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

Report on the effectiveness of the Marine Travel Routes and Management Plan for High Speed Ferries of SkyPier on Chinese White Dolphins

This paper presents a 12-month review of the effectiveness of the implementation of the Marine Travel Routes and Management Plan for High Speed Ferries of SkyPier (SkyPier Plan) for Chinese White Dolphins (CWDs). This report covers a 12-month survey period, allowing seasonal variation to be accounted for thereby providing higher statistical power and an improved precision of analysis in comparison to the earlier presented 6-month review.

BACKGROUND

2. The Environmental Permit granted to the Airport Authority Hong Kong (AAHK) on the Expansion of Hong Kong International Airport (HKIA) into a Three-Runway System (3RS) required that AAHK develop and submit a SkyPier Plan to the Advisory Council on the Environment (ACE) for comment prior to submitting the plan. Approval of the plan was obtained from Environmental Protection Department (EPD) in November 2015.

3. In the SkyPier Plan, AAHK committed to implementing the CWD mitigation measure requiring SkyPier high speed ferries (HSFs) travelling between HKIA and Zhuhai / Macau to divert their routes away from the narrower navigation corridor between the southern boundary of the Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP) and airport north during construction of the 3RS project to a route north of the SCLKCMP, together with an associated 15-knot speed control across an area with high CWD abundance along the diverted route (i.e. a Speed Control Zone (SCZ)). The primary aim of the route diversion and 15-knot speed restriction in the SCZ is to mitigate the adverse impacts expected from SkyPier HSFs and other vessels using the narrowing navigation corridor between the south of SCLKCMP and the 3RS marine works area during the 3RS construction phase.

4. The route diversion and speed restriction within the SCZ have been implemented since 28 December 2015. The first SkyPier Plan effectiveness report was presented to ACE on 5 September 2016 using 6-month CWD monitoring data collected primarily from vessel line-transect and land-based theodolite tracking surveys between December 2015 and June 2016. This paper provides a further update on the effectiveness of SkyPier Plan mitigation measures including aspects of CWD density and abundance with a full year of CWD monitoring data for the period December 2015 to December 2016.

VESSEL LINE-TRANSECT MONITORING AND LAND-BASED THEODOLITE TRACKING FINDINGS

5. The 12-month CWD monitoring results (both vessel-based and land-based surveys) covered the CWD baseline monitoring period and the first six months of construction phase monitoring. Small vessel line-transect CWD surveys have been carried out over the period in Northeast Lantau (NEL), Northwest Lantau (NWL), West Lantau, Southwest Lantau and Deep Bay using a methodology consistent with on-going long-term AFCD survey effort and land-based theodolite tracking of CWDs has also been undertaken from a Lung Kwu Chau monitoring station. Details of the CWD vessel line-transect monitoring and the land-based theodolite tracking findings are presented in **Annex 1**.

6. The CWD monitoring data collected over the 12-month period indicated that the waters in and near the SCZ, especially the areas around Lung Kwu Chau and the Urmston Road are still being used by CWDs as important habitats, with the waters off Lung Kwu Chau remaining an important foraging area for CWDs. Analysis and interpretation of the 12-month datasets, in conjunction with preliminary analysis of data collected by another independent survey team for the Hong Kong-Zhuhai-Macao Bridge (HKZMB) project, does not support the hypothesis of a decline in dolphin numbers in the NWL survey area in the period coinciding with the implementation of the SkyPier Plan. In fact, the data suggested that CWD numbers in the NWL survey area have apparently stabilized or may even have increased slightly over the monitoring period. During land-based monitoring, vessels were recorded within 500 metres of focal CWD groups, including HSF under speed restriction, HSF travelling at speed, and other vessels. No significant difference was observed in CWD swimming speeds, reorientation rates, or linearity. Co-occurrences of CWDs and SkyPier HSFs operating at below 15 knots were observed with only 200 to 300m separation within the SCZ.

7. While the data from this monitoring effort is not conclusive on differing CWD responses to vessels travelling fast or slowly, the scientific literature is clear that high-speed vessels tend to be avoided by humpback dolphins of the genus *Sousa* and in Hong Kong previous work has shown that dolphins flee in response to vessels moving at high speeds. Therefore, there are good reasons to expect that the slowing down of high-speed vessels, even for only a portion of their routes, results in a lessening in behavioural impacts on CWDs and this appears to be the case for diverted HSFs travelling below 15 knots in the SCZ.

8. With the above observations from the 12-month monitoring effort, it is considered that the SkyPier HSFs, managed in accordance with the controls and requirements stipulated in the SkyPier Plan, are not having any apparent negative behavioural impacts on CWDs, either along the alignment of the diverted route or in the NWL vessel transect area as a whole.

9. As examined in the approved 3RS EIA, the continuation of SkyPier HSFs using the narrowed waters between the southern boundary of the SCLKCMP and airport north during construction of the 3RS project was anticipated to contribute to the closer spacing of vessels and a reduced area for CWDs to surface, leading to increasing risk of being hit by HSFs as well as disturbance from increased anthropogenic noise in the narrowed waters. Based on the findings of this review report, the diverted SkyPier HSFs with speed control measures in place are expected to help reduce risks to CWDs using the narrowing waters between south of SCLKCMP and airport north and at the same time are not resulting in apparent negative impacts on CWDs along the diverted route. The implementation of the SkyPier plan is expected to result in an overall lessening of the negative impacts from 3RS works and associated vessel and other activities on CWDs in North Lantau waters.

10. From the data collected to date, there appears to be good agreement among the AFCD, HKZMB, and 3RS data in terms of CWD numbers and habitat use in Hong Kong. Although the three CWD monitoring efforts involve different observers collecting data, the main findings from all three are very similar. All of the monitoring work indicated that CWDs are not currently using the NEL area during daytime hours, and that the overall numbers of dolphins to the north of Lantau Island (i.e. in NEL and NWL) has decreased, with a clear indication that there has been increasingly extensive use of the waters to the southwest of Lantau Island over the same time period. Such trends will continue to be monitored by the Environmental Team (ET) as part of the on-going CWD monitoring work under the Environmental Monitoring and Audit (EM&A) programme for the 3RS project throughout the construction phase. Regular meetings with EPD and AFCD will continue to be held to review changes in CWD behaviour and abundance in western Hong Kong waters that may result from 3RS project works and to continue to monitor the effectiveness of the mitigation measures adopted under the SkyPier Plan.

11. In summary, the most important findings of this 12-month review of the effectiveness of the SkyPier Plan for CWDs are as follows:

A. Waters around Lung Kwu Chau and the nearby Urmston Road remain an important year-round habitat for CWDs, especially for foraging;
B. There is no evidence of any significant decline in dolphin use of the SkyPier Plan's SCZ around Lung Kwu Chau since the implementation of the SkyPier Plan at the end of 2015;
C. When considering both behavioural disturbance and potential injury/mortality from vessel collisions, the scientific literature and the analyses conducted so far indicate that the mitigation measures from

the SkyPier Plan are not having any apparent negative behavioural impacts on CWDs, either along the alignment of the diverted route or in the NWL vessel transect area as a whole and the SkyPier Plan mitigation measures appear to be effective in reducing the overall negative impacts from 3RS works and associated vessel and other activities on CWDs in North Lantau waters;

D. In general, findings from this study are in good agreement with findings from the long-term CWD monitoring undertaken by AFCD and the long-term CWD monitoring undertaken in conjunction with the HZMB project; and

E. Both Southwest Lantau and West Lantau appear to be being used more extensively in 2016 than in the recent past, likely due to shifting of dolphins away from highly-disturbed habitats in NWL and NEL.

Airport Authority Hong Kong
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