] The FC of the LegCo approved the DCS at KTD at an APE of $1,671 million in MOD prices in June 2009. Given that the returned tender price far exceeded the original estimates, and having reviewed the latest development plan of KTD, we adjusted the procurement strategy by implementing the DCS in three phases, i.e. Phases I, II and III, which produced more reasonable cost estimates and could better tie in with the development plan of KTD.

Annex 1

Scope of Works under Various Phases

Phases	Period	Scope of Works
Phase I – Works contract for the pipe laying work for part of KTD Package I	2010/11 – 2012/13	• Pipe laying from northern chiller plant room for provision of chilled water to public rental housing site project to meet the roadwork programme in the North Apron
Phase II – DCS core services under Design, Build and Operate (DBO) arrangement	2010/11 – 2019/20 (with an option for extending the operation period for 8 years)	• Design for the whole DCS • Building and engineering works, the northern chiller plant room, southern underground chiller plant room and the seawater pumphouse to support the operation of the entire DCS • Laying of chilled water distribution pipes not covered in Phase I for Package I users (Kai Tak Cruise Terminal (KTCT) building) • Electrical and Mechanical (E&M) equipment for KTD Package I users • Operation of DCS up to 2019/20, and possibly for 8 more years (for users of all packages) assuming extension of operation contract
Phase III (Package A) – E&M installation and pipe laying for part of KTD Packages II & III	2013/14 – 2017/18	• Pipe laying works to match with the programme of road construction and upcoming building developments including TI Tower and CEP • Provision of E&M equipment for the above building developments and two primary schools

Phases	Period	Scope of Works
Other works under Phase III– E&M installation and pipe laying for remaining KTD Packages II & III	2014/15 – 2021/22	• Pipe laying works for remaining works in KTD to match with the overall development programme • Provision of E&M equipment for the above developments


圖例：
LEGEND:
PHASE I DCS PIPES 第一期區域供冷管道
PHASE II DCS PIPES 第二期區域供冷管道
PHASE III (PACKAGE A) DCS PIPES 第三期(組合甲)區域供冷管道
OTHER WORKS UNDER PHASE III DCS PIPES 第三期其他工程區域供冷管道
DCS PLANT ROOMS 區域供冷站機房
ONGOING AND UPCOMING ROAD CONSTRUCTION WORKS RELATED TO DCS PHASE III (PACKAGE A) PIPE LAYING WORKS 與第三期(組合甲)區域供冷管道敷設工程有關之進行中及即將進行的道路建設工程
EXISTING AND UPCOMING BUILDING PROJECTS 現有及即將進行的建築項目
新蒲崗
SAN PO KONG
L2道路
ROAD L2
公共租住房屋
PUBLIC RENTAL HOUSING
小學
PRIMARY SCHOOL
小學
PRIMARY SCHOOL
公共租住房屋
PUBLIC RENTAL HOUSING
D1道路
ROAD D1
北部區域供冷站機房
NORTHERN DCS PLANT ROOM
工業貿易大樓
TRADE AND INDUSTRY TOWER
九龍灣
KOWLOON BAY
牛頭角
NGAU TAU KOK
KWUN TONG ROAD
觀塘
KWUN TONG
觀塘避風塘
KWUN TONG TYPHOON SHELTER
祥業街
CHEUNG YIP STREET
九龍城
KOWLOON CITY
D2道路
ROAD D2
兒童專科
卓越醫療中心
CENTRE OF EXCELLENCE IN PAEDIATRICS
海水泵房
SEAWATER PUMP ROOM
南部區域供冷站機房
SOUTHERN DCS PLANT ROOM
啟德郵輪碼頭大樓
KAI TAK CRUISE TERMINAL BUILDING
馬頭角
MA TAU KOK
土瓜灣避風塘
TO KWA WAN TYPHOON SHELTER
維多利亞港
VICTORIA HARBOUR