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ACE-EIA Paper 4/2013
For advice on 27 May 2013

Environmental Impact Assessment Ordinance (Cap. 499)
Environmental Assessment Report
Tseung Kwan O – Lam Tin Tunnel and Associated Works

PURPOSE

This paper presents the key findings and recommendations of the Environmental Impact Assessment (EIA) report for the proposed "Tseung Kwan O – Lam Tin Tunnel and Associated Works" (TKO-LT Tunnel) (hereafter known as 'the Project') submitted under section 6(2) of the Environmental Impact Assessment Ordinance (EIAO) (Application No. EIA-210/2013). Civil Engineering and Development Department (CEDD) (the applicant) and their consultants will present the report at the meeting of the EIA Subcommittee, if necessary.

ADVICE SOUGHT

2. Members' views are sought on the findings and recommendations of the EIA report. The Director of Environmental Protection (DEP) will take into account comments from the public and the Advisory Council on the Environment (ACE) in deciding whether or not to approve the EIA report under Section 8(3) of the EIAO.

BACKGROUND

3. Tseung Kwan O – Lam Tin Tunnel (TKO-LT Tunnel) is a dual two-lane highway approximately 4.8 km long with 2.6 km in the form of tunnel, connecting

TKO at Po Shun Road in the east and Trunk Road T2 in the west with the associated interchange (**Figure 1**).

4. The Project, together with the proposed Trunk Road T2 in Kai Tak Development (KTD) and Central Kowloon Route (CKR), will form Route 6 to provide an east-west express link between Kowloon and TKO areas. Upon completion, this strategic route will also provide the necessary relief to the existing heavily trafficked road network in the central and eastern Kowloon areas, thus reduce the related environmental impacts on these areas.

5. The applicant has submitted the EIA report for the proposed TKO-LT Tunnel and the DEP, in conjunction with the relevant authorities, considers that the EIA report meets the requirements of the EIA Study Brief and the Technical Memorandum on EIA Process (TM). Together with the EIA report for TKO-LT Tunnel, the EIA reports for Cross Bay Link (CBL) and CKR will also be considered by the EIA Subcommittee of ACE at this meeting.

NEED FOR THE PROJECT

6. At present, the existing TKO Tunnel is the main connection between TKO and the urban areas of Kowloon and Hong Kong. The tunnel has nearly reached its capacity and can hardly cater for the further development of TKO which is planned to house a total population of 450,000 besides the district's continued commercial and industrial developments. Therefore, a new external road network comprising the Project and CBL is recommended to meet the anticipated traffic flow.

7. According to traffic studies, the absence of the Project and CBL will result in serious congestion at the existing road network in Kowloon East and TKO due to the increasing population along with continued commercial and industrial developments in TKO. Without the Project, the future development of TKO New Town (e.g. TKO Town Centre South and TKO Industrial Estate) will be heavily constrained.

8. Traffic congestions have already occurred during peak hours at TKO Tunnel. The Legislative Council, Sai Kung District Council and the local community have been urging for early construction of the Project together with TKO-LT Tunnel such

that these new roads will provide the much needed additional transport capacity for development of TKO.

BENEFITS OF THE PROJECT

9. The completion of Route 6, which consists of the Project, Trunk Road T2 and Central Kowloon Route, provides an alternative east-west traffic route across Kowloon to cope with new developments and relieve the existing heavily trafficked road network in central and eastern Kowloon areas. With the traffic diversion, TKO Road will then have spare capacity to cope with the future developments in Kwun Tong District, including the proposed housing development at Anderson Road.

10. The implementation of the Project together with other components of the Route 6 and CBL will alleviate the traffic congestion and meet the long-term traffic demand of TKO area. In particular, the Project and CBL will divert heavy vehicles away from the TKO Tunnel – Wan Po Road route which cuts across the densely populated area of TKO. As a result, the nuisance of the heavy trucks will be diverted away from the city centre sensitive receivers.

11. With Route 6 and CBL in place, it is estimated that the journey time from the junction of Wan Po Road and Wan O Road to Gascoigne Road, Yau Ma Tei, will be reduced from about 35 minutes to 15 minutes. The queue length from the toll plaza will also be reduced from about 2.9 km to 0.05 km at the westbound of TKO Tunnel. The shortening of journey time and alleviation of traffic congestion will help reducing the generation of vehicle pollutants in the region.

DESCRIPTION OF THE PROJECT

12. The main features of the Project include:

a). a dual two-lane highway approximately 4.2 km long. About 2.6 km of the highway is in the form of tunnel;

b). slip roads, depressed roads, viaducts, TKO Interchange, ventilation buildings, tunnel portal facilities and about 3 ha reclamation on TKO side;

c). slip roads, branch tunnels, viaducts, Lam Tin Interchange, tunnel portal

facilities, ventilation and administration buildings on Kowloon side; and

d). the associated building, civil, structural, marine, electrical and mechanical, traffic control and surveillance system (TCSS), landscaping, and environmental protection mitigation works.

13. The Project is a DP under Item A.1, A.7, A.8, A.9, C.2(c) Part I of Schedule 2 of EIAO, extracted below for easy reference:

a). Item A.1 – "A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing roads."

b). Item A.7 – "A road or railway tunnel more than 800 m in length between portals."

c). Item A.8 – "A road or railway bridge more than 100 m in length between abutments."

d). Item A.9 – "A road fully enclosed by decking above and by structure on the sides for more than 100 m."

e). Item C.2(c) – "Reclamation works (including associated dredging works) more than 1 ha in size and a boundary of which is less than 100 m from an existing residential area."

CONSIDERATION OF ALTERNATIVE ALIGNMENTS AND OPTIONS

14. The EIA report has undergone a detailed evaluation of different alignments and structural forms at various road sections of the Project to avoid and minimize environmental impacts. Three stages of public consultation were carried out from 2009 to 2012 involving key stakeholders such as local representatives, professional institutions, community groups and conservation/ green groups in the formulation of the preferred option.

15. The selected alignment has taken into account traffic and land use planning constraints, sustainability, social impacts, environmental impacts in terms of air, noise, water, marine ecology, visual and landscape aspects and public perception.

The recommended option is regarded as the most appropriate and balanced scheme. Key environmental benefits arising from the alternative alignments and options are highlighted below.

Avoidance of Impacts

16. By shifting the tunnel portal to urbanized developed area with lower ecological value, the recommended option at Lam Tin Interchange will avoid the clearance of vegetation on the mature woodland located between the Kwong Tin Estate and Lei Yue Mun Road.

17. The TKO Interchange adopting Straight Tunnel without Toll Plaza Option will avoid direct impact and disturbance to the natural habitats (rocky shore and stream) along the coastline of Chiu Keng Wan where fish of conservation interest were recorded.

18. At Cha Kwo Ling Village (CKLV) Section, the recommended option has selected a Tunnel Option with alignment passing through the middle of the CKLV. As a result, the historic Tin Hau Temple will be preserved and clearance of CKLV can be avoided.

Minimization of Impacts

19. In addition to proper selection of alternative alignments and options to avoid environmental impacts, the following environmental/engineering designs have been considered to minimize environmental impacts:

(a) Sunken road system at the Lam Tin Interchange with extensive noise enclosures, decking, semi-enclosures and road side barriers will minimize noise and visual impacts to the nearby sensitive receivers.

(b) Straight tunnel alignment instead of S-curve tunnel alignment at the TKO section will minimize generation of C&D materials.

(c) Straight Tunnel without Toll Plaza Option at TKO Interchange has the smallest reclamation size among the options studied. The proposed reclamation extent is minimized from 12 ha to approximately 3 ha, which

greatly reduces water quality impact and disturbances to the seabed, the rocky shores and estuaries at Chiu Keng Wan.

(d) Road P2 at the eastern side of Ocean Shores has been designed as depressed road below ground and sea level with landscape deck to minimize visual and noise impacts to the nearby residential area.

(e) Least reclamation option will minimize loss of natural shoreline and cause the least effects on species of conservation interest, natural habitat and fish resources.

(f) Non-dredged reclamation method to be adopted for the reclamation at TKO in lieu of dredged method minimizes sediment generation.

SPECIFIC ENVIRONMENTAL ASPECTS TO HIGHLIGHT

Air Quality Impact

Construction Phase

20. For construction phase, potential air quality impacts would be mainly due to construction dust from excavation, materials handling, filling activities and wind erosion. With the recommended dust suppression measures including watering eight times a day, enclosing the unloading process at barging point and provision of water spraying and flexible dust curtains; and mitigation measures specified in the Air Pollution Control (Construction Dust) Regulation and Environmental Monitoring & Audit (EM&A) programme, the predicted dust impact on identified air sensitive receivers (ASRs) would comply with the Total Suspended Particulates (TSP) (1-hour, 24-hour and annual) criteria as stipulated in EIAO-TM and Air Quality Objectives (AQOs).

Operational Phase

21. The cumulative air quality impact assessment took into account the vehicle emission from open road sections, portal emissions, and ventilation buildings from the Project, Trunk Road T2 and Eastern Harbour Crossing and the effect of the recommended roadside noise barriers, semi-enclosures and landscape decks. The

result indicated that all the ASRs in the vicinity of the Project would comply with the prevailing AQOs for Nitrogen Dioxides (NO_2) (1 hr, 24 hr and annual) and Respirable Suspended Particulates (RSP) (24-hour and annual). While the Government is working with a view to having the proposed new AQOs to take effect in 2014, for the purpose of assessing the air quality impacts under the EIAO, consideration of the assessment criteria would be based on the AQOs prevailing at the time of the decision.

22. As for the predicted air pollutants concentrations inside the TKO-LT Tunnel, the proposed full enclosures and the landscape decks would comply with EPD's Tunnel Air Quality Guidelines.

Noise Impact

Construction Phase

23. The assessment examined the construction noise impacts of the Project at the Lam Tin side and TKO side, taking into account other concurrent projects. The predicted unmitigated noise levels would range from 54 to 87 dB(A) at the representative noise sensitive receivers (NSRs).

24. With implementation of quiet powered mechanical equipment, movable barriers, temporary barriers and all other possible mitigation measures, the construction noise levels at all representative NSRs would not exceed the construction noise standard, except for Kei Faat Primary School during examination periods. Despite the school would be exposed to a maximum predicted construction noise level of 70d(B)A, it has been noise insulated and provided with air conditioners. Particularly noisy construction activities would be scheduled to avoid examination periods of the school as far as practicable to further reduce the noise impact.

25. Ground-borne construction noise impacts were also found to comply with relevant criteria. No adverse ground-borne construction noise impact was predicted.

Operational Phase

26. The potential road traffic noise impacts have been assessed based on the worst case traffic flows in 2036. Without noise mitigation measures in place,

predicted traffic noise levels at the NSRs would range from 31 to 79 dB(A). Noise mitigation measures including noise barriers, semi-enclosures/full-enclosures/decking and low noise surfacing will be provided to tackle the traffic noise impacts. However, even with all direct noise mitigation measures in place, noise levels at 8 locations will still be above relevant criteria, because of contribution by existing roads not related to the Project. Nevertheless, after mitigation, the roads in the Project will have insignificant contribution to the overall noise level at these locations.

27. As traffic noise mitigation measures, the Lam Tin Interchange is designed as a sunken road system which is about 20m lower than the East Harbour Crossing Toll Plaza with extensive enclosures/decking, semi-enclosures and road-side barriers as shown in **Figure 2**, whereas the Road P2 at the eastern side of Ocean Shore in TKO has adopted a depressed road design with landscape deck. (**Figure 3**).

28. Operational noise impacts from fixed plant noise sources such as tunnel ventilation shafts and pumping stations can be effectively mitigated by implementing noise control treatment at source. Adverse residual operational noise impact is not anticipated.

Water Quality Impact

29. The elimination of the toll plaza diminishes the proposed reclamation extent from 12 ha to about 3 ha, which greatly reduces not only the water quality impacts but also disturbances to the seabed, the rocky shores and estuaries at Chiu Keng Wan.

Construction Phase

30. Environmental friendly construction methods including the use of steel cellular caissons which is similar to the method used for the Boundary Crossing Facilities of the HK-Zhuhai-Macau Bridge, will be adopted to separate the construction works from the sea. The use of cofferdam and silt curtain will also be employed for all the marine works to reduce water quality impact. After mitigation, there will be no unacceptable cumulative water quality impact due to the Project and other concurrent marine construction activities.

Operational Phase

31. Water quality modelling results indicated that there will be no significant change in the hydrodynamic and water quality regime and therefore no adverse hydrodynamic and water quality impacts are expected.

Terrestrial and Marine Ecological Impact

32. There are no Country Park, site of special scientific interest, Coastal Protection Area, Conservation Area and Marine Park within the study area. Potential direct impacts on ecological resources of conservation importance, e.g. natural coastline along Chiu Keng Wan and natural coral communities with moderate-high ecological value on western coast of Junk Bay, have been avoided or minimized in the alignment selection process.

33. The land-based construction works would cause a loss of approximately 3.8 ha of vegetated habitats with low or low to moderate ecological value. The flora and fauna recorded from these affected habitats are predominantly common and widespread in Hong Kong. Therefore, terrestrial ecological impact arising from the Project is considered to be low.

34. Reclamation and bridge piers would result in permanent loss of 3.6 ha of subtidal habitat and 19 ha of the same habitat would be lost temporarily due to marine construction works during the construction phase. To minimize the direct impact on sparse coverage (<1%) of coral community, coral translocation will be carried out as far as possible.

35. Potential indirect impact on nearby marine ecological resources due to change in water quality would be temporary and localized after the implementation of mitigation measures, e.g. the deployment of silt curtains around the active caissons installation points, opening of newly installed seawall and marine works area. After mitigation, there will be no unacceptable impact on marine ecology.

Fisheries Impact

36. The EIA confirmed no important spawning or nursery grounds in the vicinity of the proposed marine works area, while the nearest Fish Culture Zone at East Tung Lung Chau is located approximately 5 km from the works area.

37. The Project would cause about 3.6 ha permanent loss and 19 ha temporary loss of fishing area in inner Junk Bay due to the proposed reclamation and bridge construction. The importance of captured fisheries resources in the affected area is considered low in terms of both production weight and value. Fish fry production is not expected to be affected within Junk Bay and Victoria Harbour due to the proposed works. Therefore, the direct impact of the Project on fisheries resources will be low.

Landscape and Visual Impact

38. Rare or Endangered Species, Old and Valuable Trees and Important Trees are not identified within the anticipated footprint of the engineering alignment and works areas.

39. After mitigation, residual impacts to Landscape Resources at both TKO and Lam Tin at Year 10 of the operational phase would be insubstantial to moderate. Impacts will be gradually reduced when trees, shrubs and climber plantings progressively matured.

40. At both Lam Tin and TKO, the visual impact during the operational phase after mitigation will be insubstantial to moderate. All other existing or planned receivers e.g. at Hong Kong Island side will experience slight or insubstantial visual impact after mitigation.

41. It is considered that the residual landscape and visual impacts of the Project are acceptable with mitigation during construction and operational phases.

Other Environmental Impacts

42. Other impacts including waste management, cultural heritage and landfill gas hazard and hazard to life have been addressed in the EIA report. With the implementation of recommended mitigation measures, the Project will comply with the relevant requirements under the TM.

ENVIRONMENTAL MONITORING AND AUDIT

43. The EIA report includes an Environmental Monitoring and Audit (EM&A) Manual, which recommends an EM&A programme during the construction and operation stages of the Project to check the effectiveness of the recommended mitigation measures. Key recommended EM&A requirements include (i) landscape and visual mitigation measures; (ii) noise, air and water quality monitoring during construction phase; (iii) precautionary requirements against landfill gas hazards; (iv) reuse, recycle and disposal of construction waste and (v) road traffic noise monitoring after opening of the Project.

PUBLIC CONSULTATION

44. The applicant has made the EIA report, EM&A manual and Executive Summary available for public inspection under the EIAO from 3 April to 2 May 2013. During this inspection period, a total of 13 public comments were received by the Environmental Protection Department. The main concerns raised by the public will be summarised in a gist to be provided separately.

May 2013
Environmental Assessment Division
Environmental Protection Department

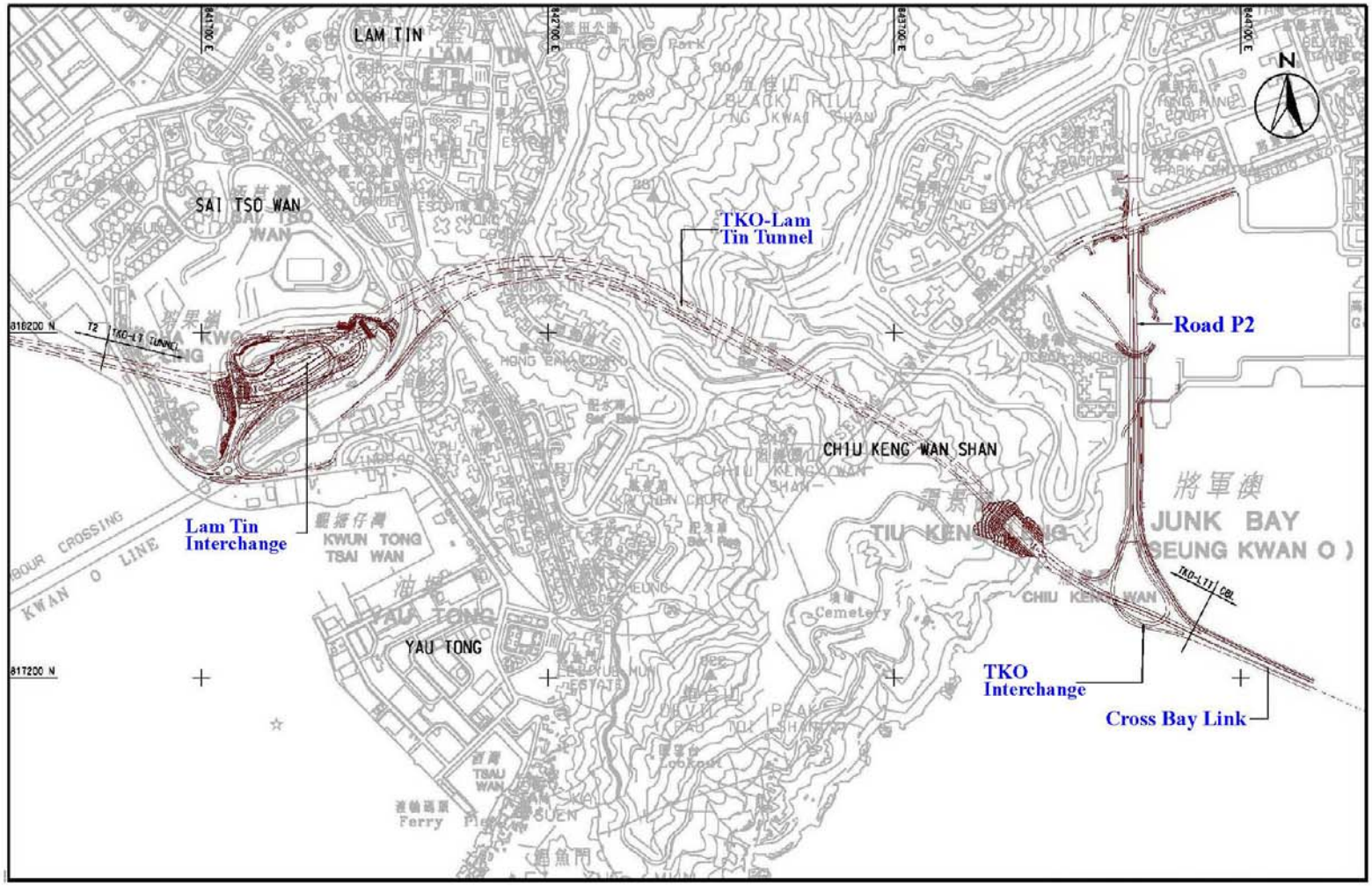

Figure 1: Project Layout Plan

Project Title: Tseung Kwan O – Lam Tin Tunnel and Associated Works

Note: This figure is extracted from the EIA Report

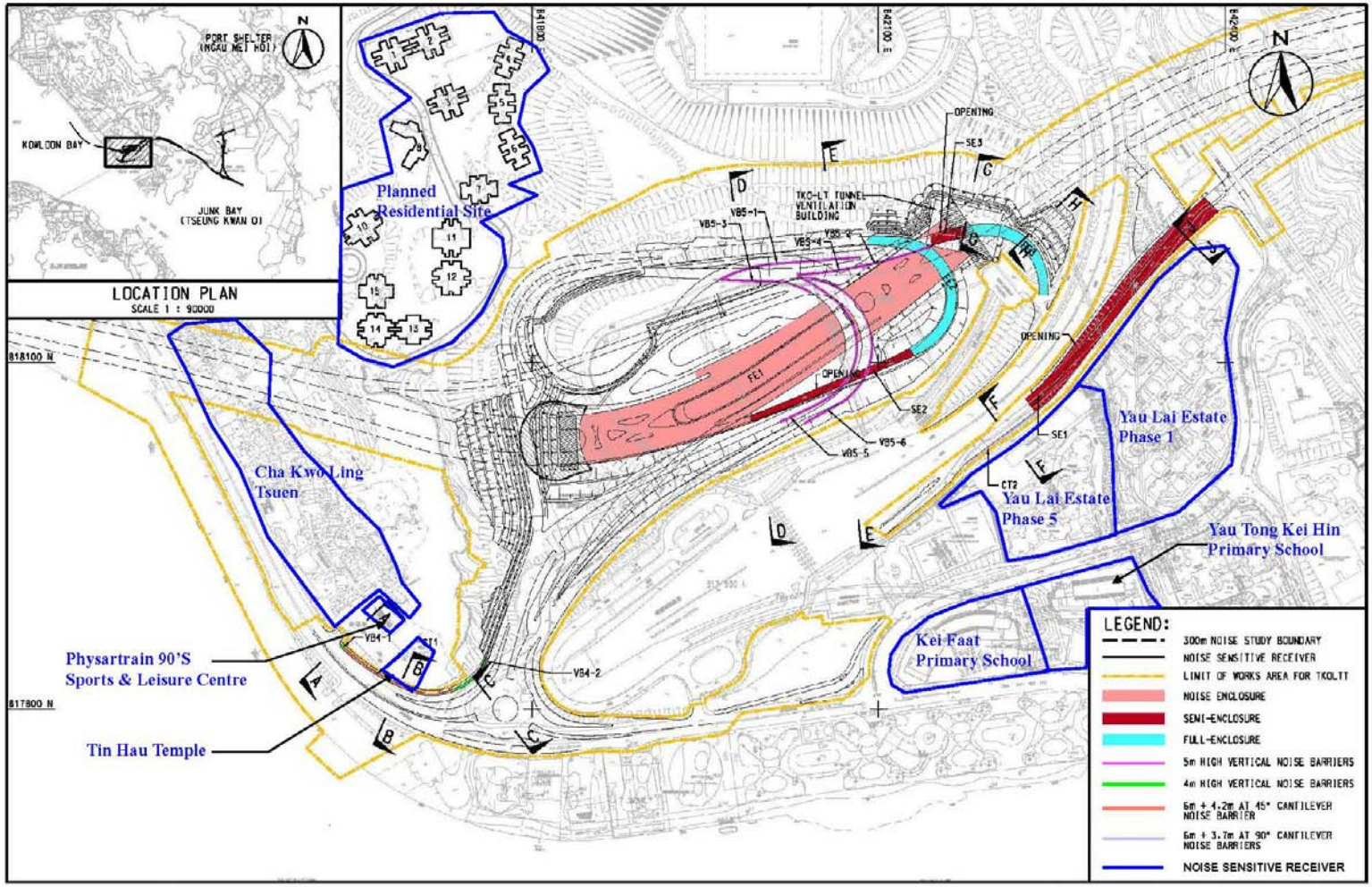

Figure 2: Noise Mitigation Measure at Lam Tin Interchange

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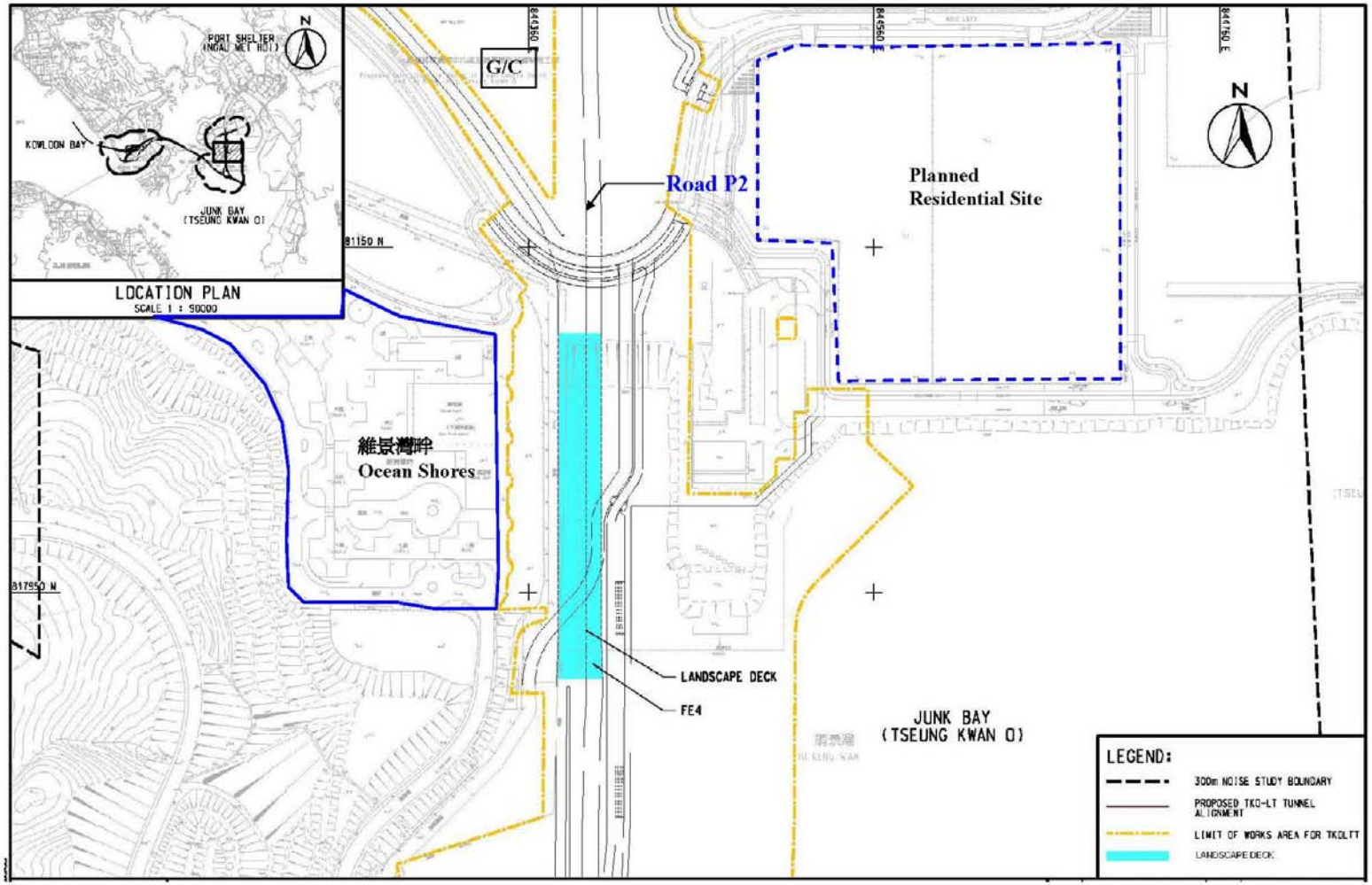

Figure 3: Noise Mitigation Measure at Road P2

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Note: This figure is extracted from the EIA Report