

For discussion  
on 8 April 2009

PWSC(2009-10)8

## **ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE**

### **HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT**

#### **Universities**

**The Chinese University of Hong Kong**

**54EF – Two integrated teaching buildings**

Members are invited to recommend to Finance Committee the upgrading of **54EF** to Category A at an estimated cost of \$741.8 million in money-of-the-day prices for the construction of two integrated teaching buildings 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 meet its existing teaching and research needs.

#### **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 **54EF** to Category A at an estimated cost of \$741.8 million in money-of-the-day (MOD) prices for the construction of two integrated teaching buildings by CUHK within its campus in Sha Tin.

**/PROJECT .....**

## PROJECT SCOPE AND NATURE

3. The scope of **54EF** comprises the construction of an 11-storey and a seven-storey building blocks on a three-storey podium, providing approximately 16 270 square meters (m<sup>2</sup>) in net operational floor area (NOFA). The following facilities will be provided by the project –

- (a) classroom facilities of about 3 320 m<sup>2</sup> in NOFA;
- (b) teaching laboratories of about 4 960 m<sup>2</sup> in NOFA;
- (c) research laboratories of about 4 660 m<sup>2</sup> in NOFA;
- (d) library space (resources and information centre) of about 3 330 m<sup>2</sup> in NOFA;
- (e) 28 covered car parking spaces; and
- (f) consequential works involving about 1 800 m<sup>2</sup> in NOFA.

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4. The site plan is at Enclosure 1. The view of the buildings (artist's impression), sectional plans and list of facilities are at Enclosures 2 to 4 respectively. CUHK plans to commence the construction works in the second quarter of 2009 for completion in the second quarter of 2012.

## JUSTIFICATION

5. The campus of CUHK was founded in 1960s. Over the years, CUHK has developed a wide range of academic programmes, and it now lacks sufficient space to meet its present and future needs. According to the results of the Review on Space and Accommodation Requirements of the UGC-funded institutions carried out by the UGC in 2006, CUHK had an estimated space shortfall of some 20 660 m<sup>2</sup> in NOFA in the 2007/08 academic year. The shortfall of space lies mainly in teaching and research laboratories, library facilities and study space. In addition, there is a strong demand from the university community for communal teaching facilities at a central and convenient location as such facilities are scattered all over the campus currently.

6. Furthermore, modern education emphasizes the importance of participation, as well as interaction and discussion among students and teaching staff. The provision of adequate space and suitable facilities such as intelligent teaching laboratories, tutorial rooms, breakout rooms, resources and information centres are thus of critical importance in supporting the university's teaching and research activities and in enhancing the overall learning experience of students. Apart from meeting its space shortfall, CUHK also sees in the project a valuable opportunity for fostering a modern learning environment and for realising its vision of developing into a leading comprehensive research university in the region.

7. Against the above background, CUHK proposes to demolish three junior staff quarter blocks at Chung Chi campus and construct two integrated teaching buildings to provide some 16 270 m<sup>2</sup> of modern teaching and research facilities. The staff quarter blocks in question are low-rise buildings constructed in the 1970s, and occupy a site within walking distance from the central campus and the University railway station. This site will be redeveloped to provide new, integrated communal teaching facilities, for which accessibility is a prime consideration.

8. The proposed new teaching buildings will accommodate mainly teaching facilities (including 58 classrooms and seven lecture theatres), teaching and research laboratories, and library space in the form of resources and information centre. As the site is located mainly on flat land and partly on cut slope, the buildings will also take advantage of the level difference and act as a conduit to improve circulation between the Chung Chi and central campuses. Students may make use of the walkway and escalator system of the podium to negotiate the level difference.

## FINANCIAL IMPLICATIONS

9. SG, UGC, on the advice of D Arch S, recommends approval of the project at a cost of \$741.8 million in MOD prices (see paragraph 12 below), made up as follows –

	<b>\$ million</b>
(a) Demolition	2.0
(b) Site formation and development	78.4
(c) Building	319.4
(d) .....	

	<b>\$ million</b>	
(d) Building services	151.5	
(e) Drainage and external works	17.4	
(f) Additional energy conservation measures	5.6	
(g) Consultants' fees for –	15.9	
(i) Tender assessment	1.2	
(ii) Contract administration	7.7	
(iii) Site supervision	6.8	
(iv) Out-of-pocket expenses	0.2	
(h) Furniture and equipment	41.6	
(i) Consequential works <sup>1</sup>	14.4	
(j) Contingencies	<u>48.5</u>	
Sub-total	694.7	(in September 2008 prices)
(k) Provision for price adjustment	<u>47.1</u>	
Total	<u>741.8</u>	(in MOD prices)

10. CUHK will engage consultants to undertake tender assessment, contract administration and site supervision of the project. A detailed breakdown of the estimate for consultants' fees is at Enclosure 5.

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<sup>1</sup> For reorganization and conversion of some 1 800 m<sup>2</sup> (in NOFA) of communal laboratories at different buildings to be vacated upon the completion of this project into laboratories for specific use and offices for better utilization of existing campus space.

11. The construction floor area (CFA) of this project is 29 423 m<sup>2</sup>. The estimated construction unit cost, represented by the building and building services costs, is \$16,004 per m<sup>2</sup> of CFA in September 2008 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, and comparable to those of similar projects such as 20EH “Baptist University Road campus development” of Hong Kong Baptist University (with an estimated construction unit cost of \$16,860 per m<sup>2</sup> of CFA in September 2008 prices).

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

<b>Year</b>	<b>\$ million (Sept 2008)</b>	<b>Price adjustment factor</b>	<b>\$ million (MOD)</b>
2009 - 10	87.2	1.03200	90.0
2010 - 11	200.2	1.05264	210.7
2011 - 12	256.1	1.07369	275.0
2012 - 13	127.4	1.09517	139.5
2013 - 14	23.8	1.11707	26.6
	<hr/> 694.7 <hr/>		<hr/> 741.8 <hr/>

13. 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 2009 to 2014. CUHK will tender the works through lump-sum contracts because it can clearly define the scope of works in advance. The contract will provide for price adjustment to reflect market fluctuations in labour and material costs.

14. The project has no impact on tuition fees. The additional recurrent costs associated with this project will be absorbed by CUHK. The proposal has no additional recurrent implication on the Government.

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## **PUBLIC CONSULTATION**

15. The project is located within the CUHK campus and there is no residential development in its immediate vicinity. The Chairman, Vice Chairman and Committee Chairmen of the Sha Tin District Council were briefed on the proposed development by CUHK in September 2007 and no adverse comment was raised.

16. CUHK has briefed and consulted its staff and students on the project on various occasions, including student assemblies and engagement meetings and fora on the Campus Master Plan. No objection to the project has been raised, and the concerns of some staff members and students about the preservation of trees along the roads next to the site and the impact of the new buildings on the neighbouring environment have been addressed in the design by setting back the new buildings from the roads and providing more buffer space between the buildings.

17. We submitted a paper on the project to the Legislative Council Panel on Education for discussion on 9 March 2009. Members did not raise any objection to the proposal.

## **ENVIRONMENTAL IMPLICATIONS**

18. 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 layout design, 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.

19. 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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20. 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. use 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 to public fill reception facilities<sup>2</sup>. CUHK will encourage the contractor to maximize the use of recycled or recyclable inert construction waste as well as the use of non-timber formwork to further minimize the generation of construction waste.

21. 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 to public fill reception facilities and landfills respectively through a trip-ticket system.

22. CUHK estimates that the project will generate in total about 63 000 tonnes of construction waste. Of these, CUHK will reuse about 30 000 tonnes (47.6%) of inert construction waste on site and deliver 31 000 tonnes (49.2%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, CUHK will dispose of 2 000 tonnes (3.2%) 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 \$1,087,000 for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne<sup>3</sup> at landfills).

## ENERGY CONSERVATION MEASURES

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

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<sup>2</sup> 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.

<sup>3</sup> 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/m<sup>3</sup>), 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 for ventilation fans in car park;
- (c) automatic demand control of supply air;
- (d) heat wheels for heat energy reclaim of exhaust air;
- (e) light-emitting diode (LED) type exit signs;
- (f) occupancy and daylight sensors for lighting control;
- (g) automatic on-off switching of lighting and ventilation fan inside lifts; and
- (h) service-on-demand control for escalators (on-off control).

24. For renewable energy technologies, this project will adopt solar park lighting at student piazza and landscape area.

25 For greening features, this project will provide greening at student piazza, central walkway, podiums and rooftops.

26. For recycled features, this project will include recycling of cooling tower bleed-off water for flushing.

27. The total estimated additional cost for adoption of above features is around \$5.6 million. There will be about 10.6% energy savings in the annual energy consumption.

## **HERITAGE IMPLICATIONS**

28. 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.

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## LAND ACQUISITION

29. The project does not require any land acquisition.

## BACKGROUND INFORMATION

30. Under existing procedures, 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 9 above.

31. We upgraded **54EF** to Category B in April 2007. CUHK engaged consultants in March 2008 to carry out site investigation, and to prepare preliminary design, detailed design and tender documents at a total estimated cost of \$15.4 million. We have charged this amount 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.

32. The project will involve the removal of 105 common trees and transplanting of 25 trees within the project site. All trees to be removed are not important trees<sup>4</sup>. CUHK will incorporate a planting proposal, which will include an estimated quantity of 225 trees and 9 800 annuals, as part of the project.

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<sup>4</sup> "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.

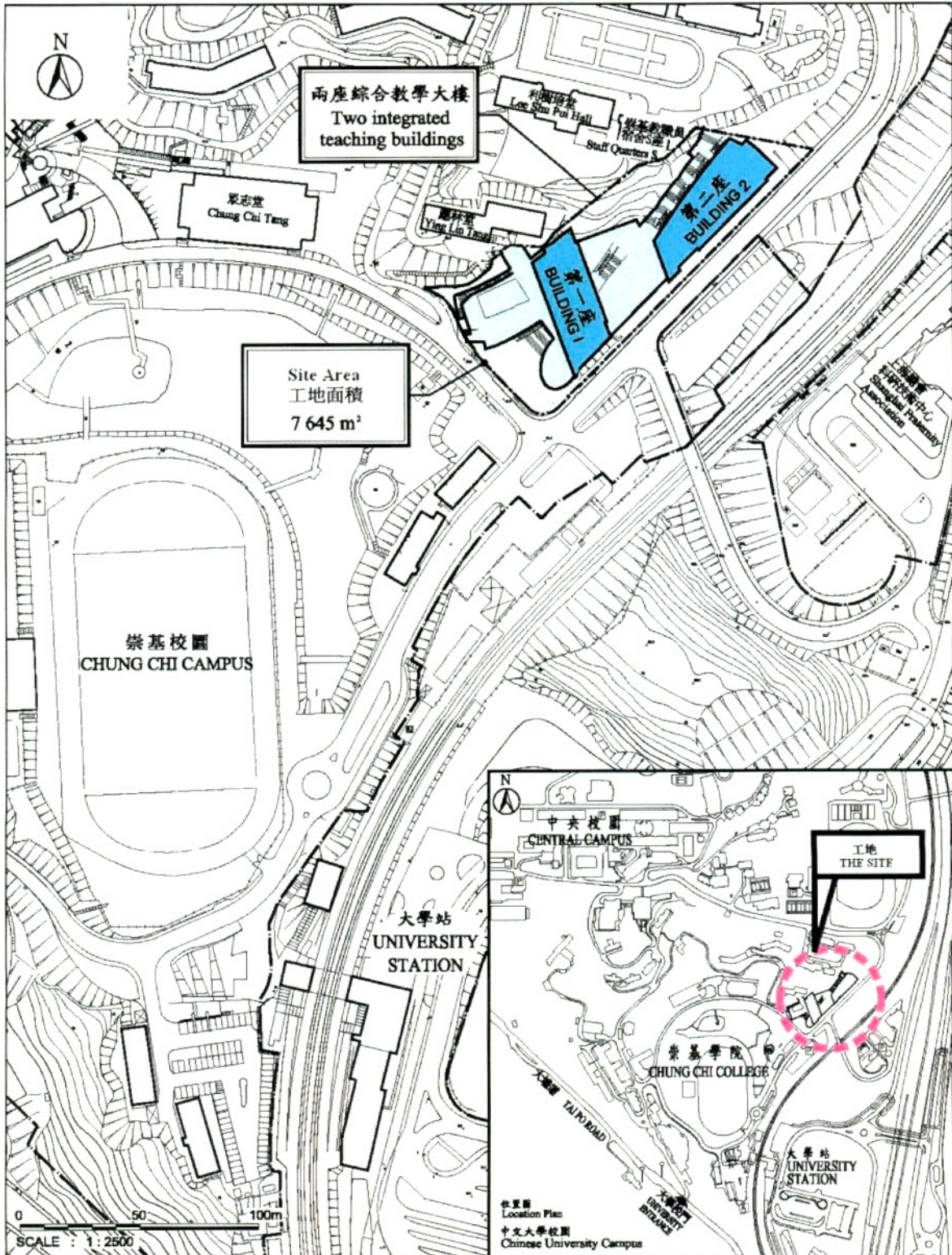
33. CUHK estimates that the project will create about 255 jobs (229 for labourers and another 26 for professional/technical staff) providing a total employment of 8 200 man-months.

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Education Bureau  
March 2009

The Chinese University of Hong Kong  
54EF – Two integrated teaching buildings  
香港中文大學  
54EF – 兩座綜合教學大樓

Site Plan 工地平面圖

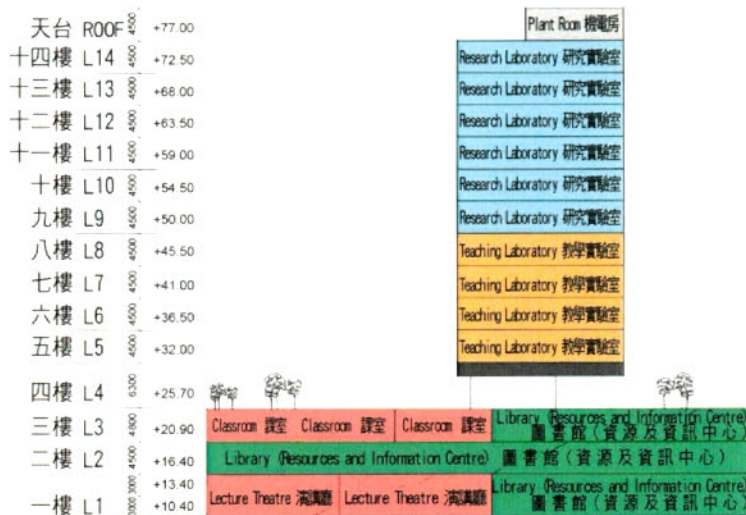
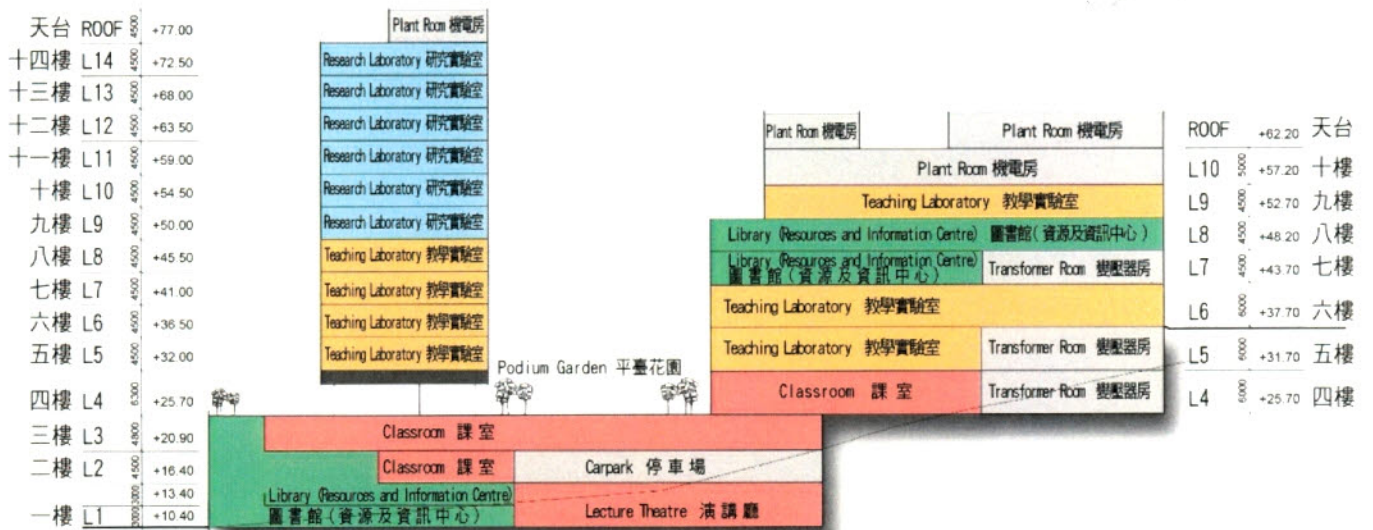
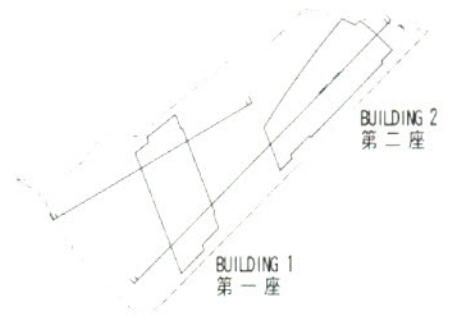


The Chinese University of Hong Kong  
54EF – Two integrated teaching buildings  
香港中文大學  
54EF – 兩座綜合教學大樓

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



The Chinese University of Hong Kong  
 54EF – Two integrated teaching buildings  
 香港中文大學  
 54EF – 兩座綜合教學大樓  
 Sectional Plan 截面圖



**Enclosure 4 to PWSC(2009-10)8**

**The Chinese University of Hong Kong  
54EF – Two integrated teaching buildings**

**List of facilities**

<b>Facilities</b>	<b>Estimated floor area in net operational floor area (NOFA) (m<sup>2</sup>)</b>
(a) Classroom facilities	3 327
(b) Teaching laboratories	4 957
(c) Research laboratories	4 664
(d) Library space (Resources and Information Centre)	3 325
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Total	16 273
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## Enclosure 5 to PWSC(2009-10)8

### The Chinese University of Hong Kong 54EF – Two integrated teaching buildings

#### Breakdown of the estimate for consultants' fees <sup>(Note 1)</sup>

		Estimated man- months	Average MPS* salary point	Multiplier <small>(Note 2)</small>	Estimated fees (\$ million)
(a) Consultants' fees <sup>(Note 3)</sup>					
(i) Tender assessment	Professional	–	–	–	1.2
(ii) Contract administration	Professional	–	–	–	7.7
(b) Site supervision <sup>(Note 4)</sup>	Technical	214	14	1.6	6.8
(c) Out-of-pocket expenses <sup>(Note 5)</sup>					
Lithography and other direct expenses					0.2
				Total	<u>15.9</u>

\* MPS = Master Pay Scale

#### Notes

1. Having examined the consultants' fees estimated by CUHK, D Arch S considers the figures acceptable.
2. A multiplier of 1.6 is applied to the average MPS point to estimate the costs of site supervision staff to be employed by CUHK. (As at 1 April 2008, MPS point 14 = \$19,835 per month.)
3. The consultants' fees for tender assessment and contract administration are calculated in accordance with the existing consultancy agreements obtained through competitive tendering for the design and construction of **54EF**. The assignment will only be executed subject to Finance Committee's approval to upgrade **54EF** to Category A.
4. CUHK will know the actual man-months and actual costs for site supervision only after completion of the construction works.
5. Out-of-pocket expenses are the actual costs incurred. The consultants are not entitled to any additional payment for the overheads or profit in respect of these items.

**The Chinese University of Hong Kong  
54EF – Two integrated teaching buildings**

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

(a) Breakdown of CFA

	<b>Estimated floor area (m<sup>2</sup>)</b>
Net operational floor area (NOFA)	16 273
Circulation areas and toilets	7 707
Mechanical and electrical plants	3 581
Parking area	1 862
CFA	<hr/> 29 423 <hr/>

(b) NOFA / CFA ratio 55.3%

(c) Estimated construction unit cost (represented by the building and building services costs) \$16,004 per m<sup>2</sup> of CFA  
(in September 2008 prices)