

**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

**Questions submitted by Dr. Gary W J Ades, EIASC, ACE
6 August 2014**

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	Need for the Third Runway	
1	<p>It has been suggested that by around 2020 Guangzhou and Shenzhen will have expanded their existing capacity to 8 runways between them (SCMP, 2 August 2014 Former member of HK airport consultative committee).</p> <p><i>Where is the evidence to support the theory that we will still be competitive with the Mainland in 2023 after their own expansion of air traffic capabilities and cargo handling and how confident can we be that air flight path restrictions will not be more stringent when these neighboring facilities are dealing with significant increases in air traffic?</i></p>	<p>When IATA Consulting conducted the Primary traffic forecast for HKIA in Master Plan 2030, competition from neighbouring airports is a key consideration. IATA Consulting has conducted an overall demand forecast for Greater PRD and it is expected that HKIA's share of the GPRD passenger market will decline from 44% in 2008 to 25% in 2030, and HKIA's share of the GPRD cargo market will decline from 72% in 2008 to 50% in 2030. Considering HKIA's share loss, and all known capacity expansion plans in GPRD airports (HKIA, Guangzhou, Shenzhen, Macau and Zhuhai), IATA Consulting anticipated that by 2030, overall capacity in the GPRD will be 240 million passengers (HKIA without 3rd runway), or 277 million passengers (HKIA with 3rd runway). However, overall demand for the GPRD will be 387 million passengers (with 97 million in HKIA). In other words, even with HKIA's 3rd runway, GPRD demand will still exceed supply by 110 million.</p> <p>For details, please refer to Chapter 14 of the Primary Air Traffic Forecast - Final Report (IATA Consulting) available at the dedicated 3RS website of AAHK: http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx</p> <p>Based on latest review, with some increase in total GPRD airport capacity, forecast demand will still exceed supply by around 100 million passengers -</p>

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		<p>this has considered HKIA with 3 runways, Guangzhou airport with 5 runways, Shenzhen airport with 3 runways, Macau airport with 2 runways and Zhuhai airport with 1 runway.</p> <p>In terms of airspace and flight paths, the Tri-partite Working Group between the Hong Kong, Mainland and Macau aviation authorities has already reached full agreement on how PRD airspace should be managed to meet the needs of GPRD airports, including the three-runway system of HKIA. Concrete steps are being undertaken by the authorities to implement all necessary measures to achieve the objective of cancellation of air traffic flow control in 2020.</p>
	Ecological Impacts	
	<u>Habitat Impacts</u>	
1	<p>We have been hearing the argument that the CWD population will recover after the construction of the new runway and the Chek Lap Kok airport (CLK) case is frequently quoted as an example of recovery or return of CWD to the north Lantau waters following development. <i>Would the HKAA make available baseline CWD population data prior to the construction of CLK airport to demonstrate the claim that the population size was not reduced after the development of the airport was completed?</i></p>	<p>Population Density information from before the airport development does not exist. However, CWD monitoring commenced in 1995 during the construction of the existing Chek Lap Kok Airport. Systematic surveys on CWDs were undertaken before, during, and after the construction of the Aviation Fuel Receiving Facility at Sha Chau as part of the original airport construction between 1995 and 1998. Percussive piling, which was much noisier and riskier for dolphins than the methods proposed for the 3RS project, was employed. The monitoring records showed evidence of a significant drop in CWD numbers, from about 100 around the start of construction to less than 50 during construction. The number quickly returned to about 100 soon after construction was completed. This example provides the best-available indication of what to expect before, during and after construction, as it involved the same sub-population of CWDs.</p>

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	<u>Effectiveness of the proposed Marine Park</u>	
2	<p>In the EIA report a Marine Park is proposed to mitigate impacts such as habitat loss, fragmentation and loss of travel area, during both the construction and operation phases. For a marine park to be effective as a mitigation measure it must be designated and managed in a priority area for the species before the construction begins. In the report the proposed MP is not in the key habitat for the species and also appears only after the construction phase of the project (lasting 7 years). <i>Why is the proposed MP considered to be effective under these circumstances?</i></p>	<p>The proposed marine park is very important for linking the critical habitats of SCLKC and the Brothers and because it will be able to ensure the health of the remaining protected habitat in perpetuity. According to data from AFCD (2014) segments of the proposed new marine park will actually also encompass areas themselves recognised as important CWD habitats.</p> <p>While it is not practicable to designate a marine park in areas that are subject to active marine works it is recognised that marine works will have impacts and these have been assessed in the EIA Report.</p> <p>New Marine Park establishment in advance has been considered, however, it was found to be not practicable to seek to designate the proposed new areas of Marine Park while construction activities for the 3RS project are ongoing (the restrictions of a marine park would themselves preclude the actual construction). It should be noted that the project proponent proposes to commence preparatory work and the process of Marine Park establishment as early as possible. In addition the impacts from marine works have been assessed in the EIA and a number of mitigation measures have been proposed as a precautionary measure and also to minimise any impact on CWDs during the nighttime and from HSF. The range of measures include HSF speed restrictions and route diversions, dolphin exclusion zones, acoustic decoupling of construction equipment, spill response plans, and construction vessel speed limits and skipper training.</p> <p>Effectiveness of the new Marine Park establishment has been assessed during the EIA study and it is considered to be adequate to effectively mitigate the predicted impacts on the CWDs arising from the project to an acceptable level.</p> <p>In the EIA report, the proposed marine park of 2,400 ha will provide an area of nearly 4 times the area lost and create additional key linkages to other current and proposed marine parks and also the mainland population of</p>

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		<p>CWDs.</p> <p>It will provide a very large area in which CWDs will enjoy significant protection from high-speed vessel traffic, excess fishing activities and other human based threats. Thus the marine park will be beneficial in protecting major travelling areas (also used for other behaviors) for the CWD between the "hotspot" of the SCLKCMP, the relative "hotspots" around the Brothers and south and southwest of the existing and expanded airport.</p> <p>In addition, it is generally recognised from international experience that marine parks are most effective when they are large in relation to the ranges of the protected animals and also that they work best when they can provide linkages between areas of core habitat for important life functions and this experience has been utilised in the development of the proposed mitigation for the CWD.</p>
	<u>Loss of CWD Habitat</u>	
3	Section 13.8.1.15. The full impacts of the temporarily impacted open waters of 981 ha on CWDs during the construction phase do not appear to have been appropriately assessed in the EIA.	<p>We believe an accurate worst case has been assessed in the EIA. While a works area for the land formation works will be designated for marine traffic purposes, the temporary works area will be demarcated by floating booms only and will not cause any significant obstruction to water flows and will allow the CWD to pass through the area. 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.</p> <p>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</p>

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	<p>The large number of moving and stationary vessels will effectively present a barrier to the CWDs (at least 300 vessels during the peak construction period as described in the EIA).</p> <p>The silt curtains would also present a barrier to CWD access. In addition to the 650 ha of habitat loss due to the Third Runway footprint, if we include the open water area impacted a total area of 1,631 ha will realistically</p>	<p>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 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.</p> <p>An objective of the good construction site practices is to keep the number of working or stationary vessels present on-site to the minimum anytime and, in addition, all skippers will be trained to provide for safe vessel operations in the presence of CWDs.</p> <p>Construction vessels will travel at low speeds and are not expected to be a significant threat to the CWDs. However, a range of precautionary measures are proposed including use of predefined and regular routes to reduce disturbance to CWDs from vessel activities, a speed limit of 10 knots to be strictly observed for construction vessels; and specific marine routes (both inside and outside the marine works area) to be specified prior to construction commencing; all of these to be defined in a specification to be agreed during the detailed design stage for inclusion in construction contracts. Another of the objectives of the good construction site practices is to keep the number of working or stationary vessels present on-site to the minimum anytime and, in addition, all skippers will be trained to provide for safe vessel operations in the presence of CWDs</p> <p>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</p>

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	not be available to the CWDs during the project construction phase (7 years). <i>Why was this worst case scenario not described or predicted as required in the TM (section 4.3.1 (b)(v))?</i>	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.
	<u>Cumulative Impacts</u>	
4	Since there is discussion about the possible movements of the local dolphins into Chinese waters resulting from the cumulative impacts in the HK waters (Section 13.11.5.35, 13.15.2.2), <i>can the PP provide more objective information about the conditions that the CWD will meet once leaving HK territorial waters?</i> There are already doubts about the suitability of this area which faces periodic dredging of the Tonggu Channel (presenting clear and regular impacts to CWD). It also faces works related to the construction of the HKZMB and also the present and future high speed vessel movements (as shown in Appendix 13.13 and Drawing No. MCL/P132/EIA/13-024). All these disturbances appear in the Core area of the PRE CWD National Nature Reserve, which is considered to be an important CWD refuge in the EIA. Although outside HK Territorial waters the impacts above relate directly to the effects of the current project. <i>Why have the cumulative impacts that the local sub population of CWD would face in Chinese waters not been assessed in the report as this relates directly to the movements and possibly survivorship of the HK population?</i>	<p>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.</p> <p>As stipulated in Section 3.4.10.2 of the Study Brief, the study area for marine ecology shall be the same as the water quality impact assessment i.e. including the North Western Water Control Zone (WCZ), North Western Supplementary WCZ, Deep Bay WCZ, Western Buffer WVCZ, as designated under the Water Pollution Control Ordinance (Cap. 358). During EM&A, dolphin monitoring is proposed during the baseline, construction, post-construction and operation phases of the 3RS, with the aims to monitor the effects on the CWDs over the construction period, and also determine the effectiveness of the mitigation on CWD numbers. An overarching goal of these surveys is to provide a dataset that can be compatible with the AFCD long term monitoring, and be stratified in such a way as to allow the calculation of density and abundance for the various different phases listed</p>

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		above and to facilitate the calculation of trends from these estimates, providing some assessment of how the project and cumulative effect may be impacting the CWDs.
	<u>Vessel Traffic</u>	
5	<p>Sections 13.11.5.3 to 13.11.5.13 of the EIA describe the impacts of the high speed ferries on CWDs and associated mitigation measures. The EIA report indicates that vessel speeds of 10 knots are a practical mitigation to reduce the chance of CWD collision. Section 13.11.5.8 states that based on studies, vessels with speeds between 9-15 knots or speeds equal to and above 14 knots can pose a serious threat to cetaceans. During both the construction and operation phases a speed limit of 15 knots will be imposed in the waters to the north and north east of SCLKCMP which have high CWD density. <i>Given the information provided in the EIA, why does the PP still consider that this speed limit is valid?</i></p>	<p>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 what is attainable for high-speed ferries without for example having unacceptable impacts for example on passenger wellbeing. 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.</p>
6	<p>The proposed vessel arrangement (Drawing No. MCL/P132/EIA/13-024) and the presence of the works area and later the proposed MP will result in a busier Urmston Road and surrounding waters which will be the remaining corridor for the CWD to move between the north west and north east Lantau waters during both the construction and operation phases. At the narrowest point of this corridor only a portion (940m during the operation phase) will be protected. <i>Have the PP assessed the impact of the increased marine traffic including high speed vessels with no speed limit, on the CWDs moving in the remaining corridor? Can the PP be</i></p>	<p>The potential changes in movement patterns of CWDs resulting from construction and operational phase marine traffic, including acoustic disturbance and injury/mortality, have been assessed to be of moderate-high and high impact significance, requiring mitigation.</p> <p>Assessments in the EIA identify that construction vessels will largely be slow-moving barges / crew boats, with noise from these vessel activities themselves not expected to have a serious impact on CWD behavior and such noise is therefore considered to represent a low impact.</p> <p>The cumulative characteristics of construction noises, noise impacts from the rerouted HKIA SkyPier HSFs and other marine traffic and the potentially</p>

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	<p><i>sure that CWDs will move predominantly in the protected area?</i></p>	<p>shortened distance to other traffic within the Urmston Road are considered to be of moderate impact significance and mitigation measures in the form of speed restrictions for SkyPier HSFs, with lower travelling speeds resulting in lower noise impacts, are proposed to ameliorate these predicted impacts.</p> <p>Other mitigation measures have been proposed as precautionary measures to minimise the acoustic disturbance to dolphins. These include setting up of dolphin exclusion zones, acoustic decoupling of construction equipment, construction vessel speed limits and use predefined and regular routes to reduce disturbance to cetaceans due to vessel movements and skipper training on safe vessel operations near CWDs.</p> <p>The EM&A will monitor the actual numbers of HSFs utilizing the SkyPier in future years, by obtaining vessel movement numbers directly from the SkyPier operators, as the HZMB and HKBCF commence operations. The proposed HSF speed limit controls as detailed are expected to be effective in reducing HSF impacts on CWDs given that the future proportion of SkyPier HSFs would reduce to about 60% of the total in the channel between HKIA and Sha Chau, thereby reducing both the physical threat from fast moving HSFs and the high noise levels known to be generated by HSFs travelling at speeds of over 30 knots. It should be noted that the speed of marine vessels, compared to the volume of traffic, is a fundamental factor in the risk of injury/mortality and noise disturbance for CWDs.</p>
7	<p>Appendix 13.13 indicates that there will be an increase in marine traffic from the Sky pier. <i>Has there been any quantitative assessment of the acoustic impact of this increase on the proposed MP which the vessels will enter shortly after leaving the Skypier? Based on what scientific data does the PP consider that this would not impact on the effectiveness of the proposed MP as a movement corridor for the CWD?</i></p>	<p>Clauses 3(iii)(d) & 3(v)(f) in Appendix F of EIA-SB requires “underwater acoustic study to collect data on anthropogenic noises generated by vessel traffic (e.g. examination of the noise characteristics of vessels departing from and arriving at the SkyPier), and acoustic behaviour of dolphins (e.g. in the presence and absence of vessel noise) for detailed assessment of acoustic disturbance to the CWDs associated with underwater noise, including pilling, noise generated from additional work barges and vessels during the construction phase, and long term increase in underwater noise disturbance caused by the predicted changes in marine traffic during the operation</p>

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		<p>phase”.</p> <p>There is extensive literature on the effects of noise on cetaceans and this has been reviewed in full. In addition, anthropogenic noises information including sounds of shipping, industrial noises from a barge or from dredging works were collected by passive acoustic monitoring, for further evaluation of acoustic habitat of CWDs and the impacts of anthropogenic noise. Noise generated by vessel traffic travelling at vary speeds to provide day and nighttime information on the acoustic behaviour of dolphins (e.g. in the presence and absence of vessel noise) for use in the detailed assessment of the CWDs.</p> <p>Assessments in the EIA identify that construction vessels will largely be slow-moving barges / crew boats, with noise from these vessel activities themselves not expected to have a serious impact on CWD behavior. And 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.</p> <p>The cumulative characteristics of construction noises, noise impacts from the 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 impact significance and mitigation measures in the form of speed restrictions for SkyPier HSFs, with lower travelling speeds resulting in lower noise impacts, will be needed to ameliorate the predicted impact.</p> <p>Other mitigation measures have been proposed as precautionary measures to minimise the acoustic disturbance to dolphins. These include setting up of dolphin exclusion zone, acoustic decoupling of construction equipment and construction vessel speed limits and skipper training.</p>

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8	<p>The EIA report appears to have failed the study brief requirement related to the study of the man-made noise generated by <u>vessel traffic</u> (Appendix F, section 3 (iii) (d)) other than the HSFs for which several references have been provided. The study of other vessels should include all types of construction boats and transport boats and the cumulative negative impacts of the generated noise from these boats in the works area (at least 300 boats in the works area during peak construction phase). The report cannot assume that these vessels will not create any noise impacts on dolphins without a detailed study to back up such assumption. <i>Can the PP provide more details on predicted impacts of the construction vessels using figures of likely daily traffic and generated noise during the peak construction period?</i></p>	<p>See response to item 7 above.</p>
9	<p>The Third Runway is effectively fragmenting the CWD habitat reducing the value of the Brother's Marine Park and creating open water no go zones. It appears that the marine traffic arrangement and proposed MP would not be completely effective in mitigating this impact. <i>What further measures can be provided to adequately comply with the requirements of the Study Brief and TM-EIAO?</i></p>	<p>The EIA has concluded that with the mitigation and compensation measures – including the proposed new marine park and proposals on SkyPier High speed ferry route diversions and speed controls – as proposed and detailed above, the residual impacts of the development can be reduced to a level that is acceptable in accordance with the requirements of the SB and TM.</p>
	<p><u>Terrestrial Impacts</u></p>	
10	<p>Since the Sha Chau Egretty is considered one of the largest colonies in HK and therefore has local conservation importance, <i>why were assessments of the impacts of noise and light pollution not provided in Chapter 12 of the report?</i> More scientific evidence is required to support the conclusion that the Sha Chau Egretty will face only moderate impacts during construction and there would not be significant impact</p>	<p>Noise impact on Sha Chau Egretty by minor construction works is addressed in S. 12.6.3.6; noise disturbance during operation phase is addressed in S.12.6.5.</p> <p>Light and glare effect to birds is addressed in S.12.6.4.6.</p> <p>Separation distance between the third runway and the egretty will remain over 1 km, therefore the impact due to operation of 3RS on the egretty is</p>

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	during the operation phase (12.7.2.6 Table 12.12)	<p>anticipated to be negligible. Other example of an egret on island habitat is that of Little Green Island, which is less than 1km away from a highly illuminated urbanized area and heavy traffic but still can show adaptive behavior.</p> <p>Only a small works area (10m x 10m) would be required for receiving and connecting the pipelines to the existing the Aviation Fuel Receiving Facility on the Sheung Sha Chau island. The proposed zone where daylighting is planned to occur has been moved northwards from the initial proposed location, specifically to avoid encroaching onto the existing Sha Chau Egret and to facilitate provision of a buffer distance in-between. Nevertheless, the construction impact is assessed as moderate owing to the ecological importance of the egret. To minimize disturbance to the ardeids, the EIA recommends that all HDD related works on the island shall be done outside the ardeids' breeding season and shall avoid night time works during all seasons (except during any unexpected emergency or contingency events). In addition, a pre-construction survey of the egret will be undertaken before commencement of HDD works to allow the proposed daylighting location to be determined with the most up to date information on the egret to hand, With the aforementioned measures in place, it is anticipated that impacts on Sha Chau Egret would be low.</p>

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	Peak Oil and Social and Environmental Impact Assessment (S&EI)	
11	Peak Oil is the peaking of global oil production which will be followed by an ever-decreasing flow of supply and ever-increasing oil costs, and this has been documented by leading analysts to be either imminent or to have already arrived. <i>Why has this phenomenon not been considered in the report to provide a more holistic view of the possible economic climate under which the new airport developments will take place?</i>	<p>Tremendous air traffic growth materialized since the 2000's in spite of the sizeable increase in oil prices (from 25\$ per barrel in 2000 to 103\$ in 2012 - in 2010 real US\$). The increase in fuel efficiency (5% p.a. representing about 50% since 2000) helped mitigating the impact of fuel increase on airline finances hence air travel competitiveness.</p> <p>Forecasters have a different appreciation of future trends on oil prices. The economist IHS Global Insight expects oil prices (in real price) to remain stable over the forecasting horizon while the US Energy Information Administration anticipates in their reference scenario a 0.8% annual increase between 2012 to 2040:</p> <p>http://www.eia.gov/forecasts/aeo/MT_intl.cfm#oilprice</p> <p>Given that fuel accounts for about 25% to 50% of airline costs (depending on the flight range), a 0.8% surge in crude oil price would result in a 0.2% to 0.4% increase in airline costs. New aircraft design and new engine technologies are expected to bring a yearly decrease in fuel consumption. For HKIA, such a decrease is estimated to represent an average -0.8% per annum decrease (on the Landing and Take-Off cycle only), thus offsetting the oil price increase foreseen by the US Government analysts. Additional gains are also expected to further decrease the fuel bill: airspace/infrastructure redesign, airline fuel saving policy, introduction of biofuel.</p> <p>IATA took this information into consideration when carrying out the forecast and estimated that stable or even reasonably increasing oil prices (in real terms) will not alter the forecasted growth.</p>

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12	<p>During the 188th ACE meeting held on 15th October 2012, a representative of the HKAA claimed that the authority was working on the scope of study of the S&EI and would undertake such an assessment which would look at social impacts on society related to airport development. <i>Now that the EIA report is available will the S&EI report follow?</i></p>	<ul style="list-style-type: none"> • AA has conducted a scoping study for valuing externalities. In the scoping study, we have researched over 140 impact assessments for infrastructure projects in other countries and none of them applied the Social Return on Investment (SROI) framework except for the nef Study for Heathrow. Our research findings showed that SROI is primarily a framework used by the voluntary/ charity sector on projects with small and defined social impact. It is not meant for mega infrastructure projects with multiple impacts. In general, there is a lack of commonly accepted standards and approaches for valuing externalities and majority of the impact assessments we have seen do not quantify externalities at all. Therefore AA confirmed that an SROI Study will not be conducted for the Three Runway System (3RS) project. • However, we do recognise carbon emission is an important externality that is more commonly monetised in a small number of impact assessments. It is also an externality that has more commonly accepted methodology for evaluation. Therefore, AA has conducted a Carbon Emissions Study to evaluate the impact of the project to climate change. The final report of the Study will be available shortly.