

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT

Universities

The Chinese University of Hong Kong

51EF – An integrated teaching building

Members are invited to recommend to Finance Committee the upgrading of **51EF** to Category A at an estimated cost of \$176.0 million in money-of-the-day prices for the construction of an integrated teaching building by The Chinese University of Hong Kong within its campus in Sha Tin.

PROBLEM

The Chinese University of Hong Kong (CUHK) needs additional space and facilities to support the implementation of the normative four-year undergraduate programme under the new academic structure for senior secondary education and higher education (i.e. the “3+3+4” academic structure).

PROPOSAL

2. The Secretary-General, University Grants Committee (SG, UGC), on the advice of the University Grants Committee (UGC) and the Director of Architectural Services (D Arch S) as UGC’s Technical Adviser, and with the support of the Secretary for Education, proposes to upgrade **51EF** to Category A at an estimated cost of \$176.0 million in money-of-the-day (MOD) prices for the construction of an integrated teaching building by CUHK.

/PROJECT

PROJECT SCOPE AND NATURE

3. The scope of **51EF** comprises the construction of a seven-storey building providing some 4 300 square metres (m²) in net operational floor area (NOFA). The building will accommodate the following facilities –

- (a) classrooms of some 3 287 m² in NOFA;
- (b) seminar rooms of some 686 m² in NOFA;
- (c) support facilities of some 327 m² in NOFA; and
- (d) 28 covered car parking spaces.

4. The site plan is at Enclosure 1. The view of the building (artist's impression), sectional plan and list of facilities are at Enclosures 2 to 4 respectively. CUHK plans to commence the construction works in the first quarter of 2010 for completion in the first quarter of 2012.

JUSTIFICATION

5. The new academic structure has been implemented in secondary schools starting from the 2009/10 academic year. The first cohort of senior secondary graduates will undergo a four-year undergraduate programme starting from the 2012/13 academic year. The UGC-funded institutions, including CUHK, need to expand their campus space and facilities in order to accommodate the additional students under the new four-year undergraduate programme, and to provide a suitable teaching and learning environment in support of the new academic structure. CUHK will carry out four capital works projects¹ to provide additional space and facilities of some 24 500 m² in NOFA in total. One of the projects is to construct an integrated teaching building.

6. CUHK proposes to construct an integrated teaching building opposite to the two integrated teaching buildings at Chung Chi campus, which are under construction, to form a cluster of teaching buildings. The proposed site is at

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¹ The other “3+3+4” capital works projects of CUHK are “**49EF** - Student amenity centre” (4 120 m²); “**52EF** - Centralized general research laboratory complex (block 1) in Area 39” (9 860 m²); and “**50EF** - Extension to the existing University Library at Central Campus” (6 170 m²). These projects were approved by the Finance Committee in January, April and June 2009 respectively.

a strategic location within walking distance from the central campus and the University railway station. The project will provide additional classrooms for the increased number of students under the new academic structure. CUHK will take this opportunity to provide more innovative teaching and learning facilities for whole-person development and student-centred learning. In addition, the project will provide a total of 28 covered car parking spaces to compensate for the existing open car parking spaces that will be lost as a result of the construction of the building.

FINANCIAL IMPLICATIONS

7. SG, UGC, on the advice of D Arch S, recommends approval of the project at a cost of \$176.0 million in MOD prices (please see paragraph 10 below), broken down as follows –

	\$ million	
(a) Site formation and development	19.8	
(b) Building	74.9	
(c) Building services	36.2	
(d) Drainage and external works	5.7	
(e) Additional energy conservation measures	3.4	
(f) Consultants' fees for contract administration	4.3	
(g) Remuneration of resident site staff	2.5	
(h) Furniture and equipment	10.0	
(i) Contingencies	11.8	
	<u>168.6²</u>	(in September 2009 prices)
(j) Provision for price adjustment	7.4	
	<u>176.0</u>	(in MOD prices)

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² This represents an increase of 47.2% over the original estimated cost of \$114.5 million in September 2004 prices.

8. CUHK will engage consultants to undertake contract administration and resident site staff to supervise the works. A detailed breakdown of the estimates for the consultant's fees and resident site staff costs by man-months is at Enclosure 5.

9. The construction floor area (CFA) of this project is 7 818 m². The estimated construction unit cost, represented by the building and building services costs, is \$14,210 per m² of CFA in September 2009 prices. A detailed account of the CFA vis-à-vis the construction unit cost is at Enclosure 6. D Arch S considers the estimated construction unit cost reasonable, having regard to the current economic situation and prevailing construction prices. The unit cost is also comparable to those of similar projects such as 52EG "Human Research Institute - phase 1" of The University of Hong Kong (with an estimated construction unit cost of \$14,519 per m² of CFA in September 2009 prices).

10. Subject to approval, CUHK will phase the expenditure as follows –

Year	\$ million (Sept 2009)	Price adjustment factor	\$ million (MOD)
2010 – 11	28.7	1.02000	29.3
2011 – 12	88.0	1.04040	91.6
2012 – 13	47.9	1.06121	50.8
2013 – 14	4.0	1.08243	4.3
	<u>168.6</u>		<u>176.0</u>

11. We have derived the MOD estimate 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 2010 to 2014. CUHK will tender the works through lump-sum contracts because it can clearly define the scope of works in advance. The contracts will provide for price adjustment to reflect market fluctuations in labour and material costs.

12. The project has no impact on tuition fees. The additional recurrent costs associated with this project will be met through annual allocations provided by Government to CUHK, which will be adjusted having regard to the increased student intake with the new academic structure. The proposal has no additional recurrent implications on the Government.

PUBLIC CONSULTATION

13. The project is located within the CUHK campus and there is no residential development in its immediate vicinity. The project will not affect residents nearby. CUHK has briefed and consulted its staff and students on the project on various occasions, including student assemblies, engagement meetings and fora to discuss the Campus Master Plan. No objection to the project has been raised. Nevertheless, some staff members and students have expressed concern about the preservation of trees along the roads next to the site, and the noise impact due to the proposed building's proximity to the Mass Transit Railway and Tolo Highway. These concerns have been duly addressed in the design, such as setting back the proposed building from the railway and the highway.

14. We consulted the Legislative Council Panel on Education on 9 November 2009 and Members supported the project.

ENVIRONMENTAL IMPLICATIONS

15. The project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). CUHK completed a Preliminary Environmental Review (PER) for the project in December 2005. The Director of Environmental Protection (DEP) agreed that with proper building orientation and central air conditioning system, the project would not have long-term environmental impact. CUHK has addressed these matters in the design of the project to the satisfaction of DEP.

16. CUHK has included in the project estimates the provisions required to implement suitable mitigation measures to control short-term environmental impacts. During construction, CUHK will control noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of mitigation measures in the relevant contract. These include the use of silencers, mufflers, acoustic linings or shields for noisy construction activities, frequent cleaning and watering of the site, and the provision of wheel-washing facilities.

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17. CUHK has considered measures (e.g. adjusting the building layout and foundation system to cope with the topography) in the planning and design stages to reduce the generation of construction waste where possible. In addition, CUHK will require the contractor to reuse inert construction waste (e.g. using excavated materials for filling) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste at public fill reception facilities³. CUHK will encourage the contractor to maximise the use of recycled / recyclable inert construction waste, as well as the use of non-timber formwork to further reduce the generation of construction waste.

18. CUHK 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. CUHK will ensure that the day-to-day operations on site comply with the approved plan. CUHK will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. CUHK 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.

19. CUHK estimates that the project will generate in total about 9 400 tonnes of construction waste. Of these, CUHK will reuse about 5 100 tonnes (54.3%) of inert construction waste on site, and deliver 3 000 tonnes (31.9%) of inert construction waste to public fills reception facilities for subsequent reuse. CUHK will dispose of the remaining 1 300 tonnes (13.8%) 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 \$243,500 for this project (based on a unit cost of \$27 per tonne for disposal at public fill reception facilities and \$125 per tonne⁴ at landfills).

ENERGY CONSERVATION MEASURES

20. This project will adopt various forms of energy efficient features including –

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³ 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.

⁴ 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 m³), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

- (a) water-cooled chillers (fresh water cooling tower);
- (b) automatic demand control of air supply in the air-conditioning system;
- (c) automatic demand control of chilled water circulation system;
- (d) heat wheels for heat energy reclaim of exhaust air;
- (e) demand control of fresh air supply with carbon dioxide sensors for air handling units;
- (f) T5 energy efficient fluorescent tubes and compact fluorescent tubes with electronic ballasts and occupancy and daylight sensors for lighting control;
- (g) light-emitting diode (LED) type exit signs; and
- (h) automatic on/off switching of lighting and ventilation fan inside the lifts.

21. For renewable energy technologies, CUHK will install integrated photovoltaic panels as roof skylight.

22. For greening features, CUHK will make provisions for greening at the roof top and vertical greening.

23. For recycled features, CUHK will adopt condensate water recycling system for irrigation.

24. The total estimated additional cost for adoption of energy conservation measures is around \$3.4 million (including \$0.8 million for energy efficient features), which has been included in the cost estimate of the project. The energy efficient features will achieve 9.4% energy savings in the annual energy consumption with a payback period of about 5.8 years.

/HERITAGE

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 any land acquisition.

BACKGROUND INFORMATION

27. Under the existing practice, UGC-funded institutions submit capital works proposals to the UGC annually. The UGC examines all these proposals carefully, with professional advice provided by D Arch S who acts as UGC's Technical Adviser, and refers those supported proposals to the Government for consideration of bidding of funds under the established mechanism. Having examined CUHK's proposal, SG, UGC has, in consultation with D Arch S, adjusted the project estimate proposed by CUHK to arrive at the project estimate set out in paragraph 7 above.

28. We upgraded **51EF** to Category B in May 2006. CUHK engaged consultants in March 2009 to carry out site investigation, and to prepare preliminary design, detailed design and tender documents at a total estimated cost of \$7.5 million, with \$1.98 million met by CUHK's own resources. We have charged the remaining \$5.52 million to block allocation **Subhead 8100EX** "Alterations, additions, repairs and improvements to the campuses of the UGC-funded institutions". The consultants have completed site investigation, preliminary design and detailed design of the project. CUHK is finalising the tender documents for the project.

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29. The project will involve the removal of 28 common trees and transplanting of 12 trees within the campus. All trees to be removed are not important trees⁵. CUHK will incorporate a planting proposal, which will include about 77 trees, as part of the project.

30. CUHK estimates that the project will create about 125 jobs (110 for labourers and another 15 for professional/technical staff) providing a total employment of 2 650 man-months.

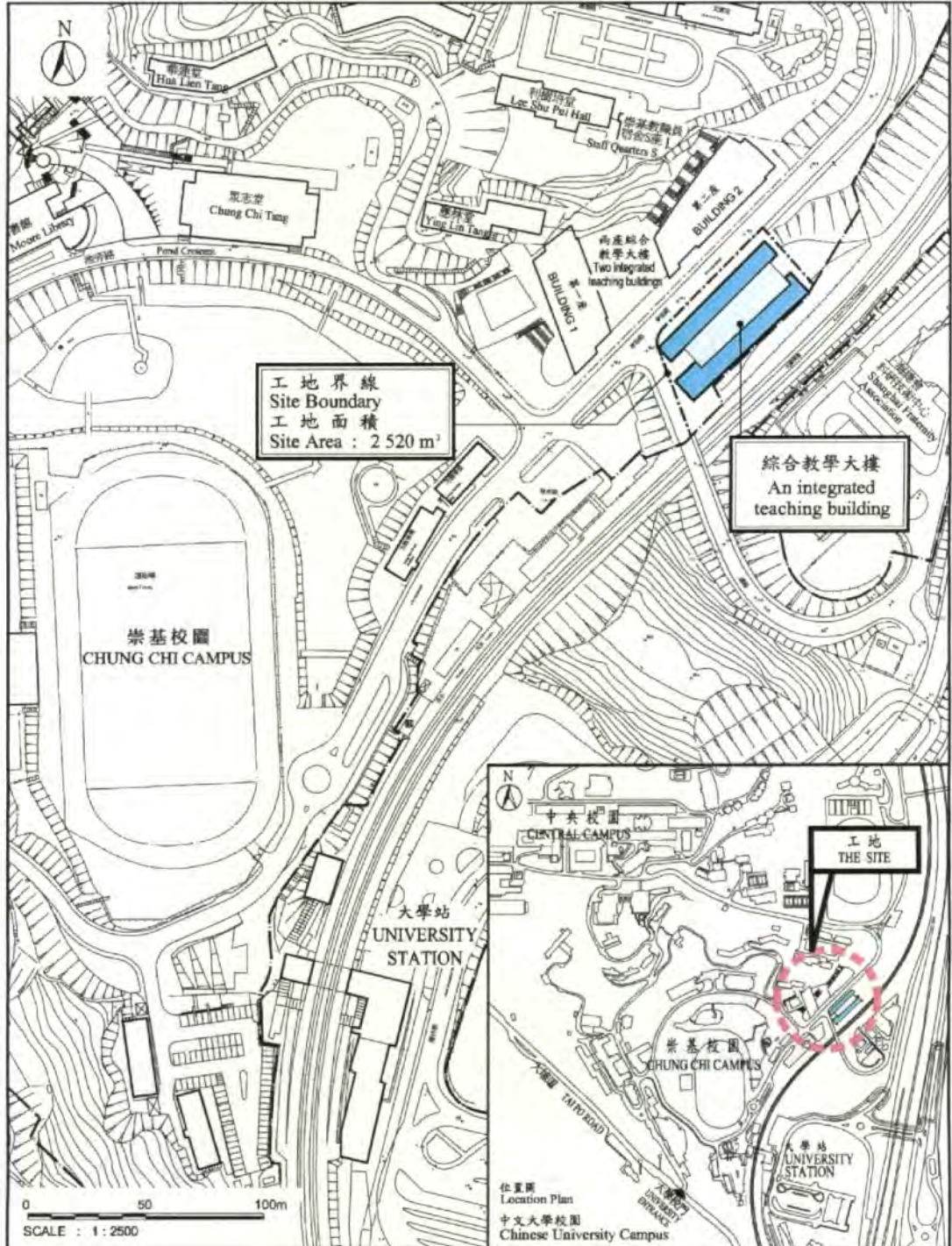
Education Bureau
November 2009

⁵ “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 of 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 m (measured at 1.3 m above ground level) or with height / canopy spread equal or exceeding 25 m.

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香港中文大學
51EF – 綜合教學大樓

Site Plan 工地平面圖



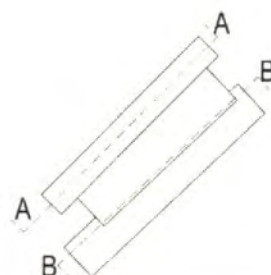
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View of the building (artist's impression) 外觀構思圖

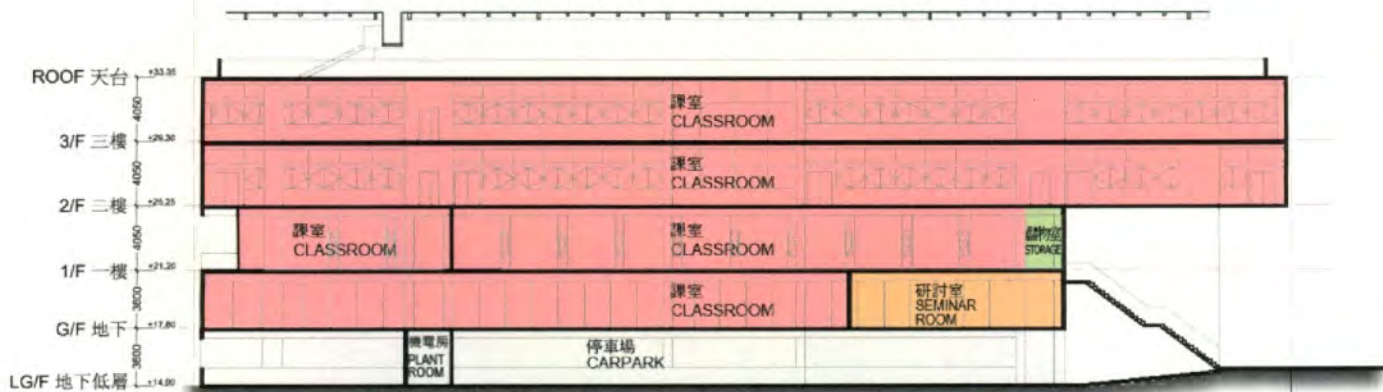


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Sectional Plan 截面圖



剖面 SECTION A-A



剖面 SECTION B-B

Enclosure 4 to PWSC(2009-10)77

**The Chinese University of Hong Kong
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List of facilities

Facilities	Estimated net operational floor area (NOFA) (m²)
(A) Teaching facilities	
(i) Classrooms	3 287
(ii) Seminar rooms	686
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	3 973
(B) Support facilities	
(i) Common room	28
(ii) Printing room	64
(iii) Storeroom	77
(iv) IT support room	158
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	327
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Total	4 300
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**The Chinese University of Hong Kong
51EF – An integrated teaching building**

**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 fees (\$ million)
(a) Consultants' fees for contract administration (Note 2)	Professional	-	-	-	4.3
(b) Remuneration of resident site staff (Note 3)	Technical	79	14	1.6	2.5
				Total	<u>6.8</u>

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS point to estimate the costs of resident site staff to be employed by CUHK. (As at 1 April 2009, MPS point 14 = \$19,835 per month.)
2. The consultants' fees for contract administration are calculated in accordance with the existing consultancy agreements for the design and construction of **51EF**. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade **51EF** to Category A.
3. CUHK will know the actual man-months and actual costs for resident site staff only after completion of the construction works.

**The Chinese University of Hong Kong
51EF – An integrated teaching building**

Breakdown of the construction floor area (CFA) vis-à-vis the construction unit cost

(a) Breakdown of CFA

	Estimated floor area (m²)
Net operational floor area (NOFA)	4 300
Circulation areas and toilets	2 389
Mechanical and electrical plants	264
Car parking area	865
CFA	<hr/> 7 818 <hr/>

(b) NOFA / CFA ratio 55.0%

(c) Estimated construction unit cost (represented by the building and building services costs) \$14,210 per m² of CFA
(in September 2009 prices)