For discussion **PWSC(2000-01)97**
on 21 February 2001

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 707 - NEW TOWNS AND URBAN AREA DEVELOPMENT
New Territories West Development
Transport - Roads
52TH - Route 5 - section between Shek Wai Kok and Chai Wan Kok

Members are invited to recommend to Finance Committee the upgrading of **52TH** to Category A at an estimated cost of $1,098.5 million in money-of-the-day prices.

PROBLEM

We need to construct the remaining section of Route 5 between Shek Wai Kok and Chai Wan Kok to relieve traffic congestion in Tsuen Wan.

PROPOSAL

2. The Director of Territory Development (DTD), with the support of the Secretary for Transport, proposes to upgrade **52TH** to Category A at an estimated cost of $1,098.5 million in money-of-the-day (MOD) prices for the construction of the remaining section of Route 5 between Shek Wai Kok and Chai Wan Kok in Tsuen Wan.

PROJECT SCOPE AND NATURE

3. The scope of works for **52TH** comprises -

/ (a) .....

(a) construction of a 1 300-metre (m)-long dual 2-lane carriageway from Cheung Pei Shan Road at Shek Wai Kok to Castle Peak Road near Tsuen Wan Police Station at Tsuen King Circuit, including a 97m-long flyover across the Mass Transit Railway (MTR) tracks (a 190m section through Discovery Park has been completed by the developer);

(b) widening and upgrading of a 700m-long existing section of Castle Peak Road between Tsuen Wan Police Station and Chai Wan Kok to dual 4-lane carriageway;

(c) improvement of Chai Wan Kok Interchange including extension of a flyover (about 166m in length), a 55m-long underpass and associated slip roads connecting Castle Peak Road with Tuen Mun Road;

(d) construction of a pedestrian subway and a footbridge;

(e) associated roadworks, drainage and sewerage works, slope works, waterworks and landscaping works;

(f) provision of noise mitigation measures including about 615m of semi-enclosed noise barriers (5.5m high), about 1 190m of cantilever noise barriers (4m to 8m high) and low noise road surfacing; and

(g) an environmental monitoring and audit (EM&A) programme for the works mentioned in paragraphs (a) to (f) above.

——— The site plans are at Enclosures 1 and 2.

JUSTIFICATION

4. Route 5 is a trunk road connecting Sha Tin and Tsuen Wan via the Shing Mun Tunnels. The section of Route 5 between Sha Tin and Shek Wai Kok, Tsuen Wan was completed in 1990. The remaining section of Route 5 to be completed under **52TH** runs from Shek Wai Kok to Chai Wan Kok.

5. At present, vehicular traffic between the Shing Mun Tunnels and Tuen Mun Road/Castle Peak Road has to pass through the congested local road network within Tsuen Wan. During peak hours, road junctions in the area operate at full capacity. Traffic congestion occurs on the approaches to Castle Peak Road (Tsuen Wan Section) between Sha Tsui Road and Sai Lau Kok Road, in the Kowloon bound direction in the morning and in the Tuen Mun bound direction in the evening. The proposed roadworks will provide a direct trunk road link between the Shing Mun Tunnels and Tuen Mun Road, as well as a local link to western Tsuen Wan. They will help relieve the present traffic congestion in the area.

6. The Traffic Impact Assessment review completed in June 1999 indicated that a number of road junctions in Tsuen Wan Town cannot cope with the growing traffic demand. In particular, the junctions at Castle Peak Road/Tai Chung Road, Sha Tsui Road/Tai Ho Road and Castle Peak Road/Tai Ho Road are operating at or beyond capacities. The existing and projected reserve capacities[1] of these three key junctions during peak hours are summarised below -

Location of Junction	**With or Without Proposed Roadworks**	**Reserve Capacity**		
		Year 2001	**Year 2006**	**Year 2011**
Castle Peak Road/ Tai Chung Road	With	-	5%	10%
	Without	-10%	-25%	-30%
Sha Tsui Road/ Tai Ho Road	With	-	-30% (5%)	-30% (0%)
	Without	-10%	-40% (-10%)	-40% (-10%)
Castle Peak Road/ Tai Ho Road	With	-	-5%	0%[2]
	Without	-5%	-10%	-5%

Percentage in ( ) indicates the reserve capacities after completion of a road junction improvement scheme at the junction of Sha Tsui Road/Tai Ho Road in 2006.

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1 "Reserve Capacity" (RC) is an indicator which reflects a junction's performance. A negative RC indicates that the junction is overloaded, thus resulting in traffic queues and delay.

2 Normally, the reserve capacity should decrease over the years due to natural growth in traffic volume. However, the traffic model indicates that the junction capacity at Castle Peak Road/Tai Ho Road can be improved with the completion of Route 9 and Route 10 by 2011.

We will continue to monitor the traffic situation at the junction of the Sha Tsui Road/Tai Ho Road and Castle Peak Road/Tai Ho Road after the completion of the proposed works, and will consider the implementation of junction improvements and traffic management measures, if necessary, to further improve the traffic situation.

7. Apart from the road junctions in Tsuen Wan Town, Tsuen Kam Interchange will also be a critical junction. The completion of the Tsing Yi North Coastal Road in 2001 will increase the traffic volume at the Interchange because the road will provide a more convenient link between Sha Tin and Lantau/Northwest New Territories via the Shing Mun Tunnels. We expect the Interchange to be heavily overloaded by 2006 causing significant delay and long traffic queues on the approach roads. The projected volume/capacity (v/c) ratios[3] in 2006 and 2011 respectively during the peak hours at Tsuen Kam Interchange with or without the proposed roadworks are as below -

	Year	
	2006	**2011**
With proposed roadworks	0.82	0.80[4]
Without proposed roadworks	1.71	1.88

When Route 5 is in place, the projected journey time between Chai Wan Kok and Shek Wai Kok will be reduced from 12.4 minutes to 2.8 minutes.

8. The review recommended that the remaining section of Route 5 should be completed as soon as possible in order to provide traffic relief to the distributor roads in Tsuen Wan, including Castle Peak Road, Tai Chung Road, Sha Tsui Road and Tai Ho Road. We plan to start construction in July 2001 for completion by December 2005.

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[3] A volume/capacity (v/c) ratio equals to or less than 1.0 means that the 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; above 1.2 indicates more serious congestion with traffic speeds progressively deteriorating with further increases in traffic.

[4] Normally the v/c ratio should increase over the years due to natural growth in traffic volume. However, the traffic model indicates that there will be a marginal decrease in traffic flows on Route Twisk via Tsuen Kam Interchange in 2011 because of the completion of Route 9 and other strategic roadworks in Northwest New Territories by 2011.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the project to be $1,098.5 million in MOD prices made up as follows –

		$ million	
(a)	At grade roadworks		120.0
(b)	Elevated bridge structures		290.0
(i)	foundations	100.0	
(ii)	substructures	15.0	
(iii)	superstructures	175.0	
(c)	Underpasses		77.0
(d)	One pedestrian subway and one footbridge		8.0
(e)	Retaining walls and slope works		120.0
(f)	Drainage and sewerage works and waterworks		52.0
(g)	Landscaping works		30.0
(h)	Noise mitigation measures		110.0
(i)	semi-enclosed noise barriers	68.0	
(ii)	cantilever noise barriers	40.0	
(iii)	low noise road surfacing	2.0	
(i)	EM&A programme		8.0
(j)	Consultants' fees for -		95.0

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		$ million	
(i)	construction stage	12.0	
(ii)	site staff costs	83.0	
(k)	Contingencies	90.0	
	Sub-total	1,000.0	(in September 2000 prices)
(l)	Provision for price adjustment	98.5	
	Total	1,098.5	(in MOD prices)

Owing to insufficient in-house resources, DTD proposes to employ consultants to carry out the construction supervision. A breakdown by man-months of the estimate for consultants' fees is at Enclosure 3.

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

Year	**$ million (Sept 2000)**	**Price adjustment factor**	**$ million (MOD)**
2001 - 2002	100.0	1.02550	102.6
2002 - 2003	220.0	1.05627	232.4
2003 - 2004	230.0	1.08795	250.2
2004 - 2005	230.0	1.12059	257.7
2005 - 2006	170.0	1.15421	196.2
2006 - 2007	50.0	1.18884	59.4
	1,000.0		1,098.5

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11. We have derived the MOD estimate on the basis of the Government's latest forecast trend of labour and construction prices for the period 2001 to 2007. We will invite tender for the proposed works under a standard re-measurement contract, because the works involve extensive earthworks and foundation works, the quantities of which may vary according to actual ground conditions. The contract will provide for price adjustments as the construction period will exceed 21 months.

12. We estimate the annual recurrent expenditure to be $17.2 million.

PUBLIC CONSULTATION

13. We consulted the Traffic and Transport Committee of the Tsuen Wan District Board on 10 March 1993 and 23 July 1993 on the preliminary layout of the proposed road scheme. Members supported the scheme.

14. On 27 March 1995, we consulted the Environmental Affairs Committee of the Tsuen Wan District Board on the proposed environmental impact mitigation measures. Members supported the road scheme on traffic grounds, but expressed reservations with regard to the noise impact during construction and upon completion of the project.

15. We gazetted the road scheme under the Roads (Works, Use and Compensation) Ordinance on 28 April 1995 and received 12 objections from two distinct groups. The first group, consisting of the Mass Transit Railway Corporation, various land owners and local residents, all objected to Government's resumption of their land and wished to safeguard their individual interests. They were also concerned about the environmental and traffic impacts of the project. The second group consisted of members of the Tang Clan who objected to the road scheme on the grounds that the project may have some 'fung shui' impact on an ancestral grave in the area. We explained to the objectors that the proposed works were required because of traffic needs. We also explained to them the recommended environmental mitigation measures under the project and traffic management measures to be carried out during the construction stage. However, we did not succeed in persuading any of the objectors to withdraw their objections. On 17 June 1997, the then Governor in Council overruled the objections in the public interest and authorized the road scheme with modifications. The modifications, originating from the objectors' comments,

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involve the provision of a footway on the top of a section of the retaining wall near the Tang Clan ancestral grave and conversion of part of a footway to a carriageway at the junction of Sha Tsui Road and Castle Peak Road.

16. We issued an information paper to Members of the Transport Panel of the Legislative Council on 16 May 2000. When we submitted the project to Members for consideration at the Public Works Subcommittee meeting held on 24 May 2000, Members raised questions regarding the capacity of the key junctions and the effectiveness of noise mitigation measures proposed in the project. After some discussion, the Administration withdrew the item in order to provide Members the additional information requested. This is mainly set out in paragraphs 6, 17-20 and 22 of this paper. Members also asked if the Administration would install noise barriers along the existing Cheung Pei Shan Road. Following ExCo's approval of the new policy to address noise impact from existing roads, the Administration has earmarked funds to retrofit noise barriers at specific locations on existing roads. Cheung Pei Shan Road has been included in the retrofitting programme. The installation work will be implemented under a separate Public Works Programme item and will be programmed to tie in with completion of this project.

ENVIRONMENTAL IMPLICATIONS

17. The project is an exempted designated project under Section 9(2)d and Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO). The environmental impacts during construction and operation were assessed in an EIA Study completed in 1995 and are now lodged in the EIAO Register. The Study findings indicate that in some instances (e.g. during night work over the MTR tracks), the construction noise impacts will exceed established standards and guidelines. We will implement the recommended mitigation measures, such as the use of quieter equipment, scheduling of activities, careful siting of equipment and use of temporary enclosures, to reduce these impacts as far as possible. We will also implement stringent control measures to minimise other construction noise impacts to meet established standards and guidelines.

18. The Study indicates that operational noise impacts are the major concern as most of the sensitive receivers along the proposed road are exposed to high levels of traffic noise from existing roads. Without noise mitigation on the completed Route 5 extension, the residents of approximately 4 300 dwellings in five villages and eight residential buildings/estates, the occupants of one Home

for the Aged, and the students in two schools would be exposed to traffic noise exceeding the level stipulated in the Hong Kong Planning Standards and Guidelines (HKPSG). In accordance with existing policy, we will provide low noise road surfacing along the full length of the road and construct noise barriers (about 1 190m long ranging from 4m to 8m in height) and semi-enclosed cantilevers (about 615m long and 5.5m high), where necessary. In addition, indirect mitigation measures have been/are being provided by the developers of Kam Fung Garden, Discovery Park and the Nan Fung development (together with the school development therein). Noise abatement measures have been provided at Kwai Ming Wu School. With these measures in place, the EIA Study indicates that the noise impact to approximately 2 500 dwellings will be at levels higher than that stipulated in the HKPSG. However, based on the calculated road traffic noise levels which indicate that in general the largest contribution is from existing sources, these receivers do not meet the eligibility criteria under existing policy for indirect acoustical mitigation measures in the form of window insulation and air-conditioners.

19. Dust suppression measures such as provision of wheel washing troughs at all vehicle exit points, covering of stockpiles of aggregates or spoil, and watering to minimise dust during earthworks operations will be incorporated in the contract documents to maintain air quality to within the established guidelines during construction.

20. Modelling of operational air quality impacts due to nitrogen dioxide (NO_2) and respirable suspended particulates (RSP) indicates that the air quality objectives for hourly NO_2 and daily RSP will not be exceeded in the design years at the identified sensitive receivers along the proposed route. The peak hour concentrations for NO_2 would range from 146 to 286 μg/m3 and the daily average RSP would range from 96 to 135 μg/m3, which are below the air quality objectives of 300 and 180 μg/m3 respectively.

21. In April 1995, the Advisory Council on the Environment endorsed the EIA with the conditions that complaint hotlines should be provided during the construction period to handle complaints from nearby residents, and that there should be independent monitoring of the environmental impacts. In April 2000 and January 2001, we completed two Environmental Reviews (ERs), taking into account the latest information available and the comments received during the public consultations. The ERs concluded that the basic findings of the EIA report are still valid. To further reduce the predicted traffic noise impact on sensitive receivers, we have increased the recommended height of the noise barriers at the

slip road near TWTL 382 and Muk Min Ha Tsuen. To ensure compliance with the EIA recommendations, we will implement an EM&A programme. We will also incorporate into the works contract standard measures to control pollution arising during construction. These measures will include frequent watering of the site and the provision of wheel-washing facilities to reduce emission of fugitive dust, the use of silenced construction plant to reduce noise generation and other procedures as recommended in Environmental Protection Department's Recommended Pollution Control Clauses. We have included in the project estimate the sum of $110 million for implementing the environmental mitigation measures and a sum of $8 million for the EM&A programme (both in September 2000 prices)

22. The scheme will bring about redistribution of traffic within Tsuen Wan which will result in environmental benefits in Tsuen Wan Town. In particular, it can be seen in paragraph 6 that roads in the old town centre, in the area of Sha Tsui Road, will enjoy a reduction in traffic volume of 10-20% at the peak hours. This will not only bring time savings, but also noise and air benefits to many local residents.

23. At the planning and design stages, we considered optimising the road levels to reduce the generation of construction and demolition (C&D) materials as much as possible. We estimate that about 75 300 cubic metres (m^3) of C&D materials will be generated by the project. Of these about 61 200 m^3 (81.3%) will be reused on site and 14 100 m^3 (18.7%) will be disposed of at landfills.

24. Under the terms of the contract, we will require the contractor to submit, for approval, a waste management plan with appropriate mitigation measures, including the allocation of an area for waste segregation. We will ensure that the day-to-day operations on site comply with the approved waste management plan. We will also require the contractor to reuse the excavated material on site as filling material as far as possible to minimise the disposal of public fill to public filling areas. To further minimise the generation of C&D materials, we will encourage the contractor to use non-timber formwork, hoarding and other temporary works. We will require the contractor to separate public fill from C&D waste for disposal at appropriate locations and to sort the C&D waste by category on site to facilitate reuse/recycling in order to reduce the generation of such waste. We will control the disposal of public fill and C&D waste to designated public filling areas and landfills respectively through a trip ticket system. We will record the disposal, reuse and re-cycling of C&D materials for monitoring purposes.

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25. The proposed works will cause limited ecological impacts including loss of introduced or cultivated plant species, and some loss of trees and scrub vegetation. To mitigate the landscape and visual impacts of the project, we will provide the maximum practicable amount of compensatory planting on all disturbed and new slopes, and screen planting along the roadside areas. In this respect, we will plant about 41 000 trees and shrubs and use hydroseeding to protect formed slopes as appropriate. We will also minimize the visual impacts of the roadside slopes by integrating the geometry of the new slopes and the colour of the associated features into their surrounding landscape setting. Regarding the highway structures and the noise mitigation structures, we will provide visual interest and maintain visual continuity by coordinating the architectural design and treatment for all different forms of structures into a unified, coherent and visually pleasing appearance. We have included a sum of $30 million (in September 2000 prices) for landscaping works in the overall project estimate.

LAND ACQUISITION

26. We will clear about 18.9 hectares of government land and resume about 30 square metres (m^2) of agricultural land and about 1 100m^2 of building land. The land acquisition and clearance will affect 59 households involving 151 persons and 121 structures. The Director of Housing will offer eligible clearees accommodation in public housing in accordance with the existing housing policy. We will charge the cost of land acquisition and clearance, estimated at $77 million, to **Head 701** - Land Acquisition.

BACKGROUND INFORMATION

27. In April 1990, we completed the first phase of Route 5 connecting Sha Tin and Shek Wai Kok in Tsuen Wan (including Shing Mun Tunnels) under **288TH** "Route 5 – section between Wo Yi Hop and Shek Wai Kok" at an estimated cost of $286.1 million in MOD prices and **173TH** "Route 5 – Sha Tin to Tsuen Wan, Shing Mun Section" at an estimated cost of $809 million.

28. We upgraded **52TH** to Category B in April 1991 for the remaining phase of Route 5. We started the preliminary design of the project in early 1992. The progress of the preliminary design was however hindered by strong objections from the Tang Clan to the proposed road layout. As a result of the lengthy negotiations with the Tang Clan, and the need to look into alternative road alignments, we could not complete the preliminary design until early 1995.

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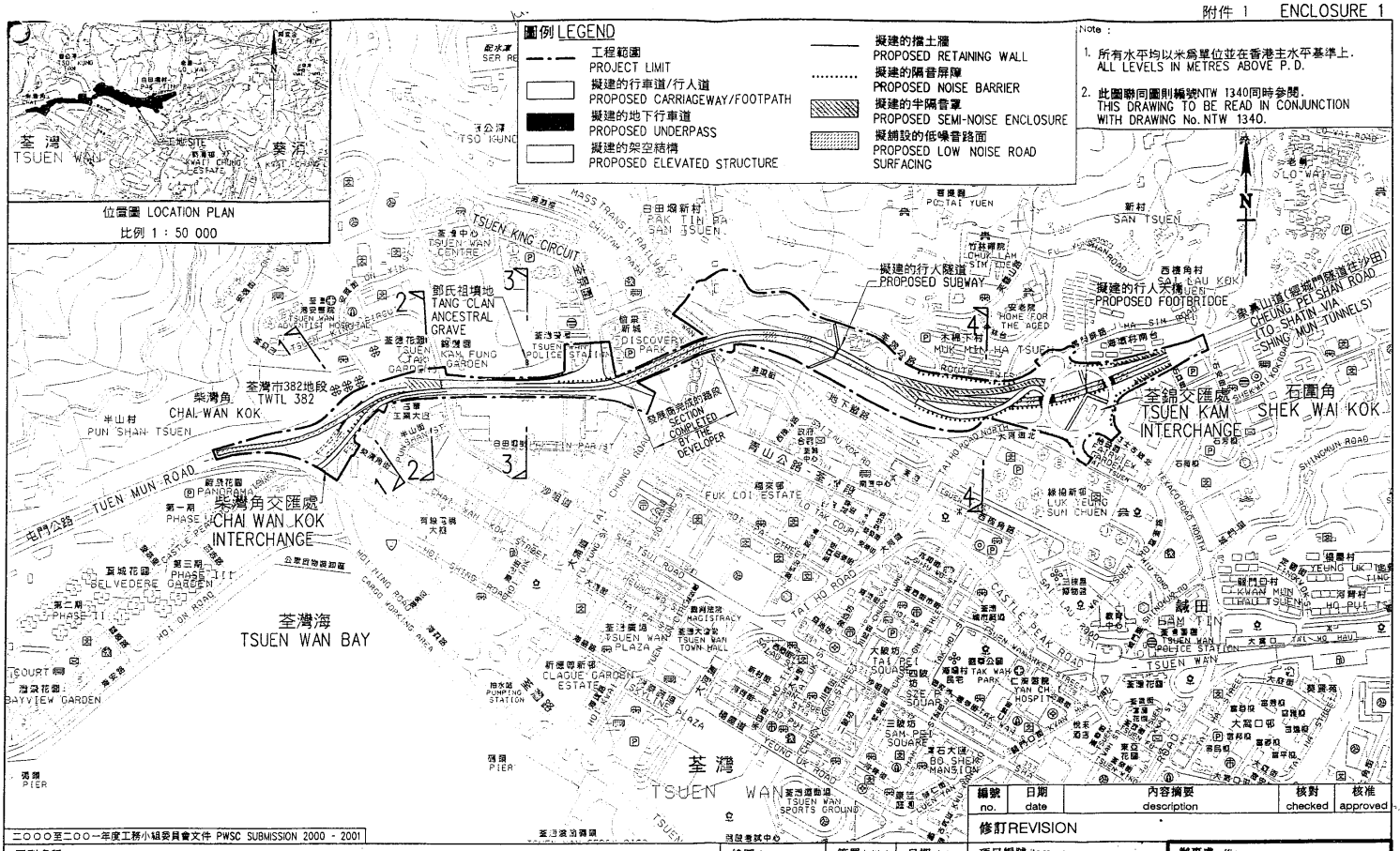
To resolve the objections from the Tang Clan under the Roads (Works, Use and Compensation) Ordinance, a further 26 months was needed to complete the necessary statutory procedures.

29. In January 1998, we upgraded part of **52TH** to Category A as **716TH** "Route 5 - section between Shek Wai Kok and Chai Wan Kok : site investigation and consultants' fees" at an estimated cost of $85 million in MOD prices for engaging consultants to carry out the site investigation and the detailed design of the project. The consultants have completed the site investigation, detailed design and preparation of tender documents for the proposed works.

30. To minimise traffic disruption during construction, we will carry out temporary traffic diversion arrangements as and when necessary.

31. We estimate that the project will provide some 520 jobs totalling 26 520 man months comprising 21 professional/managerial staff, 64 technical/ ancillary staff and 435 labourers.

Transport Bureau
February 2001



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修訂REVISION

二〇〇〇至二〇〇一年度工務小組委員會文件 PWSC SUBMISSION 2000 - 2001

圖則名稱 drawing title

五號幹線 - 石圍角至柴灣角段

ROUTE 5 - SECTION BETWEEN SHEK WAI KOK AND CHAI WAN KOK

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項目編號 item no. 52TH

比例 scale 1 : 7 500

圖則編號 drawing no. NTW 1339

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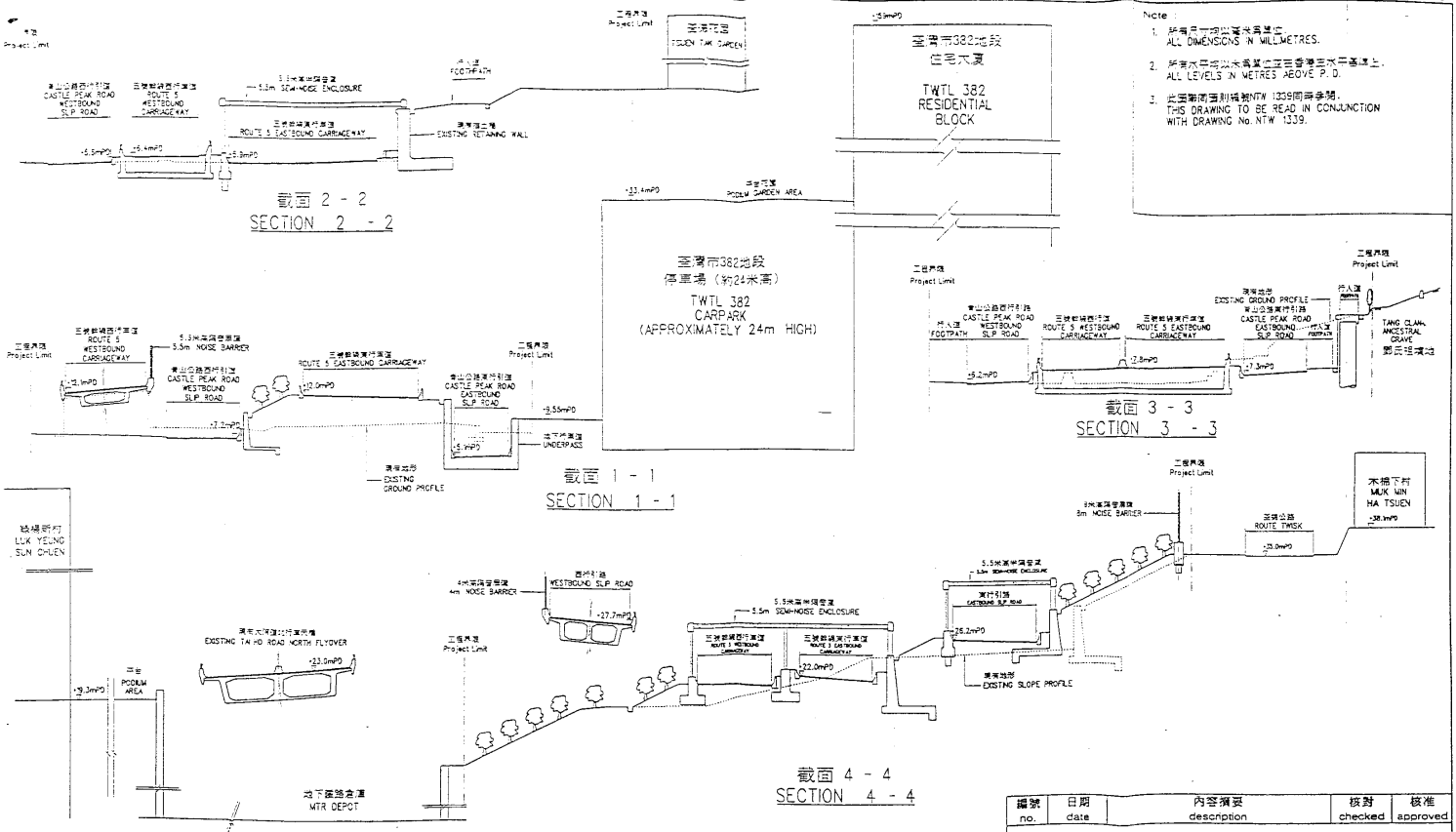
TERRITORY DEVELOPMENT DEPARTMENT



編號 no.	日期 date	內容摘要 description	核對 checked	核准 approved
修訂REVISION				

二〇〇〇至二〇〇一年度工務小組委員會文件 PWSC SUBMISSION 2000 - 2001

圖則名稱 drawing title

五號幹線 - 石圍角至柴灣角段

ROUTE 5 - SECTION BETWEEN SHEK WAI KOK AND CHAI WAN KOK

繪圖 drawn	W. W. YU	簽署 initial	日期 date	21.03.00
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項目編號 item no. 52TH

比例 scale 1 : 400

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TERRITORY DEVELOPMENT DEPARTMENT

52TH - Route 5 - section between Shek Wai Kok and Chai Wan Kok

Breakdown of estimate for consultants' fees

Consultants' staff costs			Estimated man months	Average MPS* salary point	Multiplier factor	Estimated fee ($ million)
(a)	Consultants' fees for construction stage					
	(i) contract administration	Professional	65	38	2.4	9.0
		Technical	22	14	2.4	1.0
	(ii) preparation of as-built drawings	Professional	6	38	2.4	0.8
		Technical	26	14	2.4	1.2
(b)	Resident site staff costs	Professional	393	38	1.7	38.4
		Technical	1377	14	1.7	44.6
					Total consultants' staff costs	95.0

* MPS = Master Pay Scale

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. A multiplier factor of 1.7 is applied to the average MPS point in the case of resident site staff supplied by the consultants. (At 1.4.00, MPS pt. 38 = $57,525 p.m. and MPS pt. 14 = $19,055 p.m.)

2. The figures given above are based on estimates prepared by the Director of Territory Development. The consultancy works for this project have been included as part of an existing consultancy agreement for the design and construction of Route 5 – section between Shek Wai Kok and Chai Wan Kok.