

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 - DRAINAGE

Public Safety - Landslip prevention

59BL - Investigation of sewers and drains affecting the safety of slope features in the new Government Catalogue of Slopes, phase 1

Members are invited to recommend to Finance Committee the upgrading of **59BL** to Category A at an estimated cost of \$165.6 million in money-of-the-day prices.

PROBLEM

Leakage from sewers and drains buried behind slopes may affect the stability of the slopes and, in some cases, even cause landslip, endangering the safety of life and property. However, we do not have sufficient information about the condition of the public sewers and drains maintained by Drainage Services Department (DSD sewers and drains) buried behind cut slopes, fill slopes and retaining walls (collectively named slope features) registered in the Geotechnical Engineering Office's Government Catalogue of Slopes and Retaining Walls¹ (New Catalogue).

/PROPOSAL

¹ Geotechnical Engineering Office completed a new Government Catalogue of Slopes and Retaining Walls at the end of 1998. It registered approximately 54 000 man-made slopes and retaining walls (collectively called slope features) in the territory. The new catalogue supercedes the 1977-78 Catalogue, which only registered approximately 10 000 slope features.

PROPOSAL

2. The Director of Drainage Services (DDS), with the support of the Secretary for Works, proposes to upgrade **59BL** to Category A at an estimated cost of \$165.6 million in money-of-the-day (MOD) prices to engage consultants to carry out the phase 1 investigation of the DSD sewers and drains that may affect the safety of slope features in the New Catalogue of Slopes.

PROJECT SCOPE AND NATURE

3. The scope of the phase 1 investigation comprises the following tasks -

- (a) reconnaissance to ascertain the survey boundaries of all DSD sewers and drains buried behind and adjacent to slope features registered in the New Catalogue that are not included in the 1977-78 Catalogue and that would affect buildings and major roads;
- (b) surveys of the physical condition of the identified sewers and drains;
- (c) recommendations on cost-effective remedial measures for the surveyed sewers and drains together with an implementation programme; and
- (d) development of a computerised asset inventory system containing the database of the sewers and drains together with the records of the pipe survey results and remedial measures.

JUSTIFICATION

4. Sewers and drains are susceptible to leakage. Such leakage is mainly due to deterioration of the sewers and drains following prolonged years of service or the opening of pipe joints as a result of ground movement. Leakage from sewers and drains buried behind slope features may affect slope stability and, in some cases, even cause landslip, endangering the safety of life and property.

5. In August 1996, DSD commenced an investigation of the physical condition of DSD sewers and drains affecting the safety of all the slope features

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registered in the 1977-78 Catalogue of Slopes. We carried out the investigation work under consultancies **52BL** “Investigation of sewers and drains affecting the safety of fill slopes and retaining walls” and **54BL** “Investigation of sewers and drains affecting the safety of cut slopes”. We plan to complete the work under **52BL** in April 2000 and that under **54BL** in July 2000.

6. Upon completion of a comprehensive survey of all slope features in the territory, the Geotechnical Engineering Office issued the New Catalogue in end 1998. The New Catalogue covers about 54 000 slope features. 10 000 of these had been already registered in the 1977-78 Catalogue. In October 1999, DSD engaged a consultant to carry out a desktop study to identify DSD sewers and drains near these 44 000 newly registered slope features. We estimate that there are about 4 100 slope features containing DSD services, the failure of which would affect the stability of the slopes and would, in turn, affect buildings and major roads nearby. As the failure of these slope features would affect the public severely, we plan to give such slopes priority in investigating DSD services.

7. As we do not have sufficient information about the physical condition of these sewers and drains affecting slopes features, we propose to conduct a pipe survey to record the condition of the buried services, identify the remedial works, recommend an implementation programme and develop a computerized Asset Inventory System (AIS) for effective management of these sewers and drains.

8. The investigation demands considerable resources over a specified period. Having examined in detail the nature and extent of the investigation, DDS concludes that he does not have the required expertise for the development of the AIS and also cannot re-deploy existing staff to cover the substantial additional workload. We therefore propose to engage consultants to carry out the investigation.

FINANCIAL IMPLICATIONS

9. We estimate the cost of the project to be \$165.6 million in MOD prices (see paragraph 10 below), made up as follows -

	\$ million
(a) Pipe survey	95.9
(b) Consultants' fees for -	27.4

/(i)

	\$ million	
(i) reconnaissance for DSD sewers and drains and preparation of drawings and tender documents	3.9	
(ii) monitoring, administration and reporting on internal pipe survey contract	2.0	
(iii) development of a computerised asset inventory system and survey database	2.1	
(iv) recommendations on remedial measures with an implementation programme	5.7	
(v) site supervision of pipe survey	13.7	
(c) Consultants' expenses (including computer facilities, extra copies of drawings and reports, etc.)	0.5	
(d) Contingencies	11.7	
Sub-total	135.5	(in December 1998 prices)
(e) Provision for price adjustment	30.1	
Total	165.6	(in MOD prices)

A breakdown by man months of the estimate for consultants' fees is at the Enclosure.

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

Year	\$ million (Dec 1998)	Price adjustment factor	\$ million (MOD)
2000 - 2001	1.3	1.05814	1.4
2001 - 2002	13.0	1.11104	14.5
2002 - 2003	38.5	1.16660	44.9
2003 - 2004	38.5	1.22493	47.2
2004 - 2005	32.7	1.28617	42.1
2005 - 2006	11.5	1.35048	15.5
	135.5		165.6

11. We have derived the MOD estimates on the basis of the Government's latest forecasts of trend labour and construction prices for the period 2000 to 2006. We will award the proposed consultancy on a lump sum basis with provision for price adjustment as the consultancy period will exceed 12 months. We will tender the pipe survey works under a re-measurement contract because the extent of the survey may vary depending on the site conditions. As the pipe survey contract will exceed 21 months, we will allow for provision for price adjustment to the tender price.

12. The investigation will not give rise to annually recurrent expenditure.

PUBLIC CONSULTATION

13. As the proposed investigation will have no construction works involved, interference with the daily life of the public will be minimal. Therefore, we consider public consultation not necessary.

ENVIRONMENTAL IMPLICATIONS

14. The proposed investigation will not have any long term environmental impacts. For impacts during pipe surveys, we will incorporate in the contract standard pollution control measures, such as the use of silenced plant to reduce noise generation, in order to control impacts to within the established standards and guidelines.

15. The proposed investigation works will generate only a small quantity of construction and demolition materials (C&DM). We shall require the consultants to fully consider measures to minimize the generation of C&DM and to reuse/recycle C&DM as much as possible in future construction projects.

LAND ACQUISITION

16. The proposed investigation does not require land acquisition.

BACKGROUND INFORMATION

17. The Secretary for Works reviewed slope safety measures in 1994 and recommended developing a programme to monitor and repair buried services at housing estates and other developments where leakage might affect slope stability. He presented a summary of the initial findings of the review to the Legislative Council's Panel on Planning, Lands and Works on 20 December 1994, and published a report on the review on 3 March 1995.

18. On 22 July 1996, Finance Committee approved the upgrading of **52BL** "Investigation of sewers and drains affecting the safety of fill slopes and retaining walls" to Category A at an estimated cost of \$64.3 million for the engagement of consultants to investigate the conditions of public sewers and drains behind and adjacent to fill slopes and retaining walls registered in the 1977-78 Catalogue of Slopes. The investigation under **52BL** started in August 1996 and is due for completion in April 2000.

19. On 16 January 1998, Finance Committee approved the upgrading of **54BL** "Investigation of sewers and drains affecting the safety of cut slopes" to Category A at an estimated cost of \$57.6 million for the engagement of consultants to investigate the conditions of public sewers and drains behind and adjacent to cut slopes registered in the 1977-78 Catalogue of Slopes. The investigation started in March 1998 and is due for completion in July 2000.

20. Based on the results of the on-going investigation and the recommendations being made by the consultants during the course of the consultancies under **52BL** and **54BL**, DSD has been carrying out necessary repair works to DSD sewers and drains under his maintenance programme. We will require about 18 months to complete the works.

21. In 1998, the Administration made a commitment in the Policy Address to inspect and repair underground public sewers and drains near all slope features that would affect buildings and major roads.

22. With the completion of the New Catalogue at the end of 1998 and the identification of a further 44 000 slope features, we engaged a consultant under a Category D item **A02BL** entitled "Desktop study for identification of public sewers and drains behind and adjacent to slopes and retaining walls" to carry out a desktop study to identify DSD sewers and drains near those newly registered slope features on the New Catalogue. The consultancy started in October 1999. Under the first part of the desktop study the consultants were tasked to identify DSD sewers and drains buried behind and adjacent to higher priority slope features i.e. those that would affect buildings and major roads. The results of the first part of the study, which will be completed by September 2000, will provide data for the proposed phase 1 on-site investigation and pipe survey works. Our estimate of slope features requiring investigation is about 4 100 but this may vary as the desktop study progresses. The latter will be completed by October 2001.

23. We plan to commence the proposed consultancy in October 2000 for completion in September 2004. This will enable the necessary repair works (to be carried out separately from this project item) to commence in December 2002 for completion in December 2004.

24. Based on the results of the remaining part of the desktop study under **A02BL**, we intend to create a separate item to carry out the phase 2 investigation works. The phase 2 works will investigate DSD sewers and drains buried behind and adjacent to slope features registered in the New Catalogue that would affect non-major roads, open-space and country parks etc. We plan to commence the phase 2 investigation works at the end of 2001 for completion at the end of 2006.

25. We estimate that the project will create some 90 new jobs comprising 40 professional/technical staff and 50 labourers during the consultancy period.

Works Bureau
March 2000
(PWSC0244/WIN9)

Enclosure to PWSC(1999-2000)107

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in the new Government Catalogue of Slopes, phase 1**

Breakdown of estimates for consultants' fees

Consultants' staff costs			Estimated man months	Average MPS* salary point	Multiplier factor	Estimated fee (\$ million)
(i)	reconnaissance for DSD sewers & drains and preparation of drawings and tender documents	Professional	7	40	2.4	1.1
		Technical	56	16	2.4	2.8
(ii)	monitoring, administration and reporting on internal pipe survey contract	Professional	10	40	2.4	1.5
		Technical	10	16	2.4	0.5
(iii)	development of a computerised asset inventory system and survey database	Professional	6	40	2.4	0.9
		Technical	24	16	2.4	1.2
(iv)	recommendations on remedial proposals with an implementation programme	Professional	32	40	2.4	4.8
		Technical	18	16	2.4	0.9
(v)	site supervision of pipe survey	Professional	48	40	1.7	5.1
		Technical	240	16	1.7	8.6
Total consultants' staff costs						27.4
Out-of-pocket expenses						
(i)	Consultants' expenses (including computer facilities, extra copies of drawings and reports, etc.)					0.5
Total out-of-pocket expenses						0.5

Notes :

- (1) A multiplier factor of 2.4 is applied to the average MPS point to arrive at the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultants' offices. (At 1.4.98, MPS pt. 40 = \$62,780 per month and MPS pt. 16 = \$21,010 per month) A multiplier factor of 1.7 is applied in the case of site staff supplied by the consultants.
- (2) Out-of-pocket expenses are the actual costs incurred. The consultants are not entitled to any additional payment for overheads or profit in respect of these items.
- (3) The figures given above are based on estimates prepared by the Director of Drainage Services. We will only know the actual man months and actual fees when we have selected the consultants through the usual competitive lump sum fee bid system.

(PWSC0244/WIN9)