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Urgent by fax [fax no. 2591 0558] and registered post

11 March 2008

Director of Environmental Protection
28/F Southern Centre
130 Hennessy Road
Wan Chai
Hong Kong
(Attn: Mrs Shirley LEE)



Dear Mrs LEE,

fax recd on 11/3/08

Environmental Impact Assessment (EIA) Ordinance, Cap. 499

Application for Approval of an EIA Report

Project Title: Wan Chai Development Phase II and Central-Wan Chai Bypass

(Application No.: EIA-141/2007)

I refer to your letter of 29 February 2008 and would like to provide you with the supplementary information at Annex A on 'Option Comparison', 'Compliance with the Protection of the Harbour Ordinance', 'Zero Portal Emission' and 'Use of Landscape Deck above Eastern Tunnel Portal' as requested.

In addition, I would like to provide at Annex B the comprehensive responses to all three sets of public comments for your consideration. For those endorsement conditions raised by the Advisory Council on the Environment, we have no comments.

Yours faithfully,

(Bosco B P CHAN)

for Project Manager/Hong Kong Island and Islands
Civil Engineering and Development Department

c.c.

Secretary of the ACE (Attn: Ms Josephine Cheung) – w/o encl.

Response to EPD's letter of 29 February 20081. Option Comparison

Paragraphs 3.3.2 and 3.3.3 of the EIA Study Brief require consideration of different development options and alternatives. In meeting the Study Brief requirements, Section 2.5 of the EIA Report for WDII and CWB, Volume 1, and Section 2.5 of Volume 2, present the consideration of alternatives/options for road alignments, construction method, reclamation options and shoreline configurations, and development options.

The comparison of tunnel and flyover options is given in paragraphs 2.5.27 to 2.5.40 of Volume 1 of the EIA Report (and similarly in Volume 2). The considerations for alternative locations for tunnel portal and ventilation buildings have been explained in detail in paragraphs 2.5.53 to 2.5.61 of Volume 1 of the EIA Report, and in paragraphs 2.5.44 to 2.5.52 of Volume 2. The location of the tunnel portal was determined with due regard to the Protection of the Harbour Ordinance (PHO) and the ventilation buildings, especially the East Ventilation Building, have been located away from the residential buildings as far as possible.

In respect of the consideration of environmental benefits and disbenefits between the tunnel and flyover options, the key findings are highlighted in Table 2.2 and paragraph 2.5.30 of Volume 1 and similarly in Volume 2. In arriving at these key findings, reference was made during the study to the previously approved and fully comprehensive EIA Report for the CWB & IECL, which was based on a flyover option; the flyover option under consideration in this current EIA is not materially different to the scheme assessed in the approved CWB & IECL EIA in respect of the key environmental issues. Preliminary environmental appraisal of the tunnel option was also carried out during the initial stages of concept development, which was followed up with detailed assessments in accordance with the EIA Study Brief and EIAO-TM requirements.

Whilst Table 2.2 and paragraph 2.5.30 of Volume 1 and Volume 2 highlighted the key findings of environmental benefits and disbenefits between the tunnel and flyover options, as part of the overall comparison between the tunnel and flyover options, a more detailed comparison between the flyover option (based on the approved CWB&IECL EIA) and the tunnel option under the current EIA, has been provided in Appendix 2.1 of the EIA Report. This comparison addresses the environmental issues of noise, air quality, water quality, waste management, land contamination, marine ecology, landscape and visual impacts, biogas risk, and cultural heritage, and includes the impacts during both construction and operational phases. It is therefore a comprehensive comparison between the tunnel and flyover options in respect of environmental benefits and disbenefits. The comparison includes consideration of the residential development in North Point that would be subject to noise and air quality impacts under the tunnel option.

Therefore, the tunnel option has been demonstrated in the EIA Report to be the preferred option in respect of environmental impacts, in accordance with the EIA Study Brief.

Our response to those few specific concerns raised are as follows:

- (i) With the implementation of the mitigation and enhancement measures associated with the tunnel portal and ventilation building at North Point, it is expected that noise impacts will, in fact, be reduced to below the levels to which North Point residents are

currently exposed. According to the EIA, the residential developments at North Point close to the Island Eastern Corridor (IEC), particularly those facing the existing IEC, are exposed to traffic noise impact exceeding the noise criterion of 70dB(A) by up to 12 dB(A) under the prevailing conditions. With the tunnel option, noise condition at this area will be improved by implementation of the proposed noise barriers and semi-enclosure on the constructed roads/reconstructed IEC. The EIA has predicted that after mitigation, traffic noise levels at the noise sensitive receivers in the North Point area due to the roads to be constructed/reconstructed under the Project (including Victoria Centre, Harbour Heights, and City Garden) would be reduced to below 70dB(A).

For air quality, there will be no adverse air quality impacts from the eastern tunnel portal of the Trunk Road (zero portal emission) and the tunnel ventilation building with its associated vent shaft being extended and located at the end of the eastern breakwater of the Causeway Bay Typhoon Shelter (CBTS), some 250m away from the nearest residential block. Open road emissions beyond the tunnel portal will be similar to the flyover option. Therefore, the tunnel option is not inferior to the flyover option as far as residents at North Point are concerned. Construction phase impacts of the tunnel option during the demolition of the existing IEC to facilitate the connection of the Trunk Road are short term; indeed the flyover option will also require the demolition of part of the existing IEC for its connection. It is the operation phase impacts that are considered more critical when determining the relative performance of the Trunk Road options.

- (ii) Water quality impacts during construction can be effectively mitigated and there are no adverse water quality impacts for the tunnel option due to the temporary reclamation. For the operational phase, there would be no major hydrodynamic or water quality impacts for both the tunnel and flyover options, and this has been noted in the comparison of options.
- (iii) Generally, tunnel involves significantly fewer above-ground structures than a flyover. It would thus impose comparatively less visual and physical barrier to the Harbour and can allow a continuous open promenade along the harbour-front for public enjoyment. In urban design terms, the tunnel option is a better solution than the flyover option.

The visual impacts of the flyover option compared with the tunnel option are related to the significant visual impacts of the flyover structures along part of the Wan Chai shoreline and through the CBTS, whereas there are no similar visual impacts by the tunnel option. The flyover option would be an elevated roadway running along the shoreline of Wan Chai and Causeway Bay. With regard to construction form, it would be an extension of the existing IEC. There is general public consensus that such an extension of the IEC would be visually intrusive, despite any structural fine-tuning. Furthermore, there was no support at all for the flyover option on visual ground during the extensive public engagement exercise of HER; on the contrary, there was complete agreement on the preference for the tunnel option in this respect.

In North Point, the CWB tunnel portal will be covered by a landscaped deck which will soften the appearance of the tunnel portal area to the surrounding developments. The elevated roads are mainly reconstructed sections of the existing elevated IEC and

its slip roads, to facilitate the Trunk Road connection. Visually, there will be no significantly greater visual intrusion to what currently exists and with the landscaped deck over the tunnel portal and the waterfront park on the land to be formed for tunnel construction, the overall visual impact would actually be somewhat improved over the existing situation. The administration buildings are located underneath the existing elevated IEC to make them less visibly intrusive. The noise barrier requirements at North Point would be similar for both the tunnel and flyover options.

2. Compliance with the PHO

The PHO was enacted to protect and preserve the Harbour. It requires the Harbour to be protected and preserved as a special public asset and a natural heritage of the Hong Kong people, and establishes a presumption against reclamation in the Harbour. In relation to the judicial review concerning the PHO, the Court of Final Appeal (CFA) has ruled that in order to implement the strong and vigorous statutory principle of protection and preservation, the presumption must be interpreted in such a way that it can only be rebutted by establishing an overriding public need for reclamation (the “overriding public need test”). A report (CCM Report) that provides step by step the “cogent and convincing materials” for fully demonstrating that the proposed reclamation can comply with the PHO has been prepared. The CCM Report together with its Annexes provides a comprehensive package of materials which sets out in a cogent and convincing manner the rebuttal of the presumption against reclamation in the Harbour by establishing an overriding public need for reclamation, in compliance with the CFA judgment.

For demonstrating compliance with the “overriding public need test”, the first step is to confirm that there is an overriding and present need, in this case the building of the whole Trunk Road. Having established the need for the Trunk Road, the next step is to assess whether there is any reasonable alternative to reclamation in its implementation. Notwithstanding that there is an overriding need for reclamation for the project, it is still essential to find the option that will best serve to protect and preserve the Harbour. In this regard, the area of the Harbour affected by the alternative Trunk Road tunnel and flyover options is of just as much concern as the area of physical reclamation. The flyover structures over water will impinge upon the water area of the Harbour and their visual impacts do not promote the protection and preservation of the Harbour. Moreover, where the marine use of existing water areas is restricted due to the presence of highway structures and the like, these affected water areas may not be regarded as “protected” or “preserved” for the purposes of the PHO. Therefore, when examining Trunk Road options, including both tunnel and flyover options, the land formation by physical reclamation is taken into account together with the water areas of the Harbour affected by flyover structures in order to come up with an option that may serve best to protect and preserve the Harbour.

For the flyover option, the water area at the southeast corner of the CBTS would be further affected by the new flyover structures for the Trunk Road mainline and slip roads in addition to the existing IEC flyover running across it, and is therefore accounted for as affected water area. The tunnel option, on the other hand, would not further affect this (or any) water area of the typhoon shelter as no new flyover structures would be built there.

Under the flyover option, the Trunk Road would rise up onto elevated road structure to cross over the former Wan Chai Public Cargo Working Area (ex-PCWA) basin, then over Kellett

Island (and the Cross Harbour Tunnel portal), and stay on elevated structure to the connection with the existing IEC at the eastern side of the CBTS. The elevated flyover would cut across the middle of the ex-PCWA basin. The marine use of the basin would be restricted and the basin could not be properly used as a marine recreational facility due to the highway bridge piers occupying the water area and the low headroom clearance of the flyover.

The affected areas of the Harbour, which include land formed, flyover structures over water and the affected water area, for both options, have been assessed and itemised separately for comparison. The proposed Trunk Road scheme (i.e. the Trunk Road Tunnel Variation 1) would affect the least area of the Harbour among all feasible options. Reclamation is minimised by having the Trunk Road tunnel running beneath the seabed of the ex-PCWA basin and the CBTS, which means that permanent reclamation in these areas would not be required. However, to achieve this end result, temporary works are required. These temporary works will be removed on completion of the construction of the Trunk Road tunnel, and the existing seabed and water area would be reinstated. This commitment has been made in the Trunk Road scheme gazetted on 27 July 2007 under the Roads (Works, Use and Compensation) Ordinance.

The temporary works will include the temporary reclamation for forming a dry working platform for building the sub-seabed Trunk Road tunnel which is considered to be the practically feasible form of temporary works. Temporary breakwater and piled wave walls to provide temporary mooring space (a temporary typhoon shelter) for boats displaced by the construction works in the CBTS would likewise be required to facilitate the construction of the sub-seabed tunnel.

These temporary works, therefore, would enable permanent reclamation in the ex-PCWA basin and CBTS to be avoided, with the end result being a Trunk Road scheme with the least affected area of the Harbour.

Without these temporary works, the Trunk Road scheme as currently proposed cannot be constructed. That may mean an alternative Trunk Road scheme is necessary, for example one requiring permanent reclamation in the typhoon shelter or a deep bored tunnel option requiring a greater area of permanent reclamation further east along the North Point shoreline. The result would be greater extent of reclamation or affected area of the Harbour.

The tunnel option (Trunk Road Tunnel Variation 1) best serves to protect and preserve the Harbour in that:

- (i) It affects the least area of the Harbour. The flyover option, on the other hand, affects a greater area of the Harbour through physical reclamation, impingement of existing Harbour water areas by its flyover and foundation structures, restriction of marine uses of existing water areas of the Harbour due to physical intrusion of the foundations and bridge piers and low headroom clearances of the superstructures.
- (ii) Furthermore, for the flyover option, there will be visual intrusion over a significant length through Wan Chai and Causeway Bay. On the other hand, the tunnel option which is below ground will not be visible.
- (iii) The temporary reclamation and temporary typhoon shelter are to facilitate the end product of achieving least affected area of the Harbour for the tunnel option. Without

these works, the end result would be a scheme having a greater affected area of the Harbour, which would not comply with the PHO. Therefore, the temporary works are an essential construction phase element of the scheme.

As defined in the EIA Study Brief Section 1.5, the purpose of this EIA is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the development proposed under the Project and related works that take place concurrently. The temporary works (temporary reclamation and the temporary typhoon shelter) have been included in the EIA assessments as required by the EIA Study Brief and the findings are presented in the EIA Report for WDII and CWB; no unacceptable adverse impacts have been found. The EIA Report has confirmed the environmental acceptability of the development proposed under the Project, including the associated temporary reclamation and temporary typhoon shelter during the construction stage, in compliance with the EIA Study Brief.

3. Zero Portal Emission

The design assumptions of zero portal emission from the eastern portal of the Trunk Road tunnel are given in paragraphs 2.4.18 (footnote 2), 3.5.7 and 3.6.53 of the EIA Report for WDII and CWB, Volume 1, and in Appendix 15.1 Annex 15.1.

For ease of reference, the assumptions on zero portal emission are repeated as follows:

For a typical unidirectional tunnel, tunnel traffic will create piston effect which will draw outside air from entry portal and drives the induced air to exit portal. Tunnel ventilation system will induce additional outside air to satisfy minimum air quality standard inside the tunnel in the event that piston effect alone is not able to induce adequate outside air to ventilate the tunnel. The tunnel air both induced by tunnel traffic and brought by tunnel ventilation system will escape through exit portal if no extraction system is provided upstream of the exit portal. If a powerful extraction system is provided upstream of the exit portal to extract all the polluted air, it is possible to have a system with “zero portal emission”. The amount of air flow into the tunnel induced by traffic piston effect can be predicted by using the SES (subway environmental simulation) programme under all modes of traffic conditions. The portal extraction system will be designed with over capacity (about 20%) to cover the worst traffic scenario to ensure that no polluted tunnel air will escape through the exit portal. The extraction system will operate at reduced capacity to cover other scenarios when the emission rate of traffic induced air to exit portal is less than the maximum.

The current ventilation system proposed for the CWB project consists of three extraction fans for the eastern tunnel portal. Two fans will be adequate to extract all polluted air from the upstream tunnel section of the exit portal. The third fan would be used as standby in case one fan is under maintenance or out of order. Airflow direction sensor will be installed at the exit portal to monitor the airflow direction of the tunnel. This sensor will be used to control the operation of tunnel portal extraction system to ensure that the target of “zero portal emission” will be met.

With regard to the validity of reports/information about failure of zero tunnel portal emission design of the Sydney M5 East Tunnel, please be aware that the situation for the Sydney M5 East Tunnel is different from the CWB tunnel:

- (i) The tunnel ventilation design differs in that air is re-circulated between the westbound and eastbound tunnel in the Sydney M5 East Tunnel while a direct air extraction system is proposed at the exit portals for the CWB tunnel and there is no re-circulation of air between the two tunnel boxes.
- (ii) The M5 East Tunnel is designed for zero portal emission but not designed for the traffic up to the congestion they are having now. Also, they have a problem of high volumes of heavy vehicles with illegal emissions.
- (iii) One of the effects of the above recirculation of air within the tunnels and the higher levels of vehicular emissions than designed for, is poor air quality inside the tunnel and associated poor visibility inside the tunnel. To resolve this problem, air will be deliberately released through the tunnel portal (i.e. tunnel portal emissions) while drawing more clean air into the tunnel to improve the visibility and reduce haze inside the M5 East Tunnel. Thus, the portal emissions arise from operational procedures to overcome in-tunnel air quality problems that arise through traffic congestion levels for which the current ventilation system has not been designed.
- (iv) Other air quality improvements planned for the Sydney M5 East Tunnel include:
 - video identification of pollution-causing heavy vehicles and sending polluting vehicles to the Clean Fleet Program
 - increase ventilation flows with an extra 12 jet fans
 - consider the installation of filtration technology e.g. electrostatic precipitator.

The CWB tunnel is designed for zero portal emission under a full congestion worst case scenario, and with a buffer over-capacity allowance. There will be no air recirculation and therefore less tunnel length over which the vehicular emissions will build up before extraction, and sufficient ventilation fans will be installed in the first place to ensure adequate air movement through the tunnel. The situation is therefore different from the M5 East Tunnel and the problems that have arisen there would not occur for the CWB tunnel.

4. Use of Landscape Deck above Eastern Tunnel Portal

The landscape deck above the eastern portal of the CWB tunnel is proposed primarily as visual mitigation to the surrounding developments by softening the appearance of the tunnel portal area; it will also serve to mitigate noise at that area. The deck is not designated as public open space and will not be accessible to the public. Only planting (for visual mitigation) is proposed on the deck, there are no air sensitive uses proposed on the landscape deck.

Responses to Public Comment No. 1

(a) Definite translocation time for coral colonies

We note that time of translocation for coral colonies is a factor for consideration. In this Project, the two recorded coral species (i.e. hard coral *Oulastrea crispata* and *Gorgonian Echinomuricea sp.*) are relatively tolerant to environmental stresses and can be commonly found in the more turbid water in western and southern part of Hong Kong (Chen, et al. 2003; Chan, et al. 2005). Nevertheless, translocation during the spawning period (ie July to October) will be avoided as far as practicable and the detail arrangement for the translocation will be included in the Detailed Transplantation Plan to be drafted in the detailed design phase of this Project and subjected to approval of AFCD before commencement of transplantation exercise.

(b) Adequate monitoring for the transplanted coral colonies

Growth rate of coral is species-specific. A 12-month study on growth rate of *Oulastrea crispata* (Lam 2000) found that this species scored a relatively fast growth rate of about 0.9 - 1.04 mm per month, when compared with the value ('a few millimetres per year') suggested in the comment. Although no empirical data on growth rate of *Echinomuricea sp.* is available, previous studies showed that gorgonian usually grow much faster than the hard corals and growth rate of about 0.8 - 4.5 cm per year were recorded among the shallow-water gorgonian species (Yoshioka, et al. 1991; Lasker, et al. 2003). The suggested monitoring period (i.e. quarterly monitoring for one year) in S.7.3.5 of the EM&A Manual is considered sufficient to reflect the growth condition of these two transplanted species. The monitoring requirement on growth rate of transplanted coral will be included in the Detailed Transplantation Plan. Nevertheless, we have no strong view to extend the monitoring period for the transplanted coral colonies from 1 year to 2 or 3 years should it be required.

References

Chen, et al. 2003 – A Stable Association of the Stress-Tolerant Zooxanthellae, Symbiodinium Clade D, with the Low-Temperature-Tolerant Coral, *Oulastrea crispata* (Scleractinia: Faviidae) in Subtropical Non-Reefal Coral Communities

Chan, et al. 2005 – Field Guide to Hard Corals in Hong Kong

Lam 2000 – Early growth of a pioneer recruited coral *Oulastrea crispata* (Scleractinia, Faviidae) on PFA-concrete blocks in a marine park in Hong Kong, China

Yoshioka, et al. 1991 – A comparison of the survivorship and growth of shallow-water gorgonian species of Puerto Rico

Laska, et al. 2003 – Determinate Growth and Modularity in a Gorgonian Octocoral

Responses to Public Comment No. 2

(a) Response to item A (flyover option)

A comparison between constructing the Trunk Road by tunnel and by flyover had been made in the EIA Report. It is found that the Trunk Road tunnel option performs better than the flyover option in the following aspects:

- (i) the tunnel option will result in a lesser affected area of the Harbour;
- (ii) the tunnel option will cause less traffic disruption during construction;
- (iii) the tunnel option will have more opportunities for harbour-front enhancement and providing access to the waterfront;
- (iv) the tunnel option will cause less air and noise impacts; and
- (v) the tunnel option will have no significant visual impacts along the harbour-front.

All relevant standards and guideline, including the Transport Planning and Design Manual (TPDM), will be taken into account in considering the tunnel design to ensure the traffic safety.

(b) Response to item B (helipad at ex-Wan Chai PCWA)

- (i) The proposal to construct a helipad near the former Wan Chai Public Cargo Handling Area (PCWA) would require reclamation. An overriding public need for reclamation under the PHO could not be established for this proposal.
- (ii) Although the pedestrian at the Golden Bauhinia Square (GBS) is not defined as the NSR under the EIAO TM, noise assessment to avoid adverse helicopter noise impact was carried out under a separate study "Detailed Helipad Assessment". With the implementation of noise mitigation measures include a noise barrier of 6m high around the landward side of the helipad site, the noise predicted to be generated by helicopter operations could be managed at acceptable level.

(c) Response to item C (Temporary Typhoon Shelter)

- (i) As shown in Figure 5.6 of the EIA Report Volume 4, the eastern and

western ends of the Temporary Typhoon Shelter are piled wave walls (with concrete downstand from +4 mPD to -1.5 mPD) instead of a solid breakwater so the water (except the wave at the water surface) can flow through the piled wave walls. Based on the water quality impact assessment results, no unacceptable water quality impacts would be expected during the operation of the Temporary Typhoon Shelter.

- (ii) Interface with the Shatin to Central Link (SCL) have been considered in determining the Trunk Road option.
- (iii) In S7.2.2 of the EM&A Manual, considerations on selection of proposed coral translocation recipient site are fully discussed. To maximize the successfulness of this translocation exercise, the coral recipient sites should be as near as possible to the existing coral site and with similar healthy coral communities of the same species as well as similar hydrographic condition. At Aberdeen, most of the coastal area is disturbed by human activities and comprise mainly the artificial seawall habitat. In addition, as it is located at the south part of Hong Kong Island (which is opposed to the Victoria Harbour), hydrographic condition in this area is different from that of the Victoria Harbour. In contrast, Junk Bay is considered as a more suitable option as it is the closest natural habitat (subtidal rocky substrata) with similar hydrographic condition and healthy coral assemblage of the same species being recorded previously.
- (iv) The Oil Street sale site and the former North Point Estate site are outside the project boundary of Wan Chai Development Phase II and Central-Wan Chai Bypass. The proposal to revise the development of these two sites into parks is a planning issue to be dealt with under separate forum.

Responses to Public Comment No. 3**(a) Response to comment given in the Covering Letter – Consideration of the Hotel Development in the EIA Report (Page 1-2)**

- (i) The EIA Report has already considered the potential environmental impacts on the said Hotel Development near Oil Street.
- (ii) For the air quality assessment during construction, although the predicted pollutants levels at A91 (representing the hotel development) was not selected as representative ASR for the construction dust assessment, the contour plot (Figure 3.7a - 3.17b) has covered this ASR and it is shown that the predicted 1-hour and 24 hour TSP levels at A91 would comply with the EIAO-TM criterion and AQO standards. For the operational phase air quality assessment, A91 has been selected as representative ASR as well as being covered in the contour plots.

For noise impact assessment, the hotel development is not a sensitive receiver as it will not depend on opened windows for ventilation. Nevertheless, the proposed noise mitigation measures along the IEC at North Point will reduce the traffic noise and no exceedance to the EIAO-TM traffic noise criteria.

(b) Response to the comment on Study Brief requirement – “Alternatives and options” (Page 3-4)

- (i) S3.3.2 and S3.3.3 of the Study Brief require consideration of different development options and alternatives. In meeting the Study Brief requirements, S2.5.1 to S2.5.68 of the EIA Report presented the consideration of alternatives/options for road alignments, construction method, reclamation options and shoreline configurations, and development options. In particular, the considerations for alternative locations for tunnel portal and ventilation buildings have been explained in details in S2.5.53 to S2.5.61 of the EIA Report.
- (ii) Regarding the comparison with various tunnel options, it has already been given in S2.5.15 to 2.5.26. Regarding the comparison between flyover and tunnel options, it has already been given in S2.5.27 to 2.5.40

of the EIA Report. The comparison is not biased and our responses are summarized below: -

Comparison of Tunnel and Flyover Options

Regarding the public comment that the comparison of the Tunnel and Flyover Options in the Trunk Road Report is biased, please be advised that the selection of the preferred Trunk Road option as detailed in the Trunk Road Report at Annex G of the CCM Report, which has been referred in S2.5.2 of the EIA Report, has followed a comprehensive and structured approach. It first determines the need of the Trunk Road and constraints on its alignment, determines the feasible routing for the Trunk Road, examines alignment options and forms of construction to determine whether there would be any option that would not require reclamation (i.e. whether there would be no reasonable alternative to reclamation), and then determines and compares the impacts of the feasible Trunk Road tunnel and flyover options, to arrive at the conclusion on which option should be adopted. The primary consideration in this process is compliance with the PHO and the “overriding public need test” laid down by the CFA in its judgment dated 9.1.2004 with respect to the interpretation of the PHO. Having paid due regard to the PHO and the “overriding public need test”, the public aspirations expressed during the Envisioning Stage of HER steered by the then HEC Sub-committee have also been taken into account as far as possible. There is no bias towards any particular alignment or form of construction in this process.

The selection of feasible routings for the Trunk Road was carried out prior to the determination of a preference for either tunnel or flyover form of construction. Once a feasible routing for the Trunk Road was determined, the comparison of different forms of construction, flyover and tunnel, was carried out on a common basis under key indicators of: affected area of the Harbour; impact to existing traffic; other technical concerns; planning and land use considerations; environmental concerns; time for construction; and costs.

A comprehensive comparison between the Tunnel Option and the Flyover Option has been made. The details are included in Chapter 4 of the Trunk Road Report and also given in S2.5.27 to S2.5.40 of the EIA Report. In most respects, the Tunnel Option performs better than the Flyover Option. The Tunnel Option will:

- (a) result in a lesser affected area of the Harbour;
- (b) cause less traffic disruption during construction;
- (c) not require any major reconstruction of existing highway structures;
- (d) have more opportunities for harbourfront enhancement and providing access to the waterfront;
- (e) cause less air and noise impacts (although air quality at the tunnel portal will need to be carefully addressed); and
- (f) have no significant visual impacts (the flyover, on the other hand, will have significant visual impacts along the harbourfront).

Only in respect of time for construction and costs can the Flyover Option be seen as performing better than the Tunnel Option. It is indicated in the Trunk Road Report that the time required for the construction under the tunnel option and flyover option are 7 years and 6 years respectively.

The assessment demonstrates that the Flyover Option has a greater adverse impact on the Harbour. The recommendation of the Trunk Road Report is that the Tunnel Option is the option that serves best to preserve and protect the Harbour. This conclusion is supported by demonstrating that this Trunk Road scheme minimises reclamation and the permanently affected area of the Harbour, as well as by environmental and social benefits.

In response to item (a) on Page 3

Under the Tunnel Option, potential air and noise impacts on the sensitive receivers in Wan Chai and Causeway Bay that were originally affected by CWB in the Flyover Option would be avoided/minimized. According to the EIA, the residential developments in North Point area close to the IEC, particularly those facing the existing IEC, are exposed to traffic noise impact exceeding the noise criterion of 70dB(A) by up to 12 dB(A) in the prevailing condition. With the Tunnel Option, there is opportunity to improve noise condition at this area by implementation of the proposed noise barriers and semi-enclosure on the constructed roads/reconstructed IEC. The EIA has predicted that after mitigation, traffic noise levels at the noise sensitive receivers in North Point area due to the roads to be constructed/reconstructed under the Project (including Victoria Centre, Harbour Heights, and City Garden) would be reduced to below 70dB(A). In addition, the Tunnel Option will avoid the disturbance/impact to the

archeological site and historical building, i.e. the Kellett Island Archaeological Site and the Royal Hong Kong Yacht Club on Kellett Island, that would be affected by the Flyover Option as identified in the Approved CWB&IECL EIA Report.

It should be noted that a more detailed comparison between the original scheme under the Approved CWB&IECL EIA (Flyover Option) and the present scheme under the current EIA (Tunnel Option) has been provided in Appendix 2.1 of the EIA Report that included the impacts during both construction and operational phases.

In response to item (b) on Page 3

The potential water quality impact for both the Tunnel Option and Flyover Option during construction stage has been compared in Appendix 2.1. It has addressed that the major sources of the impacts would be the same as the Flyover Option in the Approved CWB&IECL EIA Report.

In response to item (c) on Page 3

Visual Impact

Tunnel involves significantly fewer aboveground structures than a flyover. It would thus impose comparatively less visual and physical barrier to the Harbour and could allow a continuous open promenade along the harbourfront for public enjoyment. In urban design terms, the Tunnel Option is a better solution than the Flyover Option.

The visual impacts of the Flyover Option compared with the Tunnel Option are related to the significant visual impacts of the flyover structures along part of the Wan Chai shoreline and through the CBTS, where as there are no similar visual impacts by the Tunnel Option. The Flyover Option would be an elevated roadway running along the shoreline of Wan Chai and Causeway Bay. With regard to construction form, it would be an extension of the existing IEC. There is general public consensus that such an extension of the IEC would be visually intrusive, even if any structural fine-tuning may be feasible. Furthermore, there was no support at all for the Flyover Option on visual ground during the extensive public engagement exercise of HER; on the contrary, there was complete agreement on the preference for the Tunnel Option in this respect.

The noise barrier requirements would be similar for the Tunnel Option and Flyover Option.

- (c) Response to the comment on Study Brief requirement – “Comparison on environmental terms” (Page 4)

A comparison of the environmental benefits and dis-benefits of alternative alignment options have been given in Table 2.2 and S2.5.30 of the EIA Report. The environmental benefits of the project are also given in S2.4.18 and S15.2 of the EIA Report.

- (d) Response to the comment on interpretation of the Protection of the Harbour Ordinance (Page 4-5)

(i) As defined in the Study Brief S1.5, the purpose of this EIA Study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the development proposed under the Project and related works that take place concurrently. This EIA study has confirmed the environmental acceptability of the development proposed under the Project.

(ii) It has already been explained in S2.4.5, S2.5.62 to S2.5.68 of the EIA Report that a “Report on Cogent and Convincing Materials to Demonstrate the Compliance with the Overriding Public Need Test” (the CCM Report) has been prepared. For easy reference, response on compliance with PHO and interpretation on “affected area of water” are summarized below:

Compliance with PHO

The Government has strictly observed the PHO. A report (CCM Report) that provides step by step the “cogent and convincing materials” for fully demonstrating that the proposed reclamation of the WDII project can comply with the PHO has been prepared under the WDII Review. The CCM Report together with its Annexes provides a comprehensive package of materials which sets out in a cogent and convincing manner the rebuttal of the presumption against reclamation in the Harbour by establishing an overriding public need for reclamation, in compliance with the CFA judgment on 9.1.2004 in respect of the judicial review on the draft OZP No. S/H25/1.

The CCM Report demonstrates that the proposed reclamation is in compliance with the overriding public need test and is the minimum extent required. It also gives an account of the process of identifying the alignment that would best serve to protect and preserve the Harbour in that, it is the alignment which involves the minimum extent of reclamation and has the least impact on the Harbour. In the CCM Report, an overriding public need for the Trunk Road has been demonstrated, the need for reclamation for the Trunk Road has been demonstrated and it has been confirmed that there are no “no reclamation” options (i.e. no reasonable alternative to reclamation), and the essential reclamation required for the Trunk Road has also been demonstrated to be the minimum extent required to meet the overriding public need.

Minimum Reclamation

The Minimum Reclamation Report in Annex O of the CCM Report reports on the detailed examination of engineering requirements in respect of highway geometric design and construction of the Trunk Road tunnel, reclamation and seawalls, and reprovisioning requirements, to accurately determine the minimum extent of reclamation. In total, an area of 12.7 ha of reclamation (in addition to an area of 0.4 ha of affected water area by flyover structures) in the WDII area is needed to meet essential engineering requirements for construction of the Trunk Road. This includes reclamation at the west side of the HKCEC Extension, through the HKCEC water channel, along part of the Wan Chai shoreline (including the reprovisioning of the Wan Chai ferry pier) and at North Point for the connection with the IEC. This reclamation is demonstrated through detailed study to be the minimum reclamation required to meet the overriding public need for the Trunk Road.

Affected Water Areas

The PHO was enacted to protect and preserve the Harbour. It requires the Harbour to be protected and preserved as a special public asset and a natural heritage of the Hong Kong people, and establishes a presumption against reclamation in the Harbour. It is essential to find the option that will best serve to protect and preserve the Harbour, with the minimum area of the Harbour affected by reclamation. In this regard, the area of the Harbour affected by the alternative Trunk Road tunnel and flyover options is of concern. The flyover

structures over water will impinge upon the water area of the Harbour and their visual impacts do not promote the protection and preservation of the Harbour. Moreover, where the marine use of existing water areas is restricted due to the presence of highway structures and the like, these affected water areas may not be regarded as “protected” or “preserved” for the purposes of the PHO. Therefore, when examining Trunk Road options, and especially when examining the flyover option, the land formation by physical reclamation in each option is taken into account together with the water areas of the Harbour affected by flyover structures in order to determine which option may serve best to protect and preserve the Harbour in the sense of determining which option has the least impact on the Harbour.

For the Flyover Option, the water area at the southeast corner of the CBTS would be further affected by the new flyover structures for the Trunk Road main line and slip roads in addition to the existing IEC flyover running across it (Figure 4.9 of the Trunk Road Report), and is therefore accounted for as affected water area. The Tunnel Option, on the other hand, would not further affect this (or any) water area of the typhoon shelter as no new flyover structures would be built there.

Under the Flyover Option, the Trunk Road would rise up onto elevated road structure to cross over the ex-PCWA basin, then over Kellett Island (and the CHT portal), and stays on elevated structure to the connection with the existing IEC at the eastern side of the CBTS. The elevated flyover would cut across the middle of the ex-PCWA basin. The marine use of the basin would be restricted and the basin could not be properly used as a marine recreational facility due to the highway bridge piers occupying the water area and the low headroom clearance of the flyover (Section 4.6 particularly paragraphs 4.6.2 and 4.6.5 and Figure 4.10 of the Trunk Road Report).

- (e) Response to the comment on identification of Designated Projects as given in S1.6 (Page 5)
 - (i) As shown in Figure 1.2c and mentioned in S1.6.3, Vol 1, of the EIA Report, the reclamation works (including associated dredging works) at North Point has been identified as a Designated Project under Schedule 2, Part I, C.1 as the total reclamation works (including associated dredging works) are more than 5 ha in size. The environment impact assessment

for the reclamation works at North Point has already been incorporated in this WDII and CWB EIA Report.

- (ii) As highlighted in Figure 1.2a and mentioned in S1.6.3, Vol 1, of the EIA Report, Designated Project DP1 for the Central-Wanchai Bypass includes the demolition of a part of the IEC and connection of the CWB to the IEC. The environmental impact assessment for the demolition of a part of the IEC and the connection of the CWB to the IEC has already been incorporated in this WDII and CWB EIA Report.

(f) Response to the comment on zero portal emission (Page 5-6)

The design assumptions of zero portal emission from the eastern portal of the Trunk Road tunnel are given in paragraphs 2.4.18 (footnote 2), 3.5.7 and 3.6.53 of the EIA Report for WDII and CWB, Volume 1, and in Appendix 15.1 Annex 15.1.

For ease of reference, the assumptions on zero portal emission are repeated as follows:

For a typical unidirectional tunnel, tunnel traffic will create piston effect which will draw outside air from entry portal and drives the induced air to exit portal. Tunnel ventilation system will induce additional outside air to satisfy minimum air quality standard inside the tunnel in the event that piston effect alone is not able to induce adequate outside air to ventilate the tunnel. The tunnel air both induced by tunnel traffic and brought by tunnel ventilation system will escape through exit portal if no extraction system is provided upstream of the exit portal. If a powerful extraction system is provided upstream of the exit portal to extract all the polluted air, it is possible to have a system with “zero portal emission”. The amount of air flow into the tunnel induced by traffic piston effect can be predicted by using the SES (subway environmental simulation) programme under all modes of traffic conditions. The portal extraction system will be designed with over capacity (about 20%) to cover the worst traffic scenario to ensure that no polluted tunnel air will escape through the exit portal. The extraction system will operate at reduced capacity to cover other scenarios when the emission rate of traffic induced air to exit portal is less than the maximum.

The current ventilation system proposed for the CWB project consists of three

extraction fans for the eastern tunnel portal. Two fans will be adequate to extract all polluted air from the upstream tunnel section of the exit portal. The third fan would be used as standby in case one fan is under maintenance or out of order. Airflow direction sensor will be installed at the exit portal to monitor the airflow direction of the tunnel. This sensor will be used to control the operation of tunnel portal extraction system to ensure that the target of "zero portal emission" will be met.

With regard to the validity of reports/information about failure of zero tunnel portal emission design of the Sydney M5 East Tunnel, please be aware that the situation for the Sydney M5 East Tunnel is different from the CWB tunnel:

- (i) The tunnel ventilation design differs in that air is recirculated between the westbound and eastbound tunnel in the Sydney M5 East Tunnel while a direct air extraction system is proposed at the exit portals for the CWB tunnel and there is no recirculation of air between the two tunnel boxes.
- (ii) The M5 East Tunnel is designed for zero portal emission but not designed for the traffic up to the congestion they are having now. Also, they have a problem of high volumes of heavy vehicles with illegal emissions.
- (iii) One of the effects of the above recirculation of air within the tunnels and the higher levels of vehicular emissions than designed for, is poor air quality inside the tunnel and associated poor visibility inside the tunnel. To resolve this problem, air will be deliberately released through the tunnel portal (i.e. tunnel portal emissions) while drawing more clean air into the tunnel to improve the visibility and reduce haze inside the M5 East Tunnel. Thus, the portal emissions arise from operational procedures to overcome in-tunnel air quality problems that arise through traffic congestion levels for which the current ventilation system has not been designed.
- (iv) Other air quality improvements planned for the Sydney M5 East Tunnel include:
 - video identification of pollution-causing heavy vehicles and sending polluting vehicles to the Clean Fleet Program
 - increase ventilation flows with an extra 12 jet fans
 - consider the installation of filtration technology eg electrostatic precipitator.

The CWB tunnel is designed for zero portal emission under a full congestion worst case scenario, and with a buffer over-capacity allowance. There will be no air recirculation and therefore less tunnel length over which the vehicular emissions will build up before extraction, and sufficient ventilation fans will be installed in the first place to ensure adequate air movement through the tunnel. The situation is therefore different from the M5 East Tunnel and the problems that have arisen there would not occur for the CWB tunnel.

- (g) Response to the comment on air sensitive receivers given in Table 3.4 of Vol 1 (Page 6)

The identified air sensitive receivers for assessment are representative receivers to be worst affected by the Project. The landscape deck above the eastern portal of the CWB tunnel is proposed primarily as visual mitigation to the surrounding developments by softening the appearance of the tunnel portal area; it will also serve to mitigate noise at that area. The deck is not designated as public open space and will not be accessible to the public. Only planting (for visual mitigation) is proposed on the deck, there are no air sensitive uses proposed on the landscape deck.

The nearest distances between the dredging/reclamation area and the air sensitive receivers have been considered in the assessment and are presented in the model files which have been submitted to EPD.

- (h) Response to the comment on drilling and breaking construction method given in S2.6.11 of Vol 1 (Page 6)

The purpose of the EIA Study is to provide information on the nature and extent of environmental impacts not to address the safety or risk assessment. The construction method proposed is **technically feasible** as presented below:

Technical Feasibility

The method actually envisaged is a tunnelling method using mining techniques. Under the CHT, the Trunk Road tunnel is quite deep with road levels lower than -30mPD, at which levels it will avoid conflict with the anchors which hold down

the CHT portal and approach ramp structure. Based on available as-built information, these rock anchors are installed to a depth of around -17mPD, therefore the proposed tunnel allows for adequate clearance beneath the anchors.

Technical analyses on the impacts to the CHT during construction have demonstrated that the settlements of ground around the CHT portal and approach roads can be limited to acceptable limits, thus confirming that the scheme is feasible. The proposed scheme will not require the closure of any of the tunnel approach roads, and the concerned roads can be maintained at all time while the construction work is being carried out. Information were given in the CCM Report (paragraphs 3.2.2 (v) and 4.3.3. of the CCM Report refer), which was referenced in S2.4.5 of the EIA Report. The Tunnel Option is technically feasible.

- (i) Response to the comment on selection of the preferred option given in S2.5.34 of Vol 1 (Page 6)

Please refer to the responses given in paragraphs (b) to (d) above.

It should be clarified that the preferred option was derived through a series of options evaluation with respect to various factors including engineering, environmental, traffic and transport, socio-economic, and cost effectiveness. The preferred option presented in the EIA is the one that would avoid or minimize the adverse environmental impacts to the maximum practicable extent. As compared with the Flyover Option in the Approved CWB&IECL EIA Report, a better noise environment to the sensitive receivers in North Point area in the vicinity of the existing IEC (including Victoria Centre, Harbour Heights, City Garden, and Hong Kong Baptist Church Henrietta Secondary School) would be achieved by the Tunnel Option.

- (j) Response to the comment on the consideration of A91 in the construction dust impact assessment given in S3.4.3 of Vol 1 (Page 7)

For construction dust impact assessment, not only predicted pollutants levels at selected ASRs are presented, the pollutants levels at the area in the vicinity of the work sites are also presented in term of contour plot (see Figure 3.7a – 3.17b). Referring to the contour plots, the predicted 1-hour and 24 hour TSP levels at ASR A91 would comply with the EIAO-TM criterion and AQO standards.

- (k) Response to the comment on Figure 3.2 of Vol 1 regarding the location of ASR A92, and omission of FEHD's HK Transport Section Whitfield Depot and Home Affairs Department Causeway Bay Community Centre (Page 7)

Based on the North Point Outline Zoning Plan No. S/H8/21, the areas in between Harbour Heights and City Garden have been zoned as Comprehensive Development Area (1) and Comprehensive Development Area. "Flat" use has been added to Column 2 of the Notes of the "CDA(1)" zone to allow flexibility for residential use. For the land zoned as CDA, according to the revised Planning Brief for the site, residential use should be set back from the Island Eastern Corridor (IEC) for 50m with non-noise sensitive uses to screen the residential use. Therefore, ASR A92 has been assumed at 50m setback from the IEC.

The representative air sensitive receivers who would be worst affected by the Project have selected for assessment. Other than identified representative ASRs, the areas in the vicinity and within the project boundary are all considered in the assessment. The predicted 1-hour and 24-hour average NO₂ and 24-hour average RSP levels at these areas are presented in term of contour plots shown in Figure 3.18 to 3.20. Referring to the contour plots, the 1-hour and 24-hour average NO₂ and 24-hour average RSP levels at FEHD's HK Transport Section Whitfield Depot and Causeway Bay Community Centre would comply with the AQO.

- (l) Response to the comment on zero portal emission and the model of emission at landscaped deck/semi-enclosure as given in S3.5.7 & 3.5.8 of Vol 1 (Page 7-8)

Responses to the comment on zero portal emission shall refer to paragraph (f) above.

Please note that the traffic emission of the IECL underneath the landscaped deck was considered in the assessment. For the proposed landscape deck (like noise semi-enclosure) along the IECL, it was assumed that dispersion of the traffic pollutants would be emitted from the top of the noise semi-enclosures at the open side.

- (m) Response to the comment on the assumption of stability class for the worst case scenario as given in S3.6.47 & 3.6.58 of Vol 1 (Page 8)

According to the traffic forecast, the peak traffic flow occurs in the morning, therefore, corresponding stability class “D” was applied in the model run.

- (n) Response to the comment on the contours of cumulative maximum 1-hour and 24-hour TSP concentration at 5m above ground (Page 8)

For the ASRs at higher elevation, we have also considered in the assessment. For example, we have identified two representative discrete air sensitive receivers, ASR A93 and A94 for City Garden in the assessment to determine the potential dust impact. Results indicated that the max 1-hour and 24-hour TSP levels at these two discrete air sensitive receivers at 5m above ground would comply with the EIAO-TM criteria and AQO respectively.

- (o) Response to the comment on traffic flow increase as given in S4.2.22 of Vol 1 (Page 8)

The traffic flows given in S4.2.22 for with and without project scenarios are based on traffic models which has been agreed with TD for this EIA Study.

- (p) Response to the comment on exceedance of construction noise level by 10 dB at Mayson Garden, and other NP areas for the tunnel option as given in Table 4.9 of Vol 1 and the argument that flyover option is preferred (Page 8)

For the Flyover Option, the Trunk Road still has to be connected to the existing elevated IEC structure and a section of IEC structure has to be demolished as well. The demolished section for the Flyover Option will be even closer to Mayson Garden, Gordon House, Belle House and Victoria Centre than the Tunnel Option. By the same token for the Flyover, exceedance of construction noise standards at some NSRs is anticipated.

Also, referring to the comparison between the original scheme under the Approved CWB&IECL EIA (Flyover Option) and the present scheme under the current EIA (Tunnel Option) in Appendix 2.1 of the EIA Report, construction noise impact between the Flyover Option and Tunnel Option were compared and exceedance of construction noise standards at some NSRs during the construction of Tunnel Option were mentioned.