**For discussion** **PWSC(2018-19)11**
**on 9 May 2018**

# ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

**HEAD 707 – NEW TOWNS AND URBAN AREA DEVELOPMENT**
**Transport – Roads**
**822TH – Cross Bay Link, Tseung Kwan O – construction**

Members are invited to recommend to the Finance Committee the upgrading of **822TH** to Category A at an estimate cost of $5,625.7 million in money-of-the-day prices for the construction of Cross Bay Link, Tseung Kwan O and associated works.

## PROBLEM

With the further increase in population in Tseung Kwan O (TKO), traffic congestion is anticipated within the TKO town centre and along Wan Po Road during peak hours. We need to construct Cross Bay Link, Tseung Kwan O to relieve the traffic congestion within the TKO town centre and along Wan Po Road.

## PROPOSAL

2. The Director of Civil Engineering and Development proposes, with the support of the Secretary for Transport and Housing, to upgrade **822TH** to Category A at an estimated cost of $5,625.7 million in money-of-the-day (MOD) prices for the construction of Cross Bay Link, Tseung Kwan O (CBL) and associated works.

**/PROJECT** …..

## PROJECT SCOPE AND NATURE

3. The proposed scope of works under the project comprises –

(a) construction of an about 1.8 kilometres long dual two-lane carriageway with cycle track and footpath, including an about 1.0-kilometre long marine viaduct[1] across Junk Bay and an about 0.8-kilometre long Road D9, connecting Tseung Kwan O – Lam Tin Tunnel (TKO – LTT)[2] (currently under construction) and Wan Po Road in Area 86 of TKO;

(b) construction of an about 210-metre long cycle track and footpath in Area 86 connecting Road D9, with ancillary lift and staircase;

(c) associated traffic control and surveillance system, drainage, waterworks, marine, landscaping, electrical and mechanical works; and

(d) implementation of ancillary works, including environmental mitigation measures, and implementation of an environmental monitoring and audit (EM&A) programme for the works mentioned in (a) to (c) above.

The location plan, layout plan and photomontage of the project are at Enclosure 1.

4. Subject to the funding approval of the Finance Committee (FC) in this legislative year, we plan to commence the construction works in the second half of 2018 for completion in around 2022. To meet the construction programme, the Civil Engineering and Development Department (CEDD) has initiated parallel tendering for one of the works contracts for the proposed works in December 2017 and for another contract in April 2018 with a view to starting the construction works as soon as possible, but the works contracts will only be awarded upon obtaining funding approval from FC.

**/JUSTIFICATION …..**

---

[1] Including a 200-metre long arch bridge.

[2] TKO – LTT is a dual two-lane carriageway of about 3.8 kilometres long connecting Po Shun Road in TKO, Eastern Harbour Crossing and Cha Kwo Ling Road in Kwun Tong. About 2.2 kilometres of the carriageway is in the form of tunnel. Construction works commenced in 2016 for anticipated completion in 2021.

**JUSTIFICATION**

5. TKO is one of the latest generations of new town developments in Hong Kong and currently accommodates a population of about 400 000. With the further population intake at TKO town centre south and south-eastern part of TKO, i.e. Area 86, traffic demand will grow accordingly.

6. To relieve the traffic congestion at TKO Tunnel which is the only main road connection between TKO and Kowloon East, we are constructing TKO – LTT for completion in 2021. However, with the further increase in population, even with TKO – LTT in place, traffic congestion is anticipated within TKO town centre and along Wan Po Road during peak hours.

7. At present, Wan Po Road is the only road linking the south-eastern part of TKO to other areas. The project will provide an alternative access route to the south-eastern part of TKO, thereby enhancing the road network of the area. Upon completion of the project, traffic from the south-eastern part of TKO can commute to and from the western part of TKO via CBL, or commute to and from Kowloon East via TKO – LTT currently under construction, without travelling through Wan Po Road and TKO town centre. Hence, the traffic load to these roads during peak hours could be relieved, and thereby minimising the traffic and environmental impacts on residents in the vicinity.

8. According to the traffic impact assessment completed at the detailed design stage in 2015, upon completion of the project in around 2022, it is anticipated that the critical road junctions at TKO town centre and along Wan Po Road (location of the relevant critical road junctions shown in Enclosure 1) will be improved as follows –

/**Major** …..

| Major Signal-controlled Junction | Reserve Capacity[3] | | | |
|---|---|---|---|---|
| | Without the Project | | With the Project Completed | |
| | Morning peak hour | Afternoon peak hour | Morning peak hour | Afternoon peak hour |
| Po Yap Road/Tong Chun Street | -49% | -41% | 35% | 42% |
| Po Yap Road/Chui Ling Road/ Po Shun Road | -29% | -18% | 37% | 45% |
| Wan Po Road/Shek Kok Road | -4% | 5% | >50% | >50% |
| Wan Po Road/Pak Shing Kok Road | 17% | -3% | >50% | >50% |

| Major Roundabout | Design Flow to Capacity Ratio[4] | | | |
|---|---|---|---|---|
| | Without the Project | | With the Project Completed | |
| | Morning peak hour | Afternoon peak hour | Morning peak hour | Afternoon peak hour |
| Wan Po Road/ Chiu Shun Road/ Po Yap Road | 1.07 | 0.96 | 0.68 | 0.50 |

**/FINANCIAL …..**

[3] The performance of a signal-controlled junction is indicated by its reserve capacity. A positive reserve capacity indicates that the junction is operating with spare capacity, a reserve capacity >50% indicates that the junction has sufficient capacity, rendering smooth traffic flow conditions. A negative reserve capacity indicates that junction is overloaded, resulting in traffic queue and longer travel time.

[4] The traffic condition of a roundabout is indicated by its "design flow to capacity" ratio. A ratio equals to or less than 1.0 indicates that the traffic condition is acceptable. A ratio above 1.0 indicates that the roundabout is overloaded, resulting in traffic queue and longer travel time.

## FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be $5,625.7 million in MOD prices, broken down as follows –

| | | | **$ million (MOD)** |
|---|---|---|---|
| (a) | Bridge works | | 2,952.5 |
| (b) | Roadworks and drainage works | | 746.7 |
| (c) | Noise mitigation measures | | 544.4 |
| (d) | Electrical and mechanical facilities | | 253.9 |
| (e) | Traffic control and surveillance system | | 147.2 |
| (f) | Landscaping works | | 38.0 |
| (g) | Consultants' fees | | 53.1 |
| | (i) Contract administration | 14.6 | |
| | (ii) Environmental monitoring and audit | 9.7 | |
| | (iii) Management of resident site staff (RSS) | 28.8 | |
| (j) | Remuneration of RSS | | 424.7 |
| (k) | Contingencies | | 465.2 |
| | | Total | 5,625.7 |

A breakdown of the estimates for the consultants' fees and RSS costs by man-month is at Enclosure 2.

/10. …..

10. Subject to funding approval, we plan to phase the expenditure as follows –

| Year | $ million (MOD) |
|---|---|
| 2018 – 19 | 396.3 |
| 2019 – 20 | 613.0 |
| 2020 – 21 | 1,207.6 |
| 2021 – 22 | 1,517.1 |
| 2022 – 23 | 1,280.7 |
| 2023 – 24 | 574.0 |
| 2024 – 25 | 37.0 |
| | 5,625.7 |

11. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2018 to 2025. Subject to funding approval, we will deliver the works under New Engineering Contract (NEC)[5] form with provision for price adjustment in the contract.

12. We estimate the annual recurrent expenditure arising from the proposed works to be about $25.77 million.

## PUBLIC CONSULTATION

13. CEDD commenced the investigation and preliminary design study for the CBL in early 2009. Being an iconic marine viaduct across Junk Bay, CEDD carried out a 3-stage public engagement (PE) exercise, including a design idea invitation event, exhibitions and voting activity for the design proposals. Based on the result of the PE, the "Eternity Arch"(活力無限) option was adopted by CEDD as the most preferred design concept for the appearance of the marine viaduct of CBL for further technical analysis and detailed design. The Sai Kung District Council (SKDC) was supportive on the selection of preferred option when CEDD consulted the SKDC on 6 July 2010.

/14. …..

[5] NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaboration for risk management between contracting parties.

14. CEDD consulted the SKDC on the preliminary design of the project on 8 January 2013 and obtained its support. CEDD updated the SKDC about the latest design of the project on 7 November 2017 upon the substantial completion of the detailed design. The SKDC supported the project and urged for its early completion.

15. We gazetted the road scheme for the project under the Roads (Works, Use and Compensation) Ordinance (Cap. 370) on 10 and 16 May 2013. During the statutory period, 2 objections [6] related to the project were received. Subsequently, we gazetted the amendment scheme on 21 and 28 March 2014. During the statutory period, no objection was received.

16. The Transport and Housing Bureau submitted the scheme, the amendment scheme as well as the unresolved objections to the Chief Executive-in-Council for consideration. The Chief Executive-in-Council authorised the project without modification. The authorisation notice was gazetted on 21 and 28 November 2014.

17. We consulted the Legislative Council Panel on Transport on 23 February 2018. Members in general supported the project and urged for its early implementation.

## ENVIRONMENTAL IMPLICATIONS

18. The project is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an Environmental Permit (EP) is required for its construction and operation. The Director of Environmental Protection approved the EIA Report for the project on 11 July 2013, and issued the EP for the construction and operation of the project on 15 August 2013. With the implementation of the recommended mitigation measures, the approved EIA Report concludes that the project would not cause any adverse environmental impacts. The proposed mitigation measures mainly include installation of semi-enclosures and use of low noise road surfacing on the proposed Road D9.

/19……

[6] We gazetted the scheme of the project and that of the TKO–LTT project on the same dates. During the statutory period, we received 829 objections, of which two duplicated objections were cancelled as agreed by the objectors. Amongst the remaining 827 objections, two objections mainly concerned the project's road connection and environmental impact during construction. The remaining 825 objections were mainly related to the TKO–LTT project. CEDD explained to the objectors that the CBL would be connected to TKO–LTT and the project would be implemented in accordance with the requirements of the EIA Ordinance (Cap. 499) with relevant mitigation measures as stated in the EIA Report.

19. CEDD will incorporate requirements into relevant works contracts to require the contractors to implement the environmental mitigation measures, and EM&A programme recommended in the approved EIA Report. For short-term construction impacts, CEDD will implement mitigation measures such as adopting quiet powered mechanical equipment and temporary noise barriers, regular watering of the works sites and provision of wheel-washing facilities, use of temporary drains to discharge the surface run-off of sites, as well as setting up of community liaison groups. CEDD has included the cost for the provision of the necessary environmental mitigation measures, and the implementation of the EM&A programme in the project estimate.

20. At the planning and design stages, CEDD has considered adopting measures in the proposed works and construction sequence to reduce generation of construction waste where possible. In addition, CEDD will require the contractors to reuse inert construction waste (e.g. material excavated within site area for backfilling use) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities[7]. CEDD will encourage the contractors to maximise the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further reduce the generation of construction waste.

21. At the construction stage, CEDD will require the contractors to submit for approval a plan setting out the waste management measures, which will include appropriate measures to avoid and reduce inert construction waste, and to reuse and recycle such waste. CEDD will ensure that the day-to-day operations on site comply with the approved plan. CEDD will require the contractors to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. CEDD will control the disposal of inert construction waste and non-inert construction waste to public fill reception facilities and landfills respectively through a trip-ticket system.

/22……

[7] Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in public fill reception facilities requires a license issued by the Director of Civil Engineering and Development.

22. CEDD estimated that the project will generate in total about 134 000 tonnes of construction waste. Of these, about 61 000 tonnes (46%) of the inert construction waste will be reused on site and about 66 000 tonnes (49%) of inert construction waste will be delivered to public fill reception facilities for subsequent reuse. CEDD will dispose of the remaining non-inert construction waste in the amount of about 7 000 tonnes (5%) at landfills. The total cost for disposal of construction waste at public fill reception facilities and landfill sites is estimated to be about $6.1 million for the project (based on a unit charge rate of $71 per tonne for disposal at public fill reception facilities and $200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

23. In addition, CEDD estimated that the proposed works will generate about 6 120 $m^3$ of marine sediment and to be disposed of at designated site allocated by the Marine Fill Committee (MFC) or other disposal sites agreed by the MFC and the Environmental Protection Department.

## HERITAGE IMPLICATIONS

24. The project will not affect any heritage sites, i.e. all declared monuments, proposed monuments, graded historic sites and buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

## LAND ACQUISITION

25. The project does not require acquisition of private land.

## BACKGROUND INFORMATION

26. We upgraded **822TH** to Category B in April 2007.

27. On 9 January 2009, the FC approved the upgrading of part of **822TH** to Category A as **826TH** "Cross Bay Link, Tseung Kwan O – investigation and preliminary design" at an approved project estimate of $59.1 million in MOD prices for engaging consultants to undertake the preliminary design of the CBL and the associated site investigation works. The preliminary design and site investigation works were completed.

/28……

28. On 2 May 2014, the FC approved the upgrading of another part of **822TH** to Category A as **865TH** "Cross Bay Link, Tseung Kwan O – detailed design and site investigation" at an approved project estimate of $68.3 million in MOD prices for carrying out the detailed design and site investigation for the CBL and associated works. The detailed design and site investigation works have been substantially completed.

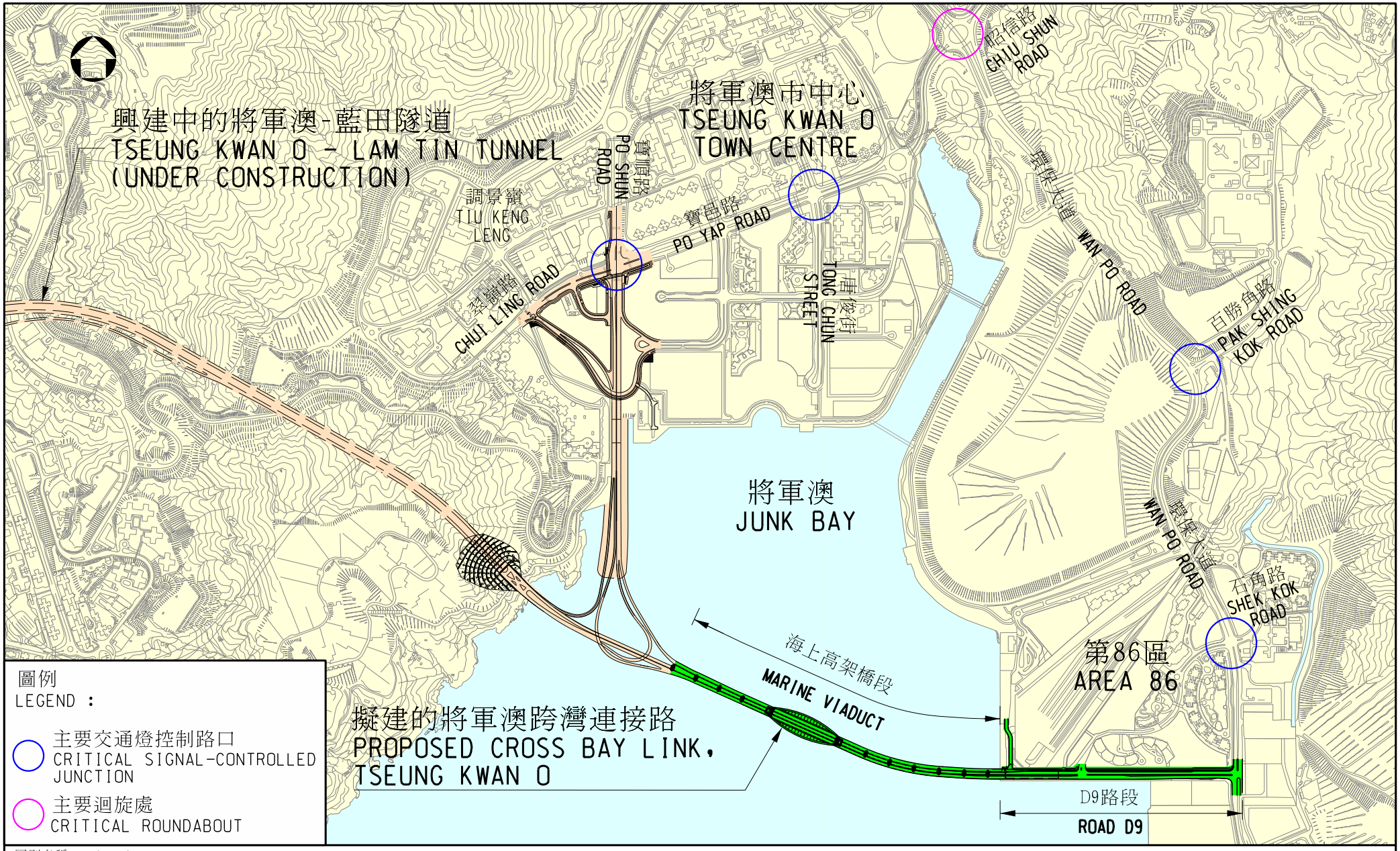
29. The proposed works will require removal of 445 trees, including 429 trees to be felled and 16 trees to be transplanted within the project boundary. All removed trees are not important tree[8]. CEDD will incorporate planting proposal as part of the project, including planting of 449 trees.

30. CEDD estimated that the proposed works will create about 1 450 jobs (1 170 for labourers and another 280 for professional or technical staff) providing a total employment of 62 300 man-months.

---

Transport and Housing Bureau
April 2018

[8] "Important trees" refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria:
(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument, and trees in memory of an important person or events;
(c) trees of precious or rare species;
(d) trees of outstanding forms (taking account of overall tree sizes, shapes and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitats; or
(e) trees with trunk diameter equal or exceeding 1.0m (measured at 1.3m above ground level), or with height or canopy spread of or exceeding 25m.




圖則名稱 drawing title

工務計劃第822TH號－將軍澳跨灣連接路－位置圖

PWP ITEM NO. 822TH - CROSS BAY LINK, TSEUNG KWAN O - LOCATION PLAN

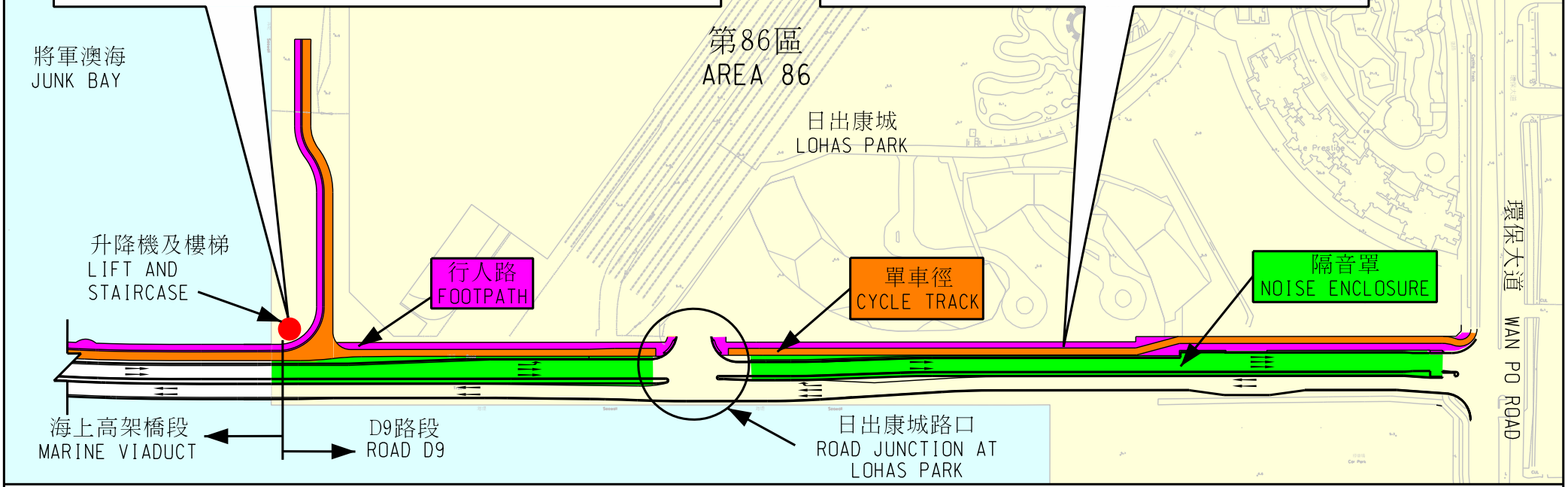
S:\Drawing\CDESAK\UNctrol_copy\CDESAKZ0085\CDESAKZ0085.dgn

A4 297MM X 210MM

附件一（4頁中的第1頁） ENCLOSURE 1 (SHEET 1 OF 4)

升降機及樓梯模擬照片
PHOTOMONTAGE OF LIFT AND STAIRCASE

行人路及單車徑模擬照片
PHOTOMONTAGE OF FOOTPATH & CYCLE TRACK




圖則名稱 drawing title

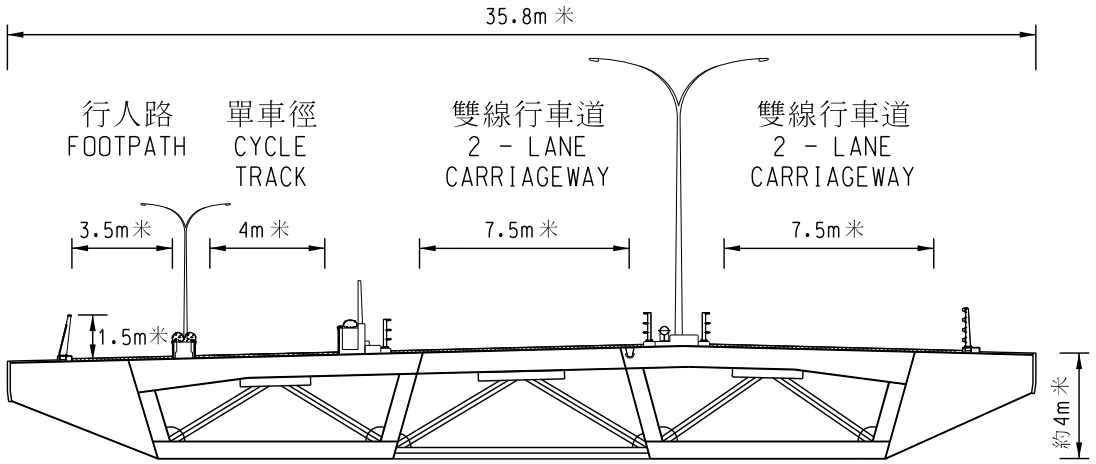
工務計劃第822TH號－將軍澳跨灣連接路－D9路段
PWP ITEM NO. 822TH - CROSS BAY LINK, TSEUNG KWAN O - ROAD D9

S:\Drawing\CDESAK\UNctrol_copy\CDESAKZ0087-0088\CDESAKZ0088.dgn

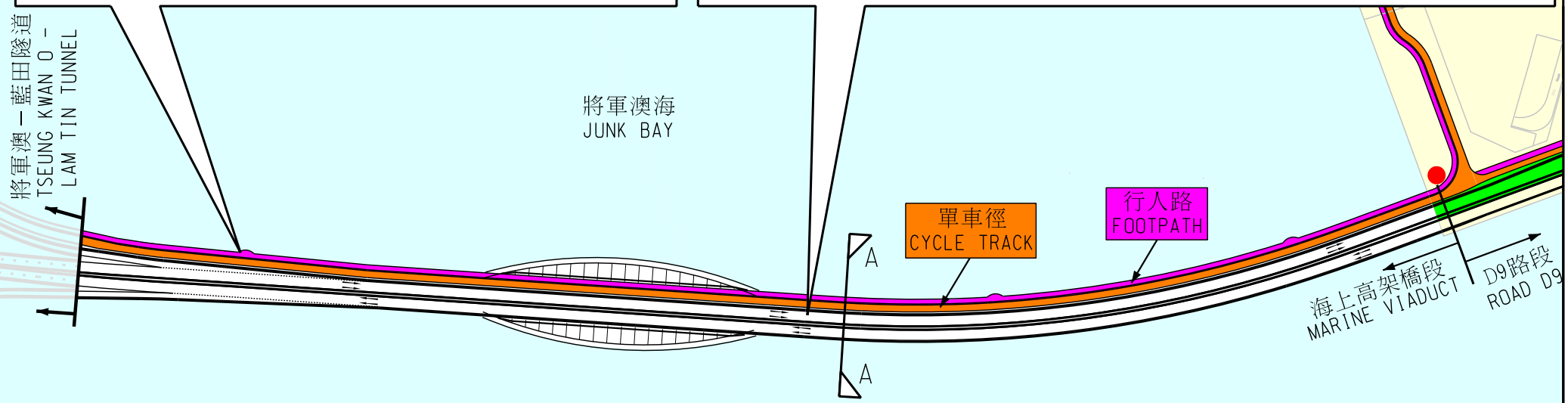
A4 297MM X 210MM

附件一（4頁中的第2頁） ENCLOSURE 1(SHEET 2 OF 4)

行人路及單車徑模擬照片
PHOTOMONTAGE AT CYCLE TRACK AND FOOTPATH



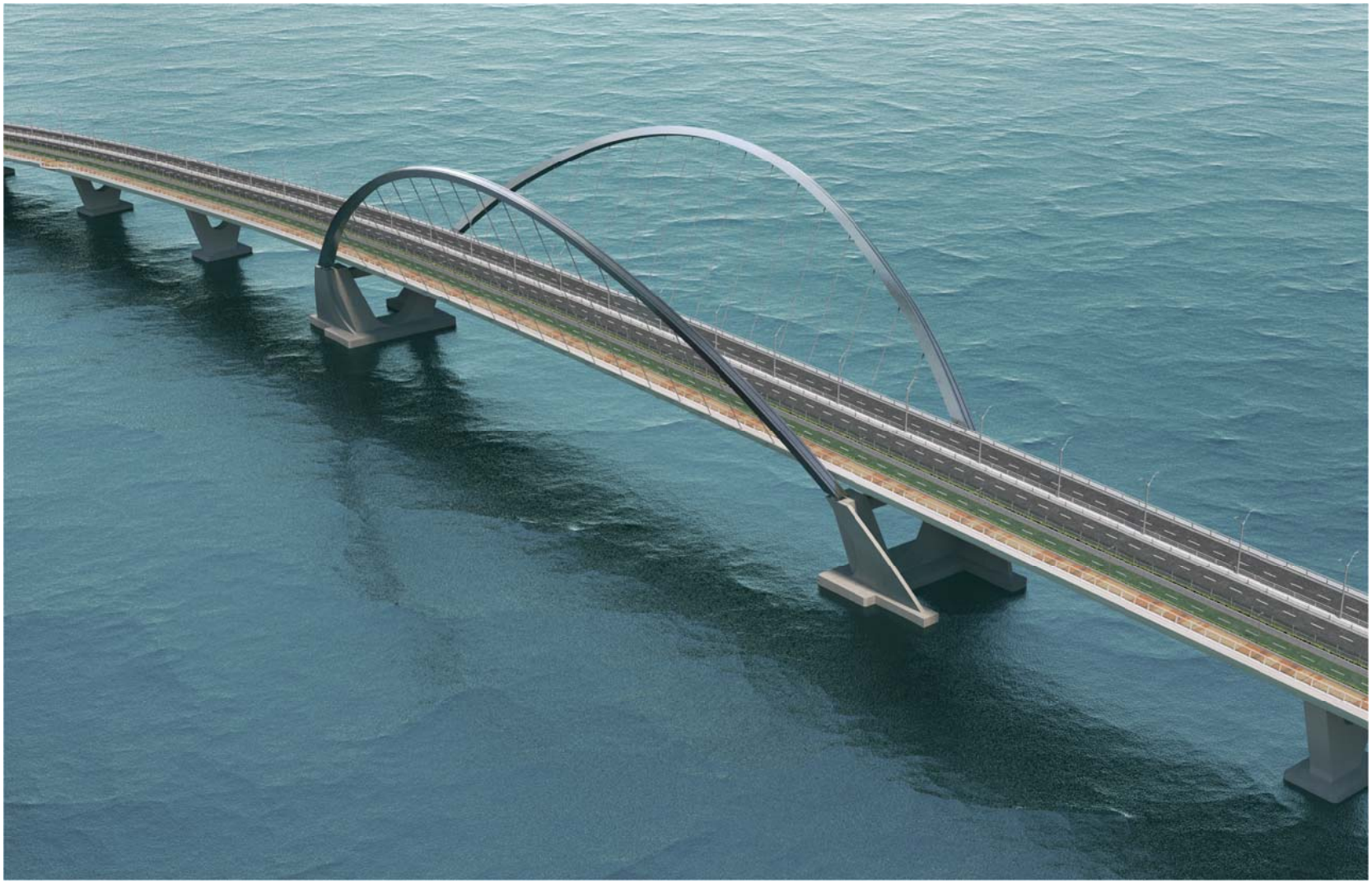

拱橋橫切圖 A-A
CROSS SECTION A-A OF ARCH BRIDGE




圖則名稱 drawing title

# 工務計劃第822TH號－將軍澳跨灣連接路－海上高架橋段
# PWP ITEM NO. 822TH - CROSS BAY LINK, TSEUNG KWAN O - MARINE VIADUCT

附件一（4頁中的第3頁） ENCLOSURE 1 (SHEET 3 OF 4)



圖則名稱 drawing title

工務計劃第822TH號－將軍澳跨灣連接路－拱橋模擬照片
PWP ITEM NO. 822TH - CROSS BAY LINK, TSEUNG KWAN O - PHOTOMONTAGE OF ARCH BRIDGE

## 822TH – Cross Bay Link, Tseung Kwan O – construction

## Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2017 prices)

| | | | Estimated man-months | Average MPS* salary point | Multiplier (Note 1) | Estimated fees ($million) | |
|---|---|---|---|---|---|---|---|
| (a) | Consultants' fees for | | | | | | |
| | (i) contract administration (Note 2) | Professional | – | – | – | 10.7 | 12.0# |
| | | Technical | – | – | – | 1.3 | |
| | (ii) environmental monitoring and audit programme(Note 3) | Professional | 29 | 38 | 2.0 | 4.6 | 8.0# |
| | | Technical | 48 | 14 | 2.0 | 2.6 | |
| | (iii) independent environmental checker(Note 3) | Professional | 3 | 38 | 2.0 | 0.5 | |
| | | Technical | 5 | 14 | 2.0 | 0.3 | |
| | | | | | Sub-total | 20.0 | |
| (b) | Resident site staff (RSS) costs (Note 4) | Professional | 1 640 | 38 | 1.6 | 206.7 | |
| | | Technical | 3 797 | 14 | 1.6 | 167.0 | |
| | | | | | Sub-total | 373.7 | |
| | Comprising – | | | | | | |
| | (i) consultants' fees for management of RSS | | | | 23.7# | | |
| | (ii) remuneration of RSS | | | | 350.0# | | |
| | | | | | **Total** | **393.7** | |

* MPS = Master Pay Scale

### Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants. A multiplier of 2.0 is applied to the average MPS salary point to estimate the full staff cost for the staff employed in the consultants' offices (including the consultants' overheads and profit) (as at now, MPS salary point 38 = $78,775 per month and MPS salary point 14 = $27,485 per month).

2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for **822TH**. The construction phase of the assignment will only be executed subject to the Finance Committee's approval to upgrade **822TH** to Category A.

3. The actual man-months and actual costs will only be known after selection of the consultants.

4. The actual man-months and actual costs will only be known after completion of the construction works.

**Remarks**

The figures in this Enclosure are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 9 of the main paper.