For discussion **PWSC(2009-10)49**
on 10 June 2009

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 – HIGHWAYS
Transport – Roads
836TH - Improvement to Sham Tseng Interchange

Members are invited to recommend to Finance Committee the upgrading of **836TH** to Category A, at an estimated cost of $99.6 million in money-of-the-day prices for the improvement to Sham Tseng Interchange.

PROBLEM

We need to improve the traffic conditions of the Sham Tseng Interchange (STI) to relieve the present and anticipated traffic congestion.

PROPOSAL

2. The Director of Highways, with the support of the Secretary for Transport and Housing (STH), proposes to upgrade **836TH** (the Project) to Category A at an estimated cost of $99.6 million in money-of-the-day (MOD) prices for the construction works covering mainly the improvements to junctions at STI and widening of sections of the Tuen Mun Road (TMR) slip roads between TMR (Tsuen Wan Bound (TWB)) and Castle Peak Road (CPR) from single two-lane to single three-lane carriageways.

/PROJECT…..

PROJECT SCOPE AND NATURE

3. The scope of works for **836TH** comprises –

(a) construction of a single-lane vehicular underpass of about 60 metres (m) long underneath TMR at the STI;

(b) widening of sections of the TMR slip roads of about 300 m long in total between TMR (TWB) and CPR from a single two-lane to a single three-lane carriageway;

(c) extension of the existing two-lane underpass underneath TMR at the STI by about 10 m;

(d) modification of the junction of the TMR slip roads and CPR (Junction J1);

(e) modification of the junction of the TMR slip roads at the STI (north of Block 5 of Rhine Garden) (Junction J2) to a signalised junction, including the extension of the existing Area Traffic Control (ATC)[1] system to cover this road junction;

(f) installation of a closed circuit television (CCTV) system[2] at Junctions J1 and J2;

(g) ancillary works including pavement reconstruction, slope, drainage and landscaping works; and

(h) implementation of an environmental monitoring and audit (EM&A) programme for the works mentioned in paragraph 3(a) to 3(g) above.

——— A plan showing the proposed works with cross sections is at Enclosure 1.

/4. …..

[1] An ATC System is a computerised system that integrates the control and operation of traffic signals within an area.

[2] A CCTV system provides traffic operators at the control centre of the Transport Department with real-time traffic information from CCTV cameras installed at strategic locations, thus allowing quick remedial actions to be taken when necessary to cope with traffic incidents and/or emergency situations.

4. We plan to commence construction works in September 2009 for completion by September 2013[3].

JUSTIFICATION

5. The STI connects CPR with TMR. It consists of mainly single two-lane TMR slip roads (including a single two-lane underpass connecting TMR (TWB), a signalised junction (Junction J1) and a priority junction (Junction J2). The STI is currently saturated during peak hours. According to the latest forecast, Junctions J1 and J2 will be further overloaded in 2016.

6. The capacities of the two junctions above during the peak hours in 2016, with and without the proposed improvement works, are summarised below in comparison with the actual figures in May 2009[4] –

Junction	Junction Capacities		
	May 2009	2016	
	Without improvement	Without improvement	With improvement
TMR slip roads / CPR (Junction J1)	4%[5]	-9%[5]	12%[5]
TMR slip roads (Junction J2)	-41%[6]	-169%[6]	5%[5]

/7. …..

[3] To facilitate interface issues and avoid possible abortive work, the Improvement to STI has been incorporated under the Eastern Section Contract (ESC) of **746TH** – Reconstruction and Improvement of TMR, the completion date of which is September 2013. The part of the works for the improvement to STI under the ESC will be executed subject to the Finance Committee's approval of the project. We will try to complete the improvement to the Interchange as early as practicable.

[4] A survey was conducted in May 2009 to take stock of the latest traffic figures at the STI. The figures accord with previous assessments conducted by the Transport Department (TD).

[5] The performance of a traffic signalised junction is indicated by its reserve capacity (RC). A positive RC indicates that the junction is operating with spare capacity. A negative RC indicates that the junction is overloaded, resulting in traffic queues and longer delay time.

[6] The performance of a priority junction is normally measured by its design flow/capacity ratio (DFC). A DFC ratio less than 1.0 (or in positive percentage) indicates that the junction is operating within design capacity. A DFC ratio greater than 1.0 (or in negative percentage) indicates that the junction is overloaded, resulting in traffic queues and longer delay time to the minor arm traffic. The figures shown in the tables are however converted from normal DFC value to give the equivalent percentages for easy comparison.

7. Junction J1 is currently a signalised junction. It connects CPR with the TMR slip roads. At present, there is one lane through the junction for traffic going to Tsuen Wan from CPR to turn left and go uphill to join TMR. Its capacity is close to saturation during morning peak hours as demonstrated by the daily queues on CPR (TWB). The latest forecast shows that the junction will be overloaded by 9% during the morning peak in 2016. Without the proposed improvement works, queues will further develop and affect the smooth operation of the through traffic on CPR (TWB). The proposed improvement works will provide an additional lane for the left-turning vehicles on the concerned section of the TMR slip roads to go uphill and offer relief to the junction.

8. Junction J2 is currently a priority junction. It connects the TMR slip roads with TMR (both TWB and Tuen Mun Bound (TMB)) and serves traffic to and from CPR. The continuous uphill traffic from CPR (TWB) towards TMR (TWB) now dominates the traffic movements at this junction and affects the downhill traffic from TMR (TMB) towards CPR. If Junction J2 is not upgraded with the proposed improvement, it will be overloaded by 169% during peak hours in 2016, with long queues along the slow lane of TMR (TMB) affecting the smooth operation of the through traffic thereon. We propose to construct another underpass exclusively for the downhill traffic from TMR (TWB) and convert Junction J2 into a signalised one at the same time.

9. With the above proposed works, there will then be a two-lane underpass for the uphill traffic and another one-lane underpass for the downhill traffic. The performance of Junction J2 will be improved with a RC of 5% in 2016.

10. TD extended the ATC system to cover the Sham Tseng area, including Junction J1, in January 2009. We will take this opportunity to further extend the ATC system to cover the proposed signalised Junction J2. Together with the CCTV system, this will provide real-time traffic information to assist in coping with traffic incidents and/or emergency situations at the STI.

FINANCIAL IMPLICATIONS

11. We estimate the cost of **836TH** to be $99.6 million in MOD prices (see paragraph 12 below), made up as follows –

/**$ million**…..

				$ million	
(a)	Roads and drains			8.4	
(b)	Earthworks			5.7	
(c)	Underpass			58.7	
(d)	Slope works			3.1	
(e)	Landscaping			1.2	
(f)	Consultant's fees			1.4	
	(i)	contract administration	1.0		
	(ii)	management of resident site staff	0.3		
	(iii)	EM&A programme	0.1		
(g)	Remuneration of resident site staff			6.7	
(h)	Contingencies			7.7	
			Sub-total	92.9	(in September 2008 prices)
(i)	Provision for price adjustment			6.7	
			Total	99.6	(in MOD prices)

A detailed breakdown of the estimates for the consultant's fees and resident site staff costs by man-months is at Enclosure 2.

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

Year	**$ million (Sep 2008)**	**Price Adjustment Factor**	**$ million (MOD)**
2009 –10	1.0	1.03500	1.0
2010 –11	36.7	1.05570	38.7
2011 –12	40.3	1.07681	43.4

/**Year**…..

Year	$ million (Sep 2008)	Price Adjustment Factor	$ million (MOD)
2012 –13	12.5	1.09835	13.7
2013 –14	1.4	1.12032	1.6
2014 –15	1.0	1.15113	1.2
	92.9		99.6

13. We have derived the MOD estimate on the basis of the Government's latest forecast of the trend rate of change in the prices of public sector building and construction output for the period 2009 to 2015. This project was tendered as a section subject to excision under the ongoing ESC of the Reconstruction and Improvement of TMR project. The part of the works for the improvement to STI under the Eastern Section Contract will be executed subject to the Finance Committee's approval of the project. The contract will provide for price adjustments.

14. We estimate the additional annual recurrent expenditure upon completion of the project to be about $0.2 million.

PUBLIC CONSULTATION

15. When we consulted the Tsuen Wan District Council (TWDC) on **746TH** – Reconstruction and Improvement of TMR in November 2006, Members expressed concerns on the traffic at the STI tailing back to CPR (TWB) and TMR (TMB) during peak hours. They requested the Administration to study the improvements to the traffic situation at the STI. We conducted a review on Junctions J1 and J2, the findings of which are set out in paragraphs 5 to 10 above. We consulted the TWDC on the scheme on 30 September 2008. Members supported the Project and requested its early implementation.

/16……

16. We consulted the Advisory Committee on the Appearance of Bridges and Associated Structures[7] on the aesthetic design of the proposed retaining wall and underpass under the project in November 2008. The Committee accepted the proposed aesthetic design.

17. We gazetted the proposed works under the Roads (Works, Use and Compensation) Ordinance (Cap. 370) (the Ordinance) on 19 December 2008. We also informed the local residents of the Project by putting up notices in the area. We received no objection. The Acting Permanent Secretary for Transport and Housing (Transport), under the delegated authority from STH, authorised the proposed works under the Ordinance on 19 March 2009. The notice of authorisation was gazetted on 27 March 2009.

18. We issued an information paper to the Legislative Council Panel on Transport for circulation on 15 May 2009. Members did not raise any objection to the Project.

ENVIRONMENTAL IMPLICATIONS

19. The Project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We have carried out an environmental review including noise, air and water quality impacts during construction as well as landscape, visual and waste management issues. The review concluded that the Project would not cause long-term environmental impacts. We will implement all the recommended mitigation measures to mitigate environmental impacts to within the established standards and guidelines.

/20. …..

[7] The Advisory Committee on the Appearance of Bridges and Associated Structures, which comprises representatives of the Hong Kong Institute of Architects; the Hong Kong Institution of Engineers; the Hong Kong Institute of Planners; an academic institution; Architectural Services Department; Highways Department; Housing Department; and Civil Engineering and Development Department, is responsible for vetting the design of bridges and other structures associated with the public highway system, including noise barriers and enclosures, from the aesthetic and visual impact points of view.

20. 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. We will implement an EM&A programme during the course of construction to ensure that proactive measures are adopted to avoid the occurrence of adverse environmental impacts on the public.

21. We have considered minimising the cutting of existing steep slopes and maximising the angle of cut slopes through optimal road alignment design to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated rock and soil materials) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of construction waste to public fill reception facilities[8]. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further minimise the generation of construction waste.

22. We will also require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste to public fill reception facilities and landfills respectively through a trip-ticket system.

23. We estimate that the Project will generate in total about 37 700 tonnes of construction waste. Of these, we will reuse about 900 tonnes (2.4%) of inert construction waste on site and deliver 36 300 tonnes (96.3%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, we will dispose of 500 tonnes (1.3%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be about $1.0 million for this Project (based on a unit cost of $27/tonne for disposal at public fill reception facilities and $125/tonne[9] at landfills).

/HERITAGE…..

---

[8] Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

[9] This estimate has taken into account the cost of 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 $\$90/m^3$), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

HERITAGE IMPLICATIONS

24. The project will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

25. The proposed works do not require any land acquisition.

BACKGROUND INFORMATION

26. We upgraded **836TH** to Category B in April 2008.

27. We engaged consultants in June 2008 to undertake the investigation and design for the Project at an estimated cost of $2.0 million in MOD prices under **Subhead 6100TX** "Highway works, studies and investigations for items in Category D of the Public Works Programme". We have substantially completed the design for the Project.

28. Of the 63 trees within the project boundary, seven trees will be preserved. The proposed works will involve the removal of 56 trees including 55 to be felled and one to be transplanted within the project site. All of the trees to be removed are not important trees[10]. We will incorporate planting proposals as part of the Project, including estimated quantities of about 1 300 trees, 4 100 shrubs and 1 600 square metres of grassed area.

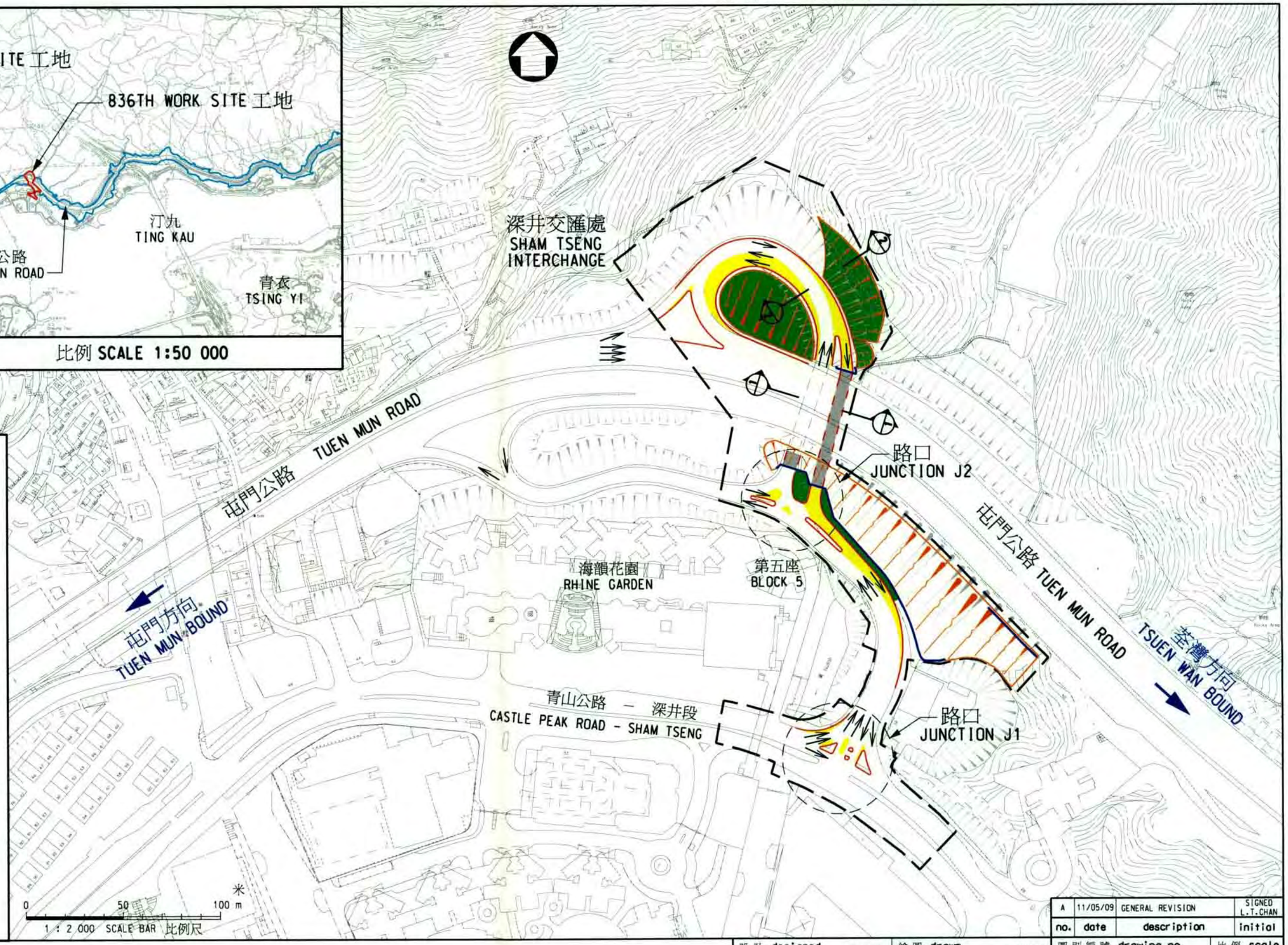
/29. ….

[10] "Important trees" refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –
(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument and trees in memory of important persons or events;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall tree size, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
(e) trees with trunk diameter equal or exceeding 1.0 metre (measured at 1.3 metre above ground level), or with height/canopy spread equal or exceeding 25 metres.

29. We estimate that the proposed works will create about 86 jobs (17 for professional/technical staff and 69 for labourers) providing a total employment of about 1 800 man-months.

Transport and Housing Bureau
May 2009

索引圖 KEY PLAN　　比例 SCALE 1:50 000



圖例
LEGEND:

- 施工區界限 LIMIT OF WORKS AREA
- 行車線數 NO. OF TRAFFIC LANE
- 擬修改的道路路線 PROPOSED ROAD REALIGNMENT
- 擬建行車道 PROPOSED CARRIAGEWAY
- 擬建行車隧道 PROPOSED UNDERPASS
- 擬建斜坡改善工程 PROPOSED SLOPE IMPROVEMENT WORKS
- 擬建景觀美化工程 PROPOSED LANDSCAPING WORKS
- 擬建護土牆 PROPOSED RETAINING WALL

no.	date	description	initial
A	11/05/09	GENERAL REVISION	SIGNED L.T.CHAN

圖則名稱 drawing title

工務計劃項目第836TH號 - 深井交匯處改善工程 - 平面圖
PWP ITEM No. 836TH - IMPROVEMENT TO SHAM TSENG INTERCHANGE - LAYOUT

設計 designed		繪圖 drawn	
L.T.CHAN	SIGNED 07/05/09	K.S.LEUNG	SIGNED 07/05/09
覆核 checked		批准 approved	
S.C.WONG	SIGNED 07/05/09	C.K.WONG	SIGNED 07/05/09

主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

圖則編號 drawing no. HMW6836TH-SP0001-A　　比例 scale 1:2000

HIGHWAYS DEPARTMENT HONG KONG 香港政府路署

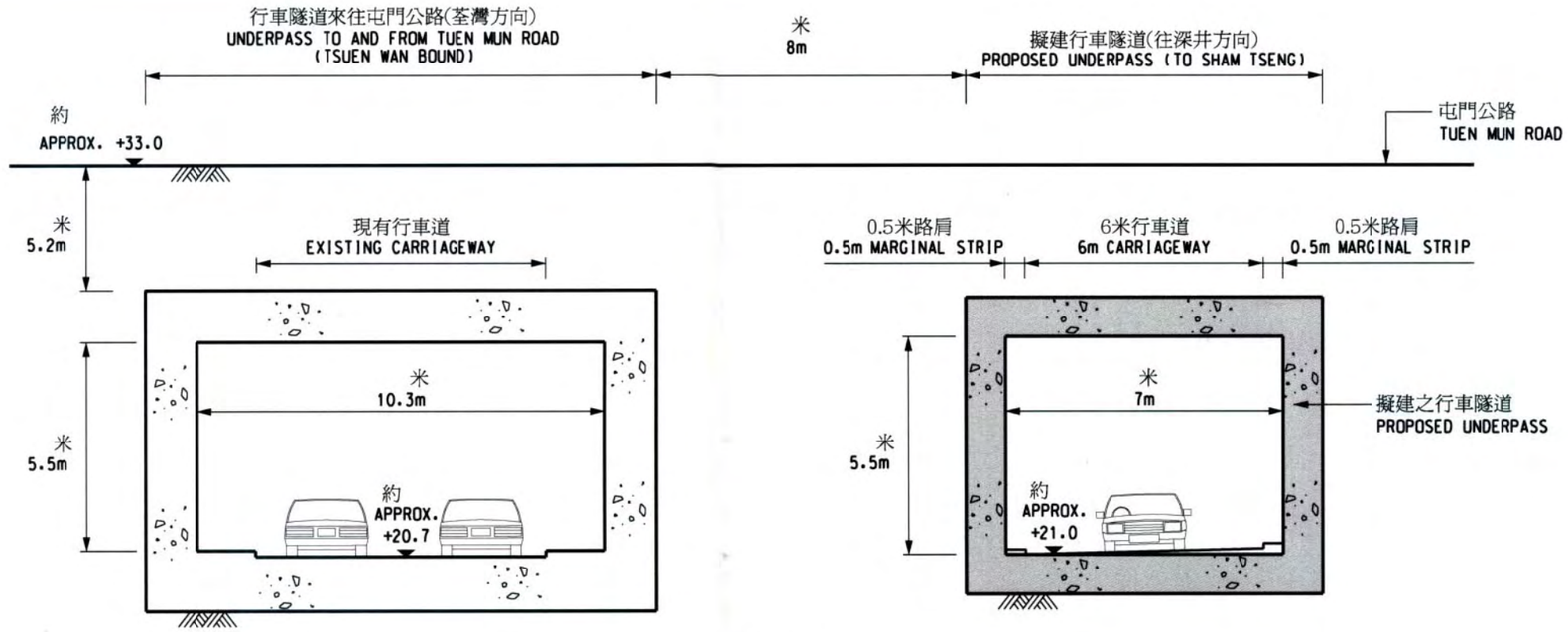
C:\CDMS\MW\dms06339\HMW6836TH-SP0001-A.dgn

A3 420 x 297

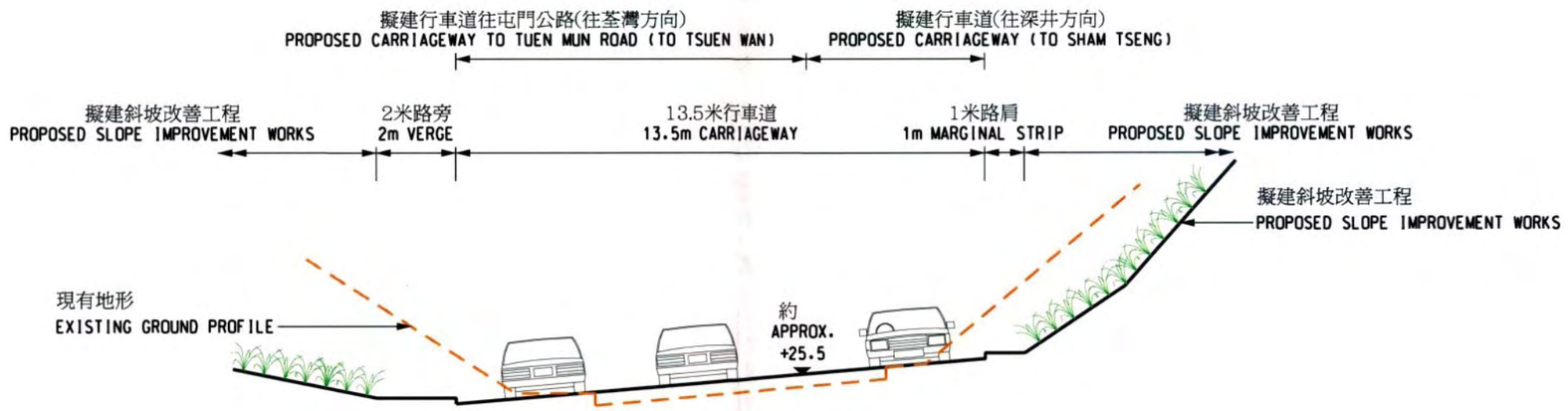
註釋 NOTES:

所有水平均以米為單位並在香港主水平基準上。

ALL LEVELS ARE IN METRES ABOVE HONG KONG PRINCIPAL DATUM.



切面 SECTION 1 - 1



切面 SECTION 2 - 2

no.	date	description	initial
A	11/05/09	GENERAL REVISION	SIGNED L.T.CHAN

圖則名稱 plan title

工務計劃項目第836TH號 - 深井交匯處改善工程 - 切面圖
PWP ITEM NO.836TH - IMPROVEMENT TO SHAM TSENG INTERCHANGE - CROSS SECTIONS

設計 designed	SIGNED	繪圖 drawn	SIGNED
L.T.CHAN	07/05/09	K.S.LEUNG	07/05/09
覆核 checked	SIGNED	批准 approved	SIGNED
S.C.WONG	07/05/09	C.K.WONG	07/05/09

主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

圖則編號 plan no. HMW6836TH-SP0002-A

比例 scale 1:150

HIGHWAYS DEPARTMENT 路政署 香港 HONG KONG

C:\CDMS\MW\dms06339\HMW6836TH-SP0002-A.dgn

A3 420 x 297

Enclosure 2 to PWSC(2009-10)49

836TH – Improvements to Sham Tseng Interchange

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2008 prices)

			Estimated Man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee ($ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	--	--	--	0.5
		Technical	--	--	--	0.5
					Sub-total	1.0
(b)	Consultants' fees for EM&A programme	Professional	0.5	38	2.0	0.06
		Technical	1	14	2.0	0.04
					Sub-total	0.1
(c)	Resident site staff costs (Note 3)	Professional	30	38	1.6	2.9
		Technical	130	14	1.6	4.1
					Sub-total	7.0
	Comprising –					
	(i) Consultants' fees for management of resident site staff					0.3
	(ii) Remuneration of resident site staff					6.7
					Total	8.1

* 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 profit 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 (as at 1 April 2008, MPS pt. 38 = $60,535 per month, and MPS pt. 14 = $19,835 per month).

2. The consultants' fees for construction supervision and contract administration are estimated in accordance with the terms stipulated in Supplementary Agreement No. 2 to CE 22/2005 (HY) titled "Improvement of Sham Tseng Interchange and Bus-Bus Interchanges on Tuen Mun Road – Investigation, Design and Construction". The construction phase of the assignment will be executed only subject to Finance Committee's approval to upgrade **836TH** to Category A.

3. We will only know the actual man-months and actual costs after completion of the construction works.