For discussion **PWSC(2006-07)33**
on 21 June 2006

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT
Medical Subventions
51MM – Prince of Wales Hospital – extension block

Members are invited to recommend to Finance Committee the upgrading of **51MM** to Category A at an estimated cost of $1,882.1 million in money-of-the-day prices for the construction of an extension block at the Prince of Wales Hospital.

PROBLEM

There is inadequate space at the Prince of Wales Hospital (PWH) to meet the standards of a modern tertiary acute hospital for the long-term medical needs of the community in the New Territories East (NTE).

PROPOSAL

2. The Director of Architectural Services (D Arch S), with the support of the Secretary for Health, Welfare and Food, proposes to upgrade **51MM** to Category A at an estimated cost of $1,882.1 million in money-of-the-day (MOD) prices for the construction of an extension block at the PWH.

/**PROJECT** .....

PROJECT SCOPE AND NATURE

3. The scope of **51MM** covers the construction, at the existing helipad and tennis court of PWH, of a new block of around 800 in-patient beds for the provision of all essential services for the acute, emergency and critical care of adult patients. With a total construction floor area (CFA) of 75 650 square meters (m^2), the proposed new block will accommodate –

(a) in-patient wards for medicine and therapeutics, surgery, cardiothoracic surgery, neurosurgery, orthopaedics and traumatology and infectious diseases;

(b) intensive care unit;

(c) coronary care / high dependency / neurosurgery high dependency units;

(d) burns unit;

(e) diagnostic radiology and organ imaging department (in-patient);

(f) accident and emergency department;

(g) anaesthesiology and operating theatre suite;

(h) ambulatory surgery;

(i) core / rapid response laboratory;

(j) blood bank;

(k) pharmacy;

(l) sterile supplies department / theatre sterile supplies unit;

(m) mortuary; and

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(n) ancillary facilities for patient relations / risk management office, shroff / accounting office, security office and control room, allied health satellite treatment areas, hospital data centre, communications, registration and admission, linen service, waste collection, information / enquiry counter, electronic banking services, convenience store, auditorium, etc.

4. To meet the need for PWH to remain operational at all times, **51MM** involves construction of an extension block in which new accommodation is provided for meeting existing service needs and demands. This also provides capacity for decanting of existing services to facilitate future improvement plans, if need be, to meet the hospital's long-term functional needs. A site plan of the proposed new block under **51MM** is at Enclosure 1. We plan to start the construction works in June 2007 for completion in June 2010.

JUSTIFICATION

Inadequate space provision to cope with increasing service demand

5. The PWH was planned as a regional hospital in the 1970s and commenced operation in 1984, providing medical services for the population in the NTE. At the time of planning, population in the NTE region was about 203 000 which grew to over 1 300 000 in 2005. Originally, the hospital had a total space provision of around 92 000m^2 in gross floor area (GFA) for hospital operations and another 63 000m^2 GFA for staff accommodation and training. To cope with the increase in service demand, alteration and addition works have been carried out at the PWH to provide additional space as well as to maintain and improve its facilities. The works include provision of additional units of the Endoscopy Centre, the Urodynamic and Lithotripsy Centre; enlargement of the Intensive Care Unit and the Labour Ward; and construction of additional buildings such as the Cancer Centre and the Li Ka Shing Specialist Clinic (South Wing). These works led to a total increase in GFA of around 33 000m^2. Despite these improvement works, the PWH is still short of space. Discounting teaching

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facilities and staff quarters, space provision at the PWH is only around 100 m^2 per bed in terms of GFA, which is less than the space provision of 110 m^2 per bed in GFA for a secondary acute hospital such as the North District Hospital and far below the space provision of 140 m^2 per bed in GFA for Queen Mary Hospital (QMH), the other teaching and tertiary acute hospital. The PWH can only accommodate 11 operating theatres, as compared with 18 currently available in the QMH.

6. According to the latest projections of the Census and Statistics Department, the population of the NTE cluster would increase by 4.4% and 7.9% by 2010 and 2013 respectively. The Hospital Authority (HA) has critically reviewed the space requirements of PWH and considers that a total space provision of around 200 000m^2 GFA would be required to meet its service needs. Such a provision would be equivalent to 140m^2 GFA per bed and is adequate for PWH to meet its service requirements as a teaching hospital as well as major tertiary acute general hospital.

Outdated and inflexible design and facilities

7. The rather piecemeal improvement works carried out over the years have resulted in scattering of related facilities and services over different locations in the PWH. For example, patients in need of an operation have to be transported for about 20 minutes among buildings, from Blocks E and F to operating theatres located in the Clinical Sciences Building. Patients also have to walk from one end of the hospital to the other to pay fees and charges, consult doctors, receive treatment and collect drugs etc. Such an arrangement increases the transit time for staff, patients and materials. It also undermines the HA's objective of providing high quality medical services. While some relocation or reorganisation of the facilities and services might be possible, the lack of space and outdated building design render such a plan difficult to pursue without causing disturbance to the patients.

8. In addition, the original hospital design of the 1970s had no provisions for the application of computer technology and digitized clinical management information in the delivery of patient care. The existing building structures and internal layouts also do not have the flexibility to accommodate changes in service delivery models necessitated by the evolvement of the demographic structure, the trend of increasing emphasis on ambulatory care services, the emergence of new diseases and advances in medical technology.

/ Deterioration .....

Deterioration of building services and facilities

9. The heavy utilization of hospital facilities has led to faster deteriorations and shorter serviceable life spans than those normally expected of building finishes, fixtures and building services installations. However, as a result of the high occupancy and utilization rates, coupled with the limited space available for decanting arrangements and the need to minimize disruptions of services, it has always been difficult for major preventive maintenance programmes, which are normally scheduled for building services installations, to be carried out at the PWH. Only day-to-day patch repair works can be carried out, where finishes, fixtures and other installations have become rather dilapidated in condition. Examples of the unsatisfactory conditions of the existing buildings and building services installations at the PWH, which may pose risks of safety hazards to both patients and staff, include –

(a) the lift service of PWH is slow, inefficient and inadequate, with lifts not designated into those for use by patients, by staff or for transporting materials. This not only results in long waiting time during peak hours or when the lifts are used for materials transport, but also increases the potential risks of cross infection;

(b) the central air-conditioning system is already fully loaded and can no longer cover further service expansions in PWH; and

(c) there is a complete lack of mechanical transport systems such as pneumatic tubes for urgent despatch of drugs, documents or samples for laboratory testing, which have become a standard feature in modern hospital design for achieving operational efficiency and covering situations requiring prompt medical attention.

Need for improvement

10. To ensure that adequate space and modern and safe services and facilities will be provided to meet current standards and future needs in the coming decades, the HA proposes to carry out improvement plans for the PWH. The plans will enable the PWH to be updated to match the standards of a modern tertiary acute hospital, with a patient-oriented setting that improves patient comfort, achieves operational efficiency, and meets the challenges of clinical and technological advances.

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11. On completion of a new block as proposed in the current project, the PWH would be able to meet service and teaching demands. While the construction of the new block could be a stand-alone project without any consequential implications on the existing blocks, it would also provide capacity for decanting of existing services to facilitate future improvement plans, if need be.

12. Planning ahead for the PWH's long term functional needs, the HA's latest conceptual plan sees scope for rationalising some of the facilities in the existing blocks along the following directions :

(a) changes to the existing Staff Quarters Blocks A, C and D into a second in-patient block accommodating services such as in-patient wards for obstetrics and gynaecology, clinical oncology, and paediatrics; neo-natal and paediatric intensive care unit; and delivery suite with operating theatres and labour-delivery-recovery rooms etc;

(b) changes to the existing Main Block (Blocks A, B, C and D) into an ambulatory care as well as diagnostic and treatment block accommodating services such as diagnostic radiology and organ imaging department (out-patient); psychiatry in-patient and support services; ambulatory diagnostic, intervention and treatment facilities for services such a ophthalmology and visual sciences endoscopy, lithotripsy and uro-investigation, dialysis and peritoneal haemodialysis; ambulatory procedure and rehabilitation facilities such as diabetes mellitus and endocrine centre; out-patient facilities such as family medicine training centre etc;

(c) improvements to the building services in the existing Clinical Building and Li Ka Shing Specialist Outpatient Clinics; and to rationalize the provisions of clinical support, teaching and research facilities located in these buildings; and

(d) identification of possible locations for greening works along the "Green Zone" concept.

FINANCIAL IMPLICATIONS

13. We estimate the capital cost of the project to be $1,882.1 million in MOD prices (see paragraph 14 below), made up as follows -

/(a) .....

			$ million	
(a)	Site works		14.0	
(b)	Piling		133.3	
(c)	Building		588.1	
(d)	Building services		525.8	
(e)	Drainage		8.3	
(f)	External works		38.1	
(g)	Link bridge and connections		57.8	
(h)	Furniture and equipment (F&E)[1]		250.0	
(i)	Consultancy fees for		5.3	
	quantity surveying (QS) services	4.3		
	risk management consultancy services	1.0		
(j)	Contingencies		136.5	
	Sub-total		1,757.2	(in September 2005 prices)
(k)	Provisions for price adjustment		124.9	
	Total		1,882.1	(in MOD prices)

Item (b) above is for piling works in connection with the construction of the new block, including construction of large diameter bored piles. Items (c) and (d) above are for builder's works and building services works in connection with the construction of the new block. The builders works involve superstructure construction, plumbing / drainage installations, provision of finishes / fittings / fixtures, landscaping and other associated works (including all necessary temporary works). The building services works include provision of electrical installations, air-conditioning / mechanical ventilation systems, fire services installations, emergency generator sets, hot water supply systems, lifts, medical gas installations and other associated works. We propose to engage consultants to

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[1] Based on an indicative list of F&E items and their estimated prices.

undertake QS services and risk management consultancy services. A breakdown of the estimate for consultant's fees by man-months is at Enclosure 2. The CFA of **51MM** is 75 650 m^2. The estimated construction unit cost, represented by building and building services costs, is $14,724 per m^2 of CFA in September 2005 prices. We consider this unit cost reasonable as compared with other similar hospital projects.

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

Year	$ million (Sept 2005)	Price Adjustment factor	$ million (MOD)
2007 – 08	30.0	1.03023	30.9
2008 – 09	400.0	1.04568	418.3
2009 – 10	650.0	1.06136	689.9
2010 – 11	300.0	1.07728	323.2
2011 – 12	250.0	1.10152	275.4
2012 – 13	100.0	1.12906	112.9
2013 – 14	27.2	1.15729	31.5
	1,757.2		1,882.1

15. 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 2007 to 2014. We will tender the project as a design-and-build contract. We intend to award the contract on a lump-sum basis because we can clearly define the scope of the works in advance, leaving little room for uncertainty. The contract will provide for price adjustments because the contract period will exceed 21 months.

16. The HA has assessed the requirements for F&E for this project, and estimates the F&E cost to be $250.0 million**.** The proposed F&E provision represents 21.5% of the total construction cost[2] of the project. An indicative list of major F&E items (costing $1 million or above per item) to be procured for the project is at Enclosure 3.

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[2] Represented by building, building services, and drainage and external works costs for this project.

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17. We estimate the additional annual recurrent expenditure arising from the project to be $84.0 million.

PUBLIC CONSULTATION

18. The HA consulted the Sha Tin, North and Tai Po District Councils on 23 March, 6 April and 11 May 2006 respectively. Members of the District Councils supported the project.

19. We consulted the Legislative Council Panel on Health Services (the Panel) on 8 May and 12 June 2006. Members of the Panel supported the project.

ENVIRONMENTAL IMPLICATIONS

20. **51MM** is not a designated project under the Environmental Impact Assessment Ordinance (Cap 499). D Arch S completed a Preliminary Environmental Review (PER) in 2001. The PER concluded that the project would not have long-term environmental impact and that further environmental studies would not be necessary.

21. During construction, we will control noise, dust and site run-off 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 for noisy construction activities, frequent cleaning and watering of the sites, and the provision of wheel-washing facilities.

22. We have considered measures in the planning and design stages to reduce the generation of construction and demolition (C&D) materials where possible. In addition, we will require the contractor to reuse inert C&D materials on site or in other suitable construction sites as far as possible, in order to minimise the disposal of C&D materials to public fill reception facilities. We will encourage the contractor to maximise the use of recycled or recyclable C&D materials, as well as the use of non-timber formwork to further minimise the generation of construction waste.

23. We will also require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse and recycle C&D materials. We will ensure that the day-to-day operations on site comply with the approved WMP. We will control the disposal of public fill and C&D waste to public fill reception facilities and landfills respectively through a trip-ticket system. We will require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

24. We estimate that the project will generate about 72 100 tonnes of C&D materials. Of these, we will reuse about 7 200 tonnes (10.0%) on site, and deliver 61 000 tonnes (84.6%) to public fill reception facilities[3] for subsequent reuse. In addition, we will dispose of 3 900 tonnes (5.4%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be $2.1 million for this project (based on a unit cost of $27/tonne for disposal at public fill reception facilities and $125/tonne[4] at landfills).

LAND ACQUISITION

25. The project does not require land acquisition.

/**BACKGROUND** .....

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

BACKGROUND INFORMATION

26. We upgraded **51MM** to Category B in October 2003. We engaged consultants to carry out PER, traffic impact assessment (TIA), utility mapping and topographical survey, and employed a term contractor to carry out site investigation works. We also appointed a consultant to perform pre-contract QS services. The total cost of these consultancy services and works is about $3.1 million. We have charged this amount to block allocation **Subhead 8100MX** "Hospital Authority – improvement works, feasibility studies, investigations and pre-contract consultancy services for building projects". The consultants have completed the PER, TIA, utility mapping and topographical survey, and the term contractor has completed the site investigation works. The QS consultant is carrying out the pre-contract QS services. We are concluding the project requirements with in-house staff resources and the QS consultant is also finalising the tender documents of the project.

27. **51MM** may involve removal of 89 trees including 51 trees to be felled and 38 trees to be transplanted elsewhere (subject to finalisation of design). All trees to be removed are not important trees[5]. We will incorporate planting proposals as part of the project, including estimated quantities of 110 trees and 24 000 shrubs.

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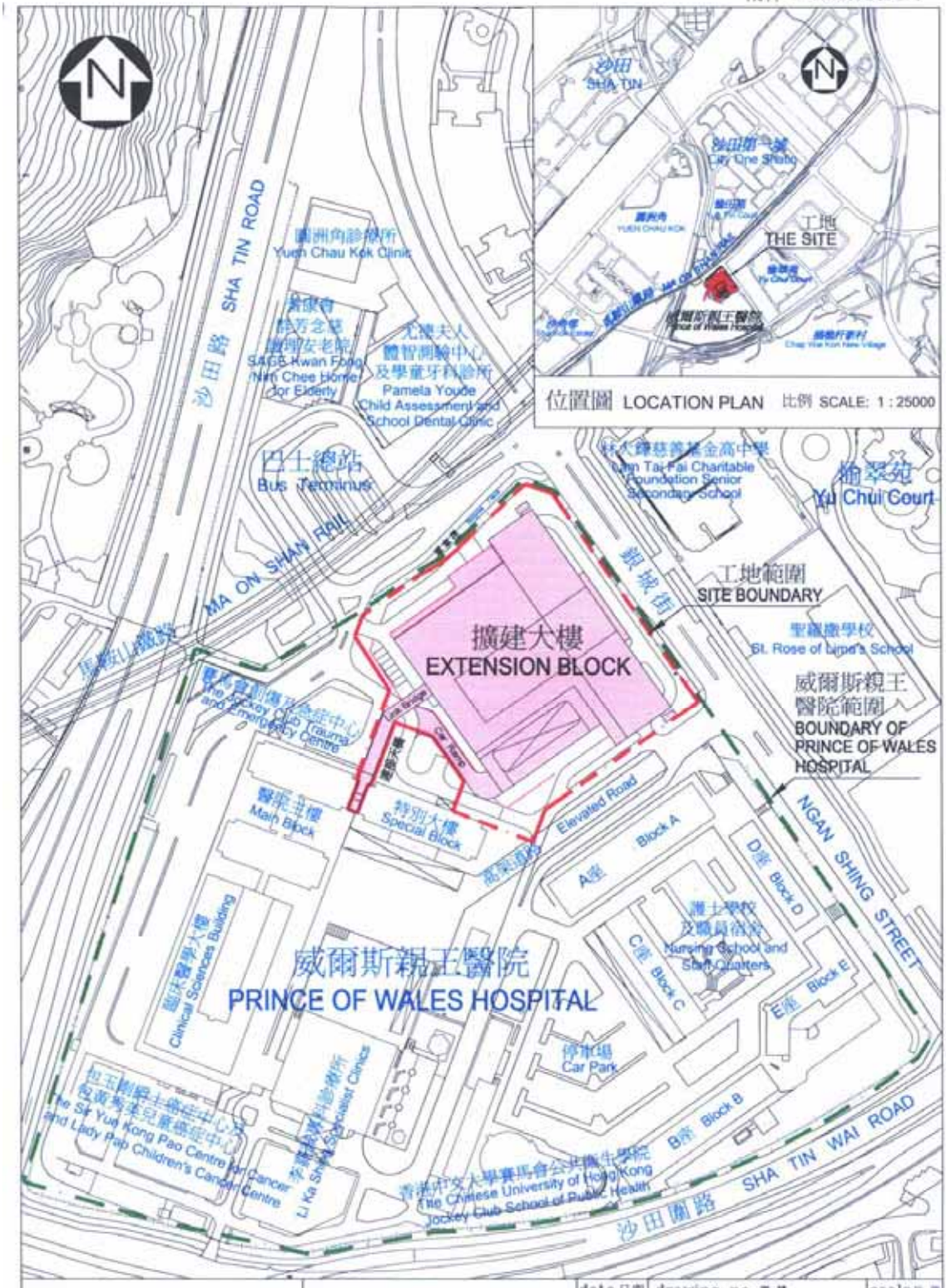
[5] Important trees refer to trees on the Register of Old and Valuable Trees, and any other trees which meet one or more of the following criteria –
(a) trees over 100 years old;
(b) trees of cultural, historical or memorable significance;
(c) trees of precious or rare species;
(d) trees of outstanding form; or
(e) trees with trunk diameter exceeding one metre (measured at one metre above ground level).

28. We estimate that the proposed works under **51MM** will create about 1 190 jobs (1 080 for labourers and another 110 for professional/technical staff) providing a total employment of 31 900 man-months.

Health, Welfare and Food Bureau
June 2006

附件一 Enclosure 1



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	approved 覆核 C.I. LING	date 日期 03-06		
	office 辦事處 PROJECT MANAGEMENT BRANCH 工程策劃管理處		ARCHITECTURAL SERVICES DEPARTMENT 建築署	

Enclosure 2 to PWSC(2006-07)33

51MM – Prince of Wales Hospital – extension block

Breakdown of the estimate for consultant's fees

Consultant's staff cost		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($million)
Quantity surveying services (Note 2)	Professional	-	-	-	1.2
	Technical	-	-	-	3.1
				Sub-total	4.3
Risk management consultancy services (Note 3)	Professional	5.6	38	2.0	0.6
	Technical	11.1	14	2.0	0.4
				Sub-total	1.0
				Total	5.3

*MPS = Master Pay Scale

Notes

(1) A multiplier of 2.0 is applied to the average MPS point to estimate the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultants' offices. (At 1 January 2005, MPS point 38 is $54,255 per month and MPS point 14 is $18,010 per month.)

(2) The consultant's staff cost for quantity surveying services is calculated in accordance with the existing consultancy agreement for the provision of quantity servicing services for **51MM**. The assignment will only be executed subject to Finance Committee's approval to upgrade **51MM** to Category A.

(3) We will only know the actual man-months and actual fees after we have selected the consultants through the usual competitive bidding system.

Enclosure 3 to PWSC(2006-07)33

51MM - Prince of Wales Hospital – extension block

Indicative list of furniture and equipment items with unit cost of $1 million or more

Item description	Quantity	Unit cost ($ million)	Total cost ($ million)
Automated analyzer for infectious disease and cancer markers	1	1.500	1.500
Automated haemostasis investigation system	1	2.550	2.550
Automated immunodiagnostic system	1	2.100	2.100
Automatic dispensing machine	1	1.500	1.500
Blood bank automation	1	1.850	1.850
Cart washing machine	1	2.180	2.180
Ceiling pendant system	1	6.400	6.400
Central monitoring system	1	1.000	1.000
Central monitoring system and information system	1	4.500	4.500
Computed radiography imaging system	1	1.000	1.000
Computed radiography system (basic)	1	1.000	1.000
Computed radiography system (basic) with dry film printer	1	1.000	1.000
Computed tomography imaging system	1	15.000	15.000
Critical care blood gas analyzer	1	2.800	2.800
Digital subtraction angiography imaging	1	15.000	15.000

Item description	Quantity	Unit cost ($ million)	Total cost ($ million)
system			
Direct digital radiography imaging system	3	5.000	15.000
Direct digital radiography mobile X-ray unit	2	2.000	4.000
Double-door steam sterilizer with floor loading	7	1.560	10.920
Echocardiogram machine	1	1.400	1.400
Echocardiogram management system	1	1.000	1.000
Fluoroscopy imaging system	1	4.500	4.500
Fluoroscopy interventional radiology imaging system	1	13.000	13.000
General digital radiographic unit with digital image storage and retrieval system	1	1.480	1.480
Haematology automation	1	9.500	9.500
Laboratory automation system	1	18.500	18.500
Laminar air flow isolation room	3	1.100	3.300
Medication dispensing storage and picking system	1	1.140	1.140
Mobile C-arm unit	2	1.300	2.600
Mortuary chambers	1	10.000	10.000
Patient monitoring and information system	1	9.600	9.600
Pharmaceutical bulk storage system	1	1.032	1.032

Item description	Quantity	Unit cost ($ million)	Total cost ($ million)
Physiological monitoring system	2	1.300	2.600
Picture archiving and communication system	1	7.600	7.600
Plasma sterilizer	1	2.000	2.000
Toxicology preliminary screening analyzer	1	1.310	1.310
Washer disinfector	5	1.240	6.200
Wireless patient monitoring system	1	1.100	1.100
X-ray fluoroscopy with bed	1	1.500	1.500