Annex D

EIA Reports on
(a) Central Kowloon Route (CKR)
(b) Cross Bay Link, Tseung Kwan O (CBL)
(c) Tseung Kwan O – Lam Tin Tunnel and Associated Works (TKO-LTT)

A summary of issues discussed by the Environmental Impact Assessment Subcommittee at the meeting on 27 May 2013

The Environmental Impact Assessment Subcommittee (EIASC) discussed the EIA reports on "Central Kowloon Route" (CKR), "Tseung Kwan O – Lam Tin Tunnel and Associated Works" (TKO-LTT) and "Cross Bay Link, Tseung Kwan O" (CBL) at its meeting on 27 May 2013. The issues discussed were summarized below.

CENTRAL KOWLOON ROUTE (CKR)
(Highways Department (HyD) as the project proponent)

Traffic speed assumptions

2. Questions were raised on the traffic speed assumed before and after the commissioning of the CKR project, which were taken the crucial parameters in validating the assessment findings. HyD advised that they had applied the EMFAC-HK model for conducting the air quality impact assessment. The model gave a quantitative assessment over 15 years from 2021 to 2036 to determine the worst-case scenario with the highest vehicle emissions from road networks within 500 m of the project boundary. Year 2021 was selected with the highest emissions, despite the common expectation that emissions in 2036 would be higher than 2021 in view of traffic growth and the resultant lower traffic speed. The EMFAC-HK model had reflected improvement in air quality, mainly as a result of implementation of the new Air Quality initiatives, e.g. phasing out aged diesel vehicles to reduce vehicle emissions, all the way through 2036.

3. There were also elaborations on the assessment on the speed issue in the key East-West corridors arising from the relieving effect of the CKR in 2021, including sections of Lung Cheung Road, Boundary Street and Prince Edward Road West etc.. The assessment on the Volume-to-Capacity Ratio (VC ratio) of less than 1 indicated that traffic speed in all the key East-West corridors increased when the CKR was in operation by 2021 with noticeable relief in traffic congestion. The VC ratio by 2036 was less impressive due to expected increase in traffic, but that would still be better as compared to 2021 without the CKR scenario.

4. Members were confirmed that the worst-case scenario had also been adopted in the noise impact assessment. Traffic noise was simulated based on the traffic forecast for 2036 when there was the highest traffic flow 15 years after commissioning

the CKR. The adopted speed in the noise model was the speed limit rather than the actual modeled speed.

Ground and groundwater movements

5. Members expressed concern on potential ground and groundwater movements relating to excavation works in the western portion of the CKR. As the CKR would run through a very old district, groundwater drawdown due to construction dewatering could have serious impact on the old buildings. Pre-grouting was therefore suggested to minimize the risk of water drawdown. HyD fully recognized the implications of groundwater level drawdown and had planned appropriate measures. For the cut-and-cover tunnel, the construction of deep excavation works would be in the form of diaphragm walls, which were founded on bedrock in order to minimize ground movement. As the walls would generally be impermeable, the walls would form a solid barrier that would effectively cut off groundwater seepage and hence mitigate the effects of ground movement due to groundwater dewatering. As a precaution measure, recharging wells would also be installed to restore the groundwater table if significant groundwater drawdown was observed. These diaphragm walls would form part of the permanent tunnel structure. Lateral support including cross walls would also be installed before commencing the excavation works as an additional measure to control ground movement due to bulk excavation. Since part of the tunnel would run through solid bedrock, significant ground improvement works would not be required to control groundwater level. In case of significant water inflow, excavation works would be stopped immediately and grouting be performed to control the inflow before resuming any excavation works. A comprehensive assessment had also been carried out on the impact of tunnel construction on adjacent buildings, with conservative design assumptions on the permeability of soil and hence the amount of dewatering required. Ground movement was found to be within the acceptable limits.

6. Regarding the use of the drill-and-blast method, Members noted that HyD would assess the ground conditions in the section to be excavated before each blasting operation. If the measured groundwater inflow exceeded the allowable inflow limit, pre-grouting would be carried out to avoid excessive dewatering. The department had assessed that the resultant ground movement would not exceed 10 mm along the tunnel alignment. This was below the alert level of 12 mm according to the "Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers APP-137 on Ground-borne Vibrations and Ground Settlements Arising from Pile Driving and Similar Operations" published by the Buildings Department. HyD would also conduct instrumentation and monitoring in accordance with established standards and practices during construction stage to closely monitor ground movement and groundwater conditions to ensure that there would not be significant groundwater drawdown which might affect the structural integrity of adjacent buildings.

Monitoring of vibrations and condition survey

7. In consideration of the substantial public concern on vibrations generated by the drill-and-blast method in tunnel construction, Members considered that HyD should

devise a monitoring plan on vibrations not covered in the Technical Memorandum on EIA Process (TM). They were concerned that some buildings along the tunnel alignment were very weathered and could be vulnerable to slight vibrations. While Members noted that HyD would undertake condition survey for these old buildings, they suggested if the department would consider extending the scope of survey to cover each and every household unit to be affected.

8. HyD assured Members that they would have stringent monitoring on ground movement and vibrations in accordance with prevailing practices. They would control the vibrations by assessing the peak particle velocity (ppv), with 25 mm/s being taken as the safety limit normally applicable for general buildings. A more conservative ppv would be adopted for the old buildings along the tunnel alignment commensurate with their structural conditions. HyD also advised that blasting operations would be strictly controlled by CEDD's Geotechnical Engineering Office (GEO) throughout the construction phase. They would also have to submit report on each blast to CEDD's Mines Division for approval. Pre-drilling would be conducted to assess and verify the design ground conditions before the tunnelling works. They might need to fine-tune the design of the tunnel lining and construction method as necessary to ensure that the construction works would be carried out safely.

9. HyD further pointed out that they had to agree on the blasting influence zone with GEO and carry out condition survey for all units of the affected buildings, after obtaining permission for entry to the premises. The amount of explosives to be used would vary for each blasting operation to ensure that the ppv generated would not be in excess of the appropriate limit for the affected structures and other geotechnical features. HyD reiterated that building safety was their primary concern, and that the construction of the CKR would not affect the structural integrity and use of buildings along the tunnel alignment.

Ecology and landscape aspect

10. Members were advised that the landscape deck at the western tunnel portal of the CKR would be accessible from the existing urban area of Yau Ma Tei through the at-grade crossing at the junction of Ferry Street and Kansu Street, as well as from Charming Garden. Signal-controlled crossings and lifts would be provided for convenient access. The deck would also be connected to the new West Kowloon Cultural District.

11. Suggestions were made for planting of trees on the landscape deck and arranging the planting in east-west orientation to create wind corridor effect, as well as using scented plants partly to counter the foul smell coming from the Yau Ma Tei Typhoon Shelter. There should also be roof garden and green vertical walls for ventilation facilities as far as practicable. HyD noted Members' comments and would take these proposals into account when coming to the detailed design of the deck.

Water quality

12. Members noted that dredging works at To Kwa Wan section would create a temporary water quality impact. They secured HyD's confirmation that the works would only be carried out in dry season as far as practicable, and that they would endeavour minimizing the quantities of sediments from the dredging activities.

TSEUNG KWAN O – LAM TIN TUNNEL AND ASSOCIATED WORKS (TKO-LTT)
(Civil Engineering and Development Department (CEDD) as the project proponent)

Monitoring of vibrations

13. CEDD assured Members that public safety was also their primary concern, and would formulate a more detailed vibration and water monitoring plan as the project proceeded. They pointed out that the major part of the TKO-LTT was deep inside the mountain with no sensitive areas, except Cha Kwo Ling Village where the tunnel would run more than 10 metres below ground. For that section, mechanical breaking method or other non-blasting method instead of traditional blasting would be used to minimize vibrations and possible ground settlement. There was no relocation plan as the squatters in Cha Kwo Ling Village would not be affected.

Ecological impact

14. Members noted that the project would not cause any impact on the natural lowland streams, and a monitoring plan would be in place to ensure that the temporarily affected area would be restored at the operation phase. CEDD advised that while the terrestrial ecology and vegetation including trees and shrub-land around the Lam Tin Interchange would be affected, they would be compensated at least in 1:1 ratio. The proposed plantation and landscape deck fronting Yau Lai Estate would be improved and the overall ecological value of the area would be enhanced.

15. Members remarked that information on the natural lowland streams in the EIA report should not be lumped together as it would cause difficulties in visualizing the details of the streams, and hence misinterpretation by other projects when the proponent referred to the EIA report in future. It was suggested that project proponents of future projects should differentiate the ecological value and characteristics of each individual stream in their EIA reports.

Design of landscape deck

16. Having regard to Members' comments on enhancing the landscape deck design such as the one at the Lam Tin Interchange, CEDD advised that proper landscape consultant and specialist would be engaged at the detailed design stage to develop the design and landscaping work.

Water quality

17. Members were advised that the proposed reclamation at the coastal area fronting Ocean Shores had been reduced to 3 ha which was the minimum area required for the construction of the depressed Road P2 and its associated facilities. The reclamation would avoid encroaching into the natural shoreline. As such, no artificial eco-shoreline would be necessary. CEDD also confirmed that the hydrodynamic condition and water quality had been assessed in detail and no adverse impacts were noted.

Seawall design

18. CEDD advised that the seawall foundation of the proposed reclamation area would incorporate a sloping design intermittent with rocks. The design had proven to be effective to encourage recolonization of coral and enhance fishery habitats.

CROSS BAY LINK, TSEUNG KWAN O (CBL)
(CEDD as the project proponent)

Design of the "Eternity Arch"

19. While noting that CEDD had collected views from local residents and Sai Kung District Council in respect of the design of the proposed "Eternity Arch" fronting LOHAS Park, Members suggested if they could make further reference to the aesthetic design of the Tsing Ma Bridge and Ting Kau Bridge for improving the design, especially its night montage. CEDD informed that the proposed "Eternity Arch" had gone through a design idea invitation namely "My Vision of Cross Bay Link - 我眼中的跨灣連接路". The "Eternity Arch" attained the highest score both given by the jury and the public voting among other winning entries. Apart from the public consultation/ engagement exercises, the appearance and structures of the CBL including the architectural lighting schemes had been submitted to the Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS). Both the "Eternity Arch" bridge scheme and the architectural lighting scheme had been accepted by ACABAS.

(<u>Post meeting note from CEDD</u>: The Jury and the Technical Committee for the design idea invitation comprised of LegCo members (Engineering, Architectural, surveying and planning functional constituency), president of HKIA, academy of HKU and HKUST and the Sai Kung District Council Member. Other bridge forms such as suspension (Tsing Ma Bridge) and cable stay (Ting Kau Bridge) were parts of the winning entries but scored lower mark than the "Eternity Arch", and therefore were not chosen for the CBL preliminary design development. Full report of the invitation event prepared by Mr Tsang Man Biu, A.P., MHKIA, R.A. is available for viewing.)

Mitigation measures for noise impact

20. CEDD informed that it was unusual to state a condition in the Environmental Permit (EP) to ban percussive piling in a construction project, unless with specific concern on causing acoustic disturbance to local marine mammals as in the case of the Hong Kong-Zhuhai-Macau Bridge Hong Kong Boundary Crossing Facilities. In any case, construction noise was governed by the Noise Control Ordinance and other related regulations. No noise permit would be issued if the noise level of the construction works exceeded the statutory noise limits. CEDD advised that non-percussive piling methods such as pre-bored H piles and concrete bored pile had been specified in the preliminary design. Contractors were expected to use vibrating hammer for conducting temporary sheet piling works which had a considerably lower noise measurement. CEDD assured Members that the prevailing mechanism would be sufficient to ensure that the noise level during the construction phase would not exceed the threshold. Members opined that the incremental noise to nearby residents in the construction stage could be substantial although the noise level would still be under the controlled level. HyD was advised to avoid using percussion piling as far as possible.

21. CEDD also informed that low noise surfacing material would be used according to normal practices. Members cautioned that CEDD should maintain the low noise surfacing material so that they could achieve the claimed noise reduction at all time. In fact, with good maintenance, this type of material could have a noise reduction of more than the claimed 1 dB(A). CEDD were appreciative of Members' comments on the potential maintenance problem of the material over time, and would liaise with HyD in devising better management and monitoring plan at the detailed design stage.

<u>Concerns common to all three EIA reports</u>

22. Both HyD and CEDD confirmed that liaison groups/liaison centres would be set up in the community under each of the three EIA projects to facilitate communication and handling of complaints/enquiries with local residents and relevant stakeholders.

23. In respect of air quality, CEDD remarked that the TKO-LTT and CBL projects would be able to comply with the new AQOs except the works at Chai Kwo Ling Tin Hau Temple where there would be temporary exceedance of nitrogen dioxide (NO_2) during operation. HyD said that while the prevailing standards would apply when designing and devising the construction methods of the CKR, they were mindful and would strive to work towards the new AQOs in minimizing the air quality impact of the project. Different initiatives/measures had been adopted such as careful selection of the location of the ventilation building, use of full or semi noise enclosures and barriers as well as installation of air purification system (APS) for the tunnel. Members were assured that all necessary measures would be taken to give continuous improvement of air quality in the project area.

24. Having regard that full or semi noise enclosures/barriers would be installed to mitigate noise impact along the route alignments, both HyD and CEDD advised that they would be careful to adopt the design of good aesthetic effect which would be in harmony with the surrounding and in consultation with the community. Environmental-friendly materials would also be used.

25. CEDD advised that APS installation would not be extended to cover the TKO-LTT and CBL projects, as air quality in the Tseung Kwan O area was better than that in the urban Kowloon area and the air pollution level was well below the accepted limits. They had to take the cost-benefit and effective use of public money angles into consideration for the proposed installation. It was pointed out that APS could only help remove the particulates of the diluted emissions and had limited effect on reducing NO_2.

Internal Discussion Session

Central Kowloon Route (CKR)

Parameters for measuring air and noise pollution

26. As a general reference for EPD in assessing air quality and noise pollution impacts of future EIA reports, Members suggested that the EIA study could also take into account the number of sensitive receivers to be affected by air and/or noise pollution in addition to the air/noise pollution levels. The exposure index was commonly practised in other countries, and a similar approach could be adopted for the presentation of air pollution level in Hong Kong.

Vibration impact on old buildings

27. Comment was made to impose a condition for HyD to monitor all old buildings in the project area which would be vulnerable to ground/groundwater movements and vibrations. EPD advised that it would not be appropriate to impose such a condition in the EP as the scope of issue was related to building safety which was governed by another ordinance. The Chairperson clarified that the request could be put to HyD in the form of a suggestion instead of imposing such as an EP condition. It was also suggested that if the dwellers of the affected old buildings so desired, HyD could consider engaging a third party to conduct the monitoring.

28. Regarding the monitoring of vibrations, the Chairperson advised that consistency of assessment parameters should be maintained when recommending HyD to conduct vibration monitoring in the whole project area. The monitoring plan should also be dealt with under the established mechanism which was outside the purview of the EIAO or the TM.

29. Referring to the public comments received from the residents of Prosperous Garden on the noise impact, EPD advised that according to HyD's presentation at the

meeting, the proposed CKR design had already been developed in response to suggestions received from the rounds of public engagements and consultation, including relocating the ventilation building away from the densely populated area, installing a full noise enclosure along Ferry Street Section of the GRF, extending the west tunnel portal towards the seafront away from residents, and designing a landscaped deck over the entire west portal for noise protection. The present CKR design so developed had fulfilled the EIAO requirements. The residents' outstanding concerns mainly involved three issues. Firstly, the re-location of the ventilation building further 1 km away from Prosperous Garden; secondly, replacement of the proposed semi noise enclosure by a full noise enclosure along the existing flyover next to Block 1 of Prosperous Garden; and thirdly, extension of the proposed full noise enclosure further north along Ferry Street. According to HyD's assessment, further relocating the ventilation building 1 km away from Prosperous Garden would involve reclamation in the harbour which could hardly be justified. Providing a full noise enclosure near Block 1 of Prosperous Garden was technically not practicable because of structural loading limitations of the existing flyover and the need to maintain traffic movement at the road junction underneath the flyover. Also, further extending the proposed full noise enclosure along Ferry Street was beyond the project scope and boundary. EPD advised that while the present CKR design had fulfilled the requirements of the EIAO and TM on the project, they would continue discussion with HyD for further refinement of the mitigation measures that could be implemented for the benefits of the different sensitive receivers.

Tseung Kwan O – Lam Tin Tunnel and Associated Works (TKO-LTT)

30. Members agreed to the suggestion that EPD would assist to remind project proponents that they should not lump up the information on lowland streams when conducting EIA studies in future.

Cross Bay Link, Tseung Kwan O (CBL)

31. Members agreed to request CEDD to enhance the design of "Eternity Arch", e.g. to give a more spectacular night montage.

32. Regarding the proposed banning of the use of percussive piling in the construction, EPD explained that it was rare to include such as a condition in the EP when the noise control regime was already covered under other legislations. Members agreed that they could register the concern as a suggestion to CEDD rather than as an EP condition.

Recommendations to ACE

33. Having regard to the findings and suggestions of the three EIA reports and information provided by HyD and CEDD as well as the respective consultant teams, EIASC agreed to recommend to the full Council that the EIA reports could be endorsed with conditions. It had also made a number of recommendations to the project

proponents. The Subcommittee agreed that it was not necessary for the project proponents to attend the full Council meeting on 17 June.

EIA Subcommittee Secretariat
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