

For Discussion
27 February 2009

Legislative Council Panel on Transport

Reconstruction and Improvement of Tuen Mun Road

PURPOSE

This paper seeks Members' views on the proposal to increase the approved project estimate (APE) for **746TH** from \$4,620.5 million by \$2,183.8 million to \$6,804.3 million in money-of-the-day (MOD) prices.

BACKGROUND

2. The approved scope of **746TH** comprises –
 - (a) reconstruction of about 13.4 kilometres (km) at-grade sections of Tuen Mun Road (TMR) and resurfacing of about 2.1 km of TMR on highway structures between Tsuen Wan and Sam Shing Hui;
 - (b) improvement of the road design of TMR according to the current expressway standards as far as practicable, including the widening of traffic lanes, provision of hard shoulders 3.65 metre (m) wide and improvement of sightlines, gradients, road curvature, super elevation, etc.;
 - (c) modification of highway structures including viaducts, bridges, box culverts, underpasses, footbridges, subways, as well as demolition and reprovision of a footbridge;
 - (d) lengthening of the merging/diverging lanes at the interchanges at Sham Tseng and Siu Lam, and the exit ramp from Tsing Long Highway to westbound TMR;

- (e) replacement of barriers at the central median along the at-grade road by concrete profile barriers and reprovisioning of barriers along the edge of the at-grade road and the edge parapets of bridges and viaducts to current standards;
- (f) upgrading works to roadside slopes;
- (g) installation along TMR of –
 - (i) a semi-enclosure about 520 m long and 9.0 m high at Castle Peak Bay;
 - (ii) cantilevered noise barriers about 180 m long and 5.6 m high and 740 m long and 7.6 m high at Tsing Lung Tau;
 - (iii) cantilevered noise barriers about 260 m long and 8.3 m high and vertical noise barriers about 605 m long and 2 m high at Anglers' Beach;
 - (iv) a semi-enclosure about 225 m long and 9 m high; cantilevered noise barriers about 355 m long and 8.3 m high and vertical noise barriers about 60 m long and 1.5 m high at Sham Tseng;
 - (v) cantilevered noise barriers about 480 m long and 8 m high and vertical noise barriers about 520 m long and 4 m high at Yau Kom Tau;
 - (vi) a semi-enclosure about 130 m long and 5.5 m high and cantilevered noise barriers about 2 060 m long and 8 m high at Tsuen Wan;

and implementation of the associated environmental monitoring and audit (EM&A) programme;
- (h) upgrading of the traffic control and surveillance system (TCSS);

- (i) installation of fire fighting system; and
- (j) associated civil, structural, landscaping works and works on environmental mitigation, drainage, road lightings, water mains and traffic aids.

A plan showing the proposed works is at **Enclosure 1**. We commenced works for the project in October 2008 for completion by phases in 2014.

PROBLEM

3. Following a review of the financial situation, it is necessary to increase the APE for **746TH** from \$4,620.5 million by \$2,183.8 million to \$6,804.3 million in MOD prices to cover the additional costs arising from the following –

- (a) higher-than-expected tender outturn price for the first civil works contract;
- (b) higher estimates of the remaining works contracts;
- (c) change in contingencies;
- (d) additional consultants' fees and resident site staff (RSS) costs; and
- (e) increase in the provision for price adjustment.

Details for the increase in costs are set out in paragraphs 4 to 18 below.

Higher-than-expected tender outturn price for the first civil works contract

4. **746TH** is to be implemented under three civil works and one E&M contracts¹. We invited tenders for the first civil works contract (i.e. Eastern Section) on 7 March 2008 and received four tenders on 16 May 2008. There was a higher-than-expected tender outturn price for this contract. The actual tender prices of all the tenders were significantly higher than the original estimate for the first works contract. After assessing the tenders, we found that an additional \$794.4 million (48% of the original estimate for the first contract) is needed to cover the price of the recommended tender. The higher-than-expected tender outturn price is

1 The three civil works contracts cover the road reconstruction and improvement works in the Eastern section (between Tsuen Wan and Tsing Lung Tau), Tai Lam section (between Tsing Lung Tau and Siu Lam), and the Sam Shing Hui section (between Siu Lam and Tuen Mun) of TMR respectively. The E&M contract covers the installation of the TCSS along the full stretch of TMR.

attributed to the accelerated increase in construction material prices and changes in market sentiments from Quarter 3 in 2007 to May 2008 when the tenders were returned, as well as the higher risk allowances made by tenderers for this contract with substantial constraints. From the construction cost indices published by the Census and Statistics Department, the cost index for steel reinforcement, galvanised mild steel, bitumen and diesel fuel as at May 2008 had risen by 72%, 39%, 19% and 31% respectively compared to those in September 2007 when the project estimate was prepared. A chart showing the relevant trend of material costs increases is at **Enclosure 2**. In the same period, the Highways Department Construction Cost Index increased from 920.0 by about 15% to 1054.6 whereas the materials index under it increased from 590.3 by about 40% to 823.9. The rapid rise in the cost of the above-mentioned raw materials, being the major elements of the project, drove up the tender price particularly. In addition, the tenders received reveals the potential contractors' concerns over the rapidly increasing but volatile trend of construction costs at that time. Under this high inflation risk, they were expected to tender consciously with a greater allowance for the risk. While a tender price index has not been compiled for roadworks, the changes in the tender price index for government building works² compiled by the Architectural Services Department in this high inflation period may serve as a reference. It rose by about 44% from Quarter 3 in 2007 to Quarter 2 in 2008. The rise is similar to the 48% increase in the first works contract's tender outturn price.

5. The increase in costs is significant for the following major types of works under the contract –

- (a) for roads and drains in which bituminous paving will be constructed and extensive temporary traffic arrangements will be required, the cost has increased from \$211.8 million by \$35.1 million to \$246.9 million (an increase of 16.6%);
- (b) for earthworks in which temporary construction access will be formed and temporary steel shoring for excavation will be required, the cost has increased from \$190.8 million by \$205.1 million to \$395.9 million (an increase of 107.5%);

² The tender price index is a quarterly index compiled by the Architectural Services Department based on data from accepted tenders.

- (c) for highway structures which will be built of reinforced concrete, the cost has increased from \$118.8 million by \$78.8 million to \$197.6 million (an increase of 66.3%);
- (d) for slope works in which extensive steel rockfall protection fences will be required, the cost has increased from \$265.7 million by \$66.8 million to \$332.5 million (an increase of 25.1%);
- (e) for noise barriers which are steel structures, the cost has increased from \$272.9 million by \$178.6 million to \$451.5 million (an increase of 65.4%); and
- (f) for contract preliminaries items in which the provision of difficult site access and intensive temporary traffic arrangements will be included, the cost has increased from \$252.7 million by \$152.7 million to \$405.4 million (an increase of 60.4%).

6. The construction sites comprise the widening of vehicular viaducts including the elevated structures in a very steep natural terrain at TMR near Ting Kau and Yau Kom Tau. The contractor will be required to form construction accesses to the work site in view of the difficult site access from the existing road network. Extensive and complicated temporary arrangements will be required to maintain existing traffic at the high speed road sections together with stringent measures such as rock fall fence for the slope protection and stabilisation works to the existing slopes as required near the works sites. For works sites with close proximity to residences, stringent environmental mitigation measures such as temporary noise barriers or working in restricted hours (e.g. road closure can be implemented only after 8:00pm, except on Public holidays and Sundays) are required to mitigate the construction impacts. Given these constraints, tenderers were understood to price with greater allowances for the construction difficulties and risks.

7. In connection with the high tender outturn price, we had scrutinised the technical proposal submitted by the recommended tender with whom we negotiated for a lower tender price. However, the tender price was only slightly reduced. In the course of the negotiation, a review (including a study on the feasibility of re-tendering) for the works contract was carried out in parallel. In view of the market condition at that time, it

was considered that a re-tendering exercise during mid-2008 to late 2008 would unlikely result in any favourable tender with a significantly lower tender price which could be accommodated within the original estimate for the works contract. Moreover, a re-tendering exercise will delay the project by at least six to nine months which is highly undesirable in view of the community's urge for the early implementation of the project. In fact, the limited potential of re-tendering to lower the tender price was evident through the tender return for the second civil works contract (i.e. Tai Lam Section) for which we received seven tenders in November 2008. There was only a slight fall in the tender rates when compared with the pre-tender estimate based on the tendered rates of the first civil works contract. The average of the three tenders with the highest scores³ under tender evaluation is around 4% lower than the pre-tender estimate. More details about this are in paragraphs 8 and 9 below.

Higher estimates of the remaining works contracts

8. The high tender outturn price of the first civil works contract warrants a review of the costs of the remaining works. Estimates of the second (i.e. Tai Lam Section) and third (i.e. Sam Shing Hui Section) civil works contracts and the TCSS contract were reviewed based on the tender outturn price of the first civil works contract. As all the works contracts have similar nature and are in the same area, the first contract's tendered rates are generally applicable to the remaining works contracts. Accordingly, we had revised the estimates for the remaining works contracts (i.e. second, third and TCSS contracts) from a total of \$1,930.9 million by \$524.0 million to \$2,454.9 million (an increase of 27.1%) which is in line with similar rates in the first contract.

9. We invited tenders for the second civil works contract on 26 September 2008 and received seven tenders on 21 November 2008. Despite the economic situation following the outbreak of the financial turmoil in October 2008 and that tenderers were understood to have taken into account the relevant effect in submitting the tenders, the tender outturn prices for the second works contract had a slight fall (around 4%) only from the revised pre-tender estimate. In assessing the tenders for this contract, we found that in general those major tendered rates showed little deviation as compared to those in the revised pre-tender estimate. We consider that a re-tendering exercise during early 2009 to mid-2009 will unlikely result in a

³ Each of the tenders comprised a technical submission and a tender price document, which were evaluated separately. Their respective scores evaluated were combined in a weighting of 40% for technical submission and 60% for tender price document to give an overall score for ranking the tenders.

significantly lower tender price. It will also delay the works commencement by at least six to nine months which is highly undesirable and would delay job creation.

Change in contingencies

10. As the tender price for the first civil works contract and the estimates for the remaining works contracts are higher, the contingency sums for unforeseen works will also need upward adjustments. It is considered necessary to revise the contingency from \$395.9 million by \$56.7 million to \$452.6 million (an increase of 14.3%).

Additional consultants' fees and RSS costs

11. **746TH** had originally proceeded on the basis of a two works contract arrangement, i.e. the Eastern Section contract and Western Section contract. The Eastern Section (about 6.8 km long) of the improvement works was tendered on 7 March 2008 and returned on 16 May 2008 (please see paragraph 4 above). During the tendering period, members of the Hong Kong Construction Association expressed concerns that many contractors are unable to become qualified in bidding for the contracts as the contract values were too high. They therefore appealed to HyD for the original Western Contract to be divided into smaller contracts to allow more contractors to bid for the works. In order to address the concern of the construction industry, HyD decided to implement the Western Section works under two separate contracts, i.e. Tai Lam Section (about 4 km long) and Sam Shing Hui Section (about 4.7 km long). In view of the increased number of the works contracts for the improvement works, the RSS establishment for the single Western Section contract arrangement was reviewed and increased to cope with more contract administrative and interfacing works.

12. Having reviewed the sum for RSS costs, we found that an additional sum of \$37.3 million is required to cover the increased cost from \$387.9 million to \$425.2 million (an increase of 9.6%).

Increase in the provision for price adjustment

13. According to existing Government practice, in general, monthly payments to contractors for construction contracts are adjusted to cover market fluctuations in labour and material costs, which are known as

Contract Price Fluctuation (CPF) payment. The adjustment mechanism⁴ is stipulated in the contract in accordance with the General Conditions of Contract for Civil Engineering Works. The CPF system allows for both upward and downward adjustments to contract payments in accordance with movements in the cost of labour and materials in Government civil engineering and building contracts. The objective of this system is for equitable risk sharing between Government as the employer and the contractor.

14. In the planning stage when a project estimate is prepared, the MOD project estimate is derived by applying to that project estimate at constant price base with a set of price adjustment factors based on the forecast of inflation/deflation for construction works at that time.

15. The contract period for all the civil works contracts at TMR will be over four years' time. The current forecast for the completion of the whole project is scheduled to be late 2014. As a result of the higher revised estimates and hence higher cashflow requirements of the three civil works contracts in constant prices, there will be increases in the estimated provision of price adjustment for all the contracts accordingly. In addition, when the MOD project estimate of **746TH** was prepared according to the set of price adjustment factors in February 2008, the prices for public sector building and construction output was then assumed to increase by 1% per annum for the period from 2008 to 2011 and 2% per annum afterwards. According to the Government Economist's latest information in January 2009, the increase in the prices is assessed to be 6.8% in 2008 and assumed to be 2% per annum over the period from 2009 to 2013 and 3% per annum over the period from 2014 to 2019. Based on the revised cashflow requirements of the project and the most updated assumption on the trend movement of change in prices for public sector building and construction output, we need to increase the provision of price adjustment under the project by \$771.4 million.

⁴ Under the adjustment mechanism, the actual monthly payment made to the contractor is derived by multiplying the value of work done with a contract price fluctuation factor which varies from month to month. The price fluctuation factor appropriate to a particular month is determined by –

- (a) the relative proportions of labour and material content contained in a Schedule of Proportions submitted by the contractor with his tender, which is related to the contractor's working methods; and
- (b) the Index Numbers of the Costs of Labour and Materials Used in Public Sector Construction Project (April 2003 = 100) published by the Census and Statistics Department on a monthly basis.

Overall Review

16. Upon a review of the financial position of the project, we consider it necessary to increase the APE of **746TH** from \$4,620.5 million by \$2,183.8 million to \$6,804.3 million in MOD prices to ensure adequate funds are available to cover the cost of the project. A breakdown of the proposed increase of \$2,183.8 million is as follows –

Factors	Proposed increased amount (\$ million)	% of the total increased amount
Additional cost associated with –		
(a) Higher-than-expected tender outturn price for the first civil works contract	794.4	36.4
(b) Higher pre-tender estimate of the remaining works contracts	524.0	24.0
(c) Change in contingencies	56.7	2.6
(d) Additional consultants' fees and RSS costs	37.3	1.7
(e) Increase in the provision for price adjustment	771.4	35.3
Total (in MOD prices)	2,183.8	100.0

A comparison of the cost breakdowns of the APE and the revised project estimate (in MOD prices) is shown in **Enclosure 3**.

FINANCIAL IMPLICATIONS

17. Subject to approval, we will revise the phasing of the expenditure as follows –

Year	\$ million (MOD)
2008-2009	154.7
2009-2010	463.1
2010-2011	796.0
2011-2012	942.1
2012-2013	961.0
2013-2014	980.2
2014-2015	1007.2
2015-2016	899.2
2016-2017	600.8
	6804.3

18. The proposed increase in the APE will not give rise to additional recurrent expenditure.

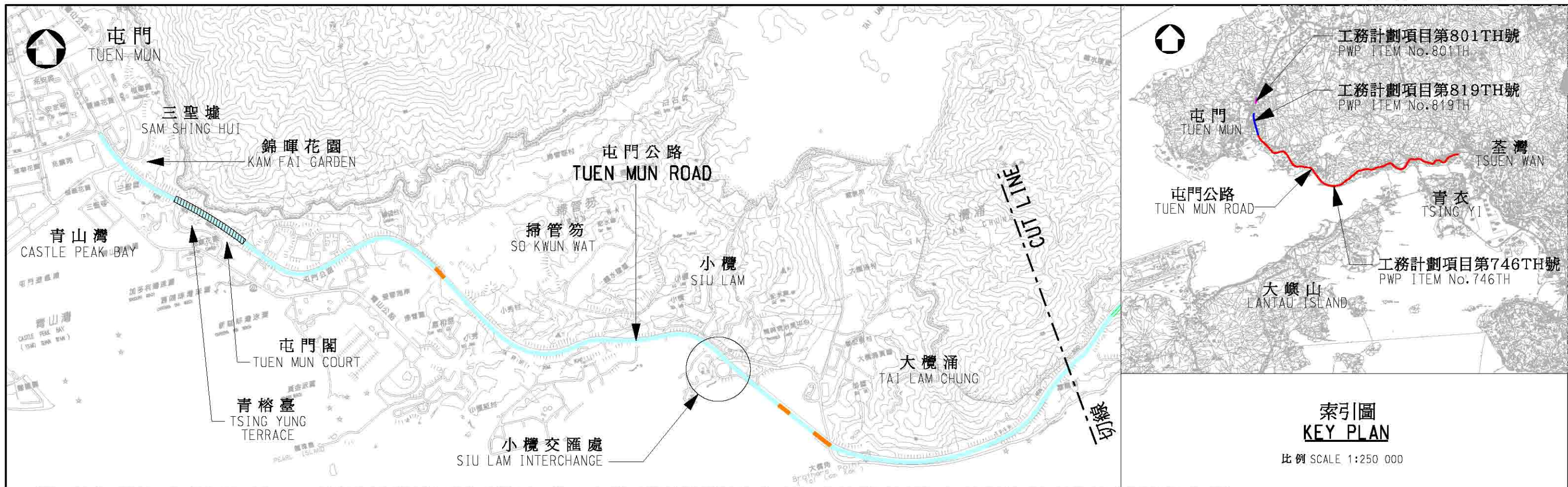
WAY FORWARD

19. We intend to submit the proposal to the Public Works Subcommittee and Finance Committee of the Legislative Council on 8 April 2009 and 24 April 2009 respectively for the increase in APE.

ADVICE SOUGHT

20. Members are invited to comment on this paper.

Transport and Housing Bureau
February 2009



圖則名稱 drawing title		設計 designed		繪圖 drawn		圖則編號 drawing no.		比例 scale	
工務計劃項目第746TH號-屯門公路重建及改善工程 PWP ITEM No.746TH - RECONSTRUCTION AND IMPROVEMENT OF TUEN MUN ROAD		C.Y.TANG	SIGNED 18/01/08	W.L.LAM	SIGNED 18/01/08	HMW6746TH-SPO005		1:25 000 OR AS SHOWN	
		覆核 checked	SIGNED S.C.WONG 18/01/08	批准 approved	SIGNED P.D.MORGAN 18/01/08	© 版權所有 COPYRIGHT RESERVED			
		主要工程管理处 MAJOR WORKS PROJECT MANAGEMENT OFFICE							

Enclosure 3

746TH – Reconstruction and improvement of Tuen Mun Road

A comparison of the approved project estimate (APE) and the revised project estimate in MOD prices is as follows –

		APE (\$ million) (i)	Revised project estimate (\$ million) (ii)	Difference (\$ million) (iii)=(ii)-(i)
(a)	Roads and drains	691.0	831.6	140.6
(b)	Earthworks	629.6	845.8	216.2
(c)	Modifications to highway structures	252.9	407.3	154.4
(d)	Slope upgrading works	714.5	881.1	166.6
(e)	Noise mitigation measures	594.0	1,041.1	447.1
	(i) semi-enclosures	280.0	506.1	
	(ii) cantilevered noise barriers	286.0	500.9	
	(iii) vertical noise barriers	28.0	34.1	
(f)	TCSS	244.5	412.9	168.4
(g)	Landscaping works	261.4	274.0	12.6
(h)	Fire fighting system	105.3	116.3	11.0
(i)	Site investigation and structural condition survey	97.1	98.6	1.5
(j)	Consultants' fees and resident site staff salaries	387.9	425.2	37.3
(k)	Contingencies	395.9	452.6	56.7
(l)	Price adjustment	246.4	1,017.8	771.4
	Total (in MOD prices)	4,620.5	6,804.3	2,183.8