

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 - HIGHWAYS

Transport - Roads

711TH - Route 9 between Tsing Yi and Cheung Sha Wan

Members are invited to recommend to Finance Committee –

- (a) the upgrading of part of **711TH** to Category A, entitled “Route 9 between Tsing Yi and Cheung Sha Wan – Ngong Shuen Chau Viaduct and the associated works”, at an estimated cost of \$3,650.0 million in money-of-the-day prices; and
- (b) the retention of the remainder of **711TH** in Category B.

PROBLEM

The existing capacity of the Cheung Tsing Highway, the Cheung Tsing Tunnel and the Tsing Kwai Highway will not be able to cope with the growing traffic demand by 2007.

PROPOSAL

2. The Director of Highways, with the support of the Secretary for Transport, proposes to upgrade part of **711TH** to Category A at an estimated cost

of \$3,650.0 million in money-of-the-day (MOD) prices for the construction of Ngong Shuen Chau Viaduct (NSCV) of Route 9 between Tsing Yi and Cheung Sha Wan (Route 9-TYCSW) in West Kowloon.

PROJECT SCOPE AND NATURE

3. The scope of works of **711TH** includes -
- (a) about 1.5 kilometres of dual three-lane highway connecting Cheung Tsing Highway at the North West Tsing Yi Interchange with the Nam Wan Tunnel;
 - (b) a 1.2 kilometre three-lane twin-tube Nam Wan Tunnel at Tsing Yi;
 - (c) about 2.7 kilometres of dual three-lane elevated highway, including the Stonecutters Bridge of about one kilometre in span, connecting the Nam Wan Tunnel with the NSCV;
 - (d) about 2.2 kilometres of dual three-lane NSCV, connecting the Stonecutters Bridge with the West Kowloon Highway and another section of Route 9 at the Lai Wan Interchange;
 - (e) slip roads connecting Route 9 with the local road networks at Container Terminal Number 8 (CT8) and the proposed Container Terminal Number 9 (CT9);
 - (f) realignment of Container Port Road South underneath NSCV; and
 - (g) environmental mitigation measures, traffic control and surveillance system, electrical and mechanical systems, geotechnical, landscape, roads and drainage works.

A layout plan of Route 9 – TYCSW is at Enclosure 1.

4. The part of the project we now propose to upgrade to Category A comprises -
- (a) construction of NSCV and its slip roads connecting with the local road networks at CT8, as mentioned in 3(d) and (e) above;

/ (b)

- (b) implementation of direct noise mitigation measures in the form of three-metre high noise barriers and low noise road surfacing along NSCV and its slip roads;
- (c) realignment of Container Port Road South, as mentioned in 3(f) above;
- (d) associated landscape, roads and drainage works for the realigned Container Port Road South; and
- (e) advance works for Stonecutters Bridge.

----- A site plan and typical sections for NSCV are at Enclosures 2A and 2B respectively.

5. We have substantially completed the detailed design and working drawings for the NSCV. We plan to start the construction works in March 2002 for completion in December 2006.

JUSTIFICATION

6. Route 9 is a trunk road linking Lantau and Sha Tin via Tsing Yi Island and West Kowloon. Its main components include North Lantau Highway and Lantau Link completed in 1997, Route 9-TYCSW as described in paragraph 3 above and another section of Route 9 between Cheung Sha Wan and Sha Tin concurrently at detailed design stage under **694TH**¹. After completion, Route 9 will provide a direct route between the Airport at Chek Lap Kok to North East New Territories (NENT) via North West New Territories (NWNT). It will also connect the Lantau Link to the West Kowloon Highway at Cheung Sha Wan, and provide direct access to the future CT9 and other existing container terminals without going through the Tsing Yi local road network.

7. Geographically, the alignment of Route 9 intersects with that of Route 3 at Tsing Yi and Cheung Sha Wan. Route 3 is a trunk road linking NWNT and Hong Kong Island via Tai Lam Tunnel, Tsing Yi, Kwai Chung and West Kowloon. The section of Route 3 serving the Tsing Yi and West Kowloon

/ areas

¹ **694TH** - Route 9 between Cheung Sha Wan and Sha Tin (Route 9 -CSWST) - is in Category B of the Public Works Programme, with an estimated cost of \$7.8 billion in September 2000 prices. Part of the project was upgraded to Category A in February 1998 as **717TH** for the engagement of consultants to undertake the detailed design of the aforesaid section of Route 9. The approved project estimate of **717TH** was \$263 million in MOD prices. We plan to implement the construction works of the Route 9-CSWST by phases from early 2002 onwards for completion in April 2007.

areas (comprising Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway) has become a fast link between North West Tsing Yi and West Kowloon since its commissioning in 1997. The subsequent opening of the Ting Kau Bridge and the Route 3 Country Park Section in 1998 has led to further traffic between the NWNT and West Kowloon using these three highways. Currently, these critical sections of Route 3 are operating near capacity, with a traffic volume to capacity (V/C)² ratio of 0.95. This situation will deteriorate in view of the planned population to be accommodated in North Lantau and NWNT. According to the forecast, the planned populations in North Lantau and NWNT are respectively 0.24 million and 1.19 million in 2007, 0.31 million and 1.39 million in 2011, and 0.37 million and 1.61 million in 2016.

8. The Territory Development Strategic Review of 1996 recommended the phased developments of the Tung Chung/Tai Ho new towns and other developments including those in Yuen Long, Tuen Mun and Tin Shui Wai. Such developments will lead to further growth in traffic demand between NWNT, Lantau and the urban areas in the next decade. The Third Comprehensive Transport Study (CTS-3) completed in 1999 recommended the commissioning of Route 9-TYCSW by around 2007 in order to meet the traffic needs.

9. In 2000, we completed a traffic impact assessment study for Route 9-TYCSW under 711TH. The study confirmed that the Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway will all reach saturation by 2007, and will operate much beyond capacity by 2011. According to the Strategic Highway Project Review carried out in March 2001, the performance of these highways/tunnel, represented by the projected V/C ratios at critical sections during peak hours, with or without Route 9-TYCSW, are as follows -

Section of Highway \ Year	2007		2011		2016	
	Without Route 9 - TYCSW	With Route 9 - TYCSW	Without Route 9 - TYCSW	With Route 9 - TYCSW	Without Route 9 - TYCSW	With Route 9 - TYCSW
Route 9 – TYCSW	-	0.5	-	0.7	-	0.9
Route 3 - section comprising Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway	1.0	0.7	1.2	0.8	1.2	0.9

/ Construction

² Volume/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.

Construction of NSCV

10. We plan to implement the construction works for **711TH** in phases and to start with NSCV for better interfacing with the West Rail works. The section of NSCV in the vicinity of Lai Wan Interchange will be very close to the proposed West Rail alignment. We need to commence construction of NSCV in early 2002 with a view to completing the foundation works before the commissioning of West Rail in late 2003. Otherwise, the relevant foundation works, which involve heavy construction, would impose a significant risk to the railway operations, especially the use of high speed electrified trains.

Noise Mitigation Measures

11. With the Route 9-TYCSW in place, the residents in the vicinity of Lai Wan Interchange will be subject to traffic noise above the levels stipulated in the Hong Kong Planning Standards and Guidelines. We will provide low noise surfacing on all the new roads and will install three-metre high noise barriers at appropriate locations in the vicinity of Lai Wan Interchange for the protection of nearby noise sensitive receivers. With these measures, the noise level standard of 70dB(A) will be met.

Realignment of Container Port Road South

12. After completion of the NSCV, a direct connection between CT8 and West Kowloon Highway will be available which will relieve traffic at the ground level roads of Kwai Chung and Cheung Sha Wan. The existing Container Port Road South will have to be realigned under the NSCV for better utilization of land use in the container terminal area and for better connection of slip roads between the viaduct and the at-grade roads.

Advance Works for Stonecutters Bridge

13. The remaining part of **711TH** including Stonecutters Bridge and Nam Wan Tunnel is currently under detailed design with construction scheduled to commence in 2003. However, a small amount of site formation and drainage works for the Stonecutters Bridge will need to be carried out on the CT9 site which is currently under intensive construction for full commissioning in 2004. To avoid undesirable disruption to the future terminal operation, we intend to advance the completion of these works. We will do so by entrusting them to the Director of Territory Development for construction under **387CL**³ "Container Terminal No. 9 - engineering works for back-up areas and infrastructure".

/ FINANCIAL

³ **387CL** "Container Terminal No. 9 - engineering works for back-up areas and infrastructure" is in Category A of the Public Works Programme. The project is scheduled to complete construction in late 2004 at an estimated cost of \$2.71 billion in MOD prices.

FINANCIAL IMPLICATIONS

14. We estimate the total cost of this project to be \$3,650.0 million in MOD prices, made up as follows –

	\$million
(a) Roads and drains	158.4
(b) Elevated highway structures	2,802.8
(c) Road lighting	30.0
(d) Environmental mitigation measures	39.9
(i) noise barriers	34.2
(ii) low noise road surfacing	5.7
(e) Landscaping works	36.2
(f) Advance site formation and drainage works for Stonecutters Bridge	2.0
(g) Consultants' fees	259.4
(i) construction stage	29.8
(ii) site staff costs	212.6
(iii) Environmental Monitoring and Audit ⁴ (EM&A) programme	12.0
(iv) Electrical and Mechanical Services Trading Fund (EMSTF) charges	5.0
(h) Contingencies	330.0
	/ Sub-total

⁴ We will engage consultants to implement an Environmental Monitoring and Audit (EM&A) programme for NSCV at an estimated cost of \$12 million to ensure timely and effective implementation of the recommended mitigation measures for 711TH.

Sub-total	3,658.7	(in September 2000 prices)
(i) Provision for price adjustment	(8.7)	
Total	3,650.0	(in MOD prices)

A breakdown by man-months of the estimates for consultants' fees for construction stage and site staff costs is at Enclosure 3.

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

Year	\$ million (Sept 2000)	Price Adjustment Factor	\$ million (MOD)
2002 – 2003	487.3	0.97976	477.4
2003 – 2004	643.8	0.98759	635.8
2004 – 2005	951.8	0.99549	947.5
2005 – 2006	843.1	1.00346	846.0
2006 – 2007	460.1	1.01149	465.4
2007 – 2008	272.6	1.01958	277.9
	<u>3,658.7</u>		<u>3,650.0</u>

16. We have derived the MOD estimate on the basis of the Government's latest forecast of trend labour and construction prices for the period 2002 to 2008. We will tender the proposed works under a standard re-measurement contract because the works involve extensive foundation works and at-grade roadwork, 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.

17. We estimate the additional annually recurrent expenditure arising from the works to be \$16.9 million.

PUBLIC CONSULTATION

18. We presented the major findings of a detailed feasibility study for **711TH**⁵ to the Sham Shui Po Provisional District Board (SSPPDB) and the Kwai Tsing Provisional District Board (KTPDB) in June and July 1998 respectively. SSPPDB supported the project in principle. Both District Boards recommended the provision of connections between the local road network and Route 9-TYCSW, wherever possible. In response to this suggestion, we have provided for additional access ramps between Route 9-TYCSW and the local road networks in the Tsing Yi and Stonecutters Island areas. As a result, traffic in these two areas will have direct access, via Route 9-TYCSW, to and from Kowloon, NWNT and Lantau Island.

19. We consulted the two Provisional District Boards again in August and September 1999 respectively on the refined layout of the Project. KTPDB supported the project in principle. SSPPDB made no comment on the layout of the roadwork. However, some members raised concern on the adequacy of the proposed noise mitigation measures to be provided adjacent to two proposed housing developments, namely, Sites Nos. 6 and 10 at the northern part of West Kowloon Reclamation (near Lai Wan Interchange). Essentially the mitigation measures would include the installation of three-metre high noise barriers and the use of low noise road surfacing. The Board referred the matter to its Environmental Committee and asked for supplementary information on the respective costs for the installation of seven-metre high noise barriers and noise enclosures on the viaduct adjacent to the two housing sites, and the likely enhancement in the development potential of these two sites, as compared with the proposed installation of three-metre high noise barriers. In response to this request, we have studied the possibilities of using seven-metre high noise barriers and noise enclosures. We also requested the Director of Housing (D of H) to advise whether there would be any enhancement in the development potential of Sites Nos. 6 and 10.

20. The findings reflected that the provision of seven-metre high noise barriers would reduce the noise level by less than one dB(A) because of the existing high ambient noise level. If we were to use noise enclosures, this would create concentrated pockets of vehicle emission at either Site Nos. 6 or 10, and are thus considered to be inappropriate. The predicted critical noise levels at Sites Nos. 6 and 10 attributable to Route 9-TYCSW are as follows -

/ Predicted

⁵ We engaged consultants to undertake a detailed feasibility study and the associated site investigations of the Project at an estimated cost of \$12 million in MOD prices under **Subhead 6100TX** "Highway work, studies and investigations for items selected in Category D of the Public Works Programme". The detailed feasibility study was completed in October 1998.

	Without noise mitigation measure	With three-metre high noise barriers	With seven-metre high noise barriers
Predicted Noise Level dB(A) in Sites Nos. 6 and 10	74	70	69.5

21. On additional costs, the provision of seven-metre high noise barriers and noise enclosures at sites No. 6 and 10 would increase the construction costs by \$90 million and \$370 million respectively.

22. We liaised closely with D of H both during the Environmental Impact Assessment (EIA) stage and the detailed design stage for Site No. 10, and concluded that the use of seven-metre high noise barriers would not enhance the development potential of the site. Site No. 6 is at a very preliminary planning stage. The EIA for this Project has been carried out using an assumed layout for Site No. 6. As the overall difference in noise attenuation with the use of seven-metre high noise barriers is minimal (less than one dB(A)), we believe the development potential of Site No. 6 is also unlikely to be affected.

23. We presented the findings at paragraphs 20 to 22 above to the Environmental Committee of SSPPDB in September 1999. Members supported the project in principle. The majority, however, still wished us to consider installing seven-metre high noise barriers rather than three-metre ones along the ramps at Lai Wan Interchange, and asked that their views be presented to the Finance Committee for information. We maintained that since the installation of three-metre high noise barriers together with the use of low noise road surfacing would meet the required standard (i.e. 70 dB(A)) and there would not be significant improvement in noise attenuation with the installation of higher noise barriers, we recommended the installation of three-metre barriers only in the EIA report.

24. We consulted the Advisory Council on the Environment (ACE) on the use of three-metre high noise barriers along the ramps at Lai Wan Interchange in September 1999. ACE did not require any additional noise mitigation measures and endorsed the EIA Report on 27 September 1999. The Director of Environmental Protection (DEP) approved the EIA Report in October 1999.

25. We gazetted the road scheme for **711TH** under the Roads (Works, Use and Compensation) Ordinance on 20 April 2000. We received one objection

/ from

from the owner of TYTL No.128 on the grounds that the construction works might disrupt his operations and the proposed roads would produce adverse visual impact. We clarified to the objector that the construction works, which would be carried out at bridge deck level (about some 40 metres above ground level) and at restricted hours, would not disrupt his operations at ground level. We also demonstrated to the objector through the use of photomontages that the visual impact of the bridge to his property would not be significant. The objector withdrew the objection unconditionally. Accordingly, the Secretary for Transport authorised the road scheme of **711TH** under section 11(a) of the Roads (Works, Use and Compensation) Ordinance on 11 September 2000.

Legislative Council Panel on Transport

26. We consulted the Legislative Council Panel on Transport on 7 May 2001. Panel Members requested additional information on the updated cost breakdown, contract packages, traffic forecast and detailed noise assessment of Route 9-TYCSW. Members also requested supplementary information for another section of Route 9 between Cheung Sha Wan and Sha Tin, including the details of objections received and tolling strategy. We issued a supplementary paper on 31 May 2001 providing the above information.

ENVIRONMENTAL IMPLICATIONS

27. The project is a designated project under Schedule 2 of the EIA Ordinance and an Environmental Permit is required for its construction and operation. Upon the endorsement of the ACE on 27 September 1999, DEP approved the EIA report for the project under the EIA Ordinance on 19 October 1999. The road scheme was then slightly modified as a result of design development. Supplementary EIA information on the modified scheme was approved by DEP on 21 January 2000. DEP issued the Environmental Permit on 28 December 2000.

28. The supplementary EIA information together with the EIA report concluded that the environmental impacts of the project could be controlled to within established criteria under the EIA Ordinance and the Technical Memorandum on EIA Process. We shall implement the environmental measures as recommended in the supplementary EIA information, the approved EIA report, the approved EM&A Manual, and the Conditions stipulated in the Environmental Permit.

29. The key environmental measures include the provision of low noise road surfacing on all the new roads and installation of three-metre high noise barriers at Lai Wan Interchange area for the protection of nearby noise sensitive

/ receivers

receivers. These should bring about a reduction of traffic noise by three to five dB(A) at critical locations. An assessment on air quality impact on the surrounding environment due to traffic emissions from Route 9-TYCSW and the surrounding roads also concluded that Air Quality Objectives as stipulated in the Air Pollution Control Ordinance at existing or planned air sensitive receivers will not be exceeded.

30. During the construction stage, we will control noise, dust and site surface water run-off nuisance through appropriate mitigation measures specified in the works contract. We will implement an EM&A programme as stipulated in the EM&A Manual during the course of construction and operation to ensure that proactive mitigation measures are in place.

31. At the planning and design stages, we considered ways to minimize the generation of construction and demolition material (C&DM) and have adopted all practical measures to do so. We shall reuse the public fill generated from the Project either on site or in other reclamation sites as far as possible. We estimate that approximately 160 000 cubic metres (m³) of the C&DM will be generated by the Project. Of these, about 7 000 m³ (4.4%) will be reused on site, 149 500 m³ (93.4%) will be reused as fill in public filling areas⁶ and 3 500 m³ (2.2%) will be disposed of at landfills.

32. We shall require the contractor to submit a waste management plan to the Engineer for approval on the advice of DEP. The waste management plan shall include appropriate mitigation measures such as the identification of a designated area for waste segregation prior to disposal. We shall ensure that the day-to-day operations on site comply with the approved waste management plan. We shall also require the contractor to use steel instead of timber for formwork and temporary work as far as practicable to further minimise the generation of waste. We shall control the disposal of the C&DM through a trip-ticket system. We shall record the disposal, reuse and recycling of the C&DM for monitoring purposes.

LAND ACQUISITION

33. We require the permanent alienation of 150 000 square metres (m²) of land on Stonecutters Island and in West Kowloon and temporary occupation of 4 660 m² of land along CT8. We will charge the land acquisition and clearance

/ costs

⁶ A public filling area is a designated part of a development project that accepts public fill for reclamation purpose. Deposition of public fill in a public filling area requires a license by the Director of Civil Engineering. The Public Fill Committee has designated Tuen Mun Area 38 and Tsing Yi North Reclamation as public filling areas for the reception of public fill generated from the NSCV works.

costs estimated to be \$7 million (in September 2000 prices) to **Head 701** – “Land Acquisition” **Subhead 1100CA** – “Compensation and *ex-gratia* allowances in respect of projects in the Public Works Programme”.

BACKGROUND INFORMATION

34. We upgraded **711TH** to Category B in August 1997.

35. We upgraded part of **711TH** to Category A as **734TH** “Route 9 between Tsing Yi and Cheung Sha Wan – detailed design and the associated site investigations”, in December 1998 with an approved project estimate of \$473.5 million in MOD prices and engaged consultants to undertake the detailed design in February 1999.

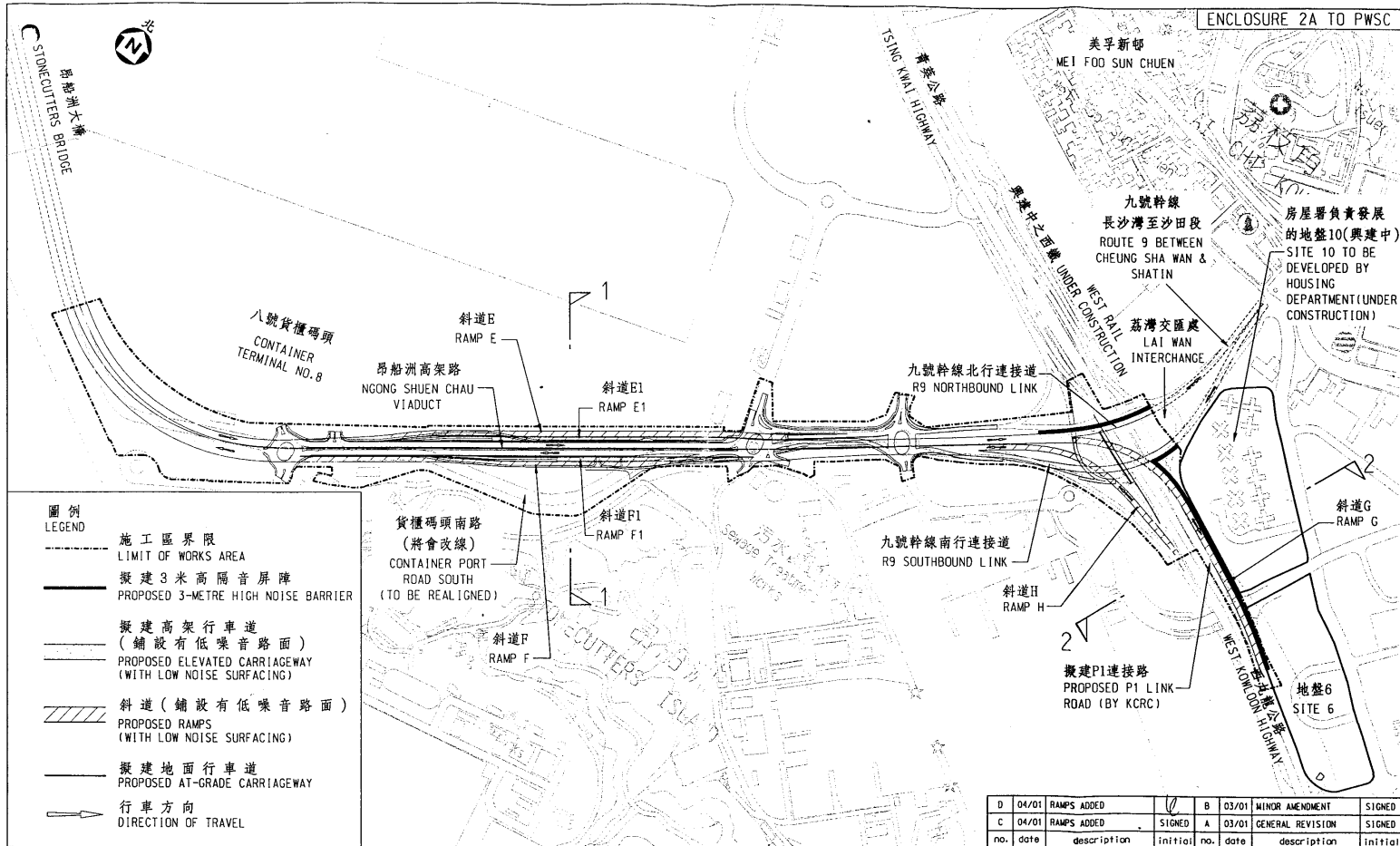
36. We plan to implement **711TH** in three phases, namely -

- (a) Phase 1 – NSCV and associated works (the subject of this paper);
- (b) Phase 2 – Nam Wan Tunnel and associated viaducts; and
- (c) Phase 3 – Stonecutters Bridge.

We have substantially completed the detailed design and working drawings for the Phase 1 works of the Project. We plan to start the Phase 1 works in March 2002 for completion in December 2006. We will commence the Phase 2 and Phase 3 works in mid 2003 for completion in 2007.

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

38. We estimate that this project will create some 1 190 jobs, totalling 62 120 man-months, comprising 205 professional/technical staff and 985 labourers.



圖例
LEGEND

- 施工區界限
LIMIT OF WORKS AREA
- 擬建3米高隔音屏障
PROPOSED 3-METRE HIGH NOISE BARRIER
- 擬建高架行車道
(鋪設有低噪音路面)
PROPOSED ELEVATED CARRIAGEWAY
(WITH LOW NOISE SURFACING)
- 斜道(鋪設有低噪音路面)
PROPOSED RAMPS
(WITH LOW NOISE SURFACING)
- 擬建地面行車道
PROPOSED AT-GRADE CARRIAGEWAY
- 行車方向
DIRECTION OF TRAVEL

D	04/01	RAMPS ADDED		B	03/01	MINOR AMENDMENT	SIGNED
C	04/01	RAMPS ADDED		A	03/01	GENERAL REVISION	SIGNED
	no.	date	description	initial	no.	date	description

drawing title 圖則名稱
 工務計劃項目第711TH號 - 九號幹線青衣至長沙灣段
 PWP ITEM NO. 711TH - ROUTE 9 BETWEEN TSING YI AND CHEUNG SHA WAN
 昂船洲高架路(平面圖)
 NGONG SHUEN CHAU VIADUCT (SITE PLAN)

designed	K. C. LAI	SIGNED	1/3/2001	drawn	D. L. CHANG	SIGNED	6/3/2001	drawing no. 圖號	MW6711TH-SP0002D	scale 比例	1 : 7 500
checked	K. C. LAI	SIGNED	7/3/2001	approved	K. S. NG	SIGNED	7/3/2001	COPYRIGHT RESERVED 版權所有 嚴禁仿製			
office	MAJOR WORKS PROJECT MANAGEMENT OFFICE 主要工程管理處										



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Enclosure 3 to PWSC(2001-02)52

**711TH – Route 9 between Tsing Yi and Cheung Sha Wan
Ngong Shuen Chau Viaduct and the Associated Works**

Breakdown of estimates for consultants' fees

Consultants' staff costs		Estimated man months	Average MPS' salary point	Multiplier factor	Estimated fee (\$ million)
(a) Consultants's fees for					
(i) Supervision of construction and management services	Professional	152	38	2.4	21.0
	Technical	193	14	2.4	8.8
(ii) Resident site staff	Professional	1 002	38	1.7	98.0
	Technical	3 537	14	1.7	114.6
(iii) EM&A programme	Professional	38	38	2.4	5.2
	Technical	148	14	2.4	6.8
				Sub-total	254.4
(iv) EMSTF charges					5.0
				Total	259.4

*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. (As at 1.4.2000, 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 Highways. Part of the consultants' fees for supervision of construction and management services is a provisional part of the lump sum price quoted by the selected consultants under Agreement No. CE 72/98 titled "Design and Construction Assignment for Route 9 between Tsing Yi and Cheung Sha Wan" which is available for acceptance by the Government subject to approval of partial upgrading of 711TH to Category A.
3. Since the establishment of the EMSTF on 1 August 1996 under the Trading Fund Ordinance, government departments are charged for design and technical consultancy services for electrical and mechanical (E&M) installations provided by Electrical and Mechanical Services Department (EMSD). The services rendered for this project include checking consultants' submissions on all E&M installations and providing technical advice to Government on all E&M works and their impacts on the project.