For discussion **PWSC(2009-10)76**
on 2 December 2009

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 703 – BUILDINGS
Environmental Hygiene – Burial grounds, columbaria and crematoria
16NB – Reprovisioning of Cape Collinson Crematorium

Members are invited to recommend to Finance Committee the upgrading of **16NB** to Category A at an estimated cost of $696.3 million in money-of-the-day prices for the reprovisioning of Cape Collinson Crematorium.

PROBLEM

The 12 existing cremators at the Cape Collinson Crematorium (CCC) are approaching the end of their serviceable life and due for replacement. There is also a need to enhance cremation service to meet the increasing public demand.

PROPOSAL

2. The Director of Architectural Services, with the support of the Secretary for Food and Health, proposes to upgrade **16NB** to Category A at an estimated cost of $696.3 million in money-of-the-day (MOD) prices for the reprovisioning of CCC.

PROJECT SCOPE AND NATURE

3. The project proposes to demolish the existing crematorium building, and to build ten new cremators and three service halls at the site and adjoining area. The project will be implemented in two phases. The scope of **16NB** comprises –

/(a) …..

(a) Phase 1 (at the existing car park site of the crematorium building) –

(i) construction of four new cremators, together with the necessary ancillary facilities, such as a filtration plant room and a workshop;

(ii) construction of two service halls, each with a clergy room, toilets, a waiting room and a catafalque leading to the cremator plant room;

(iii) provision of an ash store, a pulverization room, and dangerous goods stores;

(iv) provision of two joss paper burners with filtering devices;

(v) provision of electrical and mechanical installations including public address system and closed-circuit television (CCTV) system in the facilities to be built under Phase 1; and

(vi) provision of vehicular access, parking spaces, landscaped garden and general landscaping.

(b) Phase 2 (at the existing site of the crematorium building) –

(i) demolition of the existing crematorium building comprising 12 cremators and three service halls after the satisfactory commissioning of the new cremators under Phase 1;

(ii) construction of six cremators, together with the necessary ancillary facilities, such as a filtration plant room and a workshop;

(iii) construction of one service hall with a clergy room, toilets, a waiting room and a catafalque leading to the cremator plant room;

(iv) provision of office accommodation, a general waiting room, store rooms, toilets, changing rooms, a pantry, mortuary and a refuse storage room;

/(v) .....

(v) provision of one joss paper burner with filtering devices;

(vi) provision of electrical and mechanical installations including public address system and CCTV system in the facilities to be built under Phase 2; and

(vii) provision of parking spaces, landscaped garden, general landscaping and water features.

The site plans of the existing and proposed crematorium are at Enclosures 1 and 2 respectively. A floor plan and a sectional drawing of the proposed crematorium are at Enclosures 3 and 4 respectively. An artist's impression of the proposed development is at Enclosure 5. We plan to start the works of Phase 1 in July 2010 for completion in March 2012. Upon satisfactory commissioning of the new cremators under Phase 1, we will start the works of Phase 2 in April 2012 for completion in December 2014.

JUSTIFICATION

4. With a growing and aging population in Hong Kong, the number of deaths and the corresponding number of cremations have been rising gradually year on year. The number of deaths is projected to increase steadily from 43 700 in 2010 to 52 800 in 2020. The number of cremations will also rise from 39 300 in 2010 to 49 600 in 2020 correspondingly. In view of the increasing demand for cremation service, the Administration has embarked on a reprovisioning and modernisation programme for cremators since 2003. Our objectives are to enhance the efficiency of cremators, improve the control of emissions from cremators to meet the latest environmental standards, and fulfil our performance pledge of arranging a cremation session within the next 15 days from the date of application. To date, we have replaced old cremators at Kwai Chung, Fu Shan and Diamond Hill Crematoria and put into operation a total of 14 new cremators at the above three venues. Works for reprovisioning the Wo Hop Shek Crematorium are underway. We envisage that by its scheduled completion in early 2012, another six new cremators will come into operation. The reprovisioning of the CCC is the last major project at hand.

5. The existing 12 cremators at the CCC were replaced in early years, ten in 1995 and two in 2001. Their design is no longer compatible with modern-day standards in terms of operational efficiency and technical competency.

/Furthermore …..

Furthermore, the cremators are approaching the end of their serviceable life and due for replacement. Upon full reprovisioning of the CCC, the CCC and the other crematoria will together provide a total cremation capacity of 52 800 sessions a year by late 2014. This will sufficiently meet the cremation demand up to the early 2020s.

6. The new cremators in the CCC will be built in accordance with the latest environmental standards, fully meeting the requirements set out in the Guidance Note on the Best Practicable Means for Incinerators (Crematoria) issued by the Environmental Protection Department (EPD). The environmental performance of the new cremators will also be regulated by the Specified Process Licence of the Air Pollution Control Ordinance (Cap. 311). The operation of these new cremators will be fully computerised, adopting advanced technologies. They will be installed with an advanced flue gas filtering system to process and filter out waste gases and particles generated during the combustion process, and will also be fitted with a high temperature secondary combustion chamber to ensure complete combustion during the cremation process. The above design was adopted for the new cremators at our recently commissioned crematoria, such as Diamond Hill Crematorium, and has proven effective in reducing the emission of particles / waste gases and dark smoke as well as meeting the statutory environmental standards. The cremators being developed at the Wo Hop Shek Crematorium will also adopt this technology. The reprovisioned CCC will be equipped with a computer system to record the emissions from the cremators. The system is connected to EPD for comprehensive monitoring to ensure that waste gas emissions are in full compliance with the department's air quality standards.

FINANCIAL IMPLICATIONS

7. We estimate the capital cost of the project to be $696.3 million in MOD prices (please see paragraph 8 below), broken down as follows –

		$ million
(a)	Demolition	19.1
(b)	Site formation and geotechnical works	16.0
(c)	Piling and basement	54.4
(d)	Building	106.4

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			$ million	
(e)	Building services		32.4	
(f)	Drainage		3.4	
(g)	External works		20.4	
(h)	Additional energy conservation measures		5.2	
(i)	Supply and installation of cremators, flue gas filtering system and supporting machinery		286.8	
(j)	Furniture and equipment[1]		3.5	
(k)	Consultants' fees		17.0	
	(i) contract administration	14.0		
	(ii) management of resident site staff	3.0		
(l)	Remuneration of resident site staff		14.0	
(m)	Contingencies		57.5	
	Sub-total		636.1	(in September 2009 prices)
(n)	Provision for price adjustment		60.2	
	Total		696.3	(in MOD prices)

/We …..

[1] Based on the provision of furniture and equipment of existing crematoria and the market price of the items required.

We propose to engage consultants to undertake contract administration and site supervision. A breakdown of the estimates for consultants' fees and resident site staff costs by man-months is at Enclosure 6. The construction floor area (CFA) of the reprovisioned CCC is 6 019 square metres (m^2). The estimated construction unit cost, represented by building and building services costs, is $23,060 per m^2 of CFA in September 2009 prices. We consider the estimated construction unit cost comparable to that of other similar projects built by the Government.

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

Year	$ million (Sept 2009)	Price adjustment factor	$ million (MOD)
2010 – 2011	37.0	1.02000	37.7
2011 – 2012	113.0	1.04040	117.6
2012 – 2013	64.0	1.06121	67.9
2013 – 2014	144.0	1.08243	155.9
2014 – 2015	135.0	1.11220	150.1
2015 – 2016	70.0	1.14557	80.2
2016 – 2017	56.0	1.17993	66.1
2017 – 2018	17.1	1.21533	20.8
	636.1		696.3

9. 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 from 2010 to 2018. We will award the contract on a lump-sum basis because we can clearly define the scope of the works in advance. The contract will provide for price adjustment.

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10. At present, the annual recurrent expenditure for the CCC is $20.5 million. We estimate the annual recurrent expenditure upon completion of the project to be $55.5 million. The increase in recurrent expenditure is mainly due to the increase in number of cremation sessions and change of cremator fuel from diesel fuel oil to the more environment-friendly town gas. The impact of the capital and recurrent costs of this project on the fees and charges of the overall public crematorium services would be taken into account in the relevant fee alignment exercise.

PUBLIC CONSULTATION

11. We consulted the Eastern District Council (EDC) on the proposed project in December 2008. Members generally supported the replacement of the existing crematorium facilities and were of the view that the reprovisioning project should commence as soon as possible so as to meet the rising cremation demand.

12. There were concerns from individual EDC Members and residents regarding the impact on the flow of traffic around the Cape Collinson Crematorium and Columbarium during the grave-sweeping periods. The Traffic Impact Assessment (TIA) completed in late 2006 concluded that additional cremation sessions provided by the reprovisioned crematorium would not have impact on the traffic network around Cape Collinson. In fact, the crematorium will temporarily cease operation on the two days of the Ching Ming and Chung Yeung Festivals, and no additional traffic flow will be generated. Furthermore, we will schedule the reprovisioning works carefully to avoid affecting traffic conditions during these two festivals. In addition, works in and around the crematorium will be carried out to widen and enhance the access links to the adjoining columbarium. We will keep EDC informed of the progress of the reprovisioning works as well as the operational situation of the facilities after the new cremators have been put into operation.

13. We briefed the Legislative Council Panel on Food Safety and Environmental Hygiene in July 2009. The Panel supported the proposal.

ENVIRONMENTAL IMPLICATIONS

14. This is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an Environmental Permit (EP) is required for the construction and operation of the project. The EIA report

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concluded that the environmental impact arising from the project could be controlled to within the criteria under the EIA Ordinance and the Technical Memorandum on EIA Process. The Director of Environmental Protection approved the EIA report for the project after the statutory public inspection process and granted the EP to the Food and Environmental Hygiene Department in June 2009.

15. We shall implement the mitigation measures and the environmental monitoring and audit programme during the construction and operation stages of the project as recommended in the approved EIA report. A summary of the key recommended mitigation measures is at Enclosure 7.

16. During construction, we will control noise, dust and site runoff nuisances to within established standards and guidelines through the implementation of mitigation measures in the relevant contracts. These include the use of silencers, mufflers, acoustic lining or shields and the building of barrier walls for noisy construction activities, frequent cleaning and watering of the site, and the provision of wheel-washing facilities.

17. We have considered measures in the planning and design stages to reduce the generation of construction waste where possible (e.g. using metal site hoardings and signboards so that these materials can be recycled or reused in other projects). In addition, we will require the contractor to reuse inert construction waste on site (e.g. use of excavated materials for filling within the 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 facilities[2]. 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.

18. We will also require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigating 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.

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[2] 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.

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.

19. We estimate that the project will generate in total about 71 150 tonnes of construction waste. Of these, we will reuse about 3 400 tonnes (4.8%) of inert construction waste on site and deliver 63 850 tonnes (89.7%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 3 900 tonnes (5.5%) 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 $2.2 million for this project (based on a unit cost of $27 per tonne for disposal at public fill reception facilities and $125 per tonne[3] at landfills).

ENERGY CONSERVATION MEASURES

20. This project has adopted various forms of energy efficient features, including –

(a) T5 energy efficient fluorescent tubes and compact fluorescent lamps with electronic ballast and lighting control by daylight sensors;

(b) light-emitting diode (LED) type exit signs;

(c) variable refrigerant volume (VRV) air-conditioning system;

(d) heat recovery fresh air pre-conditioners in the air-conditioned spaces for heat energy reclaim of exhaust air;

(e) demand control of fresh air supply with carbon dioxide sensors;

(f) reclaim of waste heat energy from the cremator system for domestic hot water system; and

/(g) …..

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[3] 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 per m^3), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

(g) automatic on/off switching of lighting and ventilation fan inside lifts.

21. For renewable energy technologies, we will adopt photovoltaic system for environmental benefits.

22. For greening features, we will adopt the following green features for environmental and amenity benefits, including –

(a) landscaping at the podium on Level 2, and green roof on Level 3 and Roof Level of the crematorium building; and

(b) vertical greening on the walls of the chimney stacks.

23. For recycled features, we will adopt rainwater recycling system for landscape irrigation with a view to conserving water. We will also adopt artificial wood products made from recycled plastic fibre for louvre openings.

24. The total estimated additional cost for adoption of the energy conservation measures is around $5.2 million (including $1.3 million for energy efficient features), which has been included in the cost estimate of this project. The energy efficient features will achieve 5.9% energy savings in the annual energy consumption with a payback period at about 6.8 years.

HERITAGE IMPLICATIONS

25. This project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interests and Government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

26. The project does not require land acquisition.

/BACKGROUND …..

BACKGROUND INFORMATION

27. We upgraded **16NB** to Category B in May 2006. We engaged consultants to carry out TIA in April 2006, detailed design in September 2007, topographical survey and EIA in October 2007 as well as value management in February 2008. We employed term contractors to carry out ground investigation in November 2007. We also employed a quantity surveying consultant to prepare the tender documents in April 2009. We would charge the total cost of $9.8 million to block allocation **Subhead 3100GX** "Project feasibility studies, minor investigations and consultants' fees for items in Category D of Public Works Programme". The consultants have completed the TIA, detailed design, topographical survey, EIA and value management. The term contractors have completed the ground investigation. The quantity surveying consultant is finalising the tender documents.

28. The proposed construction works will include the removal of 82 trees, comprising six trees to be felled, and the remaining 76 trees to be replanted within the project site. All trees to be removed are not important trees[4]. We will incorporate planting proposals as part of the project, including estimated quantities of 61 trees, 3 200 shrubs, 1 600 groundcovers and 400 m^2 of grassed area.

29. We estimate that the proposed works will create about 220 jobs (195 for labourers and another 25 for professional/technical staff) providing a total employment of 10 000 man-months.

Food and Health Bureau
November 2009

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[4] "Important trees" refer 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, tree 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 metre (m) (measured at 1.3 m above ground level), or with height/canopy spread equal or exceeding 25 m.

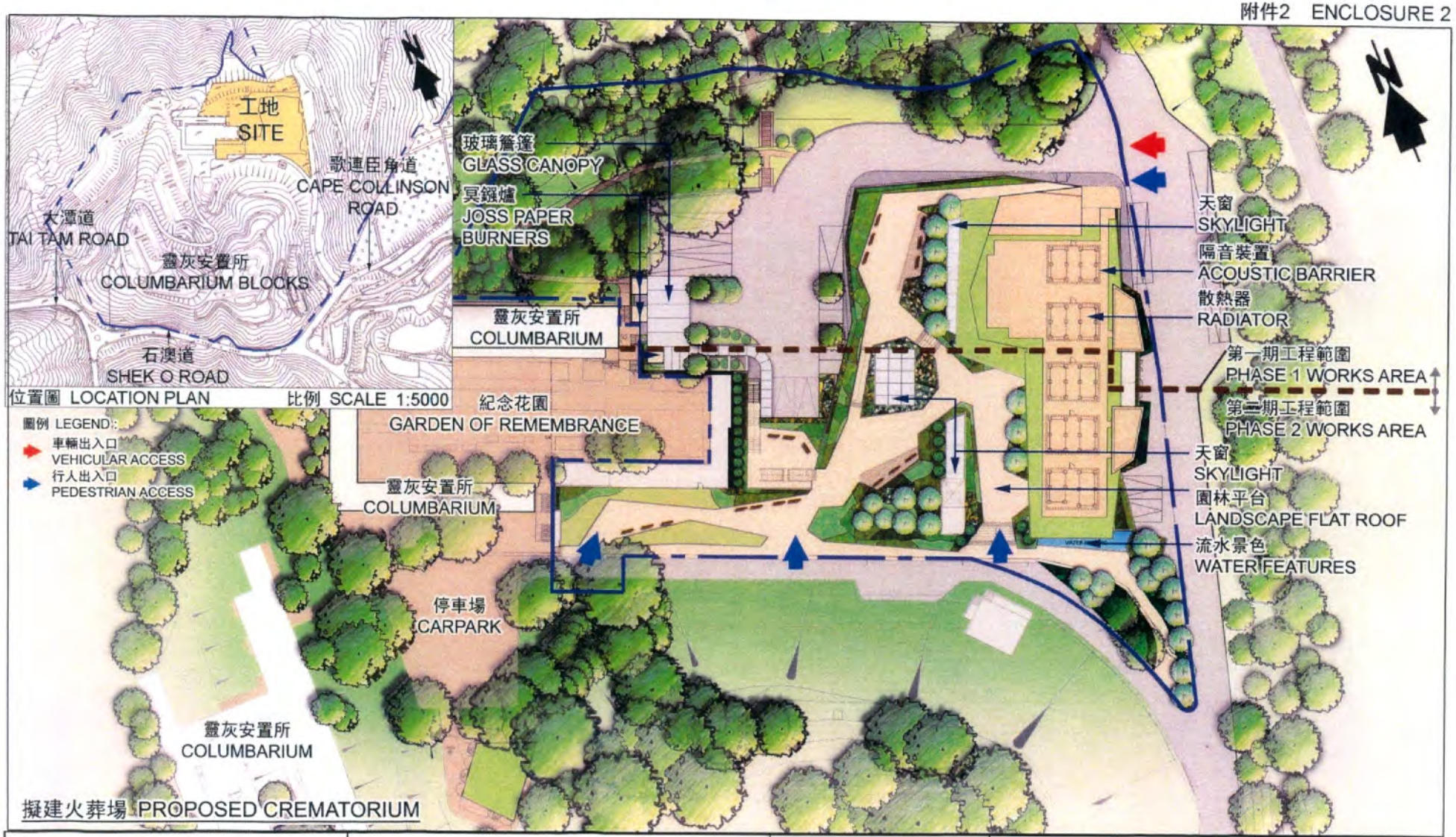
附件1 ENCLOSURE 1

位置圖 LOCATION PLAN 比例 SCALE 1:5000

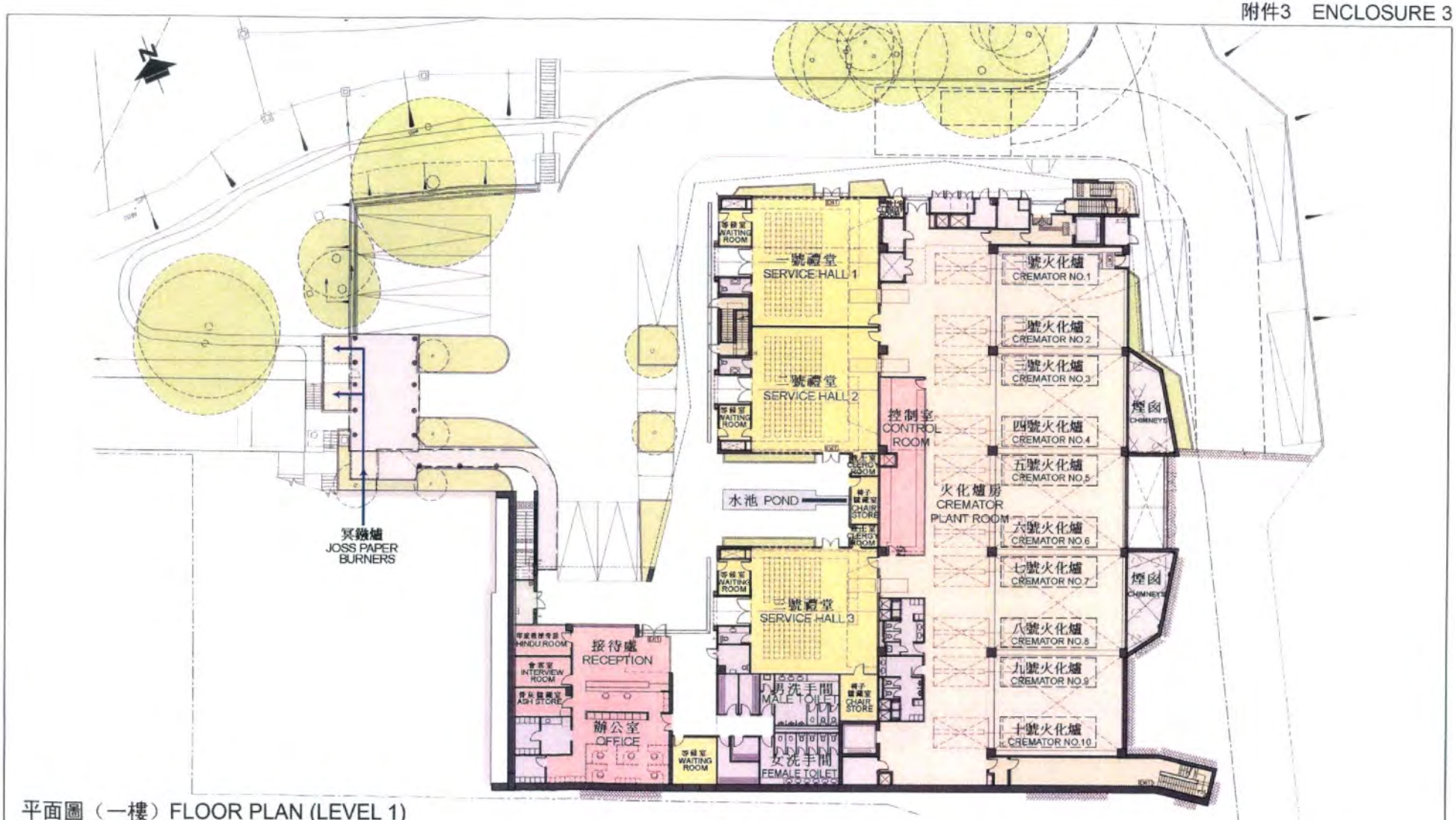
現有火葬場 EXISTING CREMATORIUM

16NB 歌連臣角火葬場重建計劃 REPROVISIONING OF CAPE COLLINSON CREMATORIUM	drawn by F. YU	date October 2009	drawing no. PMB/7025/XA001	scale 1:750
	checked by J. LAM	date October 2009		
	office PROJECT MANAGEMENT BRANCH		ARCHITECTURAL SERVICES DEPARTMENT	

附件2 ENCLOSURE 2

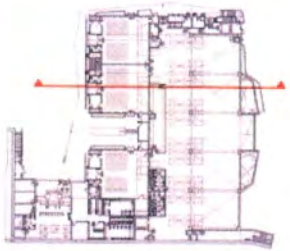


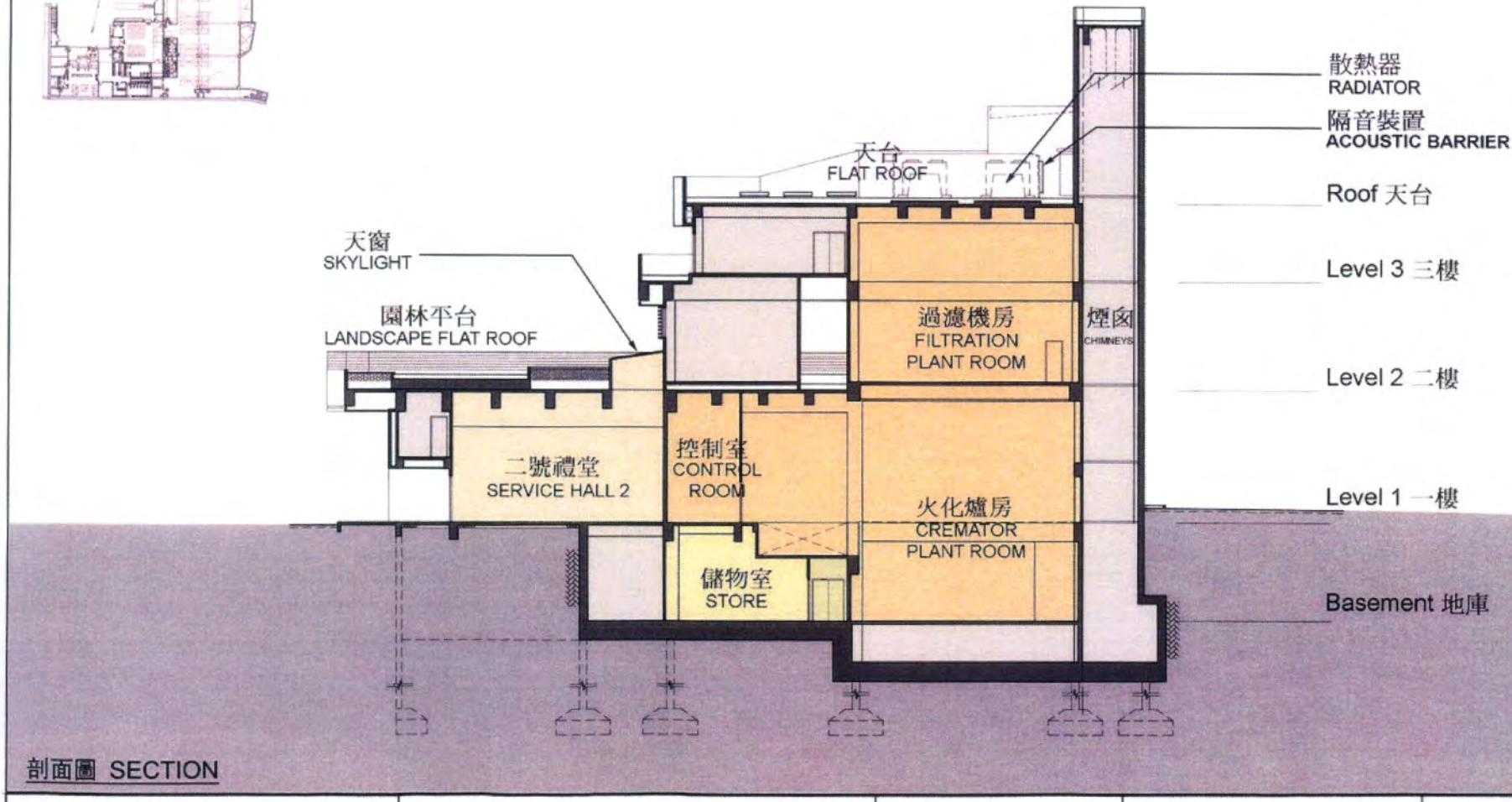
16NB 歌連臣角火葬場重建計劃 REPROVISIONING OF CAPE COLLINSON CREMATORIUM	drawn by F. YU	date October 2009	drawing no. PMB/7025/XA002	scale 1:750
	checked by J. LAM	date October 2009		
	office PROJECT MANAGEMENT BRANCH		ARCHITECTURAL SERVICES DEPARTMENT	



平面圖（一樓）FLOOR PLAN (LEVEL 1)

16NB 歌連臣角火葬場重建計劃 REPROVISIONING OF CAPE COLLINSON CREMATORIUM	drawn by F. YU	date October 2009	drawing no. PMB/7025/XA003	scale 1:450
	checked by J. LAM	date October 2009		
	office PROJECT MANAGEMENT BRANCH		ARCHITECTURAL SERVICES DEPARTMENT	





剖面圖 SECTION

16NB 歌連臣角火葬場重建計劃 REPROVISIONING OF CAPE COLLINSON CREMATORIUM	drawn by F. YU	date October 2009	drawing no. PMB/7025/XA004	scale 1:300
	checked by J. LAM	date October 2009		
	office PROJECT MANAGEMENT BRANCH		ARCHITECTURAL SERVICES DEPARTMENT	

從西北方望向火葬場的構思圖 VIEW OF THE CREMATORIUM FROM NORTH-WESTERN DIRECTION (ARTIST'S IMPRESSION)	16NB 歌連臣角火葬場重建計劃 REPROVISIONING OF CAPE COLLINSON CREMATORIUM	drawn by F. YU	date October 2009	drawing no. PMB/7025/XA005	scale NTS
		checked by J. LAM	date October 2009		
		office PROJECT MANAGEMENT BRANCH		ARCHITECTURAL SERVICES DEPARTMENT	

Enclosure 6 to PWSC(2009-10)76

16NB – Reprovisioning of Cape Collinson Crematorium

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2009 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($ million)
(a)	Consultants' fee for contract administration (Note 2)	Professional	--	--	--	8.4
		Technical	--	--	--	5.6
					Sub-total	14.0
(b)	Resident site staff costs (Note 3)	Professional	31	38	1.6	3.0
		Technical	441	14	1.6	14.0
					Sub-total	17.0
	Comprising –					
	(i) Consultants' fees for management of resident site staff					3.0
	(ii) Remuneration of resident site staff					14.0
				Total		31.0

*MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of resident site staff supplied by the consultants. (As at 1 April 2008, MPS point 14 = $19,835 per month and MPS point 38 = $60,535 per month)

2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the design and construction of **16NB.** The assignment will only be executed subject to the Finance Committee's approval to upgrade **16NB** to Category A.

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

16 NB – Reprovisioning of Cape Collinson Crematorium

Key Environmental Mitigation Measures in EIA Report

(i) The design of new cremators will adopt the latest air pollution control technology. Gaseous emissions from the new cremators will meet all relevant criteria.

(ii) A flue gas filtering system will be adopted to control the quality of the gas emitted from the cremators.

(iii) A flue gas treatment system will be adopted to reduce nuisance from joss paper burnings.

(iv) The operating parameters (e.g. temperature, oxygen content) of the new cremators will be monitored on a continuous basis and the stack emission from the new cremators will be monitored on a regular basis throughout the operation life of the new crematorium.

(v) Further contamination investigation for asbestos containing materials, dioxin containing materials and contaminated soil will be carried out after decommissioning and prior to demolition of the existing crematorium. The necessary remedial works will be carried out if contamination is identified.

(vi) Confirmatory soil sampling and testing will be carried out to confirm the clean-up of the contaminated soil and the necessary remedial works will be implemented if contamination is identified.

(vii) The architectural appearance of the crematorium will be aesthetically designed to match with the adjacent landscape setting and overall visual characters of the site.

(viii) Landscaped roof garden will be provided to enhance and embrace the amenity space with the existing Garden of Remembrance.

(ix) Acoustic barriers of 2.5m in height will be provided to reduce the noise impact of the radiators which are located on the upper roof of the crematorium.

(x) An Environmental Team will be established and an Independent Environmental Checker will be employed to undertake the environmental monitoring and audit programme.