

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 705 - CIVIL ENGINEERING Environmental Protection - Refuse Disposal 70DR - Low-level radioactive waste storage facility

Members are invited to recommend to the Finance Committee the upgrading of **70DR** to Category A at an estimated cost of \$89.1 million in money-of-the-day prices for the design and construction of a low-level radioactive waste storage facility at Siu A Chau and the decommissioning of the existing store at the Queen's Road East.

PROBLEM

Low-level radioactive waste is stored at a disused air-raid tunnel at Queen's Road East (QRE).

PROPOSAL

2. The Director of Environmental Protection, with the support of the Secretary for the Environment, Transport and Works and the Director of Health, proposes to upgrade **70DR** to Category A at an estimated cost of \$89.1 million in money-of-the-day (MOD) prices for the design and construction of a low-level radioactive waste storage facility at Siu A Chau and the decommissioning of the existing store at the QRE tunnel.

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PROJECT SCOPE AND NATURE

3. The scope of the project comprises –
 - (a) design and construction works of the low-level radioactive waste storage facility –
 - (i) design;
 - (ii) civil engineering works, including the construction of a jetty for marine access to the facility;
 - (iii) building works;
 - (iv) provision of storage, processing, operation and laboratory equipment; and
 - (v) building services and utilities;
 - (b) transfer of existing waste to the facility; and
 - (c) decommissioning of the QRE store.

———— A site plan is at Enclosure 1. We plan to commence the proposed works in September 2003 for completion by December 2004.

JUSTIFICATION

4. At present, about 55 cubic meters (m³) of low-level radioactive waste are stored in a disused air-raid tunnel at QRE. Although the tunnels provide the necessary shielding for the waste, they are located in a densely populated area and cannot accommodate the basic support equipment, such as radiological assay and contamination control devices, for this type of facility. The structural conditions of the store also require regular monitoring.

5. We completed the Radioactive Waste Management Study in 1991. The Study concluded that the QRE tunnel store was not designed for long-term storage of such material and recommended relocation of the waste to a purpose-built storage facility as soon as possible.

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6. We estimate that about 0.3 m³ of low-level radioactive waste are generated from medical and industrial sources each year. We propose to build the storage facility with an initial storage capacity of about 70 m³. With minor modifications, the capacity can be expanded to 140 m³. This would be sufficient to accommodate the existing waste and waste arising in the next 100 years.

7. We will equip the facility with packaging equipment to package future waste. The contractor will monitor the decaying process of the waste and ensure that once the short-lived waste has decayed to a suitable level, it will be disposed of as inactive waste in landfills. This will release storage space for new waste.

8. The Department of Health (DH) has reconditioned and repackaged the existing radioactive waste of the QRE tunnel in new stainless steel containers in preparation for their relocation to the Siu A Chau facility. After the relocation, DH will decommission the tunnel store. They will also ensure that the decommissioning procedures meet the relevant international requirements.

FINANCIAL IMPLICATIONS

9. We estimate that the capital cost of the proposed works is \$89.1 million in MOD prices (see paragraph 10 below), made up as follows –

	\$ million
(a) Design and construction works of the low-level radioactive waste storage facility	75.5
(i) design	0.9
(ii) civil engineering works, including the construction of a jetty for marine access to the storage facility	12.2
(iii) building works	32.5

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(iv)	provision of storage, processing, operation and laboratory equipment	22.0	
(v)	building services and utilities	7.9	
(b)	Consultancy services	4.9	
(i)	independent assessor ¹	3.4	
(ii)	contract administration and construction supervision	1.5	
(c)	Transfer of the existing waste to the new facility	4.9	
(d)	Decommissioning of the QRE store	2.0	
(e)	Contingencies	8.6	
	Sub-total	95.9	(in September 2002 prices)
(f)	Provision for price adjustment	(6.8)	
	Total	89.1	(in MOD prices)

Due to the remoteness of the site and the special nature of the project, the Director of Environmental Protection proposes to employ a consultant as on-site representative to monitor the progress and environmental performance of the construction works. A breakdown of the estimates for the consultant's fees for contract administration and construction supervision by man-months is at Enclosure 2.

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¹ The independent assessor will be appointed by the contractor on Government's agreement. The assessor will check and certify that the contractor's design complies with the contractual requirements and that the contractor constructs the facility in accordance with the approved design.

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

Year	\$ million (Sept 2002)	Price adjustment factor	\$ million (MOD)
2003 – 04	0.9	0.94300	0.8
2004 – 05	78.3	0.93003	72.8
2005 – 06	16.7	0.93003	15.5
	95.9		89.1

11. We have derived the MOD estimate on the basis of Government's latest forecast of trend labour and construction prices for the period 2003 to 2006.

12. We have invited tender for the design and construction works of the proposed storage facility under a Design-Build-and-Operate (DBO) contract. We will pay the contractor the full capital costs for the design and construction works only when the contractor has satisfactorily commissioned the facility. The contract prices for the design and construction works will be lump sums and not subject to adjustment for inflation. The contractor will transfer the existing waste to the new facility after it has been commissioned. We will pay the contractor the cost of the transfer of waste (estimated to be \$4.9 million in total) by monthly instalments during the year following the commissioning of the storage facility.

13. We will require the contractor to operate the storage facility for ten years in accordance with the performance requirements laid down in the contract. The Government will pay the contractor the operating and maintenance charges for the facility by monthly instalments, the total of which is estimated to be \$15 million over the 10 years of operation. Details are at Enclosure 3.

14. The contract management, supervision, radiological monitoring and waste disposal control during the operation stage will be undertaken through redeployment of existing staff. No additional staff and other recurrent costs will be required during the 10-year operation under the DBO contract.

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15. DH will decommission the existing store at the QRE tunnel under a separate fixed lump sum price contract. There will be no recurrent cost for the decommissioning.

PUBLIC CONSULTATION

16. We consulted the Legislative Council Panel on Environmental Affairs on 15 April 1994 on the need for a purpose-built storage facility. Members raised no objection to the project. The Panel was subsequently briefed on the developments of the project on 13 June 1995, 10 April 1997 and 19 March 2001. Upon the request of the Panel, we explored the feasibility of using storage facilities in the Mainland to store the waste. After we had completed the evaluation, we consulted the Panel again on 25 February 2002 on the merits and drawbacks of building the facility at Siu A Chau and storing the waste in a Mainland facility. We proposed to build the storage facility at Siu A Chau and Members supported our proposal. On 12 June 2003, we informed the Panel of our plan to submit the project proposal to this Subcommittee. There were no objections from Members.

17. The Wanchai District Council has since 1991 been urging Government to decommission the store at the QRE tunnel and provide a proper storage facility for low-level radioactive waste. We briefed the Council on the developments of the proposed facility in April 1997, May and July 1998, May 2000, January and May 2001 and March and May 2002.

18. We consulted the then Islands District Board on the proposed project on 27 February 1995. Members supported the proposal. The Islands District Council reaffirmed its support for the project on 8 April 2002.

19. We consulted the Radiation Board on 11 April 2002 and secured the Board's support for the proposal.

20. We need to construct a small jetty at Sum Wan, Siu A Chau to provide marine access to the storage facility. As required by the Foreshore and Sea-bed (Reclamations) Ordinance, we gazetted the proposed works in July 1995 and received three objections. Despite our efforts, we were unable to resolve the objections. The Executive Council gave authorisation for the construction works in March 1997.

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ENVIRONMENTAL IMPLICATIONS

21. The project is a designated project under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an environmental permit is required for the construction and operation of the proposed facility.

22. We completed an Environmental Impact and Safety Assessment Study on the proposed facility in 1995. The study concluded that any ecological impact would be localised and that the liquid and gaseous discharges, if any, would meet the established standards and dose limits for the public in terms of radiological impact. The study further recommended that the successful tenderer should seek approval from the Director of Environmental Protection on the detailed operation procedures and the environmental monitoring and audit programmes prior to commissioning of the proposed facility.

23. The Advisory Council on the Environment (ACE) endorsed the study in July 1995 and the study report has been placed on the register established under the EIA Ordinance. We further briefed ACE in February 2002 on Government's plan to construct the proposed facility at Siu A Chau. ACE supported the proposal.

24. We will implement the environmental mitigation measures recommended in the study report. We estimate that the cost of implementing these measures would be approximately \$4 million, which has been included in the project estimate.

25. DH has packaged the existing waste in leak-proof stainless steel drums. As recommended by the study report, we will install an air exhaust with filter and a sewerage delay tank in the proposed facility. The contractor will continuously monitor both on-site and off-site radiation levels in the vicinity. DH considers that the proposed facility will not pose health hazards to staff or members of the public.

26. At the planning and design stages, we have considered measures to reduce the generation of construction and demolition (C&D) materials. We estimate that about 7 400m³ of C&D materials will be generated by the project. Of these, we will reuse about 2 500 m³ (34%) on site, 4 800 m³ (65%) as fill in public filling areas and dispose of 100 m³ (1%) at landfills. The notional cost of

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accommodating the waste at landfills is estimated to be \$12,500 for this project (based on a notional unit cost² of \$125/m³).

27. We will reuse the excavated materials as fill materials on site to minimise off-site disposal. We will require the contractor to submit a waste management plan (WMP) which will include appropriate measures like avoidance and reduction of C&D materials, as well as waste separation to facilitate reuse and recycling. We will ensure that the day-to-day operations on site comply with the WMP. We will control the disposal of public fill and waste to designated facilities through a trip-ticket system. We will record the disposal, reuse and recycling of C&D materials.

LAND ACQUISITION

28. The proposed project does not require land acquisition.

BACKGROUND INFORMATION

29. We upgraded **70DR** to Category B in December 1993. Finance Committee upgraded part of **70DR** as **151DR** “Low-level radioactive waste storage facility - consultant’s fee and investigation” at an estimated cost of \$10.1 million to Category A in June 1994. We appointed consultants in August 1994 to carry out site investigation for the proposed facility, including detailed assessment of the site, environmental impact and safety assessment, outline design, tendering and preparation of contract.

30. We first invited tenders for the DBO contract in November 1995 and included in the tender documents a statement to the effect that no tender would be awarded until funds had been approved. Since the lowest conforming bid was not competitive, the tender exercise was cancelled in July 1997. We have examined various possible alternatives, including storing the waste at a Mainland facility. After assessing the latter option in detail and examining ways to reduce

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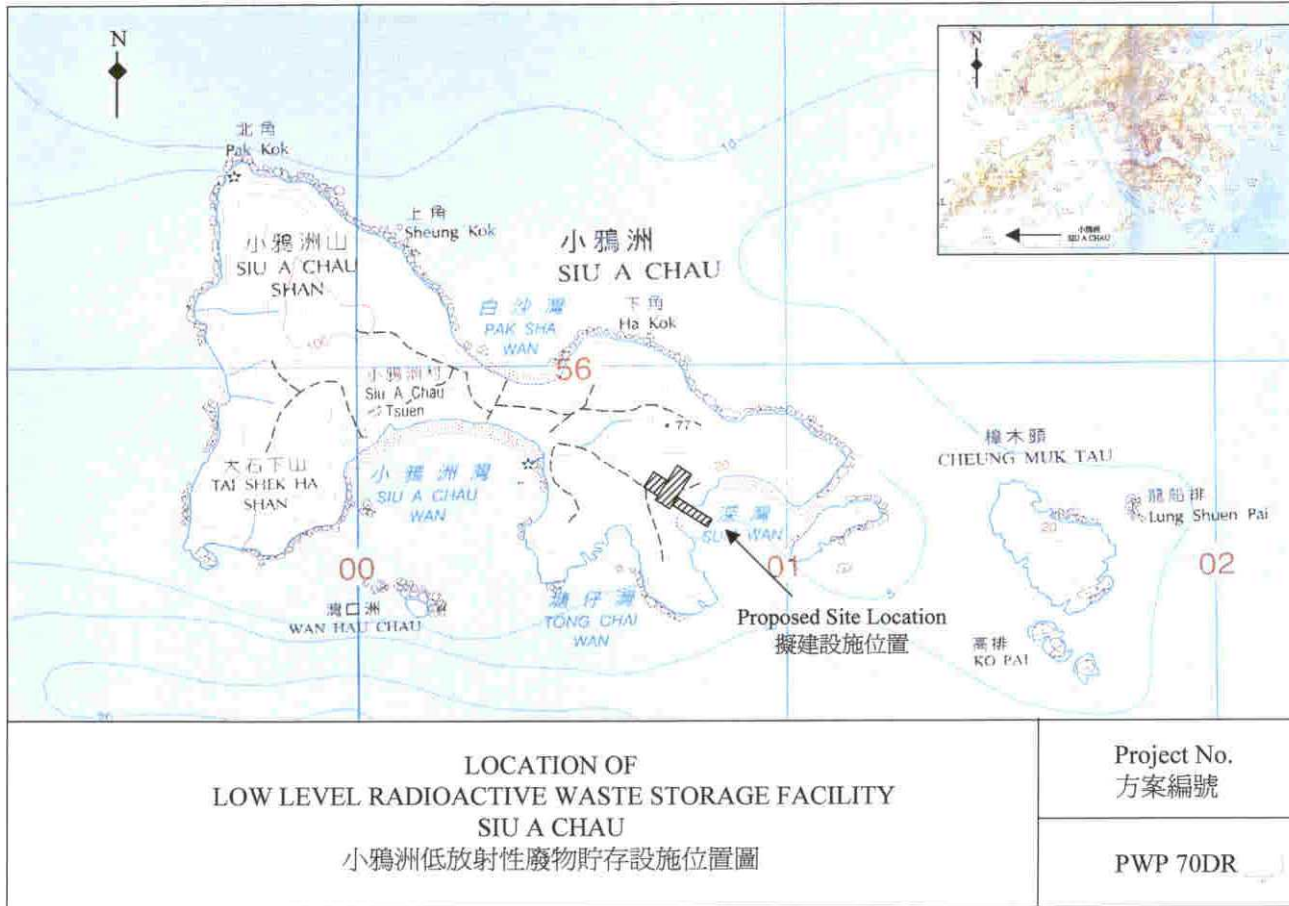
² This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m³), nor the cost to provide new landfills (which 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.

the cost of the proposed facility at Siu A Chau, we concluded in 2002 that construction of the storage facility at Siu A Chau would require the least upfront cost, and provide the greatest flexibility and most effective control in terms of waste management.

31. We have since invited tender for the DBO contract and, subject to Finance Committee approving the proposed project upgrading, plan to commence the works in September 2003 for completion and commissioning in December 2004. DH will decommission the existing store at the QRE tunnel once the proposed storage facility at Siu A Chau is commissioned.

32. We estimate that the project will create 30 jobs (five professionals, six technical/ancillary staff and 19 labourers) during the construction stage, and four jobs (one professional, one technical and two labourers) during the operation stage.

Environment, Transport and Works Bureau
June 2003



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Breakdown of the estimates for consultants' fee (at September 2002 prices)

Consultants' staff costs (Note 2)		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
Administration of contract and supervision of construction	Professional	16	38	1.6	1.5
Total consultants' staff costs					1.5

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of resident site staff supplied by the consultant. (As at 1.10.2002, MPS pt. 38 = \$57,730 per month.)
2. The figures given above are based on estimates prepared by the Director of Environmental Protection. We will only know the actual fees after we have selected the consultants.

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Breakdown of estimates for operating and maintenance costs

We estimate the operating and maintenance cost for the proposed low-level radioactive waste storage facility to be \$15 million over the ten years of operation, to be paid by monthly installments. This is an average of \$1.5 million per year, made up as follows –

	\$ million
	per year
	(at Sept 2002 prices)
(a) Labour	0.4
(b) Management, insurance and transportation	0.4
(c) Remote monitoring	0.4
(d) Consumables, power and environmental	0.3
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Total	1.5
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