

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### HEAD 705 – CIVIL ENGINEERING

#### Support – Boundary facilities (other than road works)

#### **19GB – Liantang/Heung Yuen Wai Boundary Control Point and associated works – site formation and infrastructure works**

Members are invited to recommend to the Finance Committee to increase the approved project estimate of **19GB** by \$8,719.9 million from \$16,253.2 million to \$24,973.1 million in money-of-the-day prices.

### PROBLEM

The approved project estimate (APE) of **19GB** is not sufficient to cover the cost of the works under the project.

### PROPOSAL

2. The Director of Civil Engineering and Development, with the support of the Secretary for Development, proposes to increase the APE of **19GB** by \$8,719.9 million from \$16,253.2 million to \$24,973.1 million in money-of-the-day (MOD) prices.

### PROJECT SCOPE AND NATURE

3. In July 2012, the Finance Committee (FC) of the Legislative Council approved the upgrading of **19GB** (the Project) to Category A at an estimated cost of \$16,253.2 million in MOD prices. The approved scope of **19GB** comprises –

/(a) .....

- (a) site formation of about 23 hectares of land for the development of the Boundary Control Point (BCP);
- (b) provision of a 1.8 kilometre (km) long perimeter patrol road at the BCP together with the associated gates and fencing;
- (c) construction of a pedestrian subway linking the BCP to Lin Ma Hang Road;
- (d) construction of an approximately 11 km long dual two-lane Connecting Road (with about 1.0 km of at grade road, 4.3 km of viaduct and 5.7 km of tunnel) connecting the BCP with Fanling Highway (with four interchanges along the Connecting Road at the junctions with Fanling Highway, Sha Tau Kok Road, Ping Yuen Road and Lin Ma Hang Road) and the associated administration building, ventilation adit and buildings, electrical and mechanical (E&M) works and traffic control and surveillance system;
- (e) design and construction of the Hong Kong Special Administrative Region (HKSAR) portion of four vehicular bridges and one pedestrian bridge<sup>1</sup> crossing Shenzhen River (cross boundary bridges);
- (f) associated diversion/modification works at existing local roads and junctions including Lin Ma Hang Road, access road to the resite of Chuk Yuen Village, Tai Wo Services Road East and West, Sha Tau Kok Road, and Wo Keng Shan Road, etc.;
- (g) provision of sewage collection, treatment and disposal facilities for the BCP and the resited Chuk Yuen Village;
- (h) provision of resite area(s) with supporting infrastructure for reprovisioning of the affected village houses;

/(i) .....

---

<sup>1</sup> The project scope does not include interior fitting works for the pedestrian bridge (HKSAR portion), which will be carried out separately under the BCP building works of **13GB** – Liantang/Heung Yuen Wai Boundary Control Point and associated works.

- (i) reprovisioning of the affected government facilities including Wo Keng Shan Road garden and a public toilet, the Architectural Services Department (ArchSD)'s depot at Lin Ma Hang Road and footbridges crossing Ng Tung River;
- (j) ancillary works such as the associated footpaths, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works etc; and
- (k) associated environmental mitigation measures, and Environmental Monitoring and Audit programme for the works.

———— Plans showing the proposed works are at Enclosure 1.

## PROGRESS OF THE PROJECT

4. The Project is implemented under six works contracts. Tenders for Contract 1, Contract 2 and Contract 3<sup>2</sup> were invited in 2012. The returned tender price of Contract 1, however, significantly exceeded the original estimate. To protect public funds, we cancelled the tender exercise for Contract 1 and re-packaged the works of Contract 1 into two contracts, namely Contract 5 and Contract 6<sup>3</sup>, with a view to enlarging the scope of contractors capable of undertaking the works and thus resulting in more competitive tender prices. We also introduced cost-saving measures to reduce risks to the tenderers and facilitate contractor's works on site (e.g. inviting alternative designs so that tenderers may submit a more competitive tender price due to better utilization of their resources and expertise; providing a barging point to facilitate delivery of the precast bridge deck segments to reduce handling and transportation cost; providing more working areas for the contractors' use; and reviewing the designs by taking into account feedback from the tenderers) in these two contracts as well as Contract 2 and Contract 3. Tenders for Contract 5 and Contract 6 were invited in 2013.

/5. ....

---

<sup>2</sup> The scope of Contract 1 comprises mainly the site formation works for the BCP and the construction of the northern section of the Connecting Road between Sha Tau Kok Road and the BCP (Connecting Road (Northern Section)). The scopes of Contract 2 and Contract 3 comprise mainly the construction of the southern section of the Connecting Road between Fanling Highway and Sha Tau Kok Road (Connecting Road (Southern Section)) and the construction of Fanling Highway Interchange respectively.

<sup>3</sup> The scopes of Contract 5 and Contract 6 comprise mainly the site formation works for the BCP and the construction of Connecting Road (Northern Section) respectively.

5. The works under Contract 2, Contract 3 and Contract 5 commenced in 2013. As at end-September 2014, the construction works are progressing satisfactorily. Tender assessment of Contract 6 is in progress. Tenders for Contract 4 and Contract 7<sup>4</sup> are yet to be invited. The status of the works contracts is summarized at Enclosure 2.

## JUSTIFICATION

6. Despite our efforts of arranging re-tender of Contract 1 and incorporating appropriate cost saving measures in the contracts as mentioned in paragraph 4 above, the overall prices of the returned tenders were still higher than the original estimates.

7. After reviewing the financial position of **19GB** and the tendering results of the works contracts, we consider it necessary to increase the APE of **19GB** by \$8,719.9 million from \$16,253.2 million to \$24,973.1 million in MOD prices to cover the additional costs arising mainly from the following –

- (a) recent surge in construction prices;
- (b) poor ground condition for tunnelling works;
- (c) tenderers' perception on higher risks associated with construction constraints;
- (d) increase in provision for price adjustment; and
- (e) increase in contingencies.

Details of the increases in the APE are elaborated in paragraphs 8 to 22 below.

/Recent .....

---

<sup>4</sup> The scopes of Contract 4 and Contract 7 comprise mainly the traffic control and surveillance system for the whole Connecting Road and the cross boundary bridges respectively.

### Recent surge in construction prices

8. When we applied for the funding for **19GB** in 2012, our cost estimate was based on the market situation and data available up to early 2012 by making reference to the cost information of similar infrastructure projects. Since then, there has been a surge in the construction prices, in particular for the sectors of heavy civil engineering works (such as viaduct and tunnelling works) and E&M works, leading to the higher-than-expected tender prices of the Project.

### Heavy civil engineering works

9. The heavy civil engineering works have experienced a surge in construction prices since 2012<sup>5</sup>. The substantial surge in tender prices for heavy civil engineering works was attributable to the factors detailed in paragraphs 10 and 11 below.

### *Labour and plant costs*

10. Currently, there are a number of major heavy civil engineering works projects involving viaduct and tunnelling works under construction in Hong Kong and adjacent regions. There is a strong demand for similar construction plant needed for the Project. In addition, there is also a higher-than-expected increase in labour cost. The relevant Census and Statistics Department's wage information of key trades involving viaduct works (including concreter, bar bender and fixer, rigger/metal formwork erector, carpenter (formwork) and construction plant mechanic) is at Enclosure 3. Their average daily wages had increased in the range from about 18% to 46% within the 12 months' period from August 2012. We believe that the increase in wages of tunnelling workers should be at least comparable, if not higher, than that of the viaduct field because of the demanding working environment inside tunnels and the recent abundant job opportunities. The market prices of construction plant have also substantially increased since mid-2012. Within a year, the hiring rates of crawler cranes for heavy civil engineering works (for construction of viaducts) and plant for bored piling increased by about 30% and 40% respectively. Thus tenderers, having taken the most updated trend for labour and plant costs into account, have made prudent projection and reflected these factors in their tender prices.

*/Specialist .....*

---

<sup>5</sup> For instance, in two recent mega infrastructure projects, namely Hong Kong – Zhuhai – Macao Bridge Hong Kong Link Road (**844TH**) and Tuen Mun – Chek Lap Kok Link – construction works (**825TH**), which were tendered in early 2012 and early 2013 respectively, the average unit cost of the land-based viaduct in **825TH** is some 100% higher than that of **844TH**.

*Specialist sub-contractors*

11. The installation of precast bridge segments requires prestressing operation which can only be carried out by specialist sub-contractors. Similarly, tunnel construction in the Project requires specialist sub-contractors to carry out both drill-and-blast tunnelling activities and to handle the sophisticated tunnel boring machine (TBM). The supply of prestressing and tunnel specialist sub-contractors is tight in the market where many viaduct and tunnelling works are being carried out locally and in adjacent regions, resulting in the higher-than-expected tender prices for precast bridge deck works and tunnelling works.

Electrical and mechanical works

12. The tunnelling works under this Project involve extensive E&M works including tunnel ventilation, power supply, fire services and lighting systems. The Building Services Tender Price Index compiled by the ArchSD is a reference for the general trend of tender prices on Government building services including E&M works. The indices of the first quarter of 2012 and the second quarter of 2013 were 149 and 230 respectively, representing an increase of some 54% in the tender prices for building service works over the corresponding period. Besides, as the majority of the E&M works would only be carried out at the late stage of the Project (i.e. 2017/18), tenderers might have put additional risk premium to cater for possible further market surge for the E&M works in their tenders.

13. Based on the factors mentioned in paragraphs 8 to 12 above, we estimate that the recent surge in construction prices has contributed an increase of about \$3,974.7 million, comprising \$3,321.2 million for the heavy civil engineering works and \$653.5 million for the E&M works. The increase in the heavy civil engineering works accounts for 38.1% of the proposed total increase, whereas the increase in the E&M works accounts for 7.5% of the proposed total increase.

**Poor ground condition for tunnelling works**

14. The works under **19GB** include the construction of the 4.8 km long Lung Shan Tunnel between the proposed interchanges at Fanling Highway and Sha Tau Kok Road. Upon completion, it will be the longest land road tunnel ever built in Hong Kong. Progress of part of the further site investigation

/conducted .....

conducted in late 2011 was affected by access problems and adverse weather. The results of the further site investigation completed in mid-2012 revealed that the ground condition was poorer than we envisaged. A number of faults were found to be straddling a stretch of tunnel of some 1.4 km long. This calls for more extensive temporary works such as grouting, shotcreting, temporary supporting structures and strengthening works of the permanent lining along this tunnel section. For example, an additional 20% of rock bolts and 15% of rock anchors have to be installed to withstand the poor ground condition in the fault zones. Moreover, the extent of mixed ground, which is more difficult for tunnel construction, in the section of tunnel to be excavated by TBM was found to be longer-than-expected by about 120% from some 0.3 km to some 0.7 km. This would lead to a higher construction cost due to a slower rate of construction, higher construction risk, more wear and tear problem associated with the operation of TBM and the need of more temporary grouting work.

15. The project estimate for **19GB** was prepared in early 2012 with the design of the tunnel based on the ground information and site investigation results available at that time. The updated design for the tunnel construction due to poor ground condition, which was not reflected in the cost estimate prepared for the funding application of **19GB**, contributed to the increase of about \$698.6 million. It represents 8.0% of the proposed total increase.

#### **Tenderers' perception on higher risks associated with construction constraints**

16. Construction of the 4.8 km long Lung Shan Tunnel is very complex and technically demanding, and is highly constrained by limited access. As mentioned in paragraph 14 above, as a result of the poor ground condition along the tunnel alignment revealed in the further site investigation, the tunnel construction would become more difficult than originally anticipated. The contractor would need to plan the tunnelling works very prudently and to carry out more site investigation works to better assess the ground condition before tunnel construction works start. The above technical difficulties and site specific constraints would put pressure on the contractor. As a result, the contractor may have to deploy additional resources to complete the works as scheduled in a prudent manner.

/17. ....

17. There are some other construction constraints that may result in higher tender prices of the Project. For instance, the restrictive construction duration for viaduct works over the East Rail Line, the temporary traffic arrangements at Fanling Highway and remoteness of the works site may lead to additional risk premium to be placed by tenderers in their returned tenders.

18. We estimate that tenderers' higher-than-expected risk assessment to cater for construction constraints have led to an additional cost of about \$387.3 million, which is 4.4% of the proposed total increase.

### **Increase in provision for price adjustment**

19. According to current government practice, monthly payments to contractors for construction contracts are adjusted to cover market fluctuation in labour and material costs, which are known as contract price fluctuation payment. The price adjustment is assessed based on the price adjustment factors derived from the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output together with the cash flow of the project.

20. When the project estimate of **19GB** was prepared in 2012, based on the Government's price adjustment factors available at that time and the original cash flow pattern, a provision of \$3,821.1 million was allowed for price adjustment. Due to differences in the original and latest cash flow of the Project to take account of the additional provisions as explained in paragraphs 8 to 18 above, as well as the progress of the Project, we need to seek an increase in the provision for price adjustment. Based on the latest project estimate, updated cash flow and the latest price adjustment factors adopted in October 2014, the provision for price adjustment has to be increased by \$3,324.0 million from \$3,821.1 million to \$7,145.1 million, contributing 38.1% of the proposed total increase. The latest cash flow of the project and the detailed assessment of the latest provision for price adjustment are at Enclosure 4.

---

/Increase .....



**Increase in contingencies**

21. When we applied for the funding for **19GB** in 2012, an amount of contingencies at \$1,130.0 million has been provided. With the increase in construction costs mentioned in paragraphs 13, 15 and 18 above, we consider it necessary to increase the contingencies to \$1,465.3 million (about 9% of the revised estimated value of works), similar to other public works projects, to cater for unforeseen situations during the implementation of the Project.

**Summary of Financial Position**

22. In sum, the proposed increase of \$8,719.9 million is broken down as follows –

|     | <b>Factors</b>   | <b>Proposed<br/>increased<br/>amount in<br/>MOD prices<br/>(\$ million)</b> | <b>% of the<br/>total increase</b> |
|-----|--|---|------------------------------------|
|     | <b>Increase due to –</b>   |   |                                    |
| (a) | Recent surge in construction prices  | 3,974.7   | 45.6%                              |
| (b) | Poor ground condition for tunnelling works                                     | 698.6   | 8.0%                               |
| (c) | Tenderers' perception on higher risks associated with construction constraints | 387.3   | 4.4 %                              |
| (d) | Increase in provision for price adjustment                                     | 3,324.0   | 38.1%                              |
| (e) | Increase in contingencies  | 335.3   | 3.9%                               |
| (f) | Total increase<br>(f) = (a) + (b) + (c) + (d) + (e)                            | <u>8,719.9</u>  | <u>100%</u>                        |

A comparison of the cost breakdown of the original APE and the latest project estimate is at Enclosure 5.

/FINANCIAL .....

**FINANCIAL IMPLICATIONS**

23. Subject to the approval of the FC, we will revise the phasing of the expenditure as follows –

| <b>Year</b>         | <b>\$ million<br/>(MOD)</b> |
|---------------------|-----------------------------|
| Up to 31 March 2014 | 597.7                       |
| 2014 – 2015         | 1,506.5                     |
| 2015 – 2016         | 2,629.9                     |
| 2016 – 2017         | 5,102.5                     |
| 2017 – 2018         | 5,917.8                     |
| 2018 – 2019         | 4,537.9                     |
| 2019 – 2020         | 2,872.2                     |
| 2020 – 2021         | 1,808.6                     |
|                     | <hr/> 24,973.1 <hr/>        |

24. The proposed increase in the APE will not give rise to any additional recurrent expenditure.

**PUBLIC CONSULTATION**

25. The proposed increase in the APE does not involve any change in project scope. We consider it not necessary to conduct further public consultation on the proposed cost increase.

/26. ....

26. We consulted the Legislative Council Panel on Development on the proposed increase in APE on 7 January 2014. Members requested the Government to critically review the project estimate and explore the feasibility to defer the implementation of the Project to avoid the current construction peak. We provided supplementary information and results of the review to Members on 11 April 2014 vide LC Paper No. CB(1)1248/13-14(08) and consulted the Panel on Development again on 22 April 2014 and 5 May 2014. The Panel supported submitting the Administration's proposal to the Public Works Subcommittee for consideration. The supplementary information requested by the Members will be submitted separately.

### **ENVIRONMENTAL IMPLICATIONS**

27. The proposed increase in the APE will not have any environmental implications.

### **ENERGY CONSERVATION MEASURES**

28. The proposed increase in the APE will not necessitate any additional energy conservation measures.

### **HERITAGE IMPLICATIONS**

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

### **LAND ACQUISITION**

30. The proposed increase in the APE will not require any land acquisition.

### **BACKGROUND INFORMATION**

31. In July 2012, the FC approved the upgrading of **19GB** to Category A with an APE of \$16,253.2 million in MOD prices. Construction commenced in April 2013 for completion by end 2018.

32. The proposed increase in the APE will not involve any additional tree removal or planting proposal.

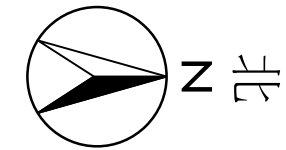
33. The proposed increase in the APE will not involve the creation of any additional professional/technical posts or job opportunities.

34. This paper supersedes PWSC(2014-15)13 which was not discussed by the Public Works Subcommittee during the 2013-14 legislative session. The programme, phasing of expenditure and estimated cost of the project have been updated due to the lapse of time.

-----

Development Bureau  
October 2014





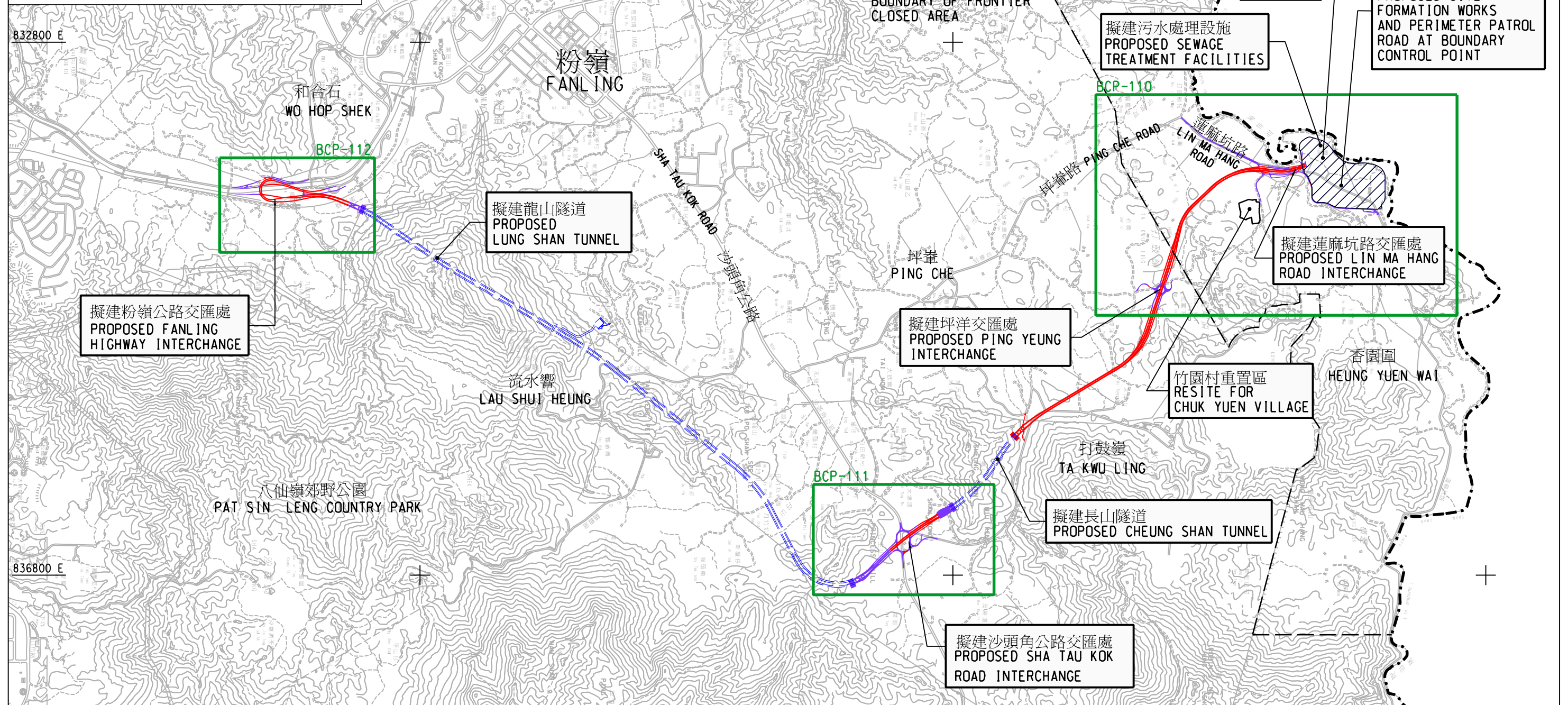
深圳市  
SHENZHEN SHI

圖例 LEGEND:

 擬建連接路（地面行車道部分）  
 PROPOSED CONNECTING ROAD  
 (AT-GRADE SECTION)

 擬建連接路（高架行車道部分）  
PROPOSED CONNECTING ROAD  
(VIADUCT SECTION)

== == == == 擬建連接路（隧道部分）  
PROPOSED CONNECTING ROAD  
(TUNNEL SECTION)



drawing title 圖則名稱

蓮塘/香園圍口岸與相關工程 - 擬建口岸及連接路之平面圖

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS  
- LAYOUT OF THE PROPOSED BOUNDARY CONTROL POINT AND CONNECTING ROAD

drawing no. 圖則編號

BCP – 109

|       |    |
|-------|----|
| scale | 比例 |
|-------|----|

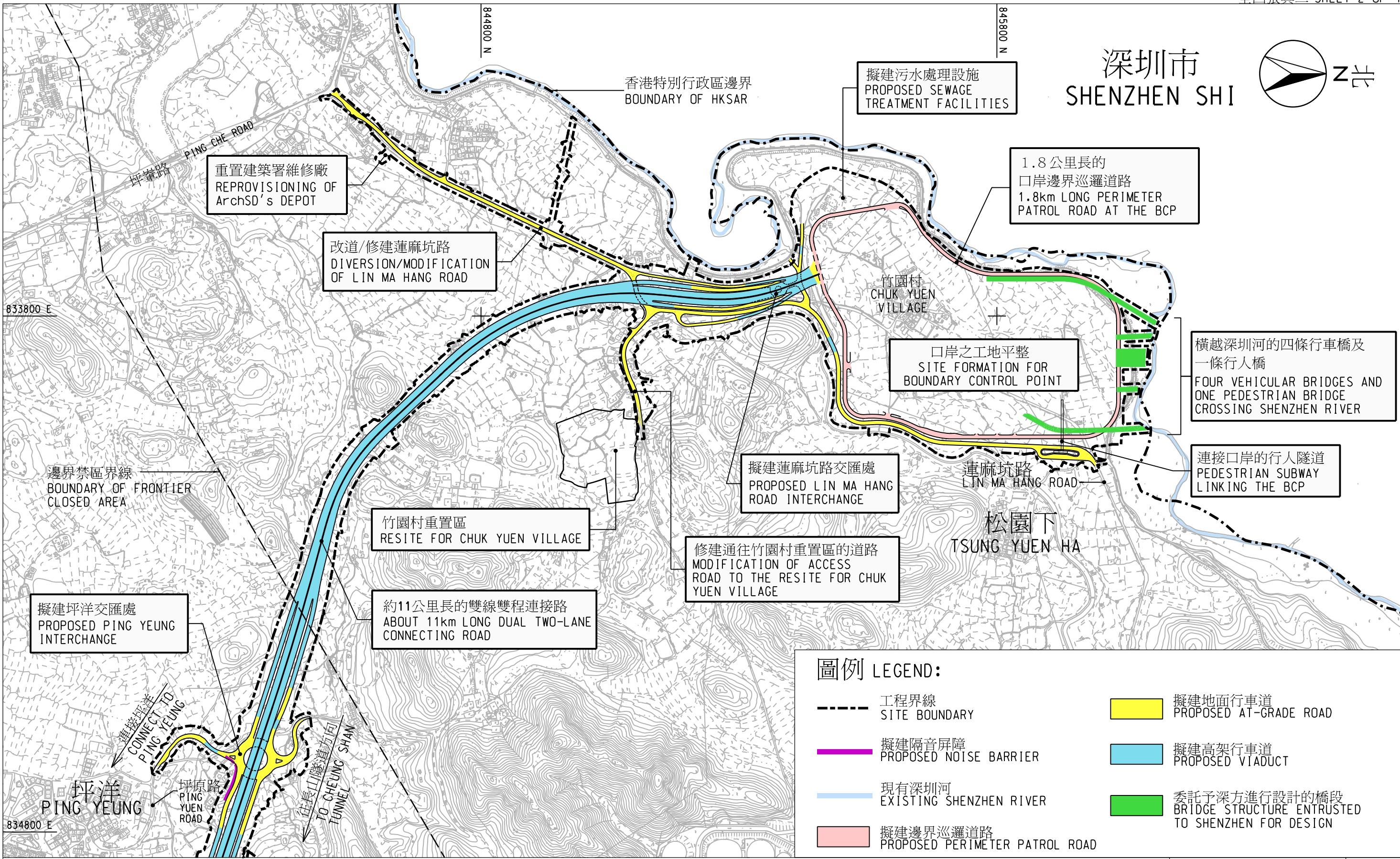
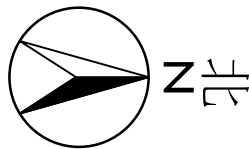
: 30 000



CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT  
HONG KONG



深圳市  
SHENZHEN SHI



圖例 LEGEND:

- 工程界線  
SITE BOUNDARY
- 擬建地面行車道  
PROPOSED AT-GRADE ROAD
- 擬建隔音屏障  
PROPOSED NOISE BARRIER
- 擬建高架行車道  
PROPOSED VIADUCT
- 現有深圳河  
EXISTING SHENZHEN RIVER
- 委託予深方進行設計的橋段  
BRIDGE STRUCTURE ENTRUSTED  
TO SHENZHEN FOR DESIGN
- 擬建邊界巡邏道路  
PROPOSED PERIMETER PATROL ROAD

drawing title 圖則名稱

擬建蓮塘/香園圍口岸工地平整及相關連接路  
PROPOSED SITE FORMATION FOR LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT  
AND ASSOCIATED CONNECTING ROAD

drawing no. 圖則編號  
BCP - 110

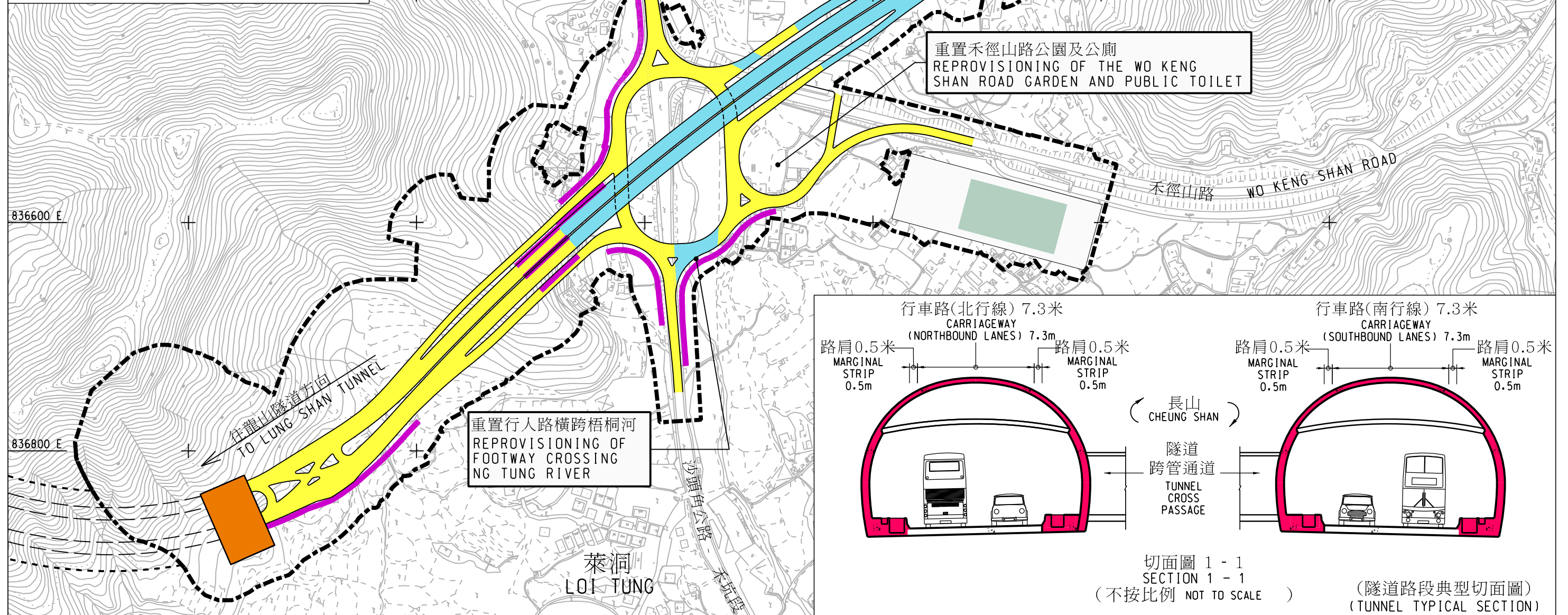
scale  
比例  
1 : 7 000

CEDD  
CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT  
HONG KONG



圖例LEGEND:

- 工程界線  
SITE BOUNDARY
- 擬建隔音屏障  
PROPOSED NOISE BARRIER
- 擬建地面行車道  
PROPOSED AT-GRADE ROAD
- 擬建高架行車道  
PROPOSED VIADUCT
- 擬建通風大樓  
PROPOSED VENTILATION BUILDING
- 擬建行政大樓  
PROPOSED ADMINISTRATION BUILDING



drawing title 圖則名稱

擬建沙頭角公路交匯處  
PROPOSED SHA TAU KOK ROAD INTERCHANGE

drawing no. 圖則編號

BCP - 111

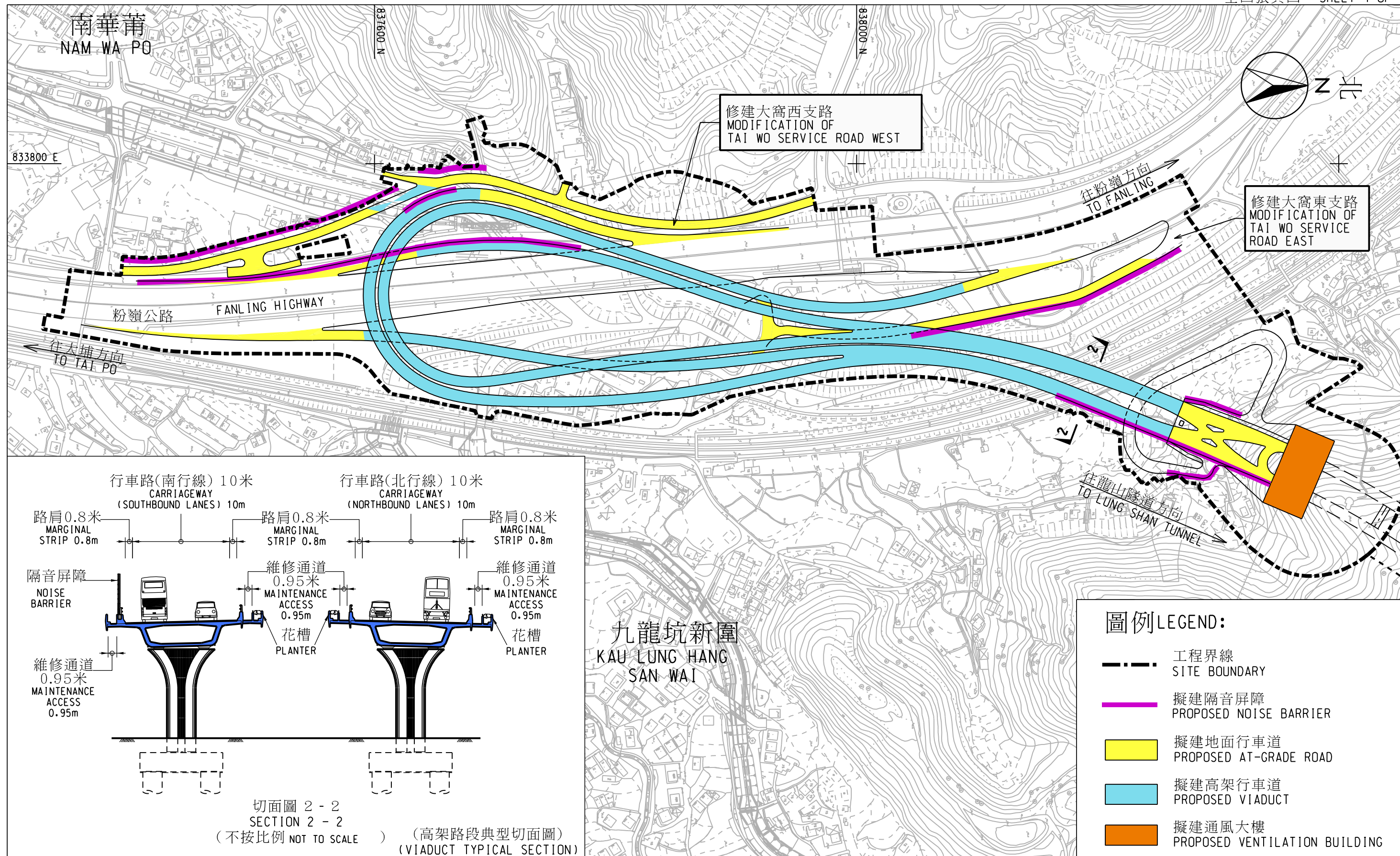
scale 比例

1 : 3 500



CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT  
HONG KONG





drawing title 圖則名稱

# 擬建粉嶺公路交匯處 PROPOSED FANLING HIGHWAY INTERCHANGE

drawing no. 圖則編號

BCP - 112

scale  
比例

1 : 3 000

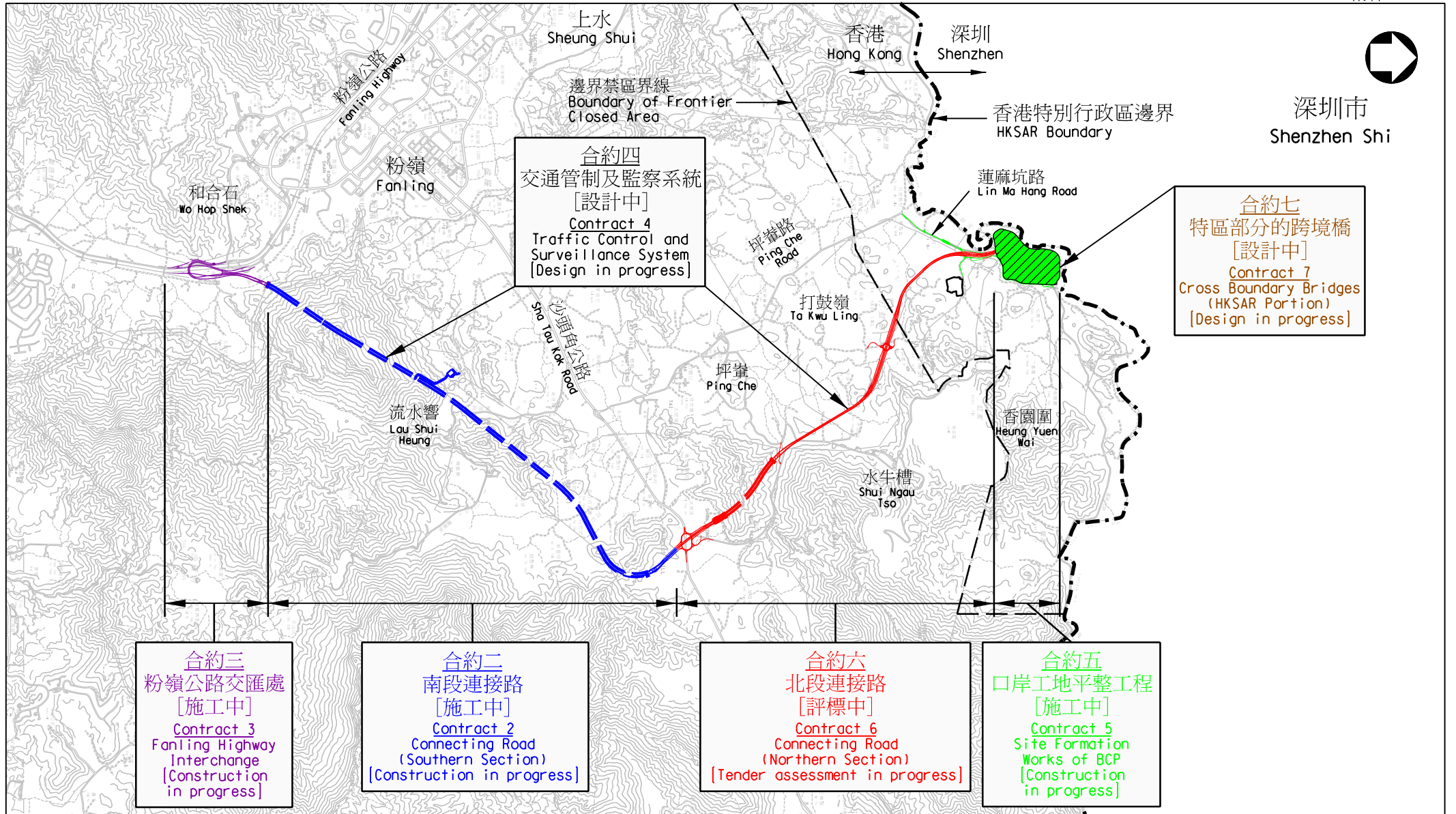


CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT  
HONG KONG





深圳市  
Shenzhen Shi



圖則名稱 drawing title

工務工程計劃項目第19GB號 — 蓮塘/香園圍口岸與相關工程 — 工地平整及基礎建設工程  
- 各工程合約現況

P.W.P. ITEM No. 19GB - LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS  
- SITE FORMATION AND INFRASTRUCTURE WORKS  
- PRESENT SITUATION OF WORKS CONTRACTS

圖號 drawing no.

BCP-124

比例 scale

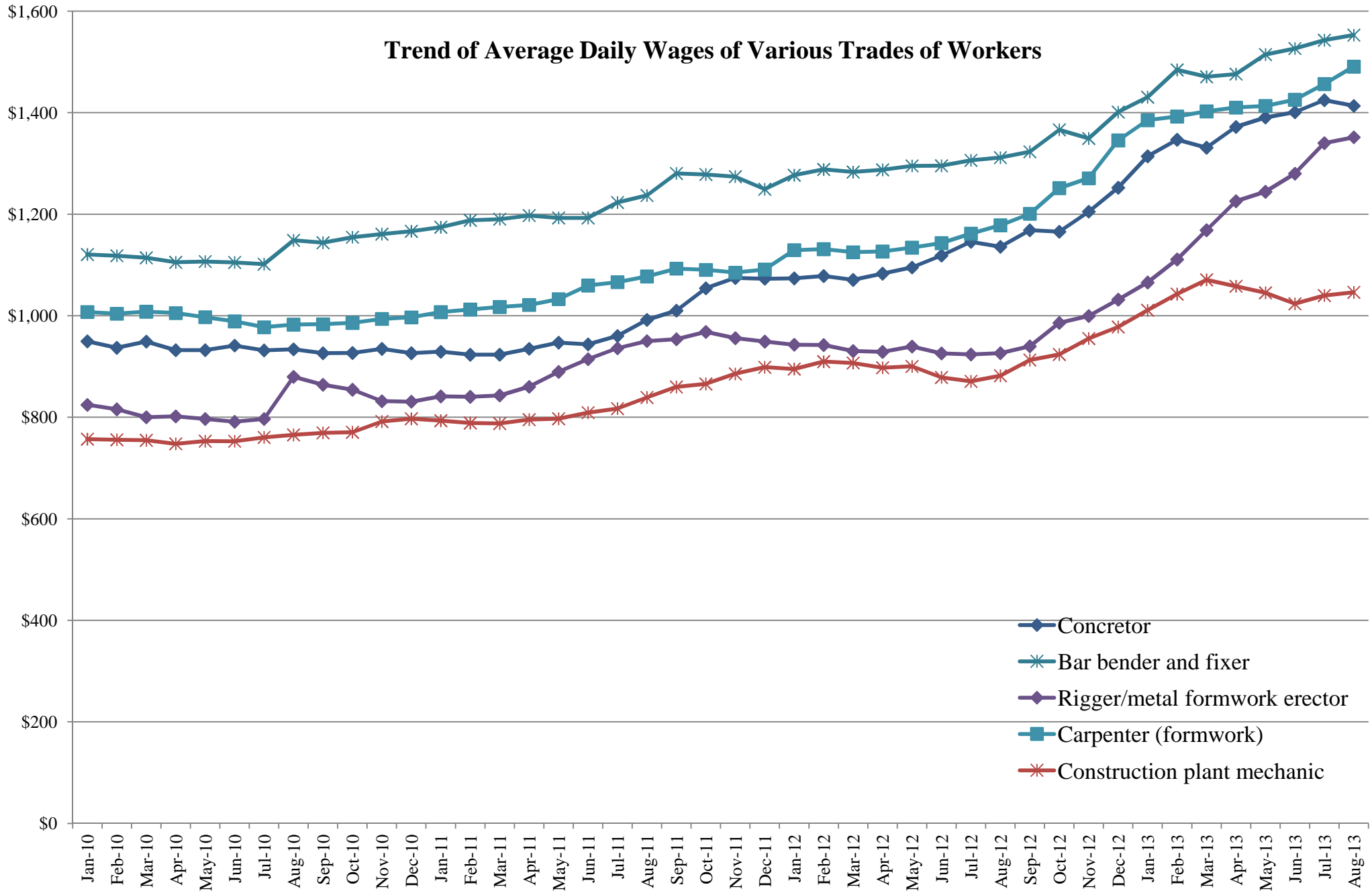
1:50 000

辦事處 office

土木工程處 口岸工程組  
BOUNDARY CONTROL POINT DIVISION



土木工程拓展署  
CIVIL ENGINEERING AND  
DEVELOPMENT DEPARTMENT



**Average Daily Wages of Various Trades of Workers**

| <b>Trade</b> |                                  | <b>8/2010<br/>(\$/day)</b> | <b>8/2011<br/>(\$/day)<br/>[%increase<br/>per year]</b> | <b>8/2012<br/>(\$/day)<br/>[%increase<br/>per year]</b> | <b>8/2013<br/>(\$/day)<br/>[%increase<br/>per year]</b> |
|--------------|----------------------------------|----------------------------|---|---|---|
| (a)          | Concretor                        | 934.0                      | 991.9<br>[6.2%]   | 1,136.0<br>[14.5%]                                      | 1,413.5<br>[24.4%]                                      |
| (b)          | Bar bender and fixer             | 1,148.6                    | 1,237.0<br>[7.7%]                                       | 1,311.5<br>[6.0%]                                       | 1,552.9<br>[18.4%]                                      |
| (c)          | Rigger/metal<br>formwork erector | 879.7                      | 950.2<br>[8.0%]   | 926.4<br>[-2.5%]  | 1,351.6<br>[45.9%]                                      |
| (d)          | Carpenter (formwork)             | 982.7                      | 1,077.4<br>[9.6%]                                       | 1,178.3<br>[9.4%]                                       | 1,490.7<br>[26.5%]                                      |
| (e)          | Construction plant<br>mechanic   | 765.4                      | 839.2<br>[9.6%]   | 881.9<br>[5.1%]   | 1,046.2<br>[18.6%]                                      |

**19GB – Liantang/Heung Yuen Wai Boundary Control Point and  
associated works – site formation and infrastructure works**

**Table 1 – Cash flow and provision for price adjustment in PWSC(2012-13)26**

| Year         | Original project estimate<br>(\$ million, in<br>September 2011<br>prices)<br>X | Original price adjustment factors<br>(March 2012)#<br>Y | Approved project estimate<br>(\$ million, in<br>MOD prices)<br>Z | Provision for price adjustment<br>(\$ million)<br>A = Z – X |
|--------------|--|---|--|---|
| 2012-2013    | 11.0   | 1.05325   | 11.6   | 0.6   |
| 2013-2014    | 525.9  | 1.11118   | 584.4  | 58.5  |
| 2014-2015    | 2,410.0  | 1.17229   | 2,825.2  | 415.2   |
| 2015-2016    | 2,578.0  | 1.23677   | 3,188.4  | 610.4   |
| 2016-2017    | 2,450.0  | 1.30479   | 3,196.7  | 746.7   |
| 2017-2018    | 1,973.0  | 1.37656   | 2,716.0  | 743.0   |
| 2018-2019    | 1,400.0  | 1.45227   | 2,033.2  | 633.2   |
| 2019-2020    | 650.0  | 1.53214   | 995.9  | 345.9   |
| 2020-2021    | 434.2  | 1.61641   | 701.8  | 267.6   |
| <b>Total</b> | <b>12,432.1</b>  |   | <b>16,253.2</b>  | <b>3,821.1</b>  |

**Table 2 – Latest cash flow and provision for price adjustment due to latest project estimate (PE) and latest adjustment factors**

| Year             | Latest PE<br>(\$ million, in<br>September 2011<br>prices)<br>a | Latest PE<br>(\$ million, in<br>September 2014<br>prices)<br>b<br>^^ | Latest price adjustment factors<br>(October 2014)##<br>c | Latest PE<br>(\$ million, in MOD prices)<br>d | Latest provision for price adjustment<br>(\$ million)<br>e | Net increase in provision for price adjustment<br>(\$ million)<br>f |
|------------------|--|--|--|---|--|---|
| Up to March 2014 | 503.9^   | 597.7^   | 1.00000  | 597.7^  | e = d – a  | f = e - A   |
| 2014-2015        | 1,270.0  | 1,506.5  | 1.00000  | 1,506.5                                       |  |   |
| 2015-2016        | 2,091.6  | 2,481.0  | 1.06000  | 2,629.9                                       |  |   |
| 2016-2017        | 3,828.4  | 4,541.2  | 1.12360  | 5,102.5                                       |  |   |
| 2017-2018        | 4,188.8  | 4,968.7  | 1.19102  | 5,917.8                                       |  |   |
| 2018-2019        | 3,030.2  | 3,594.4  | 1.26248  | 4,537.9                                       |  |   |
| 2019-2020        | 1,822.3  | 2,161.6  | 1.32876  | 2,872.2                                       |  |   |
| 2020-2021        | 1,092.8  | 1,296.3  | 1.39519  | 1,808.6                                       |  |   |
| <b>Total</b>     | <b>17,828.0</b>  | <b>21,147.4</b>  |  | <b>24,973.1</b>                               | <b>7,145.1</b>   | <b>3,324.0</b>  |

Notes:

- # Price adjustment factors adopted in March 2012 were based on the projected movement of prices for public sector building and construction output at that time, which were assumed to increase by 5.5% per annum from 2012 onwards.

- ## Price adjustment factors adopted in October 2014 are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 6.0% per annum from 2014 to 2018 and 5.0% per annum from 2019 to 2021.
- ^ \$503.9 million was the actual expenditure excluding price adjustment up to March 2014; whereas \$597.7 million was the actual expenditure including price adjustment.
- ^^ The latest project estimate (in September 2011 prices) is multiplied by 1.18620 for conversion to September 2014 prices. The figure of 1.18620 represents the changes in price movement for public sector building and construction output between September 2011 and September 2014.

**19GB – Liantang/Heung Yuen Wai Boundary Control Point and  
associated works – site formation and infrastructure works**

**Comparison between Approved Project Estimate and  
the Latest Project Estimate**

|  | <b>(A)<br/>Approved Project<br/>Estimate<br/>(\$ million)</b> | <b>(B)<br/>Latest Project<br/>Estimate<br/>(\$ million)</b> | <b>(B) – (A)<br/>Difference<br/>(\$ million)</b> |
|--|---|---|--|
| (a) Site formation and construction of perimeter patrol road with associated fencing and pedestrian subway linking the BCP to Lin Ma Hang Road | 217.9   | 245.6   | 27.7   |
| (b) Dual two-lane connecting road  | 9,282.5   | 14,203.3  | 4,920.8  |
| (i) about 1 km at-grade road   | 756.5   | 832.1   | 75.6   |
| (ii) about 4.3km viaduct   | 2,828.2   | 3,886.6   | 1,058.4  |
| (iii) about 5.7km tunnel   | 3,935.1   | 6,345.9   | 2,410.8  |
| (iv) at-grade roadworks of four interchanges   | 100.3   | 132.6   | 32.3   |
| (v) administration buildings for tunnel  | 332.5   | 430.2   | 97.7   |
| (vi) ventilation adit and buildings for tunnel   | 622.5   | 1,177.5   | 555.0  |
| (vii) traffic control and surveillance system  | 226.6   | 351.2   | 124.6  |
| (viii) electrical and mechanical (E&M) works   | 480.8   | 1,047.2   | 566.4  |
| (c) Diversion/modifications at existing local roads  | 110.6   | 131.1   | 20.5   |
| (d) Sewage collection, treatment and disposal  | 208.5   | 112.8   | (95.7)   |
| (e) Reprovisioning of affected government facilities   | 48.6  | 66.7  | 18.1   |
| (f) Design and construction of cross boundary bridges (HKSAR portion)  | 268.0   | 361.8   | 93.8   |
| (g) Provision of resite area(s) and ancillary works  | 98.0  | 134.3   | 36.3   |

|  | (A)<br>Approved Project<br>Estimate<br>(\$ million) | (B)<br>Latest Project<br>Estimate<br>(\$ million) | (B) – (A)<br>Difference<br>(\$ million) |
|--|---|---|---|
| (h) Additional energy conservation measures                                      | 20.0  | 22.0  | 2.0                                     |
| (i) Environmental mitigation measures and EM&A programme                         | 150.8   | 187.9   | 37.1                                    |
| (j) Consultants' fees <sup>1</sup> for   | 77.0  | 80.3  | 3.3                                     |
| (i) contract administration  | 40.3  | 42.3  | 2.0                                     |
| (ii) management of resident site staff   | 31.7  | 33.0  | 1.3                                     |
| (iii) independent environmental checker service                                  | 5.0   | 5.0   | 0.0                                     |
| (k) Remuneration of resident site staff  | 792.5   | 799.0   | 6.5                                     |
| (l) On-cost payable to Shenzhen Municipal Government (SZMG)                      | 11.0  | 1.2   | (9.8)                                   |
| (m) Electrical and Mechanical Services Trading Fund (EMSTF) charges <sup>2</sup> | 16.7  | 16.7  | 0.0                                     |
| (n) Contingencies  | 1,130.0   | 1,465.3   | 335.3                                   |
| Sub-total  | 12,432.1<br>(in September 2011 prices)              | 17,828.0<br>(in September 2011 prices)            | 5,395.9                                 |
| (o) Provision for price adjustment   | 3,821.1   | 7,145.1   | 3,324.0                                 |
| Total  | 16,253.2<br>(in MOD prices)                         | 24,973.1<br>(in MOD prices)                       | 8,719.9                                 |

<sup>1</sup> Excluding consultants' fees for the design and construction of the cross boundary bridges (HKSAR portion) (item (f) of paragraph 16 in PWSC(2012-13)26). Please also refer to paragraph 11 of this Enclosure.

<sup>2</sup> Since the establishment on 1 August 1996 under the Trading Fund Ordinance, the EMSTF charges government departments for design and technical consultancy services provided by the Electrical and Mechanical Services Department. 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 impact on the project.

2. As regards **items 1(b)(i) and 1(b)(iv) (at-grade road and at-grade roadworks of four interchanges of dual two-lane connecting road)**, the increase of \$107.9 million is mainly due to a higher risk premium associated with construction constraints.

3. As regards **item 1(b)(ii) (viaduct of dual two-lane connecting road)**, the increase of \$1,058.4 million is mainly due to recent surge in construction prices and a higher risk premium associated with construction constraints.

4. As regards **items 1(b)(iii), 1(b)(v) and 1(b)(vi) (tunnel, administration buildings, ventilation adit and buildings for tunnel of dual two-lane connecting road)**, the increase of \$3,063.5 million is mainly due to recent surge in construction prices, poor ground condition for tunnelling works and a higher risk premium associated with construction constraints.

5. As regards **item 1(b)(vii) (traffic control and surveillance system of dual two-lane connecting road)**, the increase of \$124.6 million is mainly due to recent surge in construction prices.

6. As regards **item 1(b)(viii) (E&M works of dual two-lane connecting road)**, the increase of \$566.4 million is mainly due to recent surge in construction prices and a higher risk premium associated with construction constraints.

7. As regards **items 1(a), 1(c), 1(d), 1(e) and 1(g) (site formation, perimeter patrol road, subway, diversion/modifications at existing local roads, sewage collection, treatment and disposal, reprovisioning of affected government facilities and provision of resite area(s) and ancillary works)**, the net increase of \$6.9 million is mainly due to a higher risk premium associated with construction constraints.

8. As regards **item 1(f) (cross boundary bridges (HKSAR portion))**, the increase of \$93.8 million is mainly due to recent surge in construction prices.

9. As regards **item 1(h) (additional energy conservation measures)**, the increase of \$2.0 million is mainly due to recent surge in construction prices.



10. As regards **item 1(i) (environmental mitigation measures and EM&A programme)**, the increase of \$37.1 million is mainly due to a higher risk premium associated with construction constraints.

11. As regards **item 1(j)(i), 1(j)(ii), 1(k) and 1(l) (consultants' fees for contract administration and management of resident site staff, remuneration of resident site staff, and on-cost payable to SZMG)**, we agreed with SZMG in June 2013 that each side will construct the portion of the cross boundary bridges within its own territory. As such, there is no entrustment of the construction of the cross boundary bridges (HKSAR portion) to SZMG. The on-cost payable to SZMG is reduced by \$9.8 million. The consultants' fees and remuneration of resident site staff are correspondingly increased by \$9.8 million.

12. As regards **item 1(n) (contingencies)**, the increase of \$335.3 million is due to the increased estimate of the works items mentioned in paragraphs 2 to 10 above, to cater for possible additional costs due to remeasurement, variations of works and possible claims in the construction and finalization stages of the Project.

13. As regards **item 1(o) (provision for price adjustment)**, the increase of \$3,324.0 million is due to the increased estimate of the works items mentioned in paragraphs 2 to 10 and contingencies in paragraph 12 above, the latest cash flow and the increase of the latest price adjustment factors.