

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### HEAD 706 – HIGHWAYS

#### Transport – Roads

#### 731TH – Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

Members are invited to recommend to Finance Committee the upgrading of **731TH** to Category A at an estimated cost of \$686.3 million in money-of-the-day prices for the widening and improvement of Castle Peak Road between Ka Loon Tsuen and Siu Lam in Tuen Mun.

### PROBLEM

The capacity of the existing section of Castle Peak Road (CPR) between Ka Loon Tsuen and Siu Lam in Tuen Mun is insufficient to cope with the future traffic demand generated from the northwest New Territories (NWNT).

### PROPOSAL

2. The Director of Highways, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **731TH** to Category A at an estimated cost of \$686.3 million in money-of-the-day (MOD) prices for the widening and improvement of the section of CPR between Ka Loon Tsuen and Siu Lam.

### PROJECT SCOPE AND NATURE

3. The scope of **731TH** includes –

/(a) .....

- (a) widening of a 1.1-kilometre (km) section of CPR between Ka Loon Tsuen and Tai Lam Kok from a single three-lane carriageway to a dual two-lane carriageway with a three-metre (m) wide footpath on both sides;
- (b) construction of a 1.0-km section of new CPR between Tai Lam Kok and Siu Lam, including a 800-m long dual two-lane viaduct;
- (c) reclamation of 0.8 hectare of land and construction of a 1.1-km long seawall;
- (d) provision of a roundabout at Tai Lam Kok;
- (e) reconstruction of the 1.2-km section of CPR between Tai Lam Kok and Siu Lam; and
- (f) associated works on junction modification, slope stabilisation, landscaping, street lighting and drainage.

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A site plan and road sections of CPR are at Enclosure 1.

4. We plan to commence the detailed design and construction works in March 2004 for completion in May 2007.

## JUSTIFICATION

5. The existing CPR between Area 2 in Tsuen Wan and So Kwun Tan in Tuen Mun is a rural road connecting Tsuen Wan and Tuen Mun, serving mainly the residential developments along the road. As CPR runs parallel to Tuen Mun Road (TMR), it also supplements TMR to serve east-west traffic movements in the NWNT.

6. We plan to upgrade CPR between Area 2 and So Kwun Tan to dual two-lane carriageway standard in three phases to cope with the increasing traffic demand arising from the planned residential developments<sup>1</sup> in

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<sup>1</sup> The planned residential developments include 4 100 new flats to be built in Tuen Mun. Based on the latest planning data, the population in the NWNT will increase from 1 100 000 by 150 000 to 1 250 000 from 2006 to 2016.

the NWNT. CPR can also act as a relief route for TMR in case of emergency. We have already completed the improvement works to the section of CPR from Siu Lam to So Kwun Tan<sup>2</sup> in November 2000 and commenced the widening of the road section between Area 2 and Ka Loon Tsuen<sup>3</sup> in August 2001 for completion in early 2006. This project is the final phase of the CPR improvements.

7. The major section of CPR between Ka Loon Tsuen and Siu Lam is a three-lane carriageway with two lanes designated for the westbound traffic. Upon completion of the improvement of the other sections of CPR to dual two-lane carriageway standard, this section of CPR will become a bottleneck. We need to widen it to dual two-lane carriageway standard consistent with the configurations of the other improved sections of CPR and to remove the bottleneck. The projected traffic volume to capacity (v/c) ratios<sup>4</sup> of CPR during morning peak hours in 2003, 2007, 2011 and 2016, with and without the proposed widening, are as follows –

V/C Ratio of CPR at Tai Lam Kok	Year			
	2003	2007	2011	2016
Without the proposed road improvement works	0.78	1.22	1.66	1.72
With the proposed road improvement works	–	0.41	0.56	0.57

8. The existing section of CPR between Ka Loon Tsuen and Tai Lam Kok runs closely parallel to TMR and crosses TMR through an underpass structure at Tai Lam Kok. We have to reclaim 0.8 hectare of land to widen the

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<sup>2</sup> We upgraded **541TH** “Improvement to Castle Peak Road from Siu Lam to So Kwun Tan” to Category A at an estimated cost of \$379.2 million in MOD prices in July 1996.

<sup>3</sup> We upgraded **365TH** “Castle Peak Road improvement between Area 2 and Sham Tseng, Tsuen Wan” and **553TH** “Castle Peak Road improvement between Sham Tseng and Ka Loon Tsuen, Tsuen Wan” to Category A at an estimated cost of \$2,528.3 million and \$1,232.3 million in MOD prices respectively in March 2001.

<sup>4</sup> Volume to capacity (v/c) ratio is an indicator which reflects the performance of a road. A v/c ratio equal to or less than 1.0 means that a road has sufficient capacity to cope with the volume of vehicular traffic under consideration and the resultant traffic will flow smoothly. A v/c ratio above 1.0 indicates the onset of congestion; that above 1.2 indicates more serious congestion with traffic speeds deteriorating progressively with further increase in traffic.

seaward side of this section of CPR. As the underpass structure poses a major constraint for widening the CPR between Tai Lam Kok and Siu Lam along the existing route, we will construct a dual two-lane viaduct to the south of TMR to avoid disruption to the operation of the heavily trafficked TMR. The existing CPR will then be relegated as a local distributor. We will connect the viaduct to the existing CPR by the provision of a new roundabout at Tai Lam Kok and reprovisioning of the existing one at Siu Lam.

9. The pavement of CPR from Tai Lam Kok to Siu Lam was constructed in 1984. It will be reaching the end of its service life in 2006. We propose to reconstruct this section of carriageway to improve the riding comfortability. We will improve the roadside slopes to meet the prevailing standards stipulated in the Geotechnical Manual for Slopes and Guidelines for Natural Terrain Hazard Studies in conjunction with the road works.

## FINANCIAL IMPLICATIONS

10. We estimate the cost of this project to be \$686.3 million in MOD prices (see paragraph 11 below), made up as follows –

	<b>\$ million</b>
(a) Road and drains	83.8
(b) Viaduct	332.1
(c) Reclamation and seawall	136.2
(d) Slope works and retaining wall	21.1
(e) Landscaping works	12.1
(f) Consultants' fees	60.7
(i) construction supervision and contract administration	5.3
(ii) resident site staff costs	52.3
	(iii) .....

(iii) environmental monitoring and audit (EM&A) programme <sup>5</sup>	3.0		
(iv) Electrical and Mechanical Services Trading Fund (EMSTF) charges <sup>6</sup>	0.1		
(g) Contingencies		57.9	
	Sub-total	703.9	(in September 2003 prices)
(h) Provision for price adjustment		(17.6)	
	Total:	686.3	(in MOD prices)

Item 10(b) includes the viaduct and associated foundation works. Item 10(c) includes seawall construction, reclamation and the associated formation works. A breakdown of the estimates for item 10(f) above on consultants' fees is at Enclosure 2.

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

Year	\$ million (Sep 2003)	Price Adjustment Factor	\$ million (MOD)
2003 – 2004	0.6	1.00000	0.6
2004 – 2005	79.6	0.98225	78.2

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<sup>5</sup> We will engage consultants to implement an EM&A programme at an estimated cost of \$3.0 million to ensure timely and effective implementation of the recommended mitigation measures for the project.

<sup>6</sup> Since the establishment on 1 August 1996 under the Trading Funds Ordinance, the EMSTF charges government departments for design and technical consultancy services for electrical and mechanical (E&M) installations provided by the Electrical and Mechanical Services Department (EMSD). The services rendered for this project include checking contractor's submission on all E&M installations and providing technical advice to the Government on all E&M works and their impacts on the project from maintenance and general operation points of view.

2005 – 2006	299.0	0.97734	292.2
2006 – 2007	229.4	0.97245	223.1
2007 – 2008	80.3	0.96759	77.7
2008 – 2009	11.1	0.96638	10.7
2009 – 2010	3.9	0.96638	3.8
	703.9		686.3

12. We have derived the MOD estimate on the basis of the Government's latest forecast of trend labour and construction prices for the period 2003 to 2010. We have invited tenders for the works under a design-and-build contract in order to minimise the time required for the detailed design and construction, and achieve a cost-effective design by the contractor. We will allow for price adjustments in the contract as the construction period will exceed 21 months.

13. At present, the recurrent expenditure for the section of CPR between Ka Loon Tsuen and Siu Lam is \$1.5 million. We estimate the annual recurrent expenditure upon completion of the project to be \$5.3 million.

## **PUBLIC CONSULTATION**

14. We consulted the Traffic and Transport Committee (T&TC) and the Environmental and Health Affairs Committee of Tsuen Wan District Council on 4 July and 12 July 2001 respectively. We also consulted the T&TC of the Tuen Mun District Council on 13 July 2001. Members of the Committees supported the project.

15. We gazetted the road scheme under the Roads (Works, Use and Compensation) Ordinance on 28 June 2002 and received one objection. The objector suggested the Administration to develop the area between Ka Loon Tsuen and Tai Lam Chung as a tourist attraction area in conjunction with the project. The Administration explained to the objector that there was no imminent plan to develop the locality for tourism purpose, but would take note of his suggestion and

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consult the concerned parties in the long-term planning. In addition, the objector requested the Administration to improve the junction of CPR and Tai Lam Chung Road to facilitate turning of long vehicles and to provide a lay-by in front of an existing temple. To address the concerns of the objector, the Administration would improve the concerned junction and provide the lay-by as requested. The objector withdrew his objection subject to the agreed modifications.

16. Having considered the proposed modifications, the Chief Executive-in-Council authorised the project on 20 May 2003 and the notice of authorisation was gazetted on 6 June 2003.

17. We consulted the LegCo Panel on Transport on 28 November 2003. Members supported the implementation of the project.

## **ENVIRONMENTAL IMPLICATIONS**

18. The project is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an environmental permit is required for the construction and operation of the project. The key environmental concerns are traffic noise, tree felling and water quality. A statutory EIA has been conducted in 2001 and the EIA report concluded that the environmental impact of the project can be controlled to within the criteria under the EIA Ordinance and the Technical Memorandum on EIA Process. The Director of Environmental Protection (DEP) approved the EIA report in December 2001.

19. When we conducted the EIA in 2001, the section of the proposed CPR between Ka Loon Tsuen and Siu Lam was parallel to a section of the proposed Route 10. In the light of public concerns, we revised the original scheme and gazetted a new scheme for the Route 10 (Southern Section) in June 2002 to delete this part of the road from the project scope. As a result of these changes, we conducted an Environmental Review (ER) for CPR to take into account of the revised road layout and the latest traffic flow data and planning parameters.

20. In respect of noise mitigation measures, the ER showed that the overall noise level at the noise sensitive receivers (NSRs) near TMR is dominated by traffic noise generated from existing roads. The 780-m long 3.5-m high noise barriers, originally proposed to be provided on the viaduct, would only reduce the traffic noise at the NSRs<sup>7</sup> from 64.9 dB(A) - 70.1 dB(A) down to 64.6 dB(A) - 69.9 dB(A). Such reductions in noise level are considered acoustically ineffective.

21. The ER also showed that provision of the 130-m long 5.5-m high proposed noise barriers could only reduce the traffic noise arising from the existing road at 14 dwellings near Siu Lam roundabout from 70.6 dB(A) - 78.6 dB(A) by 1 - 2.5 dB(A). The cost for provision of these noise barriers, which amounts to about \$900,000 per dwelling, is prohibitively high when compared to those provided at other locations. We therefore consider that the provision of these noise barriers may not be practicable and cost-effective.

22. We have explored other possible measures to mitigate the traffic noise. Instead of the proposed noise barriers, we will provide low noise road surfacing on the new viaduct which will reduce traffic noise by 2 - 3 dB(A). By providing low noise road surfacing on the new viaduct instead of noise barriers, we will save about \$21 million in capital cost.

23. During construction, we will control noise, dust and site run-off nuisance to comply with established criteria through the implementation of appropriate mitigation measures in the works contract. In addition, we will request the contractor to use closed-grab dredger with silt curtain in carrying out dredging works to minimise the impacts on the water quality. We will also implement an EM&A programme to ensure timely and effective implementation of the recommended mitigation measures.

24. The EIA also studied ways to reduce the generation of construction and demolition (C&D) materials. We will minimise their generation by reusing them as fill in the road embankments. We estimate the project will generate about 219 300 cubic metres (m<sup>3</sup>) of C&D materials. Of these, we will reuse 87 500 m<sup>3</sup>

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<sup>7</sup> The NSRs are Siu Lam Hospital and Siu Lam Psychiatric Centre.



(40%) on site, 5 300 m<sup>3</sup> (2%) as fills in public filling areas<sup>8</sup>, and dispose of 126 300 m<sup>3</sup> (58%) unsuitable marine sediment in marine disposal sites and 200 m<sup>3</sup> C&D waste at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$25,000 for this project (based on a notional<sup>9</sup> unit cost of \$125/m<sup>3</sup>).

25. We will require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reuse and recycle C&D materials. We will require the contractor to ensure that the day-to-day operations on site comply with the approved WMP. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes. To further minimise the generation of C&D materials, we will encourage the contractor to use non-timber formwork and recyclable materials for temporary works. We will control the disposal of the C&D materials to designated public filling facilities and landfills through a trip ticket system. We will require the contractor to separate public fill from C&D waste for disposal at appropriate facilities.

## LAND ACQUISITION

26. The proposed works do not require land acquisition.

## BACKGROUND INFORMATION

27. We upgraded **731TH** to Category B in September 1998.

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<sup>8</sup> A public filling area is a designated part of a development project that accepts public fill for reclamation purpose. Disposal of public fill in a public filling area requires a licence issued by the Director of Civil Engineering.

<sup>9</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/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.

28. We engaged consultants to undertake an investigation and preliminary design of the project at an estimated cost of \$12.4 million in MOD prices under **Subhead 6100TX** “Highways works, studies, and investigations for items in Category D of the Public Works Programme”. The consultants completed the investigation and preliminary design in November 2002.

29. We engaged consultants in June 2003 to undertake the tender documentation of the project at an estimated cost of \$4.0 million under **Subhead 6100TX**.

30. To minimise disruption to traffic, we will carry out temporary traffic diversions as and when required. We will consult the relevant District Councils on major temporary traffic arrangements before their implementation.

31. The proposed road improvement works may involve felling of 444 trees, subject to finalisation of design. All trees to be removed are not important trees<sup>10</sup>. We will incorporate planting proposals as part of the project, including estimated quantities of 600 trees, 7 000 shrubs and 22 000 square metres of grassed area.

32. We estimate that this project will create some 460 jobs comprising 95 professional/technical staff and 365 labourers, totalling 11 100 man-months.

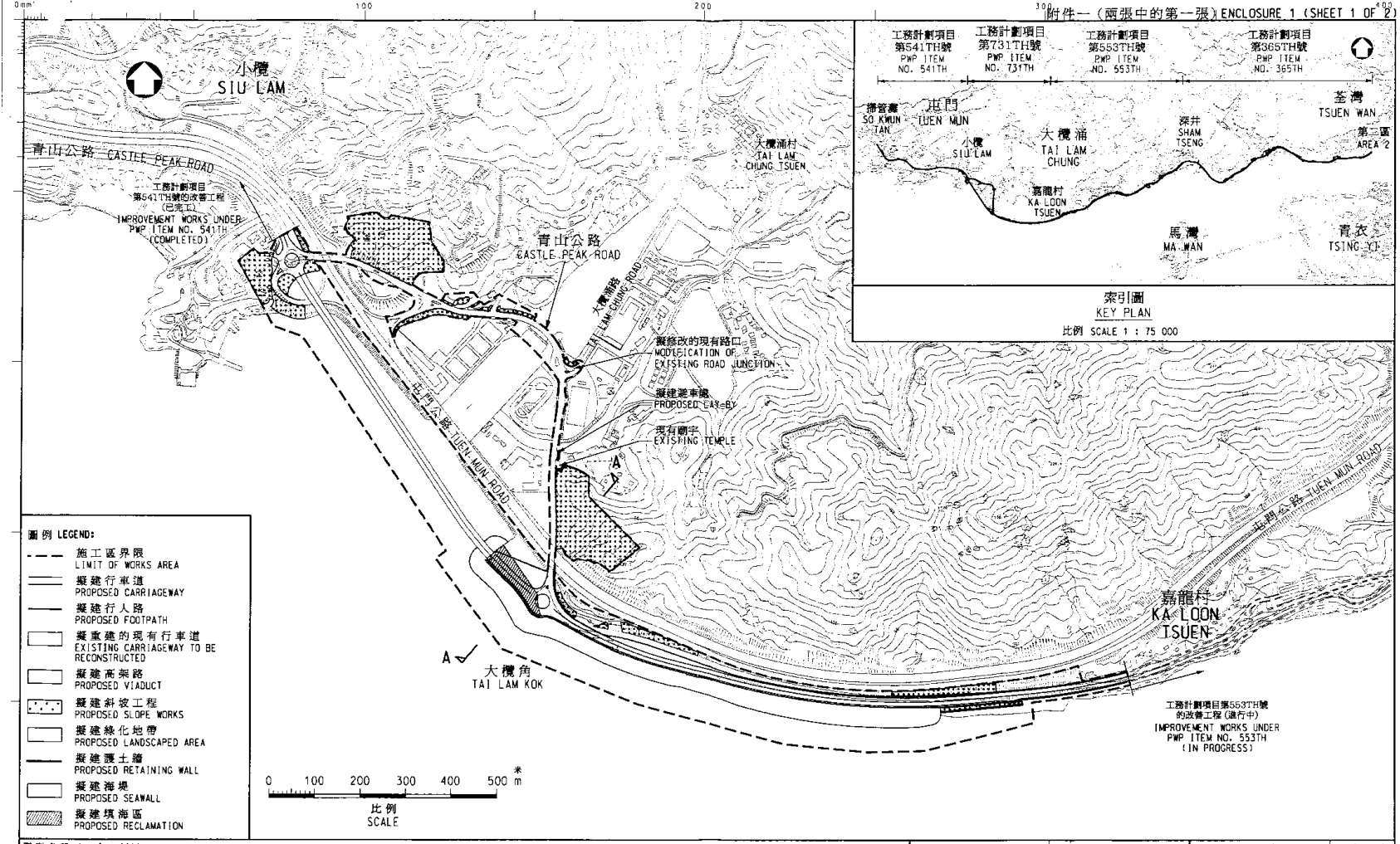
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Environment, Transport and Works Bureau  
February

2004

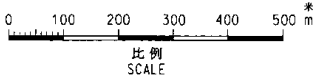
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<sup>10</sup> Important trees include trees on the Register of Old and Valuable Trees, and any other trees which meet one or more of the following criteria –

- (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).



- 圖例 LEGEND:**
- 施工區界限  
LIMIT OF WORKS AREA
  - 擬建行車道  
PROPOSED CARRIAGEWAY
  - 擬建行人路  
PROPOSED FOOTPATH
  - 擬重建的現有行車道  
EXISTING CARRIAGEWAY TO BE RECONSTRUCTED
  - 擬建高架路  
PROPOSED VIADUCT
  - ▨ 擬建斜坡工程  
PROPOSED SLOPE WORKS
  - ▨ 擬建綠化地帶  
PROPOSED LANDSCAPED AREA
  - ▨ 擬建護土牆  
PROPOSED RETAINING WALL
  - ▨ 擬建海堤  
PROPOSED SEAWALL
  - ▨ 擬建填海區  
PROPOSED RECLAMATION



圖則名稱 drawing title  
 工務計劃項目第731TH號  
 嘉龍村至小欖之間的青山公路改善工程 - 工地平面圖  
 PWP ITEM No. 731TH  
 IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM - SITE PLAN

設計 designed	SIGNED	繪圖 drawn	SIGNED
C.T. YEUNG	26/11/03	Y.L. SHIU	26/11/03
覆核 checked	SIGNED	批准 approved	SIGNED
C.T. YEUNG	28/11/03	C.W. CHAN	04/12/03

主要工程管理處  
MAJOR WORKS PROJECT MANAGEMENT OFFICE

圖則編號 drawing no.  
HW6731TH-SK0042

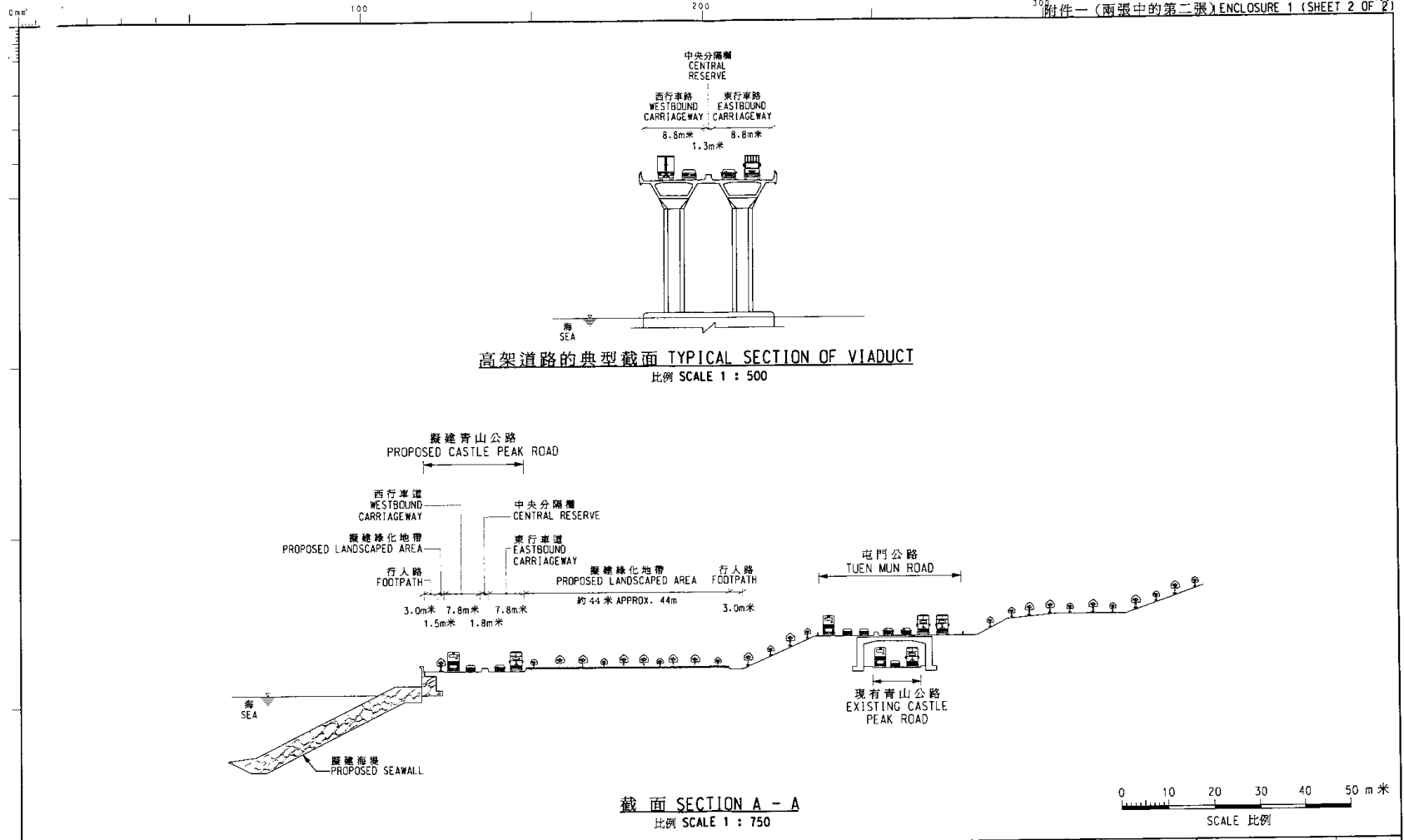
比例 scale  
1 : 7500  
OR 按  
AS SHOWN 圖則

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HIGHWAYS DEPARTMENT  
HONG KONG

路政署  
HONG KONG

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圖則名稱 drawing title  
 工務計劃項目第731TH號  
 嘉龍村至小欖之間的青山公路改善工程-截面圖  
 PWP ITEM NO. 731TH  
 IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM - SECTIONS

設計 designed C.T.YEUNG 26/11/03	SIGNED	繪圖 drawn Y.L.SHIU 26/11/03	SIGNED
覆核 checked C.T.YEUNG 28/11/03	SIGNED	批准 approved C.W.CHAN 04/12/03	SIGNED

主要工程管理處  
MAJOR WORKS PROJECT MANAGEMENT OFFICE

圖則編號 drawing no. HMW6731TH-SK0043	比例 scale 顯示 AS SHOWN
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HIGHWAYS DEPARTMENT 路政署 HONG KONG	

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**Enclosure 2 to PWSC(2003-04)56(Revised)**

**731TH - Improvement to Castle Peak Road  
between Ka Loon Tsuen and Siu Lam**

**Breakdown of estimates for consultants' fees (in September 2003 prices)**

			<b>Estimated man- months</b>	<b>Average MPS* salary point</b>	<b>Multiplier (Note 1)</b>	<b>Estimated fee (\$ million)</b>
<b>Consultants' staff costs</b>						
(a)	Construction supervision and contract administration (Note 2)	Professional	-	-	-	2.8
		Technical	-	-	-	2.5
(b)	Resident site staff	Professional	321	38	1.6	28.8
		Technical	791	14	1.6	23.5
(c)	EM&A programme	Professional	15	38	2.0	1.7
		Technical	34	14	2.0	1.3
					Sub-total	60.6
(d)	EMSTF charges					<u>0.1</u>
					<b>Total</b>	<u><b>60.7</b></u>

\* MPS = Master Pay Scale

**Notes**

1. A multiplier of 2.0 is applied to the average MPS point to arrive at the full staff costs including the consultants' overheads and profits as the staff will be employed in the consultants' offices. A multiplier of 1.6 is applied to the average MPS point in case of resident site staff supplied by the consultants. (At 1 January 2004, MPS pt. 38 = \$55,993 per month and MPS pt. 14 = \$18,603 per month).
2. The consultants' fees for construction supervision and contract administration are estimated in accordance with Agreement No. CE 96/2002 (HY) titled "Tender and Construction of Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam". The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade **731TH** to Category A.