

ITEM FOR FINANCE COMMITTEE

CAPITAL WORKS RESERVE FUND HEAD 708 – CAPITAL SUBVENTIONS AND MAJOR SYSTEMS AND EQUIPMENT

Transport Department

New Subhead “Replacement of the High Voltage and Low Voltage Switchboards, Transformers and Associated Power Supply Equipment of the Electricity Supply and Distribution System in the Aberdeen Tunnel”

Members are invited to approve a new commitment of \$24.6 million for replacing switchboards, transformers and associated power supply equipment of the electricity supply and distribution system in the Aberdeen Tunnel.

PROBLEM

The existing electricity supply and distribution system in the Aberdeen Tunnel (ABT) comprises high and low voltage switchboards, transformers and associated power supply equipment (e.g. generators and cables). Most of the core components of the system are reaching the end of their serviceable life.

PROPOSAL

2. We propose to replace the switchboards, transformers and associated power supply equipment of the existing electricity supply and distribution system of the ABT at an estimated cost of \$24.6 million to ensure a stable and reliable power supply for safe, efficient and cost-effective tunnel operation.

/JUSTIFICATION

JUSTIFICATION

3. The existing electricity supply and distribution system in question was put in use when the ABT was opened in 1982. Most of the core components of the system are reaching the end of their serviceable life. The switchboards and transformers have deteriorated to a state beyond economic repair, and it has become increasingly difficult to maintain them in good operating conditions. In addition, as these switchboards and transformers are mostly of an old design, most of their spare parts have already become obsolete. For example, the oil circuit breakers of the high voltage switchboard are currently not available in the market.

4. To ensure efficient and safe tunnel operation during power failure, we also propose to retrofit the essential power supply system. Instead of using no-break generators, we propose to use two uninterruptible power supply systems with emergency generators^{Note}. This complies with the latest design requirements of the Transport Department and Highways Department, and will provide a more reliable power supply in case of power failure.

5. Any problems with the electricity supply and distribution system will directly affect the normal operation of the tunnel. If the service of the ABT has to be suspended due to power failure, there will be serious traffic congestion on the roads linking Aberdeen and the city area of Hong Kong Island. We therefore consider the proposed replacement essential.

FINANCIAL IMPLICATIONS

6. We estimate the capital cost of the project to be \$24.6 million, made up as follows -

/(a)

^{Note} The major function of the essential power supply system is to provide emergency lighting for the tunnels to allow for evacuation during power failure. It is specified in the Public Lighting Design Manual published by the Highways Department that the essential power for the tunnel lighting shall be fed by uninterruptible power supply connected to generators. This would be more reliable than a no-break generator system. Besides, the uninterruptible power supply plus emergency generators system provides a smoother transition in case of power interruption.

		\$ million
(a)	Replacement of	16.2
	(i) two high voltage switchboards	5.5
	(ii) six low voltage switchboards	4.0
	(iii) six transformers	3.8
	(iv) high voltage cables	1.2
	(v) low voltage cables	1.4
	(vi) cable tray and other mounting accessories	0.3
(b)	Improvements to the essential power supply system (two uninterruptible power supply systems with two emergency generators)	3.6
(c)	Electrical and Mechanical Services Trading Fund project management charges	2.8
(d)	Contingency (10% of (a) and (b))	2.0
Total		24.6

7. On paragraphs 6(a) and (b) above, the total cost of \$19.8 million will cover the supply, installation, testing and commissioning of all high voltage switchboards, low voltage switchboards, transformers and associated power supply equipment (e.g. generators and cables).

8. On paragraph 6(c) above, the Director of Electrical and Mechanical Services will carry out the project's feasibility study, prepare the specifications, design and project programme, oversee the tendering process, undertake site inspection, installation supervision, testing and commissioning of the system, and monitor the defect rectification during the defect liability period.

9. We intend to phase the expenditure as follows -

Year	\$ million
2005-2006	0.25
2006-2007	1.25
2007-2008	16.0
2008-2009	7.1
Total	24.6

10. Since this is a replacement of the existing equipment, there will not be any additional recurrent expenditure.

11. The above proposal will have no impact on the level of the tolls of the ABT.

IMPLEMENTATION PLAN

Encl. 12. The replacement project is scheduled to start in late 2005 and will take about 30 months to complete. A work programme is at the Enclosure. The first ten months are for preparations including detailed investigation, system design and tendering. The subsequent 20 months are for equipment manufacturing and delivery, system installation, testing and commissioning.

13. During project implementation, we will ensure minimal disruption to the tunnel traffic as far as possible. Most of the works will be carried out at night during the routine tube closure for maintenance with the other tube adopting the one-tube-two-way operation.

BACKGROUND INFORMATION

14. The operation and management of the ABT is overseen by a management contractor. The average daily traffic of ABT was about 57 600 vehicles in 2004.

15. We consulted the Legislative Council [Panel on Transport on this proposal on 25 February 2005](#). Members noted the proposal and had not raised any questions.

Environment, Transport and Works Bureau
May 2005

**Work Programme for Replacement of Switchboards,
Transformers and Associated Power Supply Equipment in the Aberdeen Tunnel**

	Task Name	Duration (months)	2005	2006		2007		2008
			7-12	1-6	7-12	1-6	7-12	1-6
1	System Engineering Study	4	█					
2	Detailed Design	4		█				
3	Tendering	3		█				
4	Equipment Manufacture, Installation, Testing & Commissioning	20			████████████████████			
