For discussion **PWSC(2015-16)29**
(date to be confirmed)

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 705 – CIVIL ENGINEERING
Civil Engineering – Multi-purpose
45CG – District Cooling System at the Kai Tak development

Members are invited to recommend to Finance Committee to increase the approved project estimate of **45CG** by $606.1 million from $3,145.9 million to $3,752 million in money-of-the-day prices for implementing Phase III (Package B) of the District Cooling System at the Kai Tak development.

PROBLEM

We need to implement Phase III (Package B) (Phase IIIB) of the District Cooling System (DCS) to meet the development schedule of the projects at the Kai Tak development (KTD). The approved project estimate (APE) of **45CG** is not sufficient to cover the costs of works under the project.

PROPOSAL

2. The Director of Electrical and Mechanical Services, with the support of the Secretary for the Environment, proposes to increase the APE of **45CG** by $606.1 million from $3,145.9 million to $3,752 million in money-of-the-day (MOD) prices for implementing Phase IIIB of the project.

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3. Subject to the progress and development programme of KTD, we will consider the need and the programme for the remaining works under Phase III[1] in due course, and seek support from the Public Works Subcommittee (PWSC) and Finance Committee (FC) for further increasing the APE to cover those works.

PROJECT SCOPE AND NATURE

4. The DCS Phase IIIB project aims to provide chilled water supply from DCS to a number of public developments in KTD, including the existing headquarters of the Electrical and Mechanical Services Department (EMSD HQ) and the new developments including To Kwa Wan Station and Kai Tak Station of the Shatin to Central Link (SCL) and the proposed Kowloon East Regional Headquarters and Operational Base cum Ngau Tau Kok Divisional Police Station. The pipe laying works under Phase IIIB will also facilitate the connection of DCS to future developments located close to these pipes.

5. The proposed scope of works under Phase IIIB comprises –

(a) laying part of chilled water distribution pipe networks at a length of about 5 300 metres (m) at sections of future Road L9 and Road L16, sections of Shing Fung Road, sections of Cheung Yip Street and Shing Cheong Road, the waterfront promenade adjacent to the Hong Kong Children's Hospital, and the utility reserve zone for pipework adjacent to the proposed Multi-Purpose Sports Complex (MPSC);

(b) laying part of seawater pipe network at a length of about 1 800 m under sections of Shing Fung Road and the utility reserve zone for pipework adjacent to the proposed MPSC;

(c) supply and installation of electrical and mechanical equipment at the northern chiller plant building;

/(d) …..

[1] The scope of the remaining works under Phase III includes the installation of electrical and mechanical equipment and pipe laying for remaining KTD Packages II and III. Details are set out in Enclosure 1.

(d) provision of connection facilities (including heat exchangers) at user buildings including the EMSD HQ, To Kwa Wan Station and Kai Tak Station of the SCL, and the proposed Kowloon East Regional Headquarters and Operational Base cum Ngau Tau Kok Divisional Police Station; and

(e) consultancy services for pre-construction stage (design) of the remaining Phase III Works.

6. An outline of the proposed scope of works and a layout of DCS pipe networks under various phases are set out at Enclosures 1 and 2 respectively.

7. Subject to FC's funding approval, we plan to commence the construction works for Phase IIIB in the third quarter of 2015 for completion in phases by end 2018.

JUSTIFICATION

8. The DCS is a major infrastructure in support of the sustainable and environmentally-friendly development at Kai Tak. 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 supporting a planned total of about 1.73 million square metres of non-domestic air-conditioned gross floor areas, requiring about 284 megawatt of refrigeration cooling capacity.

9. The DCS is an energy-efficient air-conditioning system as it consumes 35% and 20% less electricity as compared with traditional air-cooled air-conditioning systems and individual water-cooled air-conditioning systems (WACS) using cooling towers respectively. The technology has been widely adopted in other parts of the world, such as Singapore, Europe and the United States.

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 upon completion of the entire DCS project is estimated to be 85 million kilowatt-hour (or about 20%-35% reduction as compared with the original electricity consumption of 243 million kilowatt-hour without the DCS), with a corresponding reduction of 59 500 tonnes of carbon dioxide emission per annum. DCS will contribute to air quality improvement and carbon reduction.

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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) reduced heat island effects in KTD and no noise and vibration arising from the operation of heat rejection equipment and chillers of air-conditioning plants in buildings, as such equipment will no longer be necessary for buildings subscribing to district cooling services. Also, DCS can contribute to air quality improvement and the vision of achieving low carbon economy; and

(d) a more adaptable air-conditioning system to the varying demand as compared with individual air-conditioning systems. Each user building may adjust its contract cooling capacity by putting up a written application to EMSD[2] one year before the proposed date required of the adjusted cooling capacity, without carrying out extensive modification works for the building in question.

Urgency of Phase IIIB

12. We need to urgently proceed with Phase IIIB of the DCS in order to meet the development schedules of the EMSD HQ and the To Kwa Wan Station and Kai Tak Station of the SCL.

13. Moreover, the laying of underground pipes under Phase IIIB will have to tie in with the programmes of ongoing and upcoming road construction, as well as other underground utilities, including sections of Shing Fung Road,

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[2] The user building should put up a written application to EMSD one year before the proposed date required of the adjusted cooling capacity. While it may take some time for EMSD to confirm the cooling demand of the building and revise the contract cooling capacity accordingly, EMSD will make its best efforts to provide the approved consumer of the building the required cooling capacity under normal operating conditions at all times.

sections of Cheung Yip Street and Shing Cheong Road. This can minimise the need for utility diversions, and/or subsequent re-opening of newly completed road for installing DCS pipes at a later stage. To achieve better co-ordination and interface, part of the DCS pipe laying works at sections of Shing Fung Road, sections of Cheung Yip Street and Shing Cheong Road to be funded under Phase IIIB will be entrusted to the Civil Engineering and Development Department (CEDD) for implementation together with the infrastructure works at the southern part of the Kai Tak Airport[3].

14. To tie in with the ongoing and upcoming programmes of the developments and infrastructure works carried out by CEDD, we also propose to commence the design of the remaining Phase III works at part of the Road D3 in 2015-16 in parallel with the design of the road works of project **702CL** "Kai Tak development – remaining infrastructure works for developments at the former runway at South Apron".

Project Estimate up to Current Development

15. The estimated cost of Phases I, II and IIIA of **45CG** is $3,145.9 million in MOD prices. Together with the estimated cost of $606.1 million in MOD prices for Phase IIIB under the project, the estimated project cost of **45CG** up to current development is $3,752 million in MOD prices. The latest estimated cost for the remaining works under Phase III is $1,193.5 million in MOD prices. The estimated project cost up to current development for all phases of **45CG** is therefore $4,945.5 million in MOD prices. This is the same as we last estimated when seeking additional funding for DCS Phase IIIA in May 2013 vide PWSC(2013-14)12.

/**FINANCIAL** …..

[3] CEDD plans to seek funding approval from FC within the current legislative session for upgrading **711CL**, entitled 'Kai Tak development – Infrastructure works for development at the southern part of the former runway'.

FINANCIAL IMPLICATIONS

16. We estimate the capital cost of the proposed works of Phase IIIB under the project to be $606.1 million in MOD prices, broken down as follows –

			$ million	
(a)	DCS electrical and mechanical installations and associated builders' works		55.9	
(b)	Mains laying		354.6	
(c)	Connection facilities at user buildings		8.6	
(d)	Environmental mitigation measures		10.3	
(e)	Consultants' fees for		13.1	
	(i) Contract administration for Phase IIIB	7.5		
	(ii) Pre-construction of the remaining Phase III	5.6		
(f)	Resident site staff (RSS) costs		43.0	
(g)	Contingencies		48.6	
	Sub-total		534.1	(in September 2014 prices)
(h)	Provision for price adjustment		72.0	
	Total		606.1	(in MOD prices)

A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Enclosure 3.

17. Subject to approval, we will phase the expenditure of Phase IIIB works as follows –

Year	$ million (Sept 2014)	Price adjustment factor	$ million (MOD)
2015-16	82.9	1.05725	87.6
2016-17	312.6	1.12069	350.3
2017-18	101.8	1.18793	120.9
2018-19	28.0	1.25920	35.3
2019-20	5.9	1.33475	7.9
2020-21	2.9	1.40483	4.1
	534.1		606.1

18. The latest cash flow for Phase I, II, IIIA and IIIB of the DCS is set out in Enclosure 4. Comparison of the cost breakdown of the APE and the latest project estimate (PE) is at Enclosure 5.

19. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period 2015 to 2021. The contracts will provide adjustments for price fluctuation.

20. The latest estimates on the annual recurrent costs arising from this project are at Enclosure 6. The District Cooling Services Ordinance, which was passed by LegCo in March 2015, provides that subject to the approval of the Financial Secretary, the recurrent costs arising from this project, including the operation and maintenance fees for the contractor and utility charges for operating the DCS plants, may be offset by the DCS tariff charges collected.

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21. When we sought FC's approval for upgrading **45CG** to Category A in June 2009 (PWSC(2009-10)24 refers), we proposed that private non-domestic developments would be connected to DCS on a voluntary basis. For the purpose of increasing the subscription rate and maximising environmental benefit of the project, Members of the LegCo Panel on Environmental Affairs suggested in July 2010 that all private non-domestic projects in the KTD be obliged to subscribe to the district cooling services.

22. The Government has actively explored the feasibility of the above suggestion and considered it feasible to stipulate the requirement to connect to the DCS in the conditions of sale for the sale sites for non-domestic development. In general, Lands Department (LandsD) will check compliance with the positive obligations in the conditions of sale on completion of the new development on the sale site before the issuance of Certificate of Compliance, which would only be issued to the purchaser of the site by LandsD upon satisfactory compliance with the positive obligations. Insofar as the DCS requirement is concerned, LandsD will consult EMSD to ensure that the requirement for connection to DCS has been complied with to the satisfaction of EMSD.

Tariff Rate

23. The DCS tariff has been set at a competitive level comparable to the cost of individual 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 DCS consumers over the project life, which is estimated to be 30 years, as taxpayers should not subsidise such air-conditioning charges.

PUBLIC CONSULTATION

24. We consulted the LegCo Panel on Development on the proposed works under Phase IIIB on 28 April 2015. Members in general supported the submission of the proposal to PWSC for examination.

25. 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.

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26. In addition, we consulted the following parties which had no objection to the implementation of 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 Habourfront Enhancement Committee on 15 December 2008.

27. On 13 February 2009, the Town Planning Board (TPB) approved the planning application for the proposed public utility installation (DCS including chiller plant, seawater pump house and above-ground operational facilities) within the "Open Space", "Commercial (4)", and "Residential (Group C)" zones at the middle section of the ex-Kai Tak Airport runway on the then approved Kai Tak Outline Zoning Plan No. S/K22/2. On 31 August 2012, the Director of Planning, under the delegated authority of the TPB, approved the application for 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 enable a connection of the DCS chiller plant and the seawater pump room, and suit the design of the road situated above the related facilities.

ENVIRONMENTAL IMPLICATIONS

28. The project 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.

29. 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.

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30. 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, 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 minimize the disposal of inert construction waste at public fill reception facilities[4]. 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.

31. 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.

32. We estimate that the project will generate in total 153 420 tonnes of construction waste. Of these, we will reuse 95 990 tonnes (62.6%) of inert construction waste on site and deliver 46 430 tonnes (30.2%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of 11 000 tonnes (7.2%) 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 $2.6 million for this project (based on a unit charge rate of $27 per tonne for disposal at public fill reception facilities and $125 per tonne at landfills).

HERITAGE IMPLICATIONS

33. The project will not affect any heritage sites, 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.

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[4] 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

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

BACKGROUND INFORMATION

35. With the support of the LegCo Panel on Environmental Affairs, the Government sought FC's funding approval for implementing DCS Phases I and II on 18 February 2011 at an APE of $1,861.8 million in MOD prices[5]. The construction works for Phase I and those for Phase II of DCS were completed in the first quarter of 2013 and the third quarter of 2014 respectively.

36. To tie in with the developments and infrastructure works at KTD, the Government sought FC's funding approval for implementing Phase III (Package A) on 21 June 2013 at an APE of $1,284.1 million. The total APE for Phase I, II and IIIA works is $3,145.9 million in MOD prices. On top of the $606.1 million under the current application for Phase IIIB implementation, we plan to seek funding approval from LegCo for the remaining works under Phase III at an estimated cost of $1,193.5 million in MOD prices, in the next two years depending on the development schedule of KTD. We also informed PWSC/FC when seeking additional funding for DCS Phase IIIA in May 2013 vide PWSC(2013-14)12 that subject to the progress and development programme of KTD, we would invite tenders for remaining Phase III works and seek funding approval from PWSC and FC in due course.

37. At the PWSC meeting on 31 October 2001, to enable Members to consider projects relating to the entire KTD (formerly known as South East Kowloon development), some Members suggested and the Administration agreed to include information on the progress, scope and approved project estimates of all the KTD Public Works Programme items in future KTD PWSC submissions. For details, please refer to the Development Bureau's PWSC submission PWSC(2015-16)26 on **711CL** "Kai Tak development – infrastructure works for developments at the southern part of the former runway", which has been submitted to be considered at the same PWSC meeting.

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[5] FC 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.

38. Of the seven trees within the works boundary of Phase IIIB of the project, no important trees[6] are identified. No trees will be affected by the proposed works. All seven trees are to be retained and protected on site. No planting proposals will be incorporated in this project.

39. We estimate that the proposed works for Phase IIIB under the project will create about 190 jobs (150 for labourers and another 40 for professional or technical staff) providing a total employment of 5 500 man-months.

Environment Bureau
June 2015

[6] "Important trees" refers to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –

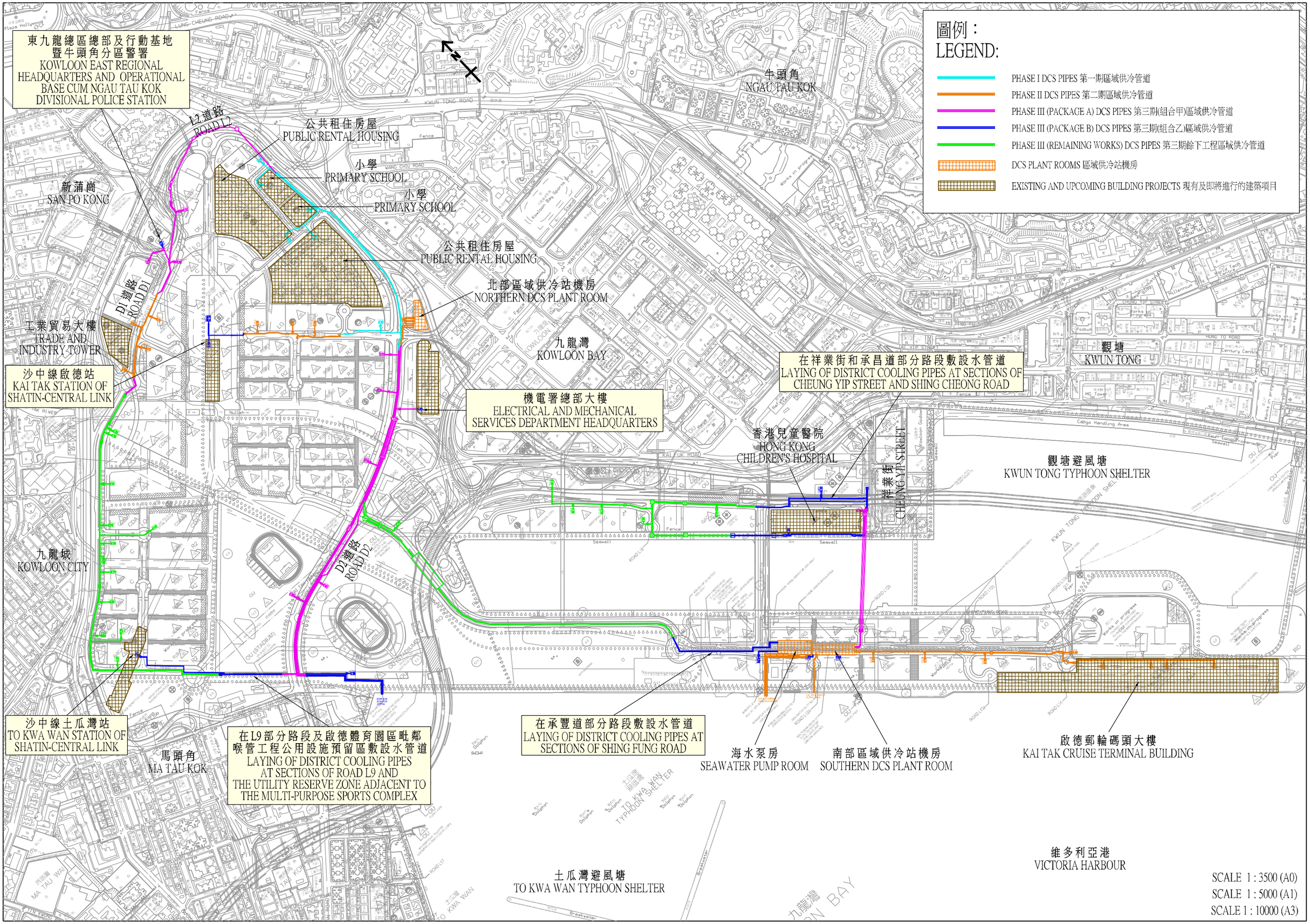
(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, trees as landmark of monastery or heritage monument, and trees in memory of an important person or event;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
(e) trees with trunk diameter equal or exceeding 1.0 metres (m) (measured at 1.3 m above ground level), or with height / canopy spread equal or exceeding 25 m.

Enclosure 1 to PWSC(2015-16)29

District Cooling System (DCS) at the Kai Tak development (KTD)
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 arrangement	2010/11 – 2019/20 (with an option for extending the operation period for eight 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 building); ◆ electrical and mechanical (E&M) equipment for KTD Package I users; and ◆ operation of DCS up to 2019/20, and possibly for eight more years (for users of all packages) assuming extension of operation contract.
Phase III (Package A) – E&M installations and pipe laying for part of KTD Packages II and III	2013/14 – 2017/18	◆ pipe laying works to match with the programme of road construction and upcoming building developments including Trade and Industry Tower and Hong Kong Children's Hospital; and ◆ provision of E&M equipment for the above building developments and two schools.

Phase III (Package B) – E&M installations and pipe laying for part of KTD Packages II and III	2015/16 – 2018/19	◆ pipe laying works to match with the programme of road construction and upcoming building developments including the Electrical and Mechanical Services Department Headquarters, To Kwa Wan Station and Kai Tak Station of the Shatin to Central Link, and the proposed Kowloon East Regional Headquarters and Operational Base cum Ngau Tau Kok Divisional Police Station; ◆ provision of E&M equipment for the above building developments; and ◆ consultancy services for pre-construction stage (design) of the remaining Phase III works to tie in with the ongoing and upcoming programmes on the developments and infrastructure works carried out by CEDD.
Other works under Phase III – E&M installations and pipe laying for remaining KTD Packages II and III	2016/17 – 2021/22	◆ pipe laying works for remaining works in KTD to match with the overall development programme; and ◆ 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
PHASE III (PACKAGE B) DCS PIPES 第三期(組合乙)區域供冷管道
PHASE III (REMAINING WORKS) DCS PIPES 第三期餘下工程區域供冷管道
DCS PLANT ROOMS 區域供冷站機房
EXISTING AND UPCOMING BUILDING PROJECTS 現有及即將進行的建築項目
東九龍總區總部及行動基地暨牛頭角分區警署
KOWLOON EAST REGIONAL HEADQUARTERS AND OPERATIONAL BASE CUM NGAU TAU KOK DIVISIONAL POLICE STATION
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
北部區域供冷站機房 NORTHERN DCS PLANT ROOM
新蒲崗 SAN PO KONG
D1道路 ROAD D1
工業貿易大樓 TRADE AND INDUSTRY TOWER
沙中線啟德站 KAI TAK STATION OF SHATIN-CENTRAL LINK
機電署總部大樓 ELECTRICAL AND MECHANICAL SERVICES DEPARTMENT HEADQUARTERS
九龍灣 KOWLOON BAY
牛頭角 NGAU TAU KOK
在祥業街和承昌道部分路段敷設水管道 LAYING OF DISTRICT COOLING PIPES AT SECTIONS OF CHEUNG YIP STREET AND SHING CHEONG ROAD
觀塘 KWUN TONG
香港兒童醫院 HONG KONG CHILDREN'S HOSPITAL
祥業街 CHEUNG YIP STREET
觀塘避風塘 KWUN TONG TYPHOON SHELTER
九龍城 KOWLOON CITY
D2道路 ROAD D2
沙中線土瓜灣站 TO KWA WAN STATION OF SHATIN-CENTRAL LINK
在L9部分路段及啟德體育園區毗鄰喉管工程公用設施預留區敷設水管道 LAYING OF DISTRICT COOLING PIPES AT SECTIONS OF ROAD L9 AND THE UTILITY RESERVE ZONE ADJACENT TO THE MULTI-PURPOSE SPORTS COMPLEX
馬頭角 MA TAU KOK
在承豐道部分路段敷設水管道 LAYING OF DISTRICT COOLING PIPES AT SECTIONS OF SHING FUNG ROAD
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
土瓜灣避風塘 TO KWA WAN TYPHOON SHELTER
維多利亞港 VICTORIA HARBOUR
SCALE 1 : 3500 (A0)
SCALE 1 : 5000 (A1)
SCALE 1 : 10000 (A3)

Enclosure 3 to PWSC(2015-16)29

45CG – District Cooling System at the Kai Tak development

Breakdown of the estimates for consultants' fees and resident site staff costs for Phase IIIB (in September 2014 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($million)
(a)	Consultants' fees for contract administration for Phase IIIB and pre-construction of the remaining Phase III	Professional	63	38	2.0	9.0
		Technical	84	14	2.0	4.1
(b)	Resident site staff cost (Note 2)	Professional	125	38	1.6	14.3
		Technical	736	14	1.6	28.7
					Total	**56.1**

* MPS = Master Pay Scale

Notes

1. A multiplier of 2.0 is applied to the average MPS salary point to estimate the cost of staff to be employed in the consultants' offices. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of resident site staff supplied by the consultants (as at now, MPS salary point 38 = $71,385 per month, and MPS salary point 14 = $24,380 per month).

2. The actual man-months and actual costs will only be known after the completion of the construction works.

Enclosure 4 to PWSC(2015-16)29

45CG – District Cooling System at the Kai Tak development

Table 1 - Latest cash flow for Phases I, II, IIIA and IIIB

Year	Phases I, II and IIIA	Phase IIIB	Phases I, II, IIIA and IIIB
	Latest PE ($ million MOD prices) (a)	Latest PE ($ million in MOD prices) (b)	Latest PE ($ million in MOD prices) (c) = (a) + (b)
2010 – 2011	14.3	–	14.3
2011 – 2012	435.8	–	435.8
2012 – 2013	876.0	–	876.0
2013 – 2014	566.8	–	566.8
2014 – 2015	488.8	–	488.8
2015 – 2016	398.4	87.6	486.0
2016 – 2017	174.5	350.3	524.8
2017 – 2018	118.5	120.9	239.4
2018 – 2019	42.1	35.3	77.4
2019 – 2020	21.8	7.9	29.7
2020 – 2021	8.9	4.1	13.0
Total	**3,145.9**	**606.1**	**3,752.0**

Table 2 - Latest cash flow and provision for price adjustment for all Phases

Year	PE in PWSC (2013-14)12[#] ($ million in Sept 2012 prices) (a)	Price adjust-ment factors in PWSC (2013-14)12[#] (b)	PE in PWSC (2013-14)12[#] ($ million in MOD prices) (c)	Latest PE ($ million in Sept 2014 prices) (d)	Latest price adjust-ment factors (Sept 2014)[*] (e)	Latest PE ($ million in MOD prices)[^] (f)
2010 – 2011	14.3	1	14.3	14.3[+]	1	14.3[+]
2011 – 2012	435.8	1	435.8	435.8[+]	1	435.8[+]
2012 – 2013	876.0	1	876.0	876.0[+]	1	876.0[+]
2013 – 2014	526.8	1.06225	559.6	566.8[+]	1	566.8[+]
2014 – 2015	473.8	1.12599	533.5	488.8[+]	1	488.8[+]
2015 – 2016	523.5	1.19354	624.8	459.7	1.05725	486.0
2016 – 2017	477.3	1.26516	603.9	660.8	1.12069	740.6
2017 – 2018	394.3	1.34107	528.8	406.4	1.18793	482.8
2018 – 2019	287.4	1.41147	405.7	242.8	1.25920	305.7
2019 – 2020	118.5	1.48205	175.6	145.7	1.33475	194.5
2020 – 2021	81.1	1.55615	126.2	209.4	1.40483	294.2
2021 – 2022	27.0	1.63396	44.1	36.6	1.47507	54.0
2022 – 2023	10.0	1.71565	17.2	3.9	1.54882	6.0
Total	**4,245.8**		**4,945.5**	**4,547.0**		**4,945.5**

[+] Actual expenditure up to March 2015.

[#] As per Enclosure 4 to PWSC(2013-14)12 when we sought PWSC's endorsement of APE increase for Phases I, II and IIIA of **45CG** on 22 May 2013. We estimated at the time that the cost for Phase III would be $1,799.6 million in MOD prices and that the estimated project cost for all phases would be about $4,945.5 million in MOD prices.

[*] Price adjustment factors adopted in September 2014 are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 6% per annum over the period from 2015 to 2019 and 5% per annum over the period from 2020 to 2023.

^ FC approved the implementation of Phases I, II and IIIA on 26 June 2013 at an APE of $3,145.9 million in MOD prices. Taking into account the proposed APE increase for Phase IIIB by $606.1 million in MOD prices and the estimated cost of $1,193.5 million in MOD prices for the remaining works of Phase III, there is no change to the estimated project cost for all phases (viz. $4,945.5 million in MOD prices).

Enclosure 5 to PWSC(2015-16)29

45CG – District Cooling System at the Kai Tak development

Comparison between existing APE for Phases I II and IIIA and the latest project estimate for Phases I, II, IIIA and IIIB

A comparison of the existing APE for Phases I, II and IIIA and the latest project estimate for Phases I, II, IIIA and Phase IIIB is as follows –

		(A) Existing APE for Phases I, II and IIIA	(B) Latest Project Estimate for Phases I, II, IIIA and IIIB	(B) – (A) Difference
			($ million in MOD prices)	
(a)	DCS plants			
	(i) civil works	897.0	897.0	0
	(ii) E&M works	475.2	531.1	55.9
(b)	Mains laying	1,096.9	1,451.5	354.6
(c)	Connection facilities at user buildings	27.3	35.9	8.6
(d)	Environmental mitigation measures	8.8	19.1	10.3
(e)	Consultants' fee for contract administration	17.0	30.1	13.1
(f)	Resident site staff costs	103.8	146.8	43.0
(g)	Contingencies	162.9	211.5	48.6
(h)	Provision for price adjustment	357.0	429.0	72.0
	Total	**3,145.9**	**3,752.0**	**606.1**

As regards item (a)(ii) (DCS plants – E&M works), the increase of $55.9 million is for supply and installation of electrical and mechanical equipment at northern chiller plant buildings for existing Headquarters of EMSD, the To Kwa Wan Station and the Kai Tak Station of the SCL and the proposed Kowloon East Regional Headquarters and Operational Base cum Ngau Tau Kok Divisional Police Station.

2. **As regards item (b) (mains laying)**, the increase of $354.6 million is for laying of chilled water distribution pipe networks at sections of future Road L9 and Road L16, sections of Shing Fung Road, sections of Cheung Yip Street and Shing Cheong Road, the Waterfront Promenade adjacent to the Hong Kong Children's Hospital, and the utility reserve zone for pipework adjacent to the proposed MPSC and laying of seawater pipe networks under sections of Shing Fung Road and the utility reserve zone for pipework adjacent to the MPSC.

3. **As regards item (c) (connection facilities at user buildings)**, the increase of $8.6 million is for supply and installation of connection facilities such as heat exchangers, lead-in pipes and valves and sensors at user buildings of existing Headquarters of EMSD, To Kwa Wan Station and Kai Tak Station of the SCL, and the proposed Kowloon East Regional Headquarters and Operational Base cum Ngau Tau Kok Divisional Police Station.

4. **As regards item (d) (environmental mitigation measures)**, the increase of $10.3 million is for environmental mitigation measures such as water, noise and air pollution control for DCS Phase IIIB works.

5. **As regards item (e) (consultants' fee for contract administration)**, the increase of $13.1 million is for consultants' fee for contract administration for DCS Phase IIIB works and the pre-construction of the remaining Phase III works.

6. **As regards item (f) (resident site staff costs)**, the increase of $43.0 million is for resident site staff for DCS Phase IIIB works.

7. **As regards item (g) (contingencies)**, the increase of $48.6 million is the cost estimation for contingency for DCS Phase IIIB works.

8. **As regards item (h) (provision for price adjustment)**, the increase of $72.0 million is the provision for price adjustment for DCS Phase IIIB works.

Enclosure 6 to PWSC(2015-16)29

45CG – District Cooling System at the Kai Tak development

Estimated recurrent costs (in MOD prices)

Year	Estimated recurrent costs* $ million
2016-2017	73.5
2017-2018	71.3
2018-2019	60.9
2019-2020	40.5

* As provided in the District Cooling Services Ordinance, charges and fees received for the provision of district cooling services may be used to settle the operation and maintenance fees for the DCS operator as well as utility costs for operating the DCS plants. Therefore, the estimated recurrent cost shown in the table above is the shortfall of operating expenses incurred after deducting the charges and fees received for the provision of district cooling services of that particular year. Price adjustment factors adopted for converting charges and fees received and operating expenses incurred in September 2014 prices to MOD prices are based on the assumption of 4.5% increase per annum, from 2016 to 2027. It is estimated that starting from 2020-2021, the charges and fees received would be sufficient to settle all the operation and maintenance fees for the DCS operator as well as utility costs for operating the DCS plants.