

**For discussion  
on 11 February 2009**

**PWSC(2008-09)71**

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

**HEAD 708 - CAPITAL SUBVENTIONS AND MAJOR SYSTEMS  
AND EQUIPMENT**

**Universities**

**The Hong Kong University of Science and Technology**

**10EL - New academic building**

Members are invited to recommend to Finance Committee the upgrading of **10EL** to Category A at an estimated cost of \$668.5 million in money-of-the-day prices for the construction of a new academic building by The Hong Kong University of Science and Technology within its campus in Clear Water Bay.

**PROBLEM**

The Hong Kong University of Science and Technology (HKUST) 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”).

**/PROPOSAL .....**

## 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 **10EL** to Category A at an estimated cost of \$668.5 million in money-of-the-day (MOD) prices for the construction of a new academic building by HKUST within its campus in Clear Water Bay.

## PROJECT SCOPE AND NATURE

3. The scope of **10EL** comprises the construction of an eight-storey academic building providing approximately 12 460 square metres (m<sup>2</sup>) in net operational floor area (NOFA). It will accommodate the following facilities —

- (a) classrooms of about 2 660 m<sup>2</sup> in NOFA;
- (b) teaching laboratories of about 520 m<sup>2</sup> in NOFA;
- (c) research laboratories of about 1 800 m<sup>2</sup> in NOFA;
- (d) office facilities of about 5 220 m<sup>2</sup> in NOFA;
- (e) staff/student amenities facilities of about 1 680 m<sup>2</sup> in NOFA; and
- (f) support facilities of about 580 m<sup>2</sup> in NOFA such as meeting rooms, computer-based data processing and telecommunications rooms, storage, etc.

4. The building will be built on a slope platform within the University campus. The site is undeveloped, and the proposed development will include slope stabilisation works and the construction of associated infrastructure<sup>1</sup> such as access roads for vehicles and passages/escalators for pedestrians.

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<sup>1</sup> The costs of the slope stabilisation works and infrastructure development will be shared by two other proposed developments of HKUST to be built on the same slope platform, i.e. **12EL** - Institute for Advanced Study (IAS) and a residence block for IAS to be wholly funded by the University.

5. A 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. HKUST plans to start construction works in the third quarter of 2009 for completion in the fourth quarter of 2011.

## JUSTIFICATION

6. The new academic structure for senior secondary education and higher education (i.e. the "3+3+4") will be implemented starting from the 2009/10 academic year. The first cohort of senior secondary students will undergo a four-year undergraduate programme starting from the 2012/13 academic year. The UGC-funded institutions, including HKUST, will need to expand their campus space and facilities in order to accommodate the additional students under the new four-year undergraduate programmes, and to provide a suitable teaching and learning environment in support of the curriculum under the new academic structure.

7. HKUST plans to carry out two capital works projects<sup>2</sup> to provide additional space and facilities of some 15 500 m<sup>2</sup> in NOFA within its campus to support the implementation of "3+3+4", one of which is this proposed new academic building.

8. The new academic building will provide accommodation for the School of Business and Management (SBM) and the new School of Innovation Technology and Management (SITM) to be established in 2012 when the new academic building becomes available and interdisciplinary programmes are expanded. SBM currently occupies around 7 000 m<sup>2</sup> in NOFA in the existing academic building. The space is less well integrated than is desirable, with some facilities housed in areas more suited to research laboratory operations. Relocating SBM to the new academic building will therefore have significant advantages in optimising its operation as well as rationalising the use of the existing space. HKUST will allocate the campus space vacated by SBM to other schools to meet their shortage of space arising from the implementation of "3+3+4".

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<sup>2</sup> The other "3+3+4" capital works project is **11EL** - Extension to the existing Academic Building. The project was approved by the Finance Committee in January 2008 and is under construction.

**FINANCIAL IMPLICATIONS**

9. SG, UGC, on the advice of D Arch S, recommends approval of the project at a cost of \$668.5 million in MOD prices (see paragraph 12 below), made up as follows –

	<b>\$ million</b>	
(a) Site formation and development <sup>3</sup>	102.6	
(b) Slope works	24.5	
(c) Building	248.6	
(d) Building services	120.5	
(e) Drainage and external works	31.1	
(f) Additional energy conservation measures	6.7	
(g) Consultants' fees for –	12.8	
(i) Tender assessment	1.1	
(ii) Contract administration	4.8	
(iii) Site supervision	6.7	
(iv) Out-of-pocket expenses	0.2	
(h) Furniture and equipment	36.9	
(i) Contingencies	43.9	
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Sub-total	627.6 <sup>4</sup>	(in September 2008 prices)
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(j) Provision for price adjustment	40.9	
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Total	668.5	(in MOD prices)
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<sup>3</sup> Including associated infrastructure works such as access roads and escalators.

<sup>4</sup> This represents an increase of 63.4% over the original estimated cost of \$384.2 million in September 2004 prices.

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

11. The construction floor area (CFA) of this project is 22 460 m<sup>2</sup>. The estimated construction unit cost, represented by the building and building services costs, is \$16,434 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, HKUST 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	95.0	1.03200	98.0
2010 – 11	200.8	1.05264	211.4
2011 – 12	234.7	1.07369	252.0
2012 – 13	65.0	1.09517	71.2
2013 – 14	32.1	1.11707	35.9
	627.6		668.5

13. 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 buildings and construction output for the period 2009 to 2014. HKUST will tender the works through a lump-sum contract 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.

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

## **PUBLIC CONSULTATION**

15. The project is located within the HKUST campus. There are no residential developments nearby, and the project will not affect residents in the vicinity. HKUST has consulted its staff and students who expressed support to the project. The Sai Kung District Council was briefed on the Campus Development Plan during its visit to HKUST in February 2008, and a public exhibition of the proposed campus developments was held on campus from then till the end of November 2008. A link to the campus development plan has been posted on the main HKUST website.

16. We submitted a paper on the project to the Legislative Council Panel on Education for discussion on 12 January 2009. Members did not raise any objection to the proposal.

## **ENVIRONMENTAL IMPLICATIONS**

17. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The project will not cause long term environmental impact. HKUST has included in the project estimates the cost for implementing suitable mitigation measures to control short term environmental impacts.

18. During construction, HKUST 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 lining or shields for noisy construction activities; frequent cleaning and watering of the site; and the provision of wheel-washing facilities.

19. HKUST has considered the topography of the site (e.g. move the new building away from slope edge so that slope stabilisation work can be kept to the absolute minimum) in the planning and design stages to reduce the generation of construction waste where possible. In addition, HKUST 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 at public fill reception facilities<sup>5</sup>. HKUST 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.

20. HKUST will also require the contractor to submit for approval a plan setting out its waste management measures which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. HKUST will ensure that the day-to-day operations on site comply with the approved plan. HKUST will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. HKUST 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.

21. HKUST estimates that the project will generate in total about 99 190 tonnes of construction waste. Of this, HKUST will reuse about 73 260 tonnes (73.9%) of inert construction waste on site and deliver 19 645 tonnes (19.8%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, HKUST will dispose of 6 285 tonnes (6.3%) of non-inert construction waste at landfills. The total cost of accommodating construction waste at public fill reception facilities and landfills is estimated to be \$1,316,040 for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne<sup>6</sup> at landfills).

**/ENERGY .....**

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<sup>5</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 at public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

<sup>6</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.

## **ENERGY CONSERVATION MEASURES**

22. This project has adopted various forms of energy efficiency features including –

- (a) water cooled chillers;
- (b) heat recovery fresh air pre-conditioning;
- (c) light-emitting diode (LED) type exit signs;
- (d) occupancy and daylight sensors for lighting control; and
- (e) automatic lighting and ventilation control for lifts.

23. For renewable energy technologies, the project will adopt solar lightings in landscape area.

24. For greening features, the project will adopt greening for rooftops and open space.

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

26. The total estimated additional cost for adoption of above features is around \$6.7 million. There will be about 10.8% energy savings.

## **HERITAGE IMPLICATIONS**

27. The 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

28. The project does not require any land acquisition.

## BACKGROUND INFORMATION

29. 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 HKUST's proposal, SG, UGC has, in consultation with D Arch S, adjusted the project estimate proposed by HKUST to arrive at the project estimate set out in paragraph 9 above.

30. We upgraded **10EL** to Category B in April 2006. HKUST engaged consultants in January 2007 to carry out topographical survey, site investigation, preliminary design, detailed design and to prepare tender documents at a total cost of \$11.7 million. These consultancies were charged to block allocation **Subhead 8100EX** "Alterations, additions, repairs and improvements to the campuses of UGC-funded institutions". The consultants have completed the topographical survey, site investigation, preliminary design and detailed design of the project. HKUST is finalising the tender documents for this project.

31. The project will involve the removal of 170 common trees and transplanting of 86 trees within the project site. All trees to be removed are not important trees<sup>7</sup>. HKUST will incorporate planting proposals in the project, which will include an estimated quantity of 400 trees, 45 000 shrubs and 9 000 m<sup>2</sup> grassed area.

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<sup>7</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.

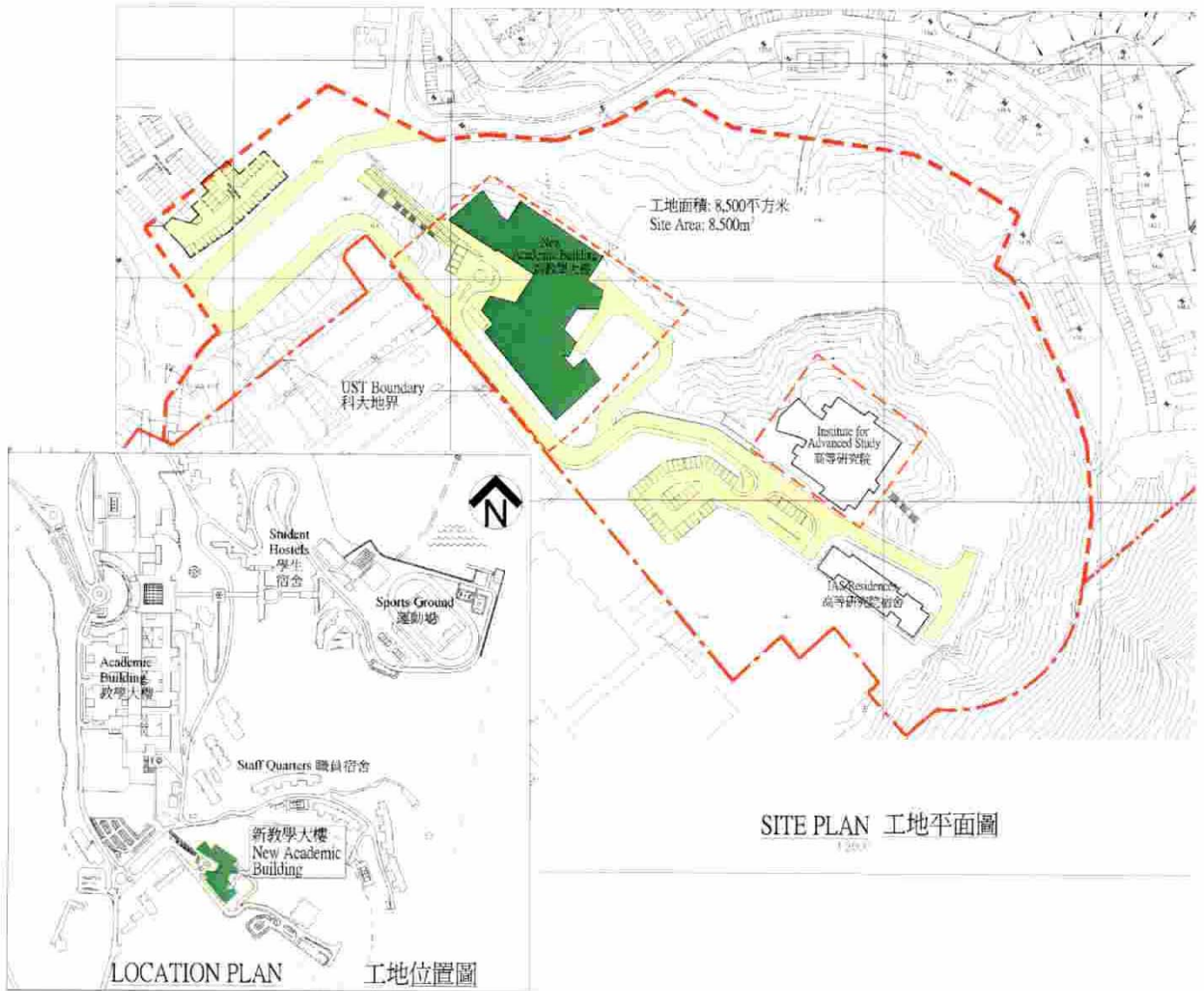
32. HKUST estimates that the project will create about 280 jobs (250 for labourers and another 30 for professional/technical staff), providing a total employment of 7 400 man-months.

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Education Bureau  
February 2009

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香港科技大學  
10EL - 新教學大樓

Site Plan 工地平面圖



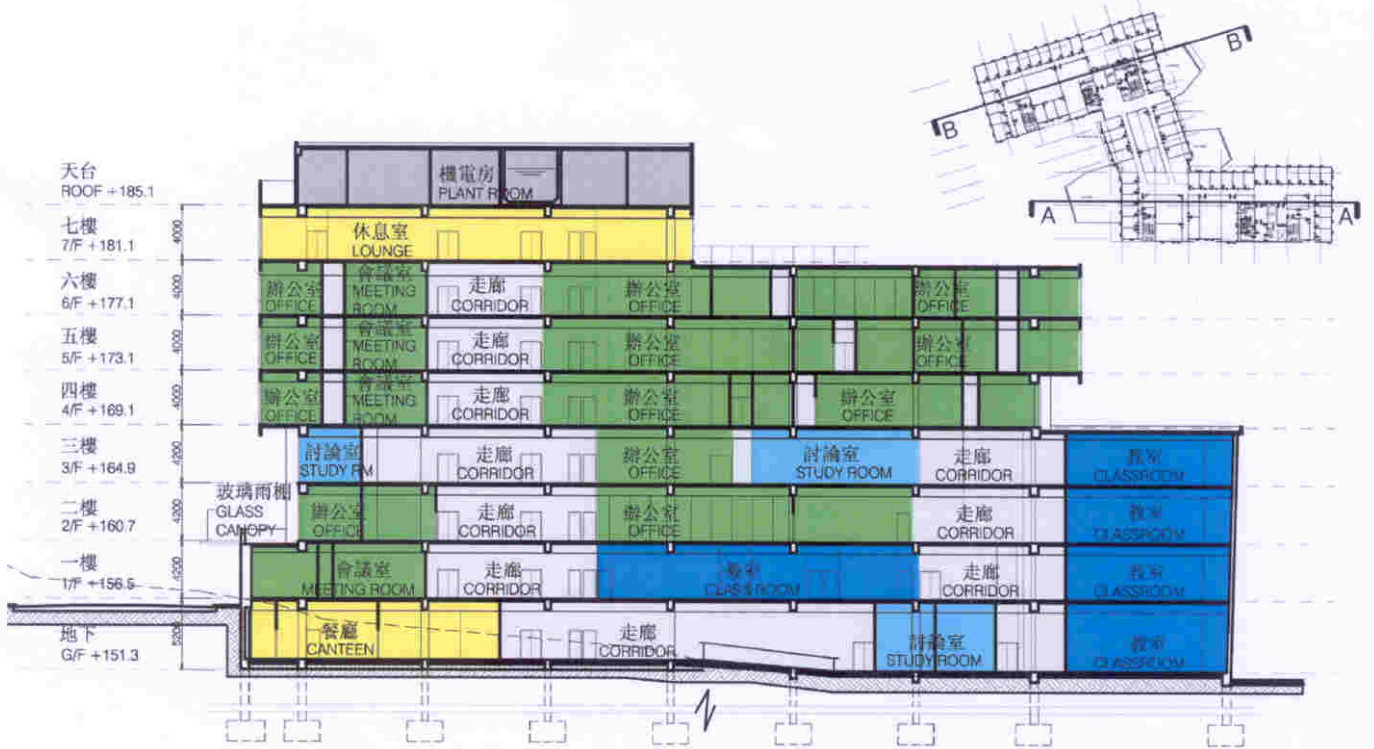
**The Hong Kong University of Science and Technology**  
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**View of the building (artist's impression) 外觀構思圖**

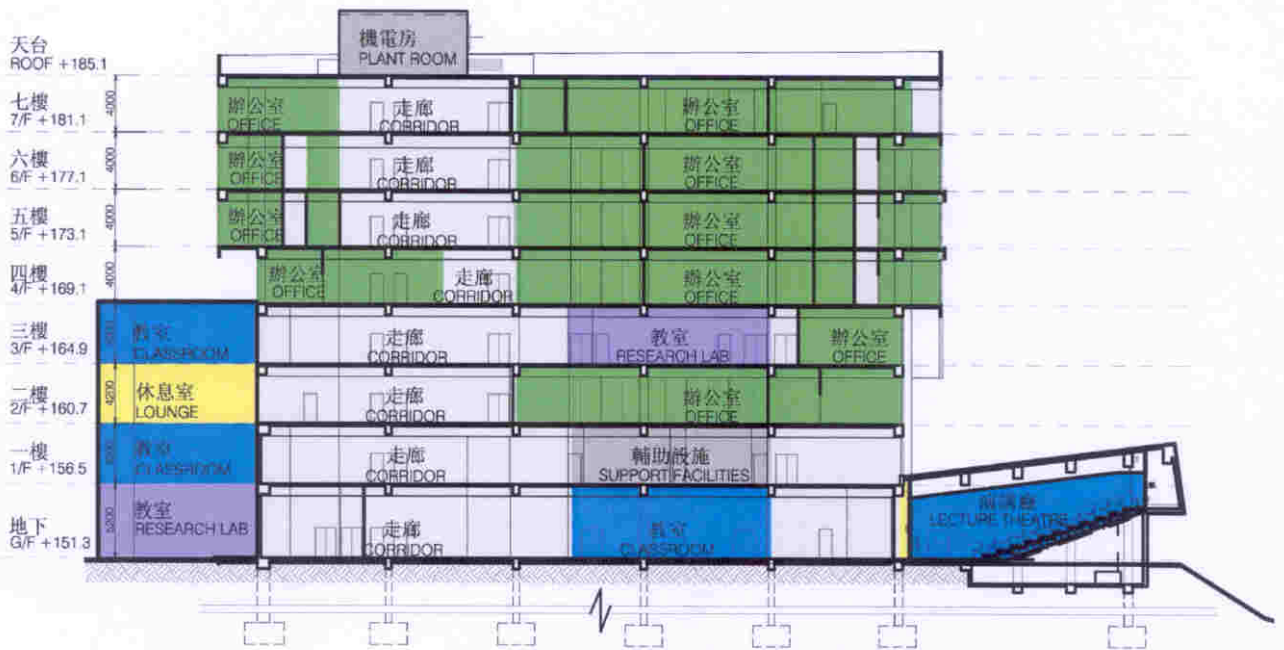


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Sectional Plan 截面圖



SECTION A - A  
 截面圖 A - A



SECTION B - B  
 截面圖 B - B



**The Hong Kong University of Science and Technology  
10EL - New academic building**

**List of facilities**

<b>Facilities</b>	<b>Estimated floor area in net operational floor area (NOFA) (m<sup>2</sup>)</b>
(a) Classrooms	2 660
(b) Teaching laboratories	520
(c) Research laboratories	1 800
(d) Office facilities	5 223
(e) Student/staff amenities	1 674
(f) Support facilities	584
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Total	12 461
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**The Hong Kong University of Science and Technology**  
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**Breakdown of the estimate for consultants' fees**<sup>(Note 1)</sup>

		Estimated man- months	Average MPS* salary point	Multiplier (Note 2)	Estimated fees (\$ million)
(a) Consultants' fees <sup>(Note 3)</sup>					
(i) Tender assessment	Professional	–	–	–	1.1
(ii) Contract administration	Professional	–	–	–	4.8
(b) Site supervision <sup>(Note 4)</sup>	Professional	40	38	1.6	3.9
	Technical	88	14	1.6	2.8
(c) Out-of-pocket expenses <sup>(Note 5)</sup>					
Lithography and other direct expenses					0.2
				Total	12.8

\* MPS = Master Pay Scale

**Notes**

1. Having examined the consultants' fees estimated by HKUST, the Director of Architectural Services considers the figures acceptable.
2. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of site supervision staff to be employed by HKUST. (As at 1 April 2008, MPS point 38 = \$60,535 per month, and 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 **10EL**. The assignment will only be executed subject to Finance Committee's approval to upgrade **10EL** to Category A.

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4. HKUST 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 Hong Kong University of Science and Technology  
10EL - New academic building**

**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)	12 461
	Circulation areas and toilets	8 804
	Mechanical and electrical plant	<u>1 195</u>
	CFA	<u>22 460</u>
(b)	NOFA / CFA ratio	55.5%
(c)	Estimated construction unit cost (represented by the building and building services costs)	\$16,434 per m <sup>2</sup> of CFA (in September 2008 prices)