

For Discussion
on 29 September 2003

File Ref : ETWB(T)CR 1/4661/00 Pt. 25

Legislative Council Panel on Transport

The Hong Kong – Zhuhai – Macao Bridge (“the Bridge”)

PURPOSE

An information paper was circulated to Members of the Legislative Council on 6 August 2003 on the arrangements for taking forward the advance work for the Bridge. This paper updates Members on the latest progress and seeks Members’ support for a funding application to be made to PWSC/FC for an investigation and preliminary design study.

PROGRESS TO-DATE

Feasibility Studies for the Bridge

2. The first meeting of the Hong Kong – Zhuhai - Macao Bridge Advance Work Coordination Group (Coordination Group) was held on 29 August 2003 in Guangzhou. The meeting agreed to proceed with the Project as quickly as possible, and to commission feasibility studies on various subjects, including economic benefits, alignment, environmental impact and hydrology. On completion, these studies will be submitted to the National Development and Reform Commission (NDRC) for approval by the State Council to create a project item for the

construction of the Bridge. The Coordination Group will meet again shortly to discuss the landing points of the Bridge and the detailed arrangement for commissioning the feasibility studies. An indicative map of a possible alignment for the Bridge is at Annex A for Members' reference. In parallel, each respective jurisdiction will also carry out all necessary statutory procedures and feasibility studies for the connecting infrastructure for the Bridge.

Landing Point in Hong Kong and Connecting Infrastructure

3. We completed a Preliminary Environmental Review (PER) in October 2002 for the possible landing points of the Bridge and the alignments of the connecting infrastructure. We examined a large number of areas along the west coast of Hong Kong, including Black Point in Tuen Mun, San Shek Wan in Northwest Lantau, Yi O and Peaked Hill in Southwest Lantau etc. The landing points at Southwest Lantau would result in the shortest distance from Zhuhai and Macao, but they were not acceptable as there is a potential site for designation as a Marine Park in that area and were discarded. Black Point was also considered but there were concerns on ecological grounds as it is the major feeding ground for comparatively denser population of dolphins. We propose that the landing point of the Bridge should be best at Northwest Lantau while Black Point is less favourable. From January to July 2003, the Institute of Comprehensive Transport was appointed jointly by ourselves and NDRC to conduct a study of a land connection between Hong Kong and west coast of Pearl River. In the study three alignments were considered under the principle of sustainable development. The

conclusion was to give top priority to the connection between Zhuhai, Macao and North West Lantau Island of Hong Kong.

4. On Northwest Lantau, we have now identified two possible sites near San Shek Wan Headland as suitable locations to provide the landing point for the Bridge, and two possible alignments for the connecting infrastructure to link the Bridge with the existing road network and strategic facilities. The first option is indicated as Alignment 1 in Annex B. The connecting road will take the form of a short tunnel underneath the area south of Sha Lo Wan Village, exit as a trestle bridge near Hau Hok Wan to cross over to the Airport Island, run along Chun Wan Road, and then cross the waters east of the Airport Island to link with the North Lantau Highway.

5. The alternative landing point is further north and the alignment is indicated as Alignment 2 in Annex B. The connecting link will start from the landing point of the Bridge, cross the Airport Channel, run along the south coast of the Airport Island and join the local road network at the southeast tip of Airport Island. This link will also be further extended and linked up with the North Lantau Highway at Tai Ho as traffic builds up in the longer term. As compared to Alignment 1, this alternative will lessen the environmental impact arising from the project, obviate the need for tunneling and likely reduce the cost and construction programme.

6. A decision on the landing point for the Bridge in Hong Kong and the alignment of the connecting link will be made after we have

completed the necessary environmental and engineering studies.

Boundary Crossing Facilities

7. Studies with the experts of Guangdong and Macao sides will be required on the arrangements for the boundary crossing facilities for the Bridge. We will look into the option of adopting an arrangement similar to the co-location arrangement adopted for the Hong Kong-Shenzhen Western Corridor, but this can only be ascertained after the agreements of the parties concerned have been obtained.

INVESTIGATION AND PRELIMINARY DESIGN

8. We need to conduct an investigation and preliminary design study for the section of the Bridge within Hong Kong territory as well as the connecting link for connection to our local transport network. The Environmental Impact Assessment (EIA) process and initial engineering design work will also need to commence. For the Hong Kong section of the Bridge, we will include in the EIA the possible alignments identified. Our findings and decision on the final alignment will be reported to the Advance Works Co-ordination Group to facilitate overall planning for the Bridge.

9. We intend to submit a paper to the Public Works Subcommittee (PWSC) in October 2003 proposing to upgrade 787TH – Hong Kong – Zhuhai – Macao Bridge Hong Kong Section and North Lantau Highway Connection – investigation and preliminary design to Category A at an estimated cost of \$59.0 million to employ consultants to

undertake the study. The scope and funding requirement is set out in the draft PWSC paper at Annex C.

PROGRAMME

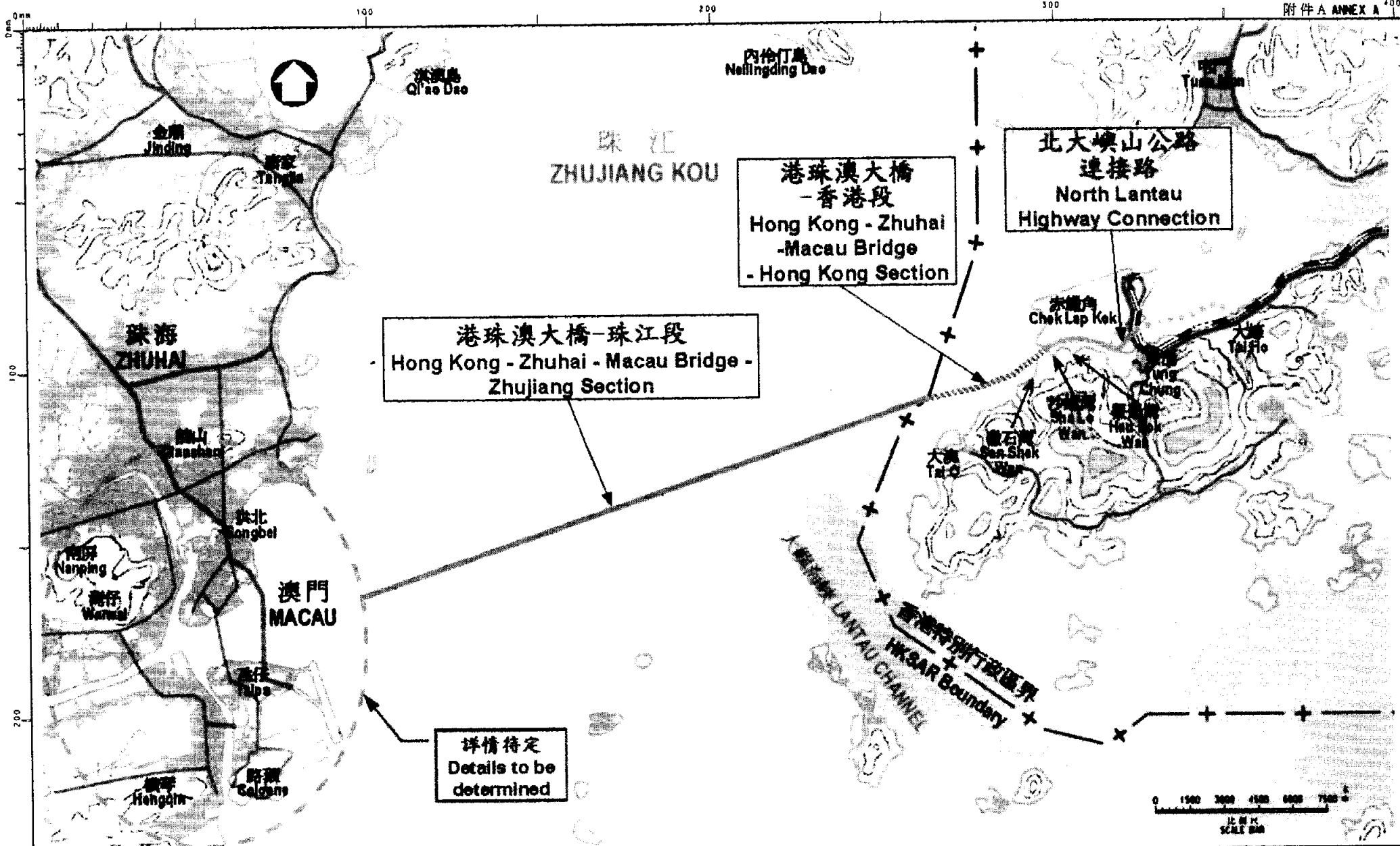
10. A programme for the Bridge and the connecting link will have to be coordinated and discussed with Guangdong and Macao Governments.

ADVICE SOUGHT

11. Members are invited to note the content of this paper and indicate support for the funding submission on the investigation and preliminary design study.

Environment, Transport and Works Bureau

24 September 2003



港珠澳大橋-珠江段
Hong Kong - Zhuhai - Macau Bridge -
Zhujiang Section

港珠澳大橋
-香港段
Hong Kong - Zhuhai
-Macau Bridge
- Hong Kong Section

北大嶼山公路
連接路
North Lantau
Highway Connection

詳情待定
Details to be
determined

圖名及圖號 plan title

港珠澳大橋
HONG KONG - ZHUHAI - MACAU BRIDGE

設計 designed W.K.LAI 22/09/03	繪圖 drawn Y.L.SHEU 22/09/03	圖則編號 plan no. HMW6787TH-SK0078	比例 scale N.T.S.
覆核 checked W.K.LAI	批准 approved W.C.LAU	© 版權所有 COPYRIGHT RESERVED	
王聖土庫管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE			

黑角咀
BLACK POINT

屯門
TUEN MUN

香港特別行政區界
HK SAR BOUNDARY

研究地區
STUDY AREA

香港國際機場
HONG KONG INTERNATIONAL AIRPORT

北大嶼山公路
NORTH LANTAU HIGHWAY (NLH)

港珠澳大橋 - 珠江段
ZHUJINAG SECTION OF HZMB

機場水道 AIRPORT CHANNEL

棠殼灣
HAI HOK WAN

鴨脷
FUNG CHUNG

大嶼
TAI HO

敵石灣
SAN SHEK WAN

隧道
TUNNEL

深屈
SHAM WAT

大澳
TAI O

大嶼山
LANTAU ISLAND

圖例：
LEGEND :

路線 1
ALIGNMENT 1
路線 2
ALIGNMENT 2

備註：示意路線
NOTE: ALIGNMENTS ARE INDICATIVE ONLY.



圖則名稱 drawing title

港珠澳大橋
香港的著陸點及連接的基礎建設
HONG KONG - ZHUHAI - MACAU BRIDGE
(HZMB)
LANDING POINT IN HONG KONG AND
CONNECTING INFRASTRUCTURE

設計 designed

W.K.LAI 18/09/03

覆核 checked
W.K.LAI

繪圖 drawn

Y.L.SHIU 18/09/03

批准 approved
W.C.LAU

主要工程管理處
MAJOR WORKS
PROJECT MANAGEMENT OFFICE

圖則編號 drawing no.
HMW6787TH-SP0002

比例 scale
1:100000

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HONG KONG
DEPARTMENT OF HIGHWAYS
路政署

For discussion
on 29 October 2003

PWSC(2003-04)XX

DRAFT

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 – HIGHWAYS

Transport – Roads

787TH – Hong Kong – Zhuhai – Macao Bridge Hong Kong Section and North Lantau Highway Connection – investigation and preliminary design

Members are invited to recommend to Finance Committee the upgrading of **787TH** to Category A at an estimated cost of \$59.0 million in money-of-the-day prices for the investigation and preliminary design of the Hong Kong – Zhuhai – Macao Bridge Hong Kong Section and North Lantau Highway Connection.

PROBLEM

We need to build a boundary crossing between the Hong Kong Special Administrative Region (HKSAR) and the west bank of Pearl River Delta to enhance Hong Kong's economic development and its status as a hub in the Pearl River Delta Region.

PROPOSAL

2. The Director of Highways (D of Hy), with the support of the Secretary for the Environment, Transport and Works (SETW), proposes to upgrade **787TH** to Category A at an estimated cost of \$59.0 million in money-of-the-day (MOD) prices to employ consultants to undertake an investigation study for the section of the proposed Hong Kong – Zhuhai – Macao Bridge (HZMB) between the boundary of HKSAR and the landing point at Northwest Lantau, i.e. Hong Kong Section (HKS), and the connecting road linking it with the North Lantau Highway (NLH), i.e. North Lantau Highway Connection (NLHC), and to develop a conceptual design for the HZMB HKS as well as a preliminary design for the NLHC.

PROJECT SCOPE AND NATURE

3. The scope of works of **787TH** comprises –
 - (a) investigation of the HKS of HZMB and NLHC including its longer term connection to Tai Ho;
 - (b) conceptual design of the HKS;
 - (c) preliminary design of the NLHC; and
 - (d) associated site investigation and supervision.

A location plan showing the HZMB and the NLHC is at Enclosure 1. A drawing showing the study area and tentative alignments of the NLHC under consideration is at Enclosure 2.

4. We plan to start the investigation and preliminary design works for the project in November 2003 for completion in October 2004.

JUSTIFICATION

5. In January 2003, the National Development and Reform Commission (NDRC) and the HKSAR Government jointly commissioned the Institution of Comprehensive Transportation (ICT) to conduct a study on the transport linkage between HKSAR and the Pearl River West. The study completed in July 2003 concluded that the construction of a land transport link between Hong Kong and Pearl River West would contribute to the development of tourism, logistics, finance and trade in Hong Kong, reinforce its status as an international shipping and aviation centre, and also promote the economic integration between Hong Kong and Pearl River West. The report confirmed the need and urgency for such a link, and recommended the construction of HZMB and the early commencement of various studies including environmental impact assessment and hydrology study. It also recommended that the form, alignment and landing points of HZMB be finalised as soon as possible.

6. As announced following the Sixth Plenary Session of the Hong Kong/Guangdong Co-operation Joint Conference held in HKSAR on 5 August 2003, the State Council has given approval for the governments of HKSAR, Guangdong and Macao SAR to proceed with the preparatory work for the HZMB. A HZMB Advance Work Coordination Group (AWCG) was then established by the three governments to coordinate and take forward the advance work for the HZMB, including studies on alignment, environmental impact, and hydrology.

7. The first AWCG meeting was held on 29 August 2003. The way in which the whole HZMB will be implemented is to be discussed and agreed among the three governments. The HKSAR Government will be responsible for the road infrastructure connecting HZMB to the existing HKSAR road network, i.e. NLHC. The NLHC will be implemented as a future PWP construction item.

8. To determine the alignment, general layout, land requirement, environmental and other impacts, we need to carry out the investigation for the HKS of HZMB and NLHC including possible initial connection to the road network at the southeast tip of the Airport Island and its longer term connection to Tai Ho. Such information is essential to define the scope of the HKS of HZMB and NLHC and provide input for subsequent planning and decision.

9. We will also carry out site investigation works to provide geotechnical and geological information for subsequent design work. As we do not have the necessary in-house resources, we need to employ consultants to undertake the investigation, conceptual and preliminary design, and to supervise the associated site investigation works.

10. We need to carry out an environmental impact assessment (EIA) urgently in conjunction with the investigation study in order to identify the environmental impacts and the mitigation measures required.

FINANCIAL IMPLICATIONS

11. We estimate the cost of this item to be \$59.0 million in MOD prices, made up as follows –

	\$ million
(a) Consultants' fees	29.5
(i) review the findings of previous studies, and examination of alignments and design options	0.5
(ii) miscellaneous impact assessments (environmental, traffic, marine and aviation, etc.)	14.4

(iii) engineering study, conceptual and preliminary design	13.0	
(iv) supervision of site investigation	1.6	
(b) Site investigation	26.0	
(c) Contingencies	4.00	
Sub-total	59.5	(in September 2003 prices)
(d) Provision for price adjustment	(0.5)	
Total:	59.0	(in MOD prices)

A breakdown by man-months of the estimate for consultants' fees is at Enclosure 3.

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

Year	\$ million (Sep 2003)	Price Adjustment Factor	\$ million (MOD)
2003 – 2004	25.0	1.00000	25.0
2004 – 2005	34.5	0.98625	34.0
	59.5		59.0

13. We have derived the MOD estimate on the basis of the Government's forecast of trend labour and construction prices for the period 2003 to 2005. We will employ consultants on a lump-sum basis without provision for price adjustment as the duration of the consultancy will not exceed 12 months. The consultants will supervise the site investigation works under a contract to be awarded through a competitive tendering process.

14. The proposed conceptual and preliminary design and site investigation works have no annual recurrent financial implications.

PUBLIC CONSULTATION

15. We will consult the Islands District Council and Green Groups during the process of the investigation and preliminary design, when sufficient information is available.

ENVIRONMENTAL IMPLICATIONS

16. The proposed HKS of HZMB and the NLHC are designated projects under Schedule 2 of the EIA Ordinance and an environmental permit is required for the construction and operation of the projects. We completed a Preliminary Environmental Review (PER) for the HKS of HZMB and NLHC in December 2002. We examined a large number of locations along the west coast of Hong Kong, including Black Point in Tuen Mun, San Shek Wan in Northwest Lantau, Yi O and Peaked Hill in Southwest Lantau etc. The landing points at Southwest Lantau would result in the shortest distance from Zhuhai and Macao, but they were not acceptable as there is a potential site for designation as a Marine Park in the area and were discarded. Black Point was also considered but there were concerns on ecological grounds as it is the major feeding ground for comparatively denser population of dolphins. We propose that the landing point of the Bridge should best be at Northwest Lantau while Black Point is less favourable. On Northwest Lantau, we have now identified two possible sites near San Shek Wan Headland as suitable locations to provide the landing point for the Bridge, and two possible alignments for the connecting infrastructure to link the Bridge with the existing road network and strategic facilities. We will carry out an EIA study to address the potential environmental impacts of the project and will submit the EIA report to the Director of Environmental Protection under the EIA Ordinance for approval and will follow the statutory procedures of making the EIA report available for comments by the public and the Advisory Council on the Environment. We have also started an Ecological Baseline Survey in September 2003 for the projects for timely collection of information for the future EIA study.

17. The proposed conceptual and preliminary design will not give rise to any adverse environmental impacts. We will implement environmental pollution control measures to control the environmental impacts of the associated site investigation works. The site investigation works will only generate a minimal amount of construction and demolition (C&D) materials. We will require the consultants to plan and design the works to minimize the generation of C&D materials and to reuse/recycle C&D materials as much as possible in the future implementation of construction contracts.

LAND ACQUISITION

18. The proposed conceptual and preliminary design and site investigation works study do not require any land acquisition.

BACKGROUND INFORMATION

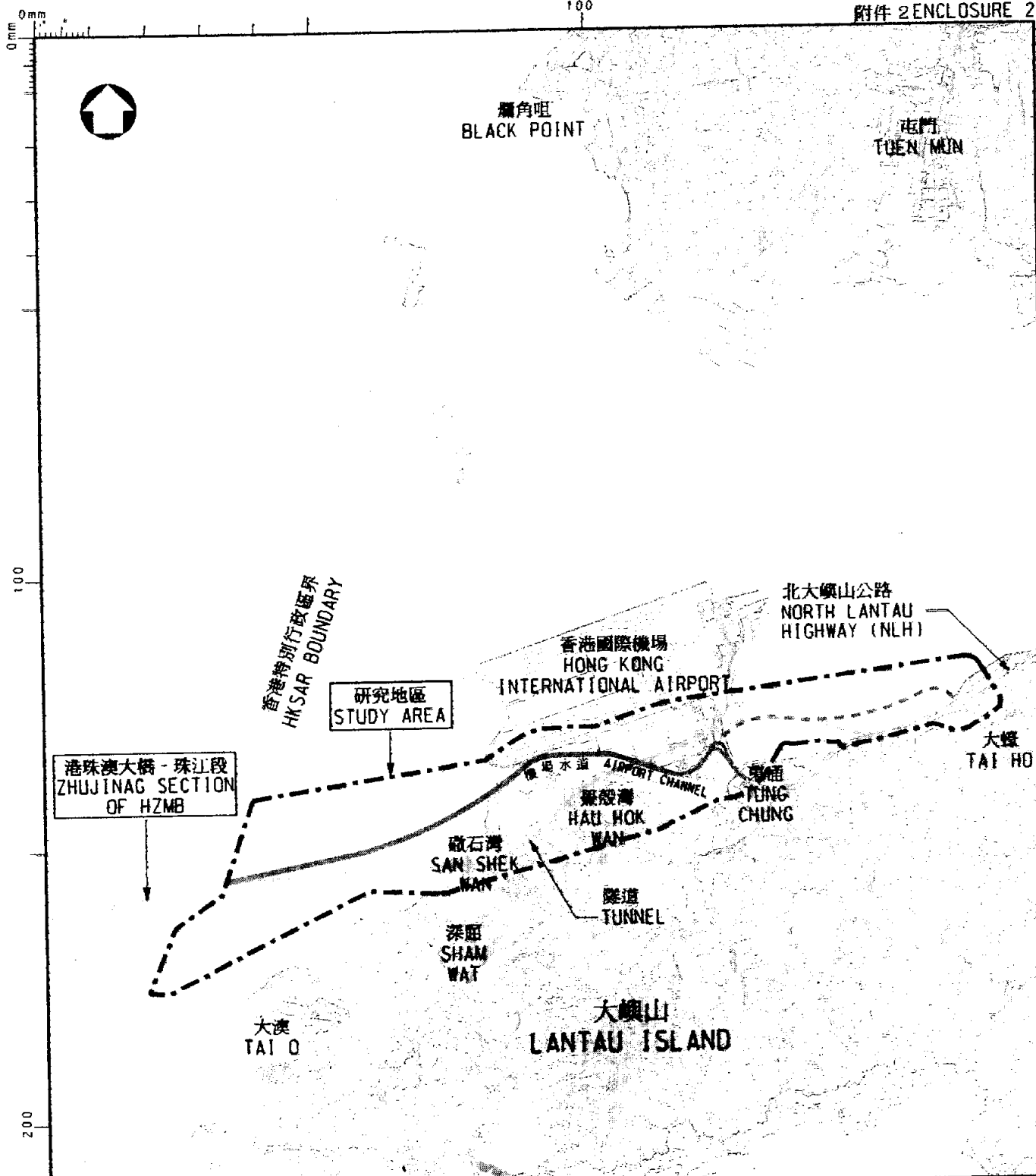
19. In October 2002, D of Hy engaged consultants to undertake a PER at an estimated cost of \$1.3 million under Subhead 6100TX “Highways works, studies and investigations for items in Category D of the Public Works Programme”. A total of twenty-two alignment options, covering three study areas in Hong Kong for the possible locations of landfalls. These include Tuen Mun, Northwest Lantau and Southwest Lantau.

20. The study report identified the area near San Shek Wan Headland as a possible area to provide a landing point. We have identified two possible alignments. One option runs in a short tunnel underneath the south of Sha Lo Wan Village, exits at Hau Hok Wan and crosses the Airport Island at the southern air cargo area. It then crosses the waters east of the Airport Island and links with the North Lantau Highway. This is indicated in Alignment 1 in Enclosure 2. The other option has the Bridge landing further north which will result in reduction in the coastal area affected. The connecting link of this option will start from the landing point of the Bridge, cross the Airport Channel, run along the south coast of the Airport Island and join the local road network at the southeast tip of Airport Island. This link will also be further extended and linked up with the North Lantau Highway at Tai Ho as traffic builds up in the longer term. The landing location and the connecting link are indicated as Alignment 2 in Enclosure 2.

21. The study by ICT on “Transport Linkage between Hong Kong and Pearl River West” jointly commissioned by the NDRC and HKSAR Government was completed in July 2003. The ICT study confirmed the need and urgency for a link between Hong Kong, Macao and the Pearl River West, and points to a need to expedite environmental and hydrology studies to confirm its technical feasibility.

22. We estimate that the proposed work in this item will create about 70 jobs comprising 50 professional/technical staff and 20 labourers totalling 800 man-months. Pending finalization of the project estimate, we shall estimate the job openings for agreement by the Works Sub-Branch of ETWB.

Environment, Transport and Works Bureau
October 2003



圖例:
LEGEND :

路線 1
 ALIGNMENT 1

路線 2
 ALIGNMENT 2

備註: 示意路線
 NOTE: ALIGNMENTS ARE INDICATIVE ONLY.

圖則名稱 drawing title 工務計劃項目第787TH號 - 港珠澳大橋 香港段及北大嶼山公路連接路 - 勘测及初步設計 PWP ITEM NO. 787TH - HONG KONG - ZHUHAI - MACAU BRIDGE HONG KONG SECTION AND NORTH LANTAU HIGHWAY CONNECTION - INVESTIGATION AND PRELIMINARY DESIGN	設計 designed W.K.LAI 18/09/03	繪圖 drawn Y.L.SHIU 18/09/03	圖則編號 drawing no. HMW6787TH-SP0005	比例 scale 1:100000
	覆核 checked W.K.LAI	批准 approved W.C.LAU	© 版權所有 COPYRIGHT RESERVED	
	主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE		HIGHWAYS DEPARTMENT HONG KONG 路政署 香港	

Enclosure 3 to PWSC(2003-04)XX

**787TH – Hong Kong – Zhuhai – Macau Bridge Hong Kong Section and
North Lantau Highway Connection-investigation and preliminary design**

**Breakdown of estimates for consultants' fees and site investigation works (in
September 2003 prices)**

Consultants' staff costs			Estimated man- months	Average MPS* salary point	Multiplier	Estimated fee (\$ million)
(a)	Review of the findings of previous studies, and examine of alignments and design options	Professional	3	38	2.0	0.4
		Technical	3	14	2.0	0.1
(b)	Miscellaneous Impact Assessments (Environmental, Traffic, Marine and Aviation etc.)	Professional	85	38	2.0	9.8
		Technical	120	14	2.0	4.6
(c)	Engineering study, conceptual and preliminary design	Professional	80	38	2.0	9.2
		Technical	100	14	2.0	3.8
(d)	Supervision of site investigation and surveys	Professional	10	38	1.6	1.0
		Technical	20	14	1.6	0.6
Total consultant's staff costs						29.5
Out-of pocket expenses						
(e)	Site investigation and surveys					26.0
Total						55.5

* 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 the case of resident site staff supplied by the consultants. (At 1.10.2002, MPS pt. 38 = \$57,730 per month and MPS pt. 14 = \$19,195 per month.)
2. Out-of-pocket expenses are the actual cost incurred. The consultants are not entitled to any additional payment for the overheads or profit in respect of these items.
3. The figures given above are based on estimates prepared by the Director of Highways. We will know the actual man-months and fees only when we have selected the consultants through the usual competitive lump-sum fee bid system.