For discussion
on 17 October 2001

PWSC(2001-02)62

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 - HIGHWAYS
Transport - Roads
694TH - Route 9 between Cheung Sha Wan and Sha Tin

Members are invited to recommend to Finance Committee –

(a) the upgrading of part of **694TH**[1] entitled "Route 9 between Cheung Sha Wan and Sha Tin – Enabling Works", to Category A at an estimated cost of $45.7 million in money-of-the-day prices; and

(b) the retention of the remainder of **694TH** in Category B.

PROBLEM

The existing capacity of Lion Rock Tunnel, Tate's Cairn Tunnel and Tai Po Road cannot cope with the present and growing traffic demand.

/PROPOSAL …..

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[1] The project was formerly known as "Route 16 from West Kowloon to Sha Tin".

PROPOSAL

2. The Director of Highways, with the support of the Secretary for Transport, proposes to upgrade part of **694TH** to Category A at an estimated cost of $45.7 million in money-of-the-day (MOD) prices for the Enabling Works of Route 9 between Cheung Sha Wan and Sha Tin (Route 9-CSWST) in the Tai Wai area of Sha Tin.

PROJECT SCOPE AND NATURE

3. The scope of works of **694TH** includes the following proposed facilities –

(a) Lai Chi Kok Viaduct – a 1.4-kilometre dual three-lane[2] elevated carriageway from Lai Wan Interchange to Butterfly Valley. It connects to another section of Route 9 between Tsing Yi and Cheung Sha Wan (Route 9-TYCSW), with slip roads connecting to Lai Wan Interchange and Ching Cheung Road;

(b) a half-kilometre dual three-lane carriageway within Butterfly Valley;

(c) Eagle's Nest Tunnel – a 2.1-kilometre dual three-lane tunnel under the Eagle's Nest;

(d) a toll plaza at the valley of Sha Tin Heights;

(e) Sha Tin Heights Tunnel – a one-kilometre dual three-lane tunnel under Sha Tin Heights;

(f) Sha Tin Heights Tunnel Approach – a 0.6-kilometre dual two-lane tunnel approach road in Tai Wai, with slip roads connecting to Che Kung Miu Road (Che Kung Miu Road Slip Roads);

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[2] The initial scope of the proposed Lai Chi Kok Viaduct (LCKV) is a dual two-lane carriageway. In accordance with the Traffic Impact Assessment Report prepared by the consultants of the Investigation Assignment of Route 9, the projected traffic flow on the LCKV would exceed the design capacity of a dual two-lane viaduct. As such, the Commissioner for Transport advised in 1998 that the LCKV should be widened to dual three-lane.

(g) some 6.5 kilometres of noise barriers, including about 4.8 kilometres of vertical barriers ranging from three to seven metres height, about 0.8 kilometre of semi-enclosures and about 0.9 kilometre of full enclosures; and

(h) associated electrical and mechanical works, drainage works, landscaping works and geotechnical works.

A layout plan of the project is at Enclosure 1.

4. We now propose to upgrade to Category A the Enabling Works which comprise the construction of ten piers with foundations for a section of the Che Kung Miu Road Slip Roads, as mentioned in paragraph 3(f) above. A site plan and typical sections of the Enabling Works are at Enclosure 2.

5. We have completed the detailed design and working drawings for the Enabling Works. We plan to start the construction works in December 2001 for completion in February 2003.

JUSTIFICATION

6. Route 9 is a trunk road linking Lantau and Sha Tin via Tsing Yi Island and West Kowloon. It includes the North Lantau Highway and Lantau Link which were completed in 1997, Route 9-TYCSW which is currently at detailed design stage under **711TH**[3], and Route 9-CSWST which is covered under 694TH. After completion, Route 9 will provide a direct route between the airport at Chek Lap Kok to North East New Territories via Tsing Yi. It will also provide a strategic road link between Cheung Sha Wan in West Kowloon and Tai Wai in Sha Tin.

7. At present, traffic congestion happens at existing road links such as Lion Rock Tunnel, Tate's Cairn Tunnel and Tai Po Road during morning peak hours. To alleviate traffic congestion thereat, we need to construct Route 9- CSWST to provide an

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[3] **711TH** – Route 9-TYCSW is in Category B of the Public Works Programme, with an estimated cost of $12.3 billion in September 2001 prices. Part of the project was upgraded to Category A in July 2001 as **757TH** entitled "Route 9-TYCSW- Ngong Shuen Chau Viaduct and the associated works" for the construction works. The approved project estimate of **757TH** was $3,650 million in MOD prices. We plan to implement the construction works of the Route 9-TYCSW by phases from early 2002 onwards for completion in December 2007.

additional road link between Kowloon and Sha Tin. The Strategic Highway Project Review (the Review) completed by Transport Department in April 2001 confirmed that Route 9-CSWST should be completed by 2007. According to the latest traffic forecast, the peak hour volume to capacity (V/C) ratios[4] at critical sections of the relevant road links, with or without the proposed section of Route 9-CSWST, are as follows –

Year / Road Link	2001	2007		2011		2016	
	Without Route 9-CSWST	Without Route 9-CSWST	With Route 9-CSWST	Without Route 9-CSWST	With Route 9-CSWST	Without Route 9-CSWST	With Route 9-CSWST
Lion Rock Tunnel	1.0	1.4[5]	1.2	1.3[5]	1.1	1.3[5]	1.1
Tate's Cairn Tunnel	1.1	1.1	1.0	1.1	1.0	1.3	1.1
Tai Po Road	1.1	1.1	0.7	1.2	0.7	1.2	0.8
Shing Mun Tunnels	1.0	0.9	0.7	0.9	0.7	1.0	0.8
Route 9-CSWST	-	-	0.7	-	0.7	-	0.8

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[4] 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; above 1.2 indicates more serious congestion with traffic speeds progressively deteriorating with further increase in traffic.

[5] The projected drop in the V/C ratios of Lion Rock Tunnel from 1.4 in 2007 to 1.3 in 2011 and 2016 is due to the indirect contribution of planned road and railway projects shortlisted in footnote 6 below.

8. In the absence of Route 9-CSWST, Lion Rock Tunnel and Tate's Cairn Tunnel would be operating at a high V/C ratios of about 1.3 to 1.4 in future years, even taking into account the planned implementation of other new roads and railways[6] in the coming years. The traffic of Tai Po Road would also reach an unsatisfactory V/C ratio of 1.2. With the opening of Route 9-CSWST, we would be able to contain the traffic of Lion Rock Tunnel and Tate's Cairn Tunnel to a manageable V/C ratio of 1.1, and bring down Tai Po Road's V/C ratio to 0.8. Route 9-CSWST itself would be well utilised with a V/C ratio of 0.8. The Review indicates that a dual three-lane configuration of the project is well justified for meeting the forecast traffic demand and relieving traffic pressure on the existing external road links of Sha Tin.

9. We plan to implement the construction works for **694TH** in phases, with the Enabling Works commencing first for better interfacing with the East Rail Extension - Ma On Shan to Tai Wai (MOS Rail) works. A section of the Che Kung Miu Road Slip Roads will cross over the future tracks and maintenance centre of the MOS Rail as well as the existing East Rail tracks. We need to synchronise the construction of ten piers and the associated foundations for this section of Slip Roads with the MOS Rail works. The heavy construction works, if carried out after completion of the adjoining railway work, would impose significant risk to the operations of the railway and the maintenance centre. We plan to entrust the construction, including contract administration and site supervision, to the Kowloon-Canton Railway Corporation (KCRC) with a view to improving the interface and co-ordination between the railway project and the Enabling Works.

10. To tie in with the construction programme of the MOS Rail, we need to commence the Enabling Works in December 2001 for completion in February 2003. The drawing at Enclosure 2 illustrates the interface between the concerned section of Che Kung Miu Road Slip Roads and the MOS Rail.

/FINANCIAL .....

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[6] New roads planned for implementation for the period 2007 to 2016 includes Route 10 (linking North Lantau and Yuen Long Highway) and Deep Bay Link. Railway projects include Shatin to Central Link, Port Rail Line and Northern Links.

FINANCIAL IMPLICATIONS

11. We estimate the cost of the Enabling Works to be $45.7 million in MOD prices (see paragraph 12 below), made up as follows –

		$ million	
(a)	Construction cost of ten piers with foundation for a section of the Che Kung Miu Road Slip Roads	37.6	
(b)	On-cost[7] payable to KCRC	4.4	
(c)	Contingencies	3.8	
	Sub-total	45.8	(in September 2001 prices)
(d)	Provision for price adjustment	(0.1)	
	Total	45.7	(in MOD prices)

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

Year	**$ million (Sept 2001)**	**Price adjustment factor**	**$ million (MOD)**
2001 – 2002	2.0	1.00000	2.0
2002 – 2003	43.8	0.99700	43.7
	45.8		45.7

/13. …..

[7] An on-cost at 11.6% of the construction cost of the Enabling Works (i.e. item (a) in paragraph 11) will be payable to KCRC for undertaking the construction management and site supervision of the works.

13. We have derived the MOD estimate on the basis of the Government's latest forecast of trend labour and construction prices for the period 2001 to 2003. The proposed works will be included under KCRC's Contract No. TCC500 "Tai Wai Depot" (now renamed as KCRC Tai Wai Maintenance Centre). It is a lump-sum fixed price contract with remeasurable items for foundation and earthworks.

14. The proposed Enabling Works will not give rise to any annual recurrent expenditure.

PUBLIC CONSULTATION

15. We consulted the Traffic and Transport Committee (T&TC) of the then Sha Tin Provisional District Board (PDB) on the Route 9-CSWST project on 23 January 1998 and 27 March 1998. Members supported the road scheme and remarked that adequate noise mitigation measures should be incorporated into the road scheme to minimize disturbances to nearby residents. All the noise mitigation measures recommended in the Environmental Impact Assessment (EIA) Report have been incorporated into the project.

16. We also consulted the then Kwai Tsing PDB on 8 July 1999. Members had no in-principle objection to the alignment design, and would like to discuss the detailed implementation of the road scheme. We will follow up accordingly once we have finalised the design details.

17. We consulted the Environmental Committee and T&TC of the then Sham Shui Po PDB on 8 July and 29 July 1999 respectively. Members endorsed the implementation of the road scheme.

18. We gazetted the road scheme of Route 9-CSWST under the Roads (Works, Use and Compensation) Ordinance on 21 July 2000 and received a total of 68 objections. Two objections were withdrawn unconditionally. One objector was concerned about the safety hazard imposed by the project on his gas offtake station. He subsequently withdrew his objection on the understanding that the Administration would implement a package of safety measures to protect the safety of the station. Details of the unresolved objections are as follows –

/(a) …..

(a) 62 objectors were concerned about the clearance and re-housing of and compensation for their residential dwellings. 61 of them were residents of Wai Man Tsuen and they requested the Administration to revise the proposed road alignment to avoid Wai Man Tsuen. We explained to them that the clearance of Wai Man Tsuen had to be undertaken in accordance with the policy to clear all cottage areas and not because of the Route 9 project. We only make use of the cleared area for the construction of Route 9. We also explained to the objectors in detail the clearance, re-housing as well as compensation policy and arrangement and agreed to meet their re-housing requests as far as possible. However, according to legal advice and court ruling, their dwellings were on government land. Hence, no compensation would be payable to the residents for the housing structures upon clearance. The objectors maintained their objections;

(b) one objector was concerned that the remaining unresumed portion (the remaining portion) of an agricultural lot with cultivation would become unusable after resumption. He requested the Administration to resume the whole lot, or else to re-provide access and agricultural facilities and provide utility supplies to the remaining portion. We explained that the proposed portion of land for resumption would adequately serve the project needs and there was no ground to extend the resumption limit. We agreed to re-provide access to the remaining portion and grant ex-gratia allowance for his agricultural facilities affected by the resumption. The objector himself could then arrange the necessary facilities and utility supplies for the remaining portion. The objector maintained his objection; and

(c) two objectors were concerned about the environmental impacts of the project on their residential estates. One objector requested the Administration to adopt an alternative road alignment. We explained that the current alignment was chosen as the preferred routing for the community at large after careful consideration of a number of options. We also detailed the environmental mitigation measures that we would implement in order to reduce the environmental impacts

/to …..

to within acceptable levels. He maintained his objection. Another objector requested the Administration to lower a section of slip roads by two metres, provide landscaping on the road side slope adjacent to his residential estate, ban heavy vehicles from using Tai Po Road after the project was opened to traffic, and provide noise enclosure on a section of the project. We proposed to lower the slip road by 1.4 metres at the location requested by the objector since a lowering of two metres was impracticable due to road gradient restrictions. The concerned slope would be extensively landscaped. For the traffic volume on Tai Po Road, we explained that there would be a substantial decrease upon the opening of Route 9. We would closely monitor the traffic situation afterwards to see if further traffic management measures are warranted. We also proposed to adopt a noise enclosure as requested. The objector maintained his objection.

19. On 10 July 2001, the Chief Executive-in-Council authorized the project with modifications as set out in paragraph 18(b) and (c) above.

20. We consulted the Legislative Council Panel on Transport on 7 May 2001 regarding the proposed Route 9-TYCSW and Route 9-CSWST. Panel Members noted, inter alia, our proposal to part upgrade the latter section in October 2001 for funding the Enabling Works. They requested additional information on the updated cost breakdown, contract packages, additional traffic forecast, noise impact (in particular on the residential development in the Sha Tin area), tolling strategy for the whole Route 9, and details of the objections raised under the Roads (Works, Use and Compensation) Ordinance for the latter section. We issued a supplementary paper to Members on 31 May 2001 providing the above information.

ENVIRONMENTAL IMPLICATIONS

21. The Route 9-CSWST project is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance. We employed a consultant to conduct an EIA during the preliminary design stage to identify and assess the potential environmental impacts arising from the project. The EIA identified noise, air quality and ecological impacts being the major concerns. A package of mitigation measures to address these impacts has been proposed, and these are highlighted below –

/(a) …..

(a) installing vertical noise barriers ranging from three to seven metres high, semi-enclosures and full enclosures along most of the open carriageway section of the Route 9-CSWST to protect noise sensitive receivers in the vicinity of the route. These direct mitigation measures will help contain the noise level to an acceptable standard;

(b) fully ventilating the two tunnels (i.e. Eagle's Nest Tunnel and Sha Tin Heights Tunnel) to cater for both normal operation and emergency situation. In particular, as the south portal of the Eagle's Nest Tunnel is situated in an area more sensitive to air quality, we need an extra ventilation building midway to divert the vehicle emission away from the south portal in order to avoid exceeding the air pollutant standard;

(c) re-planting to compensate for trees felled due to the project. The re-planting area will be bigger than the area affected, and native tree species will be used to re-establish the woodland habitat; and

(d) providing extensive soft and hard landscaping works along the route, especially under the Lai Chi Kok Viaduct and Ching Cheung Road, to enhance the appearance of the surrounding areas.

22. Tunnel excavation and road formation works would produce construction and demolition (C&D) materials, both rock and soil. The design has maximized the reuse of these materials on site, e.g. used as fill for the road embankment in tunnel approaches and toll plaza. We shall require the contractors to submit a waste management plan for approval. The plan shall include appropriate mitigation measures such as the allocation of an area for waste segregation. We shall also require the contractors to ensure that the day-to- day operations on site comply with the approved waste management plan. We will set up an environmental monitoring and audit programme to ensure that the recommendations in the EIA Report will be properly carried out. We shall control the disposal of C&D materials at designated public filling facilities and landfills respectively through a trip-ticket system. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

23. The Advisory Council on the Environment endorsed the EIA Report for the project without conditions on 1 November 1999. The Director of Environmental Protection subsequently approved the EIA Report on 5 November 1999 under the EIA Ordinance.

/24. …..

24. As far as the Enabling Works are concerned, they will be constructed as entrusted works to KCRC under one of their contracts for MOS Rail. The environmental implications of the Enabling Works are minimal as the completed works will not be put into use until the entire Route 9 project is completed. For short term environmental impacts during the construction stage, such as dust nuisance and construction noise, these will be adequately taken care of within the contract managed by KCRC. An environmental monitoring and audit programme for the Enabling Works will also be incorporated in KCRC's contract.

25. Regarding the C&D materials arising from the Enabling Works, we have carefully planned and designed the slip road structure with due consideration to the level and layout of the roadworks, thus minimizing the number, size and depth of the piles and pile caps.

26. A waste management plan for the Enabling Works in conjunction with that for the construction of KCRC Tai Wai Maintenance Centre would be implemented under KCRC's contract. We estimate that the Enabling Works will generate about 6 500 cubic metres (m^3) of C&D materials. Of these, about 6 450 m^3 (99.2%) will be reused as fill in public filling areas[8] and 50 m^3 (0.8%) will be disposed at landfills. The C&D materials generated from the Enabling Works to be reused on site are minimal as there is an overall surplus of C&D materials from the foundation works under KCRC's contract. The notional cost of accommodating C&D waste at landfill sites is estimated to be $6,250 for this project (based on a notional unit cost[9] of $125/$m^3$).

LAND ACQUISITION

27. The Enabling Works do not require any land acquisition since the proposed works are partly within the existing East Rail boundaries and partly within the works limit of the MOS Rail.

/BACKGROUND …..

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[8] A public filling area is a designated part of a development project that accepts public fill for reclamation purposes. Disposal of public fill in a project filling area requires a licence issued by the Director of Civil Engineering.

[9] This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and 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 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.

BACKGROUND INFORMATION

28. We upgraded **694TH** to Category B in October 1996.

29. We upgraded part of **694TH** to Category A as **699TH** – "Route 16 from West Kowloon to Sha Tin – investigation" (Route 16 is now renamed as Route 9) in March 1997 at an estimated cost of $15.5 million in MOD prices and engaged consultants in March 1997 to undertake the detailed investigation of the project. We further upgraded another part of the project to Category A as **717TH** – "Route 16 from West Kowloon to Sha Tin – detailed design" in February 1998 at an estimated cost of $263.0 million in MOD prices and engaged consultants to undertake the detailed design in June 1998.

30. We plan to implement **694TH** in three phases, namely –

(a) Phase 1 – Enabling Works (the subject of this paper);

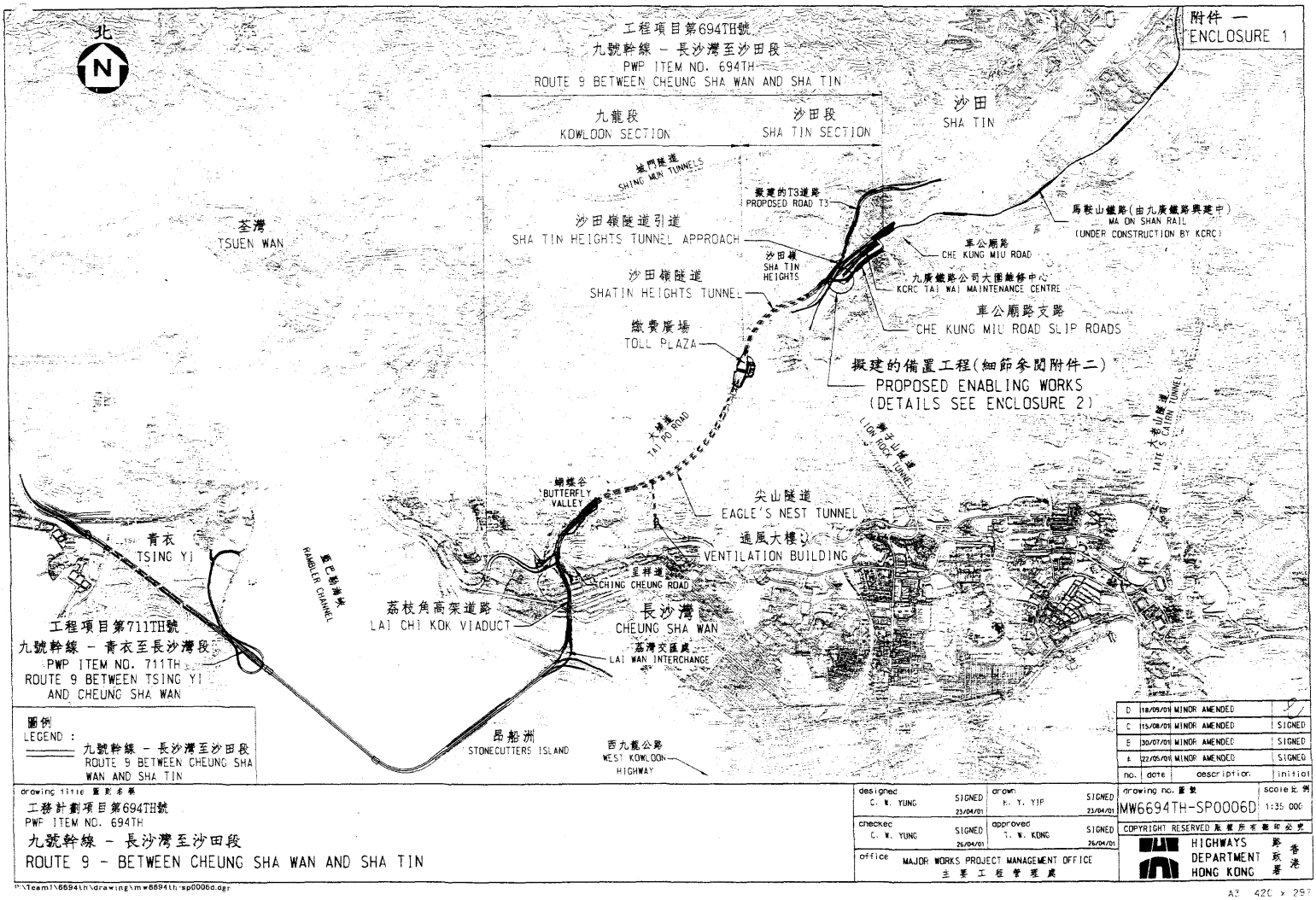
(b) Phase 2 – Sha Tin Section, comprising the civil works for the Sha Tin Heights Tunnel, the approach and slip roads in the Sha Tin area, and site formation of the toll plaza; and

(c) Phase 3 – Kowloon Section, comprising the civil works from Lai Wan Interchange to the toll plaza, and the electrical and mechanical works for the whole Route 9-CSWST.

31. With the completion of detailed design and working drawing, we plan to start Phase 1 works in December 2001 for completion in February 2003. We will commence the Phase 2 and Phase 3 works in January 2003 and September 2003 respectively, and complete both phases by April 2007.

32. We estimate that the Enabling Works will create some 45 jobs comprising ten professional/technical staff and 35 labourers, totalling 653 man-months.

Transport Bureau
October 2001



附件 一
ENCLOSURE 1

圖例
LEGEND :
九號幹線 – 長沙灣至沙田段
ROUTE 9 BETWEEN CHEUNG SHA WAN AND SHA TIN

no.	date	description	initial
D	18/09/01	MINOR AMENDED	
C	15/08/01	MINOR AMENDED	SIGNED
B	30/07/01	MINOR AMENDED	SIGNED
A	22/05/01	MINOR AMENDED	SIGNED

drawing title 圖則名稱
工務計劃項目第694TH號
PWP ITEM NO. 694TH
九號幹線 – 長沙灣至沙田段
ROUTE 9 – BETWEEN CHEUNG SHA WAN AND SHA TIN

designed C. W. YUNG	SIGNED 23/04/01	drawn H. Y. YIP	SIGNED 23/04/01
checked C. W. YUNG	SIGNED 26/04/01	approved T. W. KONG	SIGNED 26/04/01

office MAJOR WORKS PROJECT MANAGEMENT OFFICE 主要工程管理處

drawing no. 圖號 MW6694TH-SP0006D
scale 比例 1:35 000

HIGHWAYS DEPARTMENT HONG KONG 香港政府 路政署

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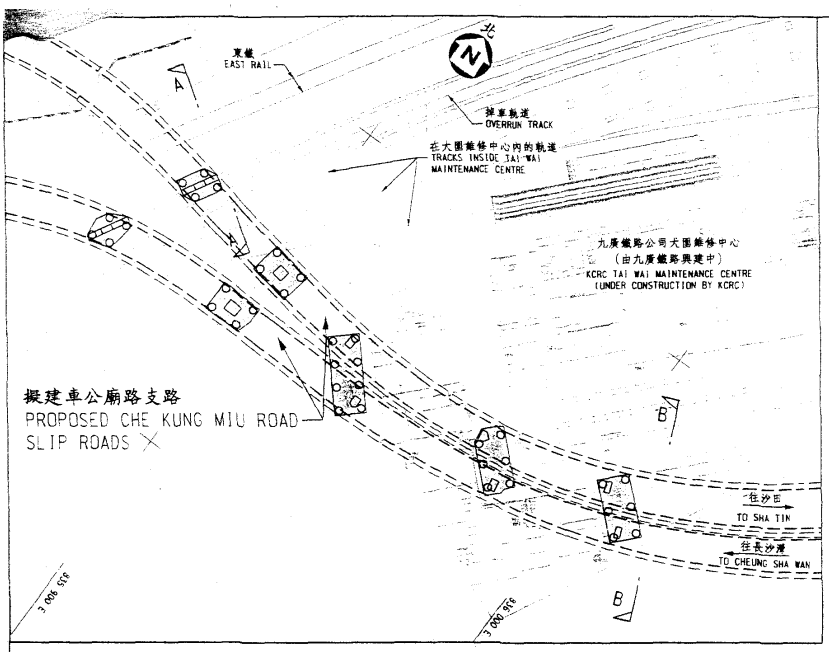

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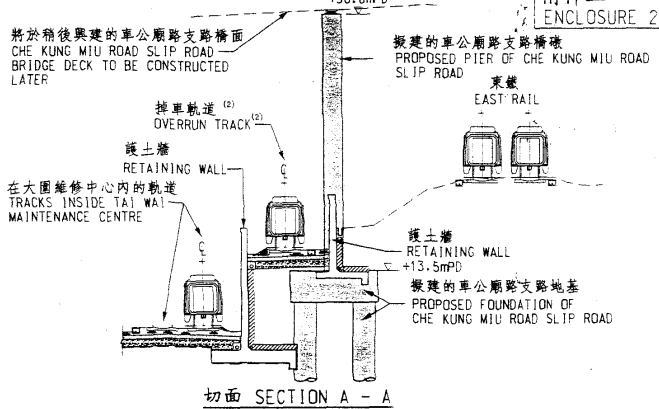
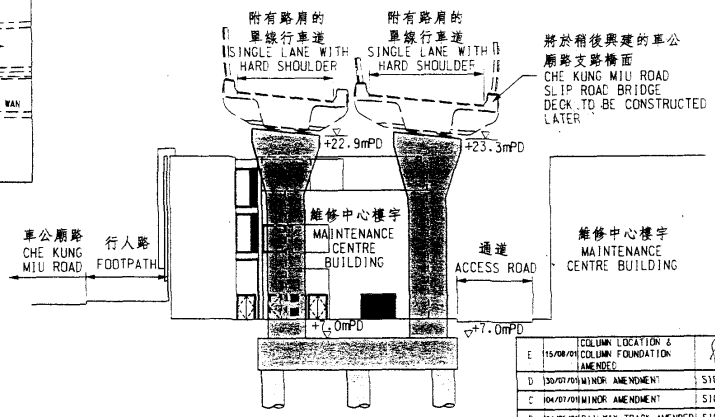


切面 SECTION A - A
比例 SCALE 1 : 300



切面 SECTION B - B
比例 SCALE 1 : 300

圖例 LEGEND:

包括在備置工程內擬建的地基及橋墩
PROPOSED PIERS AND FOUNDATIONS TO BE CONSTRUCTED UNDER ENABLING WORKS

註釋 NOTES:

(1) 所有水平以米為單位並基於香港水平基準上
ALL LEVELS ARE IN METRES ABOVE HONG KONG PRINCIPAL DATUM.

(2) 掉車軌道能讓南行列車掉頭及出入維修中心
OVERRUN TRACK ENABLES SOUTHBOUND TRAINS TO REVERSE IN DIRECTION AND ENTER/EXIT THE MAINTENANCE CENTRE.

no.	date	description	initial
E	15/08/01	COLUMN LOCATION & COLUMN FOUNDATION AMENDED	
D	30/07/01	MINOR AMENDMENT	SIGNED
C	04/07/01	MINOR AMENDMENT	SIGNED
B	04/06/01	RAILWAY TRACK AMENDED	SIGNED
A	22/05/01	LEVEL ADDED	SIGNED

drawing title 圖則名稱
工務計劃項目第694TH號 - 九號幹線長沙灣至沙田段
PWP ITEM NO. 694TH - ROUTE 9 BETWEEN CHEUNG SHA WAN AND SHA TIN
備置工程
ENABLING WORKS

designed C. W. YUNG	SIGNED 24/04/01	drawn H. Y. YIP	SIGNED 24/04/01
checked C. W. YUNG	SIGNED 26/04/01	approved T. W. KONG	SIGNED 26/04/01

office MAJOR WORKS PROJECT MANAGEMENT OFFICE 主要工程管理處

drawing no. 圖號 MW6694TH-SP0007E
scale 比例 AS SHOWN 如圖示

HIGHWAYS DEPARTMENT HONG KONG 香港政府 路政署

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A3 420 x 297