Environmental Impact Assessment Ordinance (Cap. 499), Section 6(3)
Environmental Impact Assessment Report No. ESB-223/2014

Project Title: Expansion of Hong Kong International Airport into a Three-Runway System

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1	Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP) It was stated in Paragraph 13.4.4.22 of the EIA that "*The SCLKCMP is thought to have been a successful management measure, with CWD densities in the park significantly higher than in most of the surrounding habitat more than a decade later (Hung, 2008)*". **Would the PP please provide the trend in the numbers of CWDs that are regularly using SCLKCMP before and after its establishment?** I would like to know how many individuals have been "depending" on this marine park and the changes in this number over the years. It helps to assess if "marine park" is indeed an effective conservation measure for the CWDs?	The SCLKCMP consistently has some of the highest densities of dolphins in HK. Details are in Hung (2008)[1] and AFCD's Marine Mammals Monitoring Reports (2014),identify that dolphin habitat use patterns between 2009-13 and 2004-08 were largely similar, with the most important dolphin habitats identified being the area around Lung Kwu Chau and along the west coast of Lantau. By all accounts the SCLKCMP has been very effective in assisting dolphin conservation in HK, despite that fact that it was criticised in the early years for being too small, not covering the right areas, and coming too late to help dolphins. Long-term monitoring shows that the SCLKCMP consistently has some of the highest densities of dolphins in HK. As detailed in the EIA section 13.11.5.25, marine protected areas (MPAs) worldwide have become an effective way to help maintain or restore marine habitats, by curtailing fishing (such as set-netting or trawling), industrial activities including shipping and oil and gas development, and giving speed restrictions to watercraft. A review of marine protection areas around the world has been provided in the EIA Appendix 13.15, which indicates that several small MPAs, comparable

[1] Hung, S. K. Y. (2008). Habitat use of Indo-Pacific humpback dolphins (Sousa chinensis) in Hong Kong. Doctoral dissertation, University of Hong Kong, pp. 253.

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		to the smaller sizes available in Hong Kong and being proposed for the new 3RS Marine Park, are providing positive indications that they provide protection and add to the conservation of cetaceans. Effectiveness of the SCLKCMP has also been discussed in EIA section 13.11.5.26 and in Hoyt (2011, p. 342)[2].
2	Pearl River Estuary (PRE) Population of CWDs It was stated in Paragraph 13.4.4.22 of the EIA that "*After nearly 20 years of data collection, detailed scientific studies have shown that the Hong Kong CWDs are part of a larger population in the PRE (estimated to be over 2,500 animals, the largest known of the species anywhere in its range)*". It was also stated in Paragraph 13.4.4.23 that "*With over 2,500 individuals in the PRE as a whole and a lack of evidence for an overall long-term decline in the total population, the population does not appear to be in any immediate danger of extinction. However, modelling studies (Huang et al., 2012) have suggested that within a few generations there is a real extinction risk. While the accuracy of such modelling exercises can be debated, CWDs habitats clearly remain under pressure from human activities*". **Would the PP please provide the temporal changes in the PRE population of the CWDS in the last 20 years?** The overall population trend of the CWD in PRE is crucial in assessing the impact of the 3rd Runway System on this dolphin species. **Under what grounds that the PP considered the accuracy of the modelling studies of Huang et al. 2012 "debatable"? Would the PP please provide another model that is more accurate in predicting the**	There is no available database regarding the temporal changes in the PRE population of the CWDs in the last 20 years in the same way there is for Hong Kong waters and so the trend is not currently known. Regarding the future trend of the PRE population of CWDs, the Huang et al. (2012) study was based on stranding data, which are known to have many significant biases and limitations. The best method of assessing the trend in the PRE population is by long-term assessment of line transect survey estimates of abundance, but to our knowledge this has not yet been done for the PRE population.

[2] Hoyt, E. (2011). Marine Protected Areas for Whales, Dolphins and Porpoises, Second Edition. Earthscan.

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	future trend of the PRE population of CWD?	
3	CWD field surveys conducted in this EIA study It is stated in paragraph 13.4.6.61 that "*Photo-identification of the CWDs sighted was conducted during all of the vessel surveys to provide photographic records of individual CWDs where possible. A total of 54 different individuals were identified, with 117 re-sightings made among them during the surveys*". It is then stated in paragraph 13.4.6.62 that "*Twenty-seven of the identified CWDs were observed only once or twice, and the rest (n=27) were re-identified in the survey areas 3-9 times. For example, NL179 and NL288 were reidentified seven times, and all these re-sightings occurred in airport North region. A mother-calf pair (NL123 and NL285) was re-identified six times, and all except one re-sighting were made in airport North region. Two other mother-calf pairs (NL33 with her calf with no ID yet, and NL264 with her calf NL288) also occurred regularly in the study areas. The re-sightings of manyindividuals three to nine times within the 14-month survey period suggest that a significant portion of individual CWDs has been using the survey areas to the north and west of airport as a significant part of their home ranges.*" According to the data from AFCD, the number of dolphins in HK waters has been declining from around 200 in the 1990s to around 60 today (Hung 2008, 2012, 2013). **In such a case, could the PP confirm that 90% of the dolphins occurring in HK waters are using the study site according to their surveys? And almost 50% of the CWDS in Hong Kong waters use the study site as a "significant part of their home**	We can clarify on the issue of HK CWD numbers. The most recent estimate of HK dolphin numbers is for only NEL, NWL, and WL and it is 62 CWDs (Hung 2014). However, there are also about 10 dolphins each in the SWL and southern Deep Bay areas, so the total number for HK would currently be about 80 dolphins. The 2nd point in your question is not a correct interpretation, and compares 'apples to oranges'. The 27 dolphins that the 3RS EIA identified more than once in the study area is a cumulative number reached over a year of surveys, while the abundance estimates are a 'snapshot'. A more appropriate comparison would be the 27 dolphins identified multiple times in the study area out of the several hundred that are using HK waters as part of their home range. The resulting number would be much less than 50%. Another way to look at it is that at any one time, only a small number (only about 4 of the 80 or so dolphins in HK) are likely to be within the study area.

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	range"?	
4	Impact assessment and evaluation with respect to CWD • It is stated in paragraph 13.8.1.15 that "*The water column of the proposed land formation footprint will be directly disturbed during land formation and seawall construction. There will also be a temporary works area of approximately 981 ha for the land formation works (Drawing No. MCL/P132/EIA/4-008). The temporary works area will be demarcated by floating booms, not expected to cause significant obstruction to the water column. Activities within the works area will include construction vessel traffic and working barges operating close to active works areas within the construction footprint. Thus, much of the area of marine waters within the temporary works area will remain available for use by marine fauna and is not considered as habitat loss*". This 981 ha of works area is much larger than the actual reclamation area of 672 ha on the seabed. However, footnote 1 of Table 13-25 states that "*While a works area for the land formation works will be designated (see Figure 3, Appendix 13.13), the temporary works area will be demarcated by floating booms, not expected to cause significant obstruction to the water column. Activities within the works area will include construction vessel traffic and working barges operating close to active works areas within the construction footprint. Thus, much of the area of marine waters within the temporary works area will remain available for use by CWD and other vessels and is not considered as habitat loss*". **Would the PP please indicate the maximum area of marine water that will be enclosed by the silt curtain, is it 650ha? Could the PP show us the data to prove that CWDs will continue to use the**	The indicative arrangement of areas to be taken up by silt curtains during the course of works has been provided in Appendix 8.9 of the EIA, which indicates that silt curtains are phased with the active work fronts as the 650ha land formation works progress. Due to the large extent of the works areas and the multiple works fronts, deployment of silt curtains to completely surround the entire works area is not feasible and the deployment is targeted for mitigating potential SS impacts to WSRs located to the east and northeast of the project. Appendix 8.9 also shows that additional silt curtains will be deployed as a precautionary measure to cover works areas near remaining seawall gaps . All silt curtains will be located entirely within the boundary of the temporary works area, close to the active works area of the land formation and at any one time will only cover a relatively small portion of the entire 650 ha land formation area. It should be clarified that the temporary works area demarcated by floating booms is not considered as direct habitat loss. However in terms of indirect disturbance, the EIA has accounted for vessel and other construction related activities, determining that dolphin numbers can be expected to temporarily decline in and immediately around the construction works area. We stand by the assessment that large-scale vessel activity related to construction will likely result in dolphins avoiding the general area of construction. Overall, this is adaptive behaviour by dolphins, as it gets them out of potential harm's way. A set of mitigation measures has also been proposed in the EIA for the 3RS construction phase intended to reduce the impacts on CWDs to acceptable levels. These include use of construction methods with minimal risk/disturbance (e.g., non-dredge ground improvement

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	"works area" during the reclamation process probably by using the EM&A data of the HKZMB Border Crossing reclamation work?	methods), water quality mitigation measures, construction vessel speed limits and skipper training, HSF speed restrictions and route diversions, dolphin exclusion zones, acoustic decoupling of construction equipment, spill response plans, etc. With the remaining habitat areas protected as well as possible after construction, these are expected to return to a healthier state, and dolphins can re-inhabit the general area(s).
	• It is stated in paragraph 13.9.1.12 that "*The continued and probably expanded use of the immediate footprint of the 3RS at night indicates that the area might be even more important as CWD habitat than had previously been supposed*" and "*Both airport north and airport west would be considered to be of moderate habitat quality, though it should be recognised that airport west would be considered slightly higher in the moderate range, due to the indications that foraging is going on there, in addition to travelling*". In fact, the importance of the 3RS site to the CWDs at night is mentioned in various paragraphs in Secion 13.9. **Could the PP explain why the night-time data was NOT used in the evaluation of the habitat quality of the 3RS for the CWDS? Should the habitat quality of the study site be rated as moderately high to high taking into account the night time data?**	The EIA has used a combination of 3 types of dolphin survey techniques to collect 12-14 months of project specific data on CWDs. The data have provided information on CWD density and abundance, ranging patterns of individual dolphins, swimming and movement patterns of dolphin groups and responses to vessels as well as daytime and nighttime information on dolphin presence and vocal activity. Such data have facilitated a thorough analysis of how CWDs are utilising the affected habitat and this has been taken into account in the EIA assessment along with reference to the existing long term CWD monitoring datasets. Datasets used in quantifying habitat quality were sufficient in determining that the area to the north of HKIA is used primarily for travelling and is not for example a critical feeding area for CWDs. Passive Acoustic Monitoring (PAM) has been useful for supplementing daytime monitoring data with information on diurnal CWD behavior patterns and on the general noise characteristics of the underwater environment. PAMs are able to detect the presence or absence of dolphins, however data collected does not facilitate distinction between different

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		behaviors (feeding, travelling, etc.) and distance to the dolphins being recorded by the PAM. In addition, this is the first EIA in Hong Kong adopting passive acoustic monitoring as part of a multi faceted data collection approach. The supplemental information provided by PAM has therefore been considered in determining that the area to the north of HKIA is used primarily for travelling and is not for example a critical feeding area for CWDs.
	• It is stated in paragraph 13.9.1.14 that "*Once land formation for this 3RS project is underway, the CWD will essentially be excluded from this zone but, notably, the area to the west will not be directly affected, with the land formation works just slightly extending the west end land node of the current north runway only as shown in Drawing No. MCL/P132/EIA/8-003 and could still be utilised. Notwithstanding that the marine waters to the north will only gradually be taken up and, as per the land formation sequence detailed above, there is evidence (Hung 2008) to suggest that the disturbance from the overall construction works in this area, would result in the CWDs avoiding the area. Thus, the use of this area for travelling and other activities would be lost and it is considered this would force the CWDs further north*". **Would the PP please confirm that the reclamation work on the 3RS will not over-lap with the sub-marine cable work to the west of the airport? According to Table 13-25 and paragraph 13.9.1.7, there is overlap in 2016 at the very least. In such a case, why wasn't cumulative impact assessment to the west of the airport**	The submarine cable has to be diverted outside the land formation area as the existing cables are expected to be damaged by the land formation works. Various options for the submarine cable diversion have been evaluated and the proposed alignment to the west of the airport is selected as the preferred option in view of technical considerations and environmental benefits / dis-benefits as detailed in EIA section 3.7.4. The submarine cable diversion works will overlap with the land formation works in Q1 and Q2 of 2016. During the period, sand blanket laying and ground improvement works are the dominant activities while marine filling works will not be carried out until Q4 of 2016. Water jetting method has been proposed for laying the submarine cable in order to minimise the need for excavation and associated disposal of excavated materials. A 100-500m section of the cable will be laid along the proposed alignment per day for a total length of approximate 6km and the field joint area to connect the diverted cable to the existing cables will be located at least 500 m outside the boundary of Sha Chau and Lung Kwu Chau Marine Park to reduce disturbance

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	included? Should the sub-marine cable not be located to the West of the airport as it was found a major feeding area of the CWD?	to the marine park. The impacts of the submarine cable diversion works have been assessed in different sections in the EIA and as detailed in EIA section 13.9.1.5 and 13.9.2.10, the impact of the temporary habitat loss and indirect disturbance to travelling areas would be small, of short duration and are expected to be reversible once construction works are completed. Assessment on the effects of elevations in suspended solids as detailed in EIA section 13.9.2.29 has already taken into account the assumption that the submarine cable diversion works will be carried out concurrently with the land formation works in the 2016 unmitigated scenario, with sediment loss predicted not to exceed the WQO criterion at the ecological sensitive receivers identified.
5	Noise impacts on CWDs It is stated in paragraph 13.9.2.94 that "*However, the construction vessels will be largely slow-moving barges and crew boats, and while the activities they will be undertaking, backfilling etc, can cause noise disturbance, the noise from the movement of the vessels themselves would not be expected to have a serious impact on CWD behaviour and would be considered to represent a low impact*". **Would the PP please provide evidence e.g. literature to support this paragraph?**	The EIA makes it clear that the overall activities of large numbers of barges, supply vessels, marine works, etc., will likely have the impact of reducing numbers of dolphins in and immediately around the works area. Actual noise disturbance from construction vessels themselves are not expected to cause physical or long-term acoustic harm to dolphins as dolphins are expected to simply keep out of the way, which is an expected reaction by intelligent animals. There are numerous reports and summaries on this, but the best is probably still the treatise by Richardson et al. 1995, Marine Mammals and Noise, Academic Press, San Diego, CA. Note also that in Section 13.9.2.102 of the EIA, it is concluded that the cumulative characteristics of construction noises,

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		noise impacts from rerouted HKIA SkyPier HSFs and other marine traffic and the potentially shortened distance to other traffic within the Urmston road are considered to be of moderate significance and mitigation measures in the form of speed restrictions for SkyPier HSFs, with lower travelling speeds resulting in lower noise impacts, have been proposed to ameliorate the predicted impact.
6	Table 13-30: Summary of Construction Phase Mitigation and Monitoring for Chinese White Dolphins On this table, the "New Marine Park" is put as the mitigation of various construction impacts. **Could the PP please provide an explanation of how a New Marine Park to be established in 2023 be used to mitigate the construction phase impacts from 2016-2022?**	The EIA proposes a set of mitigation measures for the 3RS construction phase impacts intended to reduce identified moderate to high impacts on CWDs as the land formation progresses as far as practicable, these including: • Use of non-dredge methods during land formation to minimise risk / disturbance to the environment e.g. adoption of deep cement mixing for ground improvement work in the contaminated mud pit area; • Complete avoidance of marine percussive piling in the 3RS project along with restrictions on small scale bored piling activities to avoid the CWD peak calving season; • Adoption of 250m Dolphin Exclusion Zones for certain land formation and other marine works; • Adoption of a Horizontal Directional Drilling method through the deep rock stratum for diversion of aviation fuel pipelines to avoid disturbance from the new pipeline alignment on the seabed; • Enforcement of a 10 knots construction vessel speed limit for works vessels, use of predefined and regular routes within Hong Kong waters with construction vessels kept to

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		a practical minimum during 3RS works; • Acoustic decoupling of construction equipment mounted on barges to the greatest extent feasible; and • Diversion of SkyPier high-speed ferries operating to and from Zhuhai and Macau from commencement of construction with speed restrictions for diverted ferries in high CWD abundance areas. The construction phase impact has been assessed as being temporary, reversible and mitigation measures recommended above could reduce the magnitude of impacts that could affect dolphin feeding, behaviour and health to a minimum and are not expected to be significant. Notwithstanding there will be some permanent loss of marine water habitat that will reduce the overall CWD habitat by 650ha. Approximately 2,400 ha of a new marine park is proposed to be designated to practically compensate the permanent habitat loss during the operation phase. The marine park is expected to have the effect of aiding and encouraging the increase of dolphin numbers after completion of construction during the 3RS operational stage, to help allow a recovery of dolphins from the expected negative impacts during the construction process. Without the marine park in place, this would be much less likely to happen. It is expected that the negative impacts to CWD during marine works can be effectively minimized by the proposed mitigation and compensation measures above to acceptable levels.

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7	Proposed New Marine Park **Could the PP please list out the "actual management measures" in the proposed marine park which would enhance its "carrying capacity" for the CWDS? Could the PP estimate the increase in carrying capacity for CWDs in the proposed marine park?**	A full set of the restrictions of marine parks is available from AFCD and these are summarized in Sections 13.11.5.31 to 13.11.5.33 of the EIA. Most relevant to dolphins are the 10 knot speed limit on all vessels, the prohibition of certain fishing methods along with licensed control of fishing activity and the restrictions on future development and recreational activities that could be harmful or disturbing to dolphins. In addition, proposed enhancement measures detailed in Section 13.13 will also be reviewed in light of the marine park designation and the AAHK will consider the potential measures that may serve to enhance the effectiveness of the new Marine Park area, including potential 'fisheries no-take zones' for core protection areas. As detailed in EIA section 13.11.5.40, a management plan for the proposed marine park will be proposed, in consultation with AFCD, covering information on the responsible departments for operation and management (O&M) of the marine park, as well as the O&M duties of each of the departments involved. The management plan will be submitted to Director of Environmental Protection (DEP) for approval before the commissioning of the 3RS project.
8	Vessel speed restriction It is proposed in Section 13.11 that vessel speed limit within marine parks should be 10 knots. For High Speed Ferries from Skypiers, it will be 15 knots outside marine parks but when crossing important CWDs waters. However, it would be 10 knots for construction vessels in waters where CWDs occur. **Would the PP please provide a table summarizing vessel speed limits in overseas marine protected areas that are targeted at dolphins? For**	Previous studies have been summarised in the EIA sections 13.11.5.8-9 although it is acknowledged that the published literature is not absolutely clear on this for dolphins. Overall the slower the vessel speeds in dolphin habitats, the better. It is believed that 10 knots vessel speed is a good criterion to mitigate against hitting dolphins, and such speeds also produce sounds of lower frequency, and thus tend to be out of the range of major communication/echolocation channels of dolphins. Fifteen knots for high-speed ferries is considered as an appropriate compromise of what is best for dolphins and

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	ships entering CWDs waters (but outside marine parks), why would the limit be 15 knots for high speed ferries but 10 for construction vessels?	what is attainable for high-speed ferries without for example having unacceptable impacts for example on passenger well-being. The risks to CWDs decrease as vessel speeds reduce and therefore, any reduction in speed from the 30-40 knots of the HSFs will provide benefit and additional protection to the CWDs.
9	EM&A CWD survey results of the HKZMB Border Crossing Reclamation I noted that the EIA study was completed before substantial EM&A data for the HKZMB was made available. **Would the PP be able to review the most up to date EM&A data of the CWD in HKZMB project?** This will contribute to the impact assessment and evaluation on the CWDs.	It is proposed that an appropriate action-limit level relating to CWD abundance during the 3RS construction phase is developed in agreement with AFCD and EPD prior to the commencement of construction. This shall be based on the latest CWD survey findings including those collected from the baseline monitoring in the EM&A programme and from other sources for example the EM&A data from HKZMB. The above will facilitate an effective ecological monitoring and audit programme during the baseline, construction, post-construction and operation phases of the 3RS project, with the effects on the CWDs to be monitored over the construction period and into operations (after marine park designation), thus helping to determine the effectiveness of the proposed mitigation measures, and to verify predictions in the EIA.