

For discussion  
on 17 December 2003

PWSC(2003-04)58

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

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

#### **Medical Subventions**

#### **56MM – Enhancement of infection control facilities in the public hospital system (Batch A)**

Members are invited to recommend to Finance Committee the approval of an increase in the approved project estimate for **56MM** from \$287.2 million by \$68.1 million to \$355.3 million in money-of-the-day prices.

#### **PROBLEM**

The approved project estimate for **56MM** is insufficient for the works under the project.

#### **PROPOSAL**

2. The Director of Architectural Services (D Arch S), with the support of the Secretary for Health, Welfare and Food, proposes to increase the approved project estimate for **56MM** from \$287.2 million by \$68.1 million to \$355.3 million in money-of-the-day (MOD) prices.

**/PROJECT .....**

**PROJECT SCOPE AND NATURE**

3. The original scope of **56MM** comprises modification of 50 wards in six public hospitals, namely, Pamela Youde Nethersole Eastern Hospital (PYNEH), Prince of Wales Hospital (PWH), Princess Margaret Hospital (PMH), Queen Elizabeth Hospital (QEH), Queen Mary Hospital (QMH) and Tuen Mun Hospital (TMH), to provide the standard facilities required for isolation rooms, where such facilities are not previously provided, by -

- (a) creation of negative pressure gradient with air flowing from “clean” zones (e.g. ward corridors) to “dirty” zones (e.g. patient rooms);
- (b) provision of 100% fresh air supply at no less than 12 air changes per hour;
- (c) installation of low level exhaust for better air flow pattern;
- (d) installation of high efficiency particulate air (HEPA) filter for filtering out droplets and aerosols;
- (e) air-tight construction for patient rooms to prevent cross contamination;
- (f) addition of doors to close off existing open cubicles;
- (g) provision of en-suite toilet / shower facilities in ward cubicles where existing building structure and building services installation permit; and
- (h) provision of infection control facilities for hospital staff, such as gowning / de-gowning areas, changing rooms, shower facilities and clinical wash-hand basins.

----- In addition, alteration works for existing treatment facilities, such as operating theatres, intensive care units (ICUs) and accident and emergency departments in five of the six hospitals would also be conducted. The original scope and nature of works of the six public hospitals is set out at Enclosure 1. In addition, there would be additional isolation beds in the intensive care units.

4. **56MM** was last submitted to this Subcommittee for scrutiny together with **57MM**, which was a project of similar nature. The hospitals covered by **57MM** were Alice Ho Miu Ling Nethersole Hospital (AHNH), Kwong Wah Hospital (KWH) and United Christian Hospital (UCH). The Hospital Authority (HA) is the works agent of **57MM**.

#### JUSTIFICATION

5. The project was planned and has to be completed within an extremely tight time frame. We had not been able to follow the usual approach of developing detailed user requirements and working out detailed cost estimates before seeking funding approval from the Finance Committee (FC). In the submission made to this Subcommittee on 2 July 2003 for **56MM** vide PWSC(2003-04)47, we mentioned that we accepted Hospital Authority (HA)'s *preliminary* cost estimates for the works involved in the six hospitals as the control figures for **56MM** given the extremely tight time frame for completion of the works required in the event of a resurgence of SARS later in the year. In tandem with the process of seeking funding approval from FC, D Arch S, as the works agent for **56MM**, will deploy in-house staff resources to develop the detailed user requirements and detailed cost estimates to satisfy himself the extent to which HA's preliminary cost estimates are correct. We further mentioned that whilst we had not been able to adhere to the usual sequential approach with the Controlling Officer (i.e. D Arch S for **56MM**) having vetted the preliminary cost estimates before seeking funding approval from FC, we were satisfied that concurrent processing was the only way forward to achieve the target project delivery date.

6. In the course of developing the detailed user requirements and detailed cost estimates, we had to adjust the scope of works for each hospital according to the actual site configurations and site constraints. Because of the constraints posed by the actual site configurations, the number of beds that the non-ICU isolation rooms can accommodate will be 784 upon completion of works if the isolation rooms are to accommodate one, two or four beds during an infectious disease outbreak. This means 87 beds less than the originally planned number of 871 beds. Nevertheless, in order to maintain existing hospital services and to meet the operational needs of the hospitals during normal times, we have to fit out and make provisions for the use of additional beds in the isolation rooms to accommodate up to eight patients when the isolation rooms are used as general wards during normal times. Upon completion of works under **56MM**, the total

/number .....

number of beds that the non-ICU isolation rooms can accommodate at normal times will be 868 (i.e. these rooms can accommodate 84 more patients when not being used as isolation rooms). All supporting systems, including the air-conditioning and ventilation systems, have also been designed to cater for a larger number of patients when the isolation rooms are used as general wards when there is no infectious disease outbreak.

7. The last outbreak of the Severe Acute Respiratory Syndrome (SARS) revealed that the provision of ICU isolation beds in the public hospital system was inadequate. Under the original project scope of **56MM**, we planned to provide 19 ICU isolation beds, with ten in QMH and nine in PMH. In the course of the works, we found that there was room to provide more isolation beds in the ICUs of five hospitals, namely, QMH, PMH, QEH, TMH and PYNEH. Taking into account that the ICU isolation beds can be used as non-ICU isolation beds *but not vice versa*, we have made use of the space available to provide more ICU isolation beds than originally planned. Upon completion of the works under **56MM**, there will be 40 additional ICU isolation beds in the hospitals concerned.

8. Taking into account the ICU isolation beds, the total number of isolation beds that can be provided in the isolation rooms and ICUs during an infectious disease outbreak is 843 (comprising 784 non-ICU isolation beds and 59 ICU isolation beds), which is 47 beds less than the originally planned number of 890 (comprising 871 non-ICU isolation beds and 19 ICU isolation beds). However, taking into account the 84 additional beds that can be provided when the isolation rooms are used as general wards at normal times, the total number of beds provided by **56MM** will be 927. We have set out at Enclosure 2 a comparison between the original and revised numbers of beds provided by **56MM**. As we have to fit out extra space to cater for the provision of additional beds in both ICUs and non-ICU isolation rooms, the construction floor area (CFA) relating to **56MM** is increased from 28 200 square metres (m<sup>2</sup>) by 416 m<sup>2</sup> to 28 616 m<sup>2</sup>.

9. We estimate the additional funding required arising from the increase in number of beds for use at normal times; number of ICU isolation beds; CFA; and the capacities of the supporting systems to be \$5.2 million in MOD prices.

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10. In the course of the works, the Architectural Services Department (ArchSD) has also encountered unforeseeable problems that require additional expenditure to resolve. The building conditions of some of the wards, particularly those in PWH, TMH and Block F of QEH where no major refurbishment works have been carried out before, were neither satisfactory nor fit for conversion into isolation rooms. Examples of the problems encountered include concrete spalling, water penetration and pipeworks which were at the end of their serviceable life. Most of these problems were not discernible while the wards were in active use; some could only be identified when works had actually started. Urgent repair and rectification works for these wards had to be carried out before the actual conversion works could begin. These urgent repair and rectification works had not been budgeted for in the original project estimate.

11. Furthermore, ArchSD also found that the capacity of the power supply in TMH, PWH, QMH and PYNEH was insufficient to support the new air-conditioning and mechanical ventilation systems in the isolation wards. In addition, the chilled water supply in five of the six hospitals, namely, PYNEH, PWH, PMH, QMH and TMH, was also inadequate to support these systems. These problems were not apparent before developing the detailed user requirements. We therefore have to incur significant additional expenditure to enlarge the capacity of the power and chilled water supply in the hospitals concerned by adding transformers, generator sets and chillers.

12. We estimate the additional funding required for the unforeseeable repair, rectification and major alteration works to be \$48.1 million in MOD prices.

13. To facilitate the carrying out of the works under **56MM**, we had to arrange decanting of the existing hospital wards. As most of the hospital services provided by these wards are essential, ArchSD had to carry out necessary diversion works for building services such as plumbing and drainage as well as medical gas and hot water supply systems to ensure that the existing hospital services can continue to be provided elsewhere in the hospital. The costs for services diversion for PWH, QEH and TMH were particularly high due to the need to re-route essential building services including the fire services systems, automatic fire alarm systems and medical gas supply systems.

14. The original project estimate of **56MM** had been worked out based on the assumption that we would decant the wards to be converted into isolation wards in one go. However, as all of the six hospitals are major acute hospitals, we have faced considerable difficulties in arranging decanting in one go without affecting the existing hospital services. In the end, the works could only be completed in two phases in accordance with the decanting plans. As a result, ArchSD had to carry out works at night for almost the entire duration of the project in order to suit the operational needs of the hospitals concerned and to expedite the completion of the works. This in turn leads to extra costs and time for carrying out the works under **56MM**.

15. We estimate the additional funding required for night works and other additional works consequential to a two-phase decanting programme as well as services diversion works to be \$14.8 million in MOD prices.

16. The works under **57MM** have been substantially completed. HA estimates there would be no need to seek additional funding from the Finance Committee for the project. This is mainly due to the fact that AHNH, KWH and UCH either are “newer” in terms of their “age” or have previously undergone major refurbishment works. Although problems of concrete spalling and water penetration have also been encountered at AHNH and KWH, the extent of additional repair and rectification works required to be carried out in the course of the conversion works was comparatively small. Moreover, the scale of **57MM** is smaller than that of **56MM**. Decanting of hospital services could therefore be arranged more easily.

17. Based on the additional funding requirements as set out in paragraphs 6 to 15 above, D Arch S considers it necessary to increase the approved project estimate for **56MM** from \$287.2 million by \$68.1 million to \$355.3 million in MOD prices (see paragraph 18 below). A breakdown for the proposed increase of \$68.1 million is as follows -

/Amount .....

	<b>Amount (\$ million)</b>	<b>% of the total additional amount</b>
(a) Increase in number of beds for use at normal times; number of ICU isolation beds; CFA; and the capacities of the supporting systems	5.2	7.7
(b) Repair, rectification and major alteration works	48.1	70.6
(c) Additional expenditure caused by phased decanting and services diversion works	14.8	21.7
Total	68.1	100.0

----- A comparison between the cost breakdowns of the approved project estimate and the revised project estimate (both in MOD prices), together with reasons leading to the proposed increase in the approved project estimate, are set out at Enclosure 3.

## **FINANCIAL IMPLICATIONS**

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

	<b>\$ million (MOD)</b>
2003-04	260.0
2004-05	95.3
Total	355.3

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19. HA estimates that the additional annual recurrent expenditure arising from project **56MM** during periods when there is no infectious disease outbreak would not be significant. With the implementation of the population-based funding mechanism, the provision of recurrent funding will no longer be facility-based. No separate resources will therefore be provided to HA to cover the recurrent consequences arising from **56MM**.

## **PUBLIC CONSULTATION**

20. We consulted the Legislative Council Panel on Health Services on the proposal on 8 December 2003. Panel Members noted the proposal.

## **ENVIRONMENTAL IMPLICATIONS**

21. The proposed increase in approved project estimate would unlikely lead to adverse environmental implications. We estimate that the proposed increase in approved project estimate will generate about 62.4 cubic metres (m<sup>3</sup>) of C&D materials. Of these, we will reuse about 2.2 m<sup>3</sup> (3.5%) on site and 50.2 m<sup>3</sup> (80.5%) as fill in public filling areas<sup>1</sup> and dispose of 10.0 m<sup>3</sup> (16%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$1,250 for this project (based on a notional unit cost<sup>2</sup> of \$125/m<sup>3</sup>).

## **LAND ACQUISITION**

22. The proposed increase in the approved project estimate does not require land acquisition.

## **/BACKGROUND .....**

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<sup>1</sup> A public filling area is a designated part of a development project that accepts public fill for reclamation purposes. Disposal of public fill in a public filling area requires a licence issued by the Director of Civil Engineering.

<sup>2</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 per m<sup>3</sup>), nor the cost to provide new landfills (which are likely to be more expensive) when the existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.



**BACKGROUND INFORMATION**

23. In July 2003, the Finance Committee approved the upgrading of the **56MM** to Category A at an estimated cost of \$287.2 million in MOD prices.

24. We started works in end July / early August 2003. Due to operational needs and the lack of space for temporary reprovisioning of existing hospital services in some hospitals, decanting of wards for conversion into isolation wards could not be carried out in one go and we had to conduct the improvement works in phases. We have completed the alteration and addition works for PYNEH and PWH, and for part of the wards in PMH, TMH, QEH and QMH by end October 2003. We shall commence the alteration and addition works for the remaining wards in PMH, TMH, QEH and QMH as soon as additional funding is approved by the Finance Committee. We expect the remaining alteration and addition works to be completed by end January 2004.

25. **56MM** does not involve any tree removal or planting proposals.

26. We estimate that the increase in the approved project estimate will create some 150 jobs, comprising ten professional / technical staff and 140 labourers, totalling 200 man-months.

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Health, Welfare and Food Bureau  
Architectural Services Department  
December 2003

## Enclosure 1 to PWSC(2003-04)58

### 56MM – Enhancement of infection control facilities in the public hospital system (Batch A)

Hospital	Scope of works
PYNEH	Alteration and addition (A&A) works in five wards and the Accident & Emergency (A&E) Department, covering a total Construction Floor Area (CFA) of around 4 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 50 beds for confirmed SARS patients</li><li>• 72 beds for suspected SARS patients</li><li>• infection control / isolation facilities in A&amp;E Department</li></ul>
PWH	Conversion / A&A works in six wards, covering a CFA of around 3 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 48 beds for confirmed SARS patients</li><li>• 60 beds for suspected SARS patients</li></ul>
PMH	Conversion of 12 wards covering a CFA of around 5 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 108 beds for confirmed SARS patients</li><li>• 84 beds for suspected SARS patients</li><li>• nine Intensive Care Unit (ICU) beds</li></ul>
QEH	Conversion / A&A works in 11 wards, covering a CFA of around 5 500 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 36 beds for confirmed SARS patients</li><li>• 124 beds for suspected SARS patients</li><li>• infection control / isolation facilities in ICU</li></ul>
QMH	Conversion / A&A works in six wards and Operating Theatre (OT) suite, covering a total CFA of around 3 200 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 54 beds for confirmed SARS patients</li><li>• 46 beds for suspected SARS patients</li><li>• 10 ICU beds</li><li>• one negative-pressure OT</li></ul>
TMH	A&A works in ten wards and the A&E Department, covering a total CFA of around 6 000 m <sup>2</sup> to provide - <ul style="list-style-type: none"><li>• 48 beds for confirmed SARS patients</li></ul>

- 141 beds for suspected SARS patients
- infection control / isolation facilities in emergency observation and pre-admission ward, the A&E Department, ICU and High Dependency Unit (HDU)

**Enclosure 2 to PWSC(2003-04)58**

**56MM - Enhancement of infection control facilities in the public hospital system  
(Batch A)**

<b>Hospital</b>	<b>Number of beds to be provided</b>			<b>Number of beds originally estimated</b>	
	<b>ICU Isolation Beds</b>	<b>Isolation Wards</b>		<b>ICU Isolation Beds</b>	<b>Isolation Wards</b>
		<b>Isolation Beds</b>	<b>Additional Beds for use at normal times</b>		
<b>PYNEH</b>	10	106	-	-	122
<b>PWH</b>	-	109	-	-	108
<b>PMH</b>	13	200	48	9	192
<b>QEH</b>	10	131	6	-	160
<b>QMH</b>	12	78	6	10	100
<b>TMH</b>	14	160	24	-	189
		784	84		
<b>Sub-total</b>	59	868		19	871
<b>Total</b>		927			890

**Enclosure 3 to PWSC(2003-04)58**

**56MM – Enhancement of infection control facilities in the public hospital system (Batch A)**

A comparison between the cost breakdowns of the approved project estimate and the revised project estimate (both in MOD prices) is as follows -

	<b>Approved Project Estimate (in MOD prices) \$ million</b>	<b>Revised Project Estimate (in MOD prices) \$ million</b>
(a) Building	156.7	183.2
(b) Building Services	104.5	158.4
(c) Contingencies	26.0	13.7
<b>Total</b>	<b>287.2</b>	<b>355.3</b>

2. As regards (a), the increase of \$26.5 million in building costs comprises –

- (i) an increase of \$3.7 million due to increase in CFA;
- (ii) an increase of \$12.5 million due to repair and rectification works to fix problems of concrete spalling, water penetration and defective services pipeworks; and associated builder's works for the additional building services alteration works as mentioned in paragraph 3 below, such as provision of new transformer rooms; and
- (iii) an increase of \$10.3 million due to the additional costs arising from the need to carry out works in phases, including the carrying out of works at night in order to suit the operational needs and decanting plans of the hospitals concerned; as well as services diversion and connection / disconnection works.

3. As regards (b), the increase of \$53.9 million in building services costs comprises –

- (i) an increase of \$2.5 million due to increase in CFA;

- (ii) an increase of \$44.0 million due to the upgrading of power supply systems to support the new air-conditioning and mechanical ventilation systems, including the addition of transformers; and the provision of air-conditioning chillers; and
  - (iii) an increase of \$7.4 million due to the additional costs arising from the need to carry out works in phases, including the carrying out of works at night in order to suit the operational needs and decanting plans of the hospitals concerned; as well as services diversion and connection / disconnection works.
- 4. As regards (c), the decrease of \$12.3 million in contingencies represents a reduced requirement for contingencies upon completion of the alteration and addition works for PYNEH and PWH as well as partial completion of the works in PMH, TMH, QEH and QMH by end October 2003.