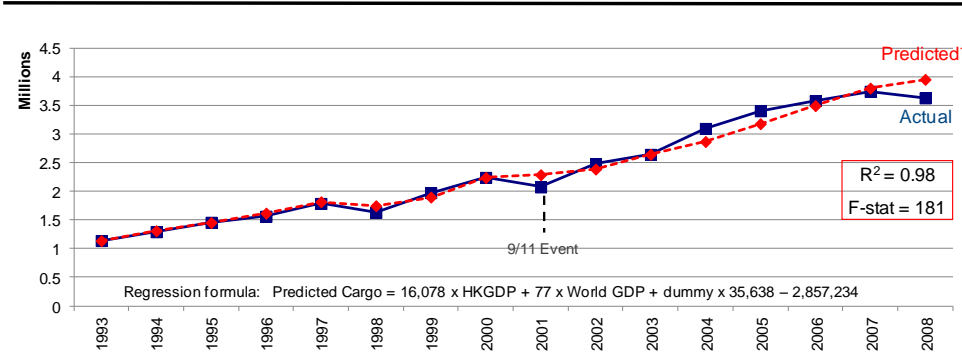
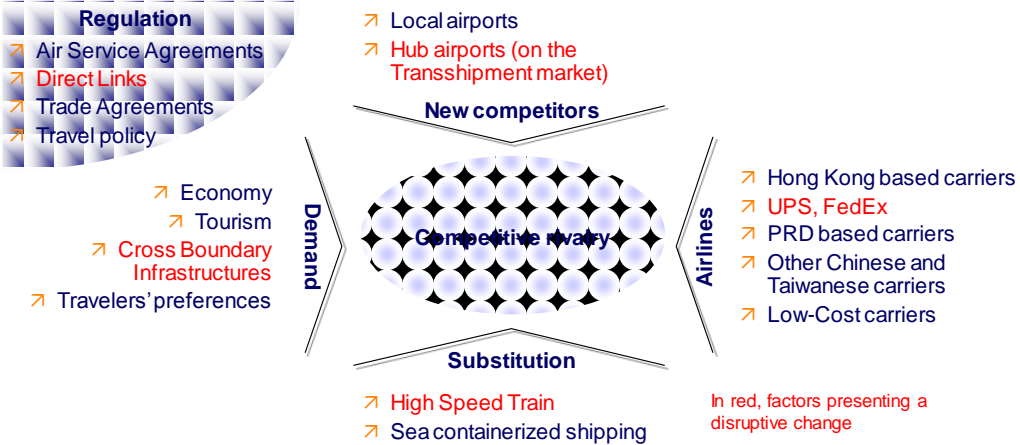


## EIA for proposed expansion of Hong Kong International Airport into a three-runway system

*Answers to questions of 30 July 2014 received from Dr. HUNG Wing-tat, Vice-Chair, EIASC, ACE*

Item No.	Questions	Responses
	<p><u>EIA Report Chapter 2: Need of the Project</u></p> <p>EIA TM para. 4.4.2 (e)- whether the assumptions and methodologies used are sound and adequate</p>	
1	<p>1. Regarding the need of the third runway, there are many standard textbook well established methods to estimate the future air traffic demands, such as the regression and market analysis approaches which are based on scientific facts and evidence of a specific airport. The project proponent commissioned IATA to conduct the air traffic forecasting. IATA has chosen the simplest regression method based on GDP alone. In Appendix 2.1, IATA stated that they have employed the parameters specific to HKIA, such as historical traffic numbers, fleet mix, passenger and cargo load factors and the market evolution over the PRD. These data and the regression results have not been shown in the EIA report, can the project proponent supply these data and the</p>	<p>The GDP regression based forecasting approach adopted by IATA Consulting for HKIA follows industry best practices. Based on detailed forecasting study conducted for Master Plan 2030 (MP2030), IATA Consulting concluded that for Hong Kong, the regression results showed that the best correlation for passenger traffic at HKIA was with HKSAR GDP (R square of 99%), and the best correlation for cargo traffic at HKIA was with HKSAR and World GDP (R square of 98%).</p> <p style="text-align: center;">Actual and predicted<sup>1</sup> HKIA passenger traffic in million passengers – 1993 to 2008</p> <p style="text-align: center;">Regression formula: Predicted Pax = 216,115 x HKGDP – dummy x 8,121,264 – 2,195,571</p> <p style="text-align: center;">Source: AAHK traffic data, IATA estimates Note: Year 2003 is dummy due to the impact of SARS Outbreak</p> <p style="text-align: center;"><sup>1</sup> Predicted traffic is derived from the equation</p>

Item No.	Questions	Responses
	regression on GDP results?	<p data-bbox="913 276 1904 304">Actual and predicted<sup>1</sup> HKIA cargo traffic in million tonnes of cargo – 1993 to 2008</p>  <p data-bbox="929 694 1323 730">Source: AAHK traffic data, IATA estimates Note: Year 2001 is dummy due to the impact of 9/11 event</p> <p data-bbox="1541 703 1854 722"><sup>1</sup> Predicted traffic is derived from the equation</p> <p data-bbox="788 767 2060 866">Detailed HKIA historical traffic numbers, fleet mix, market development for the PRD and Mainland, and forecasting results for MP2030 can be found in MP2030 Technical Report and the Primary Air Traffic Forecast – Final Report (IATA Consulting), which are available in the public domain at:</p> <p data-bbox="788 871 1684 900"><a href="http://www.threerunwaysystem.com/en/Information/Tech_report.aspx">http://www.threerunwaysystem.com/en/Information/Tech_report.aspx</a></p> <p data-bbox="788 904 1794 933"><a href="http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx">http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx</a></p> <p data-bbox="788 970 2069 1102">As the EIA preparation started in early 2012, soon after the MP2030 publication in 2011, instead of conducting a full long term forecast again, AA has asked IATA Consulting to review the MP2030 forecast, make necessary updates and develop further details. In particular, AA has asked IATA to look into three major areas:</p> <ol data-bbox="837 1107 2085 1310" style="list-style-type: none"> <li>1. Reasons why actual traffic from 2008 to 2011 has exceeded MP2030 forecast;</li> <li>2. Based on latest review of HKIA capacity, incorporate capacity constraints for 2RS (420,000 ATM) and 3RS (620,000) into the forecast, and</li> <li>3. Extend the forecast to 2038 (i.e., up to 15 years after the opening of the proposed 3<sup>rd</sup> runway expected in 2023) for use in identifying the worst assessment year in the operational air quality and aircraft noise impact assessments.</li> </ol> <p data-bbox="788 1347 2089 1375">Based on review, IATA Consulting has concluded that the underestimated GDP assumptions are the</p>

Item No.	Questions	Responses
		<p>main reason for the gap between the MP2030 forecasted and actual traffic in 2008-2011. This is because at the time of global economic crisis in 2008/ 09, the economists have relatively pessimistic view on the speed of economic recovery following the crisis. Nevertheless, IATA Consulting observed good fit of model predicted traffic results with actual traffic when the actual GDPs are adopted for 2008-2011, and concluded that the forecasting model adopted in MP2030 are still valid for HKIA (Please refer to EIA Report Volume 2, Appendix 2.1).</p>
2	<p>2. To estimate the future use of the airport, I would expect the project proponent to at least provide some facts and analytical figures regarding the current users, for example, types and number of various aircrafts/ airlines as well as types and number of passengers ( business, recreational, social etc), and, how these user' behavior changes over time and future years. Without these basic facts and analytical figures, how did the project proponent come up with any convincing projected demands? When the project proponent claims that people has less choices with the third runway, what choices are available? Which destinations that are available today will not be available in the future?</p>	<p>In MP2030, IATA Consulting has indeed taken into consideration all relevant facts and analyses needed for the traffic forecast including types and number of aircraft/ airlines, tourism trends, travelers' preferences and so on. The important market forces and factors considered by IATA Consulting are illustrated below:</p>  <p><b>Regulation</b></p> <ul style="list-style-type: none"> <li>➤ Air Service Agreements</li> <li>➤ Direct Links</li> <li>➤ Trade Agreements</li> <li>➤ Travel policy</li> </ul> <p><b>Demand</b></p> <ul style="list-style-type: none"> <li>➤ Economy</li> <li>➤ Tourism</li> <li>➤ Cross Boundary Infrastructures</li> <li>➤ Travelers' preferences</li> </ul> <p><b>New competitors</b></p> <ul style="list-style-type: none"> <li>➤ Local airports</li> <li>➤ Hub airports (on the Transshipment market)</li> </ul> <p><b>Airlines</b></p> <ul style="list-style-type: none"> <li>➤ Hong Kong based carriers</li> <li>➤ UPS, FedEx</li> <li>➤ PRD based carriers</li> <li>➤ Other Chinese and Taiwanese carriers</li> <li>➤ Low-Cost carriers</li> </ul> <p><b>Substitution</b></p> <ul style="list-style-type: none"> <li>➤ High Speed Train</li> <li>➤ Sea containerized shipping</li> </ul> <p>In red, factors presenting a disruptive change</p> <p>For detailed analysis on each factor considered, please refer to MP2030 Technical Report and the Primary Air Traffic Forecast – Final Report (IATA Consulting) available at:  <a href="http://www.threerunwaysystem.com/en/Information/Tech_report.aspx">http://www.threerunwaysystem.com/en/Information/Tech_report.aspx</a>  <a href="http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx">http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx</a></p> <p>Based on observations made on other major capacity constrained airports around the world, it is evident that once an airport reaches saturation, network growth will slow down (or shrink), it will be</p>

Item No.	Questions	Responses
		<p>harder to introduce new airlines (hence less competition on a given route), and frequency addition will be difficult. As a result, people will have less choice in terms of destination, frequency and airlines. While this is a common phenomenon, ultimately it is the airline's decision to determine which destinations to fly/ not fly based on market demand.</p>
3	<p>3. The air traffic forecasting methodology adopted by IATA for HKIA may not have followed the ACI Airport Traffic Forecasting Manual: A practical guide addressing best practices 2011. The ACI Manual specifies a much more convincing data set required for a proper forecast than that described in this EIA report Appendix 2.1. Can the project proponent explain why the best practice has not been followed?</p>	<p>The approach followed by IATA Consulting to forecast the future unconstrained demand was developed in detail in MP2030. This approach is aligned with best practices, especially in terms of data that have been used. Not only ACI, but also ICAO and IATA have developed forecasting best practices based on their day-to-day experience of aviation forecasting. These best practices are in general very similar.</p> <p>Regarding preparation of airport traffic forecast, ACI Airport Traffic Forecasting Manual recommends that the following variables be considered: GDP, Consumer Expenditure, Foreign Trade volumes, air fares, exchange rates. These variables have been considered, tested and commented on by IATA Consulting in the MP2030 forecast study report.</p> <p>Regarding consideration of non-economic drivers in the forecast, ACI Airport Traffic Forecasting Manual recommends that the following factors to be considered: e.g. competition with other airports, competition with other modes of transport, political change, imposition of constraints or lifelong constraints in the form of hotel accommodation and airport capacity constraints. These non-economic drivers are covered at length in the MP2030 forecast study report.</p> <p>In order to be exhaustive and address all potential drivers, several other factors (beyond the ones listed by ACI Airport Traffic Forecasting Manual) were studied by IATA Consulting, and their impact on Hong Kong aviation assessed: Cross-strait direct Links, China and Hong Kong aviation policy, China and Hong Kong trade policy, China and Hong Kong immigration policy, airline strategies and cargo players strategies, fleet strategies, Hong Kong-China Cross-Boundary Infrastructure Development and air-sea modal competition.</p> <p>Details on MP2030 forecasting methodology and various factors considered can be found in MP2030 Technical Report and the Primary Air Traffic Forecast – Final Report (IATA Consulting).  <a href="http://www.threerunwaysystem.com/en/Information/Tech_report.aspx">http://www.threerunwaysystem.com/en/Information/Tech_report.aspx</a>  <a href="http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx">http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx</a></p>

Item No.	Questions	Responses
4	<p>4. Regarding air space usage in PRD, flights to/from HKIA using PRD airspace accounted for 21% of the total flights served by HKIA in 2012 ( para. 2.3.6.6), the EIA report states "it is not expected that growing usage of PRD airspace would affect the viability of capacity expansion at HKIA". Can the project proponent support this statement with concrete evidence? Else, the statement is simply an expression of a wishful thinking. The 21% of flight being potentially adversely affected is a crucial restraint to the capacity of the HKIA!!!</p>	<p>As already pointed out in Para. 2.3.6.6 of the EIA report, "there is a plan agreed among relevant civil aviation authorities of Mainland, Macao and Hong Kong to address the issues relating to optimizing PRD airspace." Relevant information that illustrates the latest development is available in the public domain. For example, in a relevant written reply of Oct 23, 2013 provided by the Administration to the Legislative Council (available at: <a href="http://www.info.gov.hk/gia/general/201310/23/P201310230259.htm">http://www.info.gov.hk/gia/general/201310/23/P201310230259.htm</a> ), it can be noted that:</p> <ul style="list-style-type: none"> <li>• CAD has been discussing with the Civil Aviation Administration of China and the Macao Civil Aviation Authority to enhance the utilisation of the Pearl River Delta (PRD) airspace. The tripartite working group has reached consensus in adopting the principles of joint airspace planning, use of common standards and harmonised flight procedure design with a specific objective to plan for the optimisation of the PRD airspace structure by 2020;</li> <li>• With this understanding, the tripartite working group has agreed to gradually optimise the structure and management of the PRD airspace in the medium to long term, and to progressively establish a Southern PRD air traffic management region covering airports in Hong Kong, Shenzhen, Macao and Zhuhai. This will enhance coordination of air traffic management within the PRD region, making it less complicated and improving efficiency in flight operations. Furthermore, with air traffic control standards and procedures being harmonised progressively, the use of airspace and the efficiency in air traffic control operations will improve. With these improvements in place, the PRD region can cope with the anticipated air traffic growth within the region to some 5 000 aircraft movements per day by 2020;</li> <li>• The above improvement measures have fully taken into account HKIA's three-runway operating mode and its demand for airspace, thus supporting the expected air traffic volume of 620 000 flight movements till 2032.</li> </ul>
5	<p>5. Paragraph 4.4.2(g) of the TM requires the EIA Report to consider "whether the assessment has considered and compared the environmental benefits and disbenefits of various scenarios with</p>	<p>To fulfil the requirements of Clause 3.3.2 of the EIA Study Brief, the environmental benefits and disbenefits under various alternative development options of the project (including different layouts of third runway concourse, terminal 2 expansions and associated road network, options for diversion of 11 kV S submarine cable and aviation fuel pipeline) have been considered and compared in Sections 3.4.4 and 3.5 of the EIA Report. To meet the requirements of Clause 3.3.3 of the EIA Study Brief, the environmental benefits and disbenefits of different alternative construction methods have been</p>

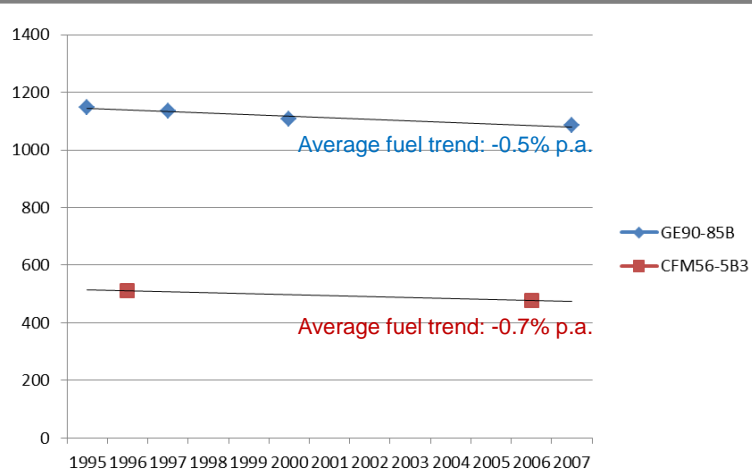
Item No.	Questions	Responses
	<p>or without the project", it appears that this EIA Report has only covered the effects with the project. Can the project proponent provide comparison figures of environmental benefits and disbenefits with or without the third runway?</p>	<p>considered and compared in Sections 3.6 and 3.7 of the EIA Report.</p> <p>The consequences of not proceeding with the project, which are largely disbenefits, are discussed in Section 2.5. The environmental benefits and disbenefits without the project have also been considered and compared in Section 2.5.4.</p>
6	<p><u>EIA report Chapter 5 - Air Quality</u></p> <p>1. Appendix 5.2.23: the assumption of 12 times of water spraying per 24 hour day does not appear to be a reasonable assumption; can the project proponent specify the area of application? and what sort of spraying equipment will be provided and how many of these spraying equipment will be stalled?</p>	<p>The construction phase air quality assessment adopted a conservative approach of assuming that the key construction works will be carried out 24 hours per day and 7 days per week throughout the relevant construction years (see Section 5.2.4.14). As discussed in Section 5.2.6.2 of EIA Report, it is recommended to perform water spraying at a frequency of once every 2 hours for 24-hour working (hence 12 times per day) for heavy construction activities at all active work area. Heavy construction activities include ground excavation, cut and fill operations (i.e. earth moving), construction of roads, drilling, etc. This recommendation is considered reasonable and practical based on experience from many other projects in Hong Kong.</p> <p>The types and quantities of water spraying equipment to be employed will be determined by the construction contractors depending on the actual site conditions. As an example, water spraying can be performed by using water sprinkler system.</p>
7	<p>2. With regard to NOx emissions, IATA consulting pointed out that current situation at HKIA has a size able room for improvement, what will HKIA do to improve the current situation of these existing aircrafts NOx emissions? In fact, para. 5.1.3.14 of the EIA report admitted that there was a well-defined and</p>	<p>On page 17 of Appendix 5.3.1-2b where the mentioned statement can be found, IATA has actually estimated that on average, HKIA 2011 busy day ATM engine NOx emissions were 3% below the CAEP/6, while 13% above the latest CAEP/8. IATA therefore made the point that HKIA will fully benefit from the introduction of new aircraft/ engines that should stand between 30% to 50% below CAEP/8 requirements.</p> <p>It is worth noting that in the face of rising fuel costs and concern over the environment, many airlines have already speed up the introduction of new aircraft models that are quieter, more fuel-efficient, and generate fewer emissions. For instance, it is understood that Cathay Pacific Airways, Hong Kong's homebase carrier, has been planning to introduce more than 80 new-model airplanes</p>

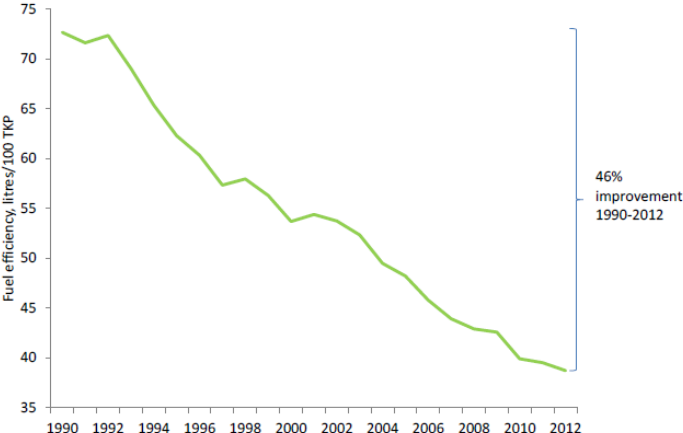
Item No.	Questions	Responses
	clear contribution of HKIA emissions to local NO <sub>x</sub> levels of 3-20%.	<p>between now and 2024.</p> <p>AAHK is committed to reducing air emissions at HKIA. As discussed in Section 5.5.2.8, AAHK has been implementing a number of measures and initiatives aimed at further reduction in air emissions from airport activities and operation and air quality will remain a key focus of AAHK's rolling environmental plan. Examples of the stated measures include banning the use of APU for all aircraft at frontal stands by end 2014 and requiring all saloon vehicles as electric vehicles by end 2017.</p> <p>While Section 5.1.3.14 summarised the key findings of the HKUST 2010 Airport Operational Air Quality Study (available in the public domain at: <a href="http://www.hongkongairport.com/eng/csr/environmental-management/DraftAOAQSReport.pdf">http://www.hongkongairport.com/eng/csr/environmental-management/DraftAOAQSReport.pdf</a>), from the air quality modelling results presented in Table 5.5.2, it can also be noted that nitrogen dioxide originating from airport operation under 3RS will account for only about 2µg/m<sup>3</sup> of the annual NO<sub>2</sub> concentrations (i.e., 5% of AQO limit) at Tung Chung. According to, for example, the definition of the impact magnitude for changes in ambient pollutant concentrations recommended by the Institute of Air Quality Management (UK), a change of the order of 1-5% of the annual AQO limit can be regarded as small.</p>
8	3. Table 5.3.59 of the EIA report provides a summary of emissions for the 3RS and 2RS. It clearly demonstrates that the emissions of 2RS are substantially less than the 3RS. If all other conditions are same, should the 2RS give a much better air quality than the 3RS?	<p>In addition to the mentioned Table 5.3.59 which has presented a summary of the emissions inventory for airport related activities in year 2031 for 3RS and 2RS, it shall be noted that the quantified changes in pollutant concentrations between the 3RS and 2RS operations are also relevant and these are as presented in Tables 5.3.96, 5.3.101 and 5.3.106 for NO<sub>2</sub>, RSP and FSP respectively. As shown in Table 5.3.96, the change in annual NO<sub>2</sub> concentrations between 3RS and 2RS would be up to only 1µg/m<sup>3</sup> (i.e., 2.5% of AQO), supporting that the impact of the proposed third runway is not significant.</p> <p>It shall also be noted that it would not be valid to assume that all conditions could be made the same under 3RS and 2RS. The fact is that without the third runway, dominant aircraft departures, which are associated with more emissions than arrivals, would need to take place on the south runway (under 2RS), which is situated closer to the ASRs in north Lantau, instead of being shifted to the centre runway (under 3RS) during daytime operation. During the night-time period when there will be less aircraft movements, without the third runway, it will neither be possible to introduce the flexibility</p>

Item No.	Questions	Responses
		<p>of assigning the existing south runway on standby. The reduction in annual NO<sub>2</sub> concentration predicted at Sha Lo Wan under 3RS when compared with the 2RS scenario has well demonstrated the above-mentioned positive effects associated with the 3RS on the air quality aspect.</p> <p>Besides, as pointed out in Section 2.5.4, it shall be noted that without the third runway, air traffic congestion is expected to increase, leading to increased holding times for take-off and landing and this would also increase aircraft emissions both on the ground (while aircraft wait for take-off, or wait for a vacant parking stand) and in the local airspace (while aircraft wait to land).</p>
	<u>Sound Methodology?</u>	
9	1. In Appendices 5.3.1, aircraft LTO schedule, aircraft types, aircraft engine model and number of engine are taken from IATA, Why these data were not obtained locally from CAD?	<p>For historical flight data that are relevant and useful for establishing the air traffic forecast, IATA used the available data obtained from CAD. For other relevant information required for forecasting the future busy day schedules that would not be available from CAD, IATA had to obtain the best available information from other sources, including that obtained from ACAS, a leading database that provides detailed technical information on 100,000 aircraft.</p>
10	2. How did the aircraft emission model be validated? What is the validated result?	<p>It shall be noted that the latest version of the Emissions and Dispersion Modelling System (EDMS), which is the required model of US Federal Aviation Administration (FAA) for similar air quality analyses for aviation emission sources, has been used in the operation air quality study in accordance with the EIA Study Brief requirements.</p> <p>EDMS is one of the few air quality assessment tools specifically engineered for the aviation community. It includes the latest aircraft engine emission factors from the International Civil Aviation Organization (ICAO) engine exhaust emissions databank, on-road vehicle emission factors from the latest version of the Environmental Protection Agency's (EPA) MOBILE6 model, and the EPA's NONROAD model for ground support and construction equipment. In addition, EDMS uses the EPA-validated AERMOD dispersion model.</p> <p>As the EDMS has been specifically designed to model airport emission sources, it is considered that the model does not require separate validation before use.</p> <p>Significant effort has been made to ensure the input data quality (such as LTO time-in-mode, air traffic diurnal profiles and other local airport operation characteristics) for the emission model (see</p>



Item No.	Questions	Responses
		Sections 5.3.4.1 to 5.3.4.83). The same emission compilation methodology has been applied to produce an inventory for Year 2011 and applied to air quality model to produce reasonable results when compared with measured air quality data (see Appendix 5.3.19-1).
11	3. Appendix 5.3.1-2b, One of the key assumptions to estimate future aircraft NOx emissions is that ICAO will keep tightening the NOx emissions limit, however, CAEP doesn't impose phasing out the aircraft with engines not meeting the standard. As such, how AAHK ensure the non-compliant engines be phased out?	<p>IATA factored in their forecast model the natural phasing out of the older aircraft and replacement by newer ones. The newer aircraft meet more stringent CAEP standards.</p> <p>In order to make a reasonable estimate on when aircraft would be retired, IATA carried out a wide survey that sought detailed inputs from 40 airlines representing 80% of the ATMs on the 2011 HKIA busy day. 31 airlines representing 67% of the air traffic movements recorded during the 2011 busy day responded and provided input. Airline fleet mix was adjusted throughout the years to follow the plans communicated by each airline where available, and also considered the actual age of the aircraft and the airline phasing out plans for specific aircraft types when available.</p> <p>For airlines that were not surveyed, IATA considered average retirement periods varying between 20 and 25 years – in line with industry practices and the answers from the surveyed airlines.</p>
12	4. In the same appendix, please provide evidence to justify the assumption that an annual 0.5% fuel saving can be achieved.	As already described in the mentioned appendix, IATA considered two very common families of different engines and characterized the gains on fuel consumption across the different versions of these engines based on the historical trend. The summary and conclusions are presented below for easy reference.

Item No.	Questions	Responses																					
		<p style="text-align: center;"><b>LTO Fuel Consumption for successive engine models</b> in kg</p>  <table border="1" data-bbox="795 343 1545 821"> <caption>LTO Fuel Consumption Data (kg)</caption> <thead> <tr> <th>Year</th> <th>GE90-85B (kg)</th> <th>CFM56-5B3 (kg)</th> </tr> </thead> <tbody> <tr> <td>1995</td> <td>1150</td> <td>-</td> </tr> <tr> <td>1996</td> <td>-</td> <td>500</td> </tr> <tr> <td>1997</td> <td>1130</td> <td>-</td> </tr> <tr> <td>2000</td> <td>1100</td> <td>-</td> </tr> <tr> <td>2006</td> <td>-</td> <td>480</td> </tr> <tr> <td>2007</td> <td>1080</td> <td>-</td> </tr> </tbody> </table> <p>Source: ICAO engine emission database</p> <ul style="list-style-type: none"> <li>↗ Between 1995 and 2007, four successive models of the GE90-85B have been released resulting in an average decrease of 0.5% p.a.</li> <li>↗ Over the same period the CFM56-5B3 engine achieved a 0.7% decrease in fuel consumption</li> <li>↗ <b>For the purpose of forecasting emissions, IATA have considered a steady improvement of fuel consumption of 0.5% p.a. as a result of continuous improvement. This decrease is applied for 10 years following the engine entry-in-service</b></li> </ul> <p>The aviation industry has a strong track record of addressing environmental concerns. Impressive progress has been achieved since the early jet age. In the last 12 years alone fuel efficiency has been improved by almost 50% (see figure below). This represented an annual saving of about 5% resulting from various improvements such as aircraft and engine technologies, airline flight operations, ground operations and maintenance.</p>	Year	GE90-85B (kg)	CFM56-5B3 (kg)	1995	1150	-	1996	-	500	1997	1130	-	2000	1100	-	2006	-	480	2007	1080	-
Year	GE90-85B (kg)	CFM56-5B3 (kg)																					
1995	1150	-																					
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Item No.	Questions	Responses
		<p>Airlines improved fuel efficiency by 46% over 1990-2012            Fuel efficiency measured in litres of fuel burned per 100 RTK</p> <p style="text-align: center;">Fuel efficiency of commercial airlines worldwide, in litres/100 RTK</p>  <p style="text-align: center;">Source: IATA calculations. Note revisions to IEA aviation fuel data have increased fuel efficiency gains from previous estimates.</p> <p>source: <a href="http://www.iata.org/whatwedo/Documents/economics/Aviation-Advocacy-Economics-2013-December.pdf">http://www.iata.org/whatwedo/Documents/economics/Aviation-Advocacy-Economics-2013-December.pdf</a> (page 23)</p>
13	5. Appendix 5.3.1-3, what are the sample sizes in obtaining the aircraft LTO time-in-mode? Why does the project proponent not use the mode value instead of the mean value?	<p>The LTO- time in modes were determined based on the following approaches:</p> <ul style="list-style-type: none"> <li>• Taxi-in and Taxi-out time: based on the aircraft ground simulation conducted by NATS in the busy day.</li> <li>• The climb out and approach time: based on radar data provided by CAD. The sample size is more than ten thousand.</li> <li>• The airborne time for take off mode: based on radar data provided by CAD. The sample size is more than ten thousand.</li> <li>• The groundborne time for take off mode: since radar data on ground from CAD is not</li> </ul>

Item No.	Questions	Responses
		<p>available, the groundborne takeoff time was based on site survey with supported from flight tracker web site: <a href="http://www.flightradar24.com/airport">http://www.flightradar24.com/airport</a>. The sample size is more than 300.</p> <p>The use of mode method has the following disadvantages: (1) Ignore most information in a distribution and (2) High fluctuations as there may be several modes or no mode in the data subject to the sample size. Hence, the mode method was not used here. On the contrary, mean value would be more appropriate as it can take into account all the data.</p>
	<p><u>Effectiveness of Abatement Measures?</u></p>	
14	<p>1. Para. 5.3.6.29 states that the PATH model adopted in the study has taken into account the emission target agreed between HKSAR and Guangdong Government in year 2012. As such, the project proponent does not require to take any mitigation measure or even is allowed to emit more, can EPD explain whether this approach comply with the spirit of the EIAO?</p>	<p>As stipulated in Section 4.2.1(c) of the EIAO-TM, one of the objectives of the EIA report is to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses due to the project. The EIA report had identified pollution sources and key pollutants of concern in Section 5.3.3, compiled emission inventory for each identified source based on best available control technology, proposed mitigation measures and legislated emission reduction policies in Section 5.3.4, explained the assessment approach for different types of emission sources in Section 5.3.5, and quantified the changes in environmental impact due to the operation of the proposed 3RS in Section 5.3.6.</p> <p>The PATH model was used to predict the contributions of air quality impact from sources far away from the airport area. The air quality impact due to emissions from the airport and nearby road network were modelled with Gaussian models at high spatial resolution (see Table 5.3.79 of the EIA report). The report had compared the air quality impact under the 2RS and 3RS scenarios at Year 2031 and quantified the changes in air quality impact in Tables 5.3.96, 5.3.101 and 5.3.106. The maximum increases of annual concentration for NO<sub>2</sub>, PM10 and PM2.5 due to the operation of 3RS are 1µg/m<sup>3</sup> (2.5% of AQO), 0.2µg/m<sup>3</sup> (0.4% of AQO) and 0.1µg/m<sup>3</sup> (0.3% of AQO) respectively.</p> <p>As described in Section 5.3.7 of the EIA report, although no non-compliance against the AQO has been predicted at the identified ASRs, AAHK has been implementing a number of measures and initiatives aimed at further reduction in air emissions from airport activities and operations and air quality will remain a key focus of AAHK's rolling environmental plan. The planned measures include banning the use of APU for all aircraft at frontal stands by end 2014 and requiring all salon vehicles as electric vehicles by end 2017, amongst other measures and initiatives listed in the above-</p>

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		mentioned Section.
15	2. Para. 5.3.7 states that no non-compliance against the AQO has been predicted at the identified ASRs. It follows that no mitigation action is required under the EIAO. All measures described in para. 5.3.7.1 are voluntary and will not be listed under the EP conditions; can EPD confirm this understanding?	<p>Our understanding from EPD is that, since the predicted results of the EIA report have taken into account a number of assumptions in emission reduction related to airport operation (see the first three bullet points under Section 5.3.7.1), as stipulated in Section 8 of the EIAO-TM, the environmental permit may impose requirements for the formulation of environmental audit requirements to monitor the implementation progress of the proposed mitigation measures.</p> <p>AAHK is committed to reducing air emissions at HKIA and will implement the listed measures regardless of whether they are specified in the Environmental Permit as conditions or not.</p>
16	3. While the project proponent assumes that all Government commitments to reduce air pollution in the PRD region will be realized, is there a reason why the project proponent has not considered the implementation of the PM2.5 legal limit as stated in the Government's Clean Air Plan? Can the project proponent why PM2.5 has not been looked at?	In conducting the air quality assessment, the PM2.5 (FSP) has been assessed against the legal limit. Please see Table 5.3.105 and S5.3.6.15 – S 5.3.6.20 of the EIA report.
17	4. Para. 5.5.2.6 suggests that the 3RS will bring environmental benefit to the receivers at Sha Lo Wan through assigning the existing south runway as standby mode wherever practicable during the night-time period. This operating mode is definitely not the worst scenario as the 3RS will soon be over capacity	Putting the existing south runway on standby where possible at night between 2300 and 0659 has already been recommended as a specific noise mitigation measure that will be implemented as standard HKIA operating procedures in the operation of the 3RS under the primary operating mode, as described in Para. 7.3.3.11 and included in the Implementation Schedule in Table 20.1, Chapter 20 (see page 20-13) of the EIA report. Therefore, the operational air quality assessment has been conducted taking into account this specific mitigation measure.

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	<p>according to the demand projection. How long can this benefit last? and why did the project proponent not assess the worst scenario situation as required by the EIAO?</p>	
	<p><u>EIA Report Chapter 7: Noise Impact</u></p>	
	<p><i>Reasonable assumption?</i></p>	
18	<p>1. The project proponent assumes that the south runway 07R-25L will be placed as standby between 23:00 to 07:00 (Tables 7.3.8 to Table 7.3.10), is it a reasonable assumption for the worst operation mode in 2030 provided that the HKIA will be over-capacity around 2030? Is it a correct understanding that "standby" implies flights using the south runway in certain contingency situations? And, it comes logically that one of the contingency situations will be the 3RS will be over-capacity. Can the project proponent provide a NEF contour when the south runway 07R-25L will have to be used at night time in the future?</p>	<p>As described above, putting the existing south runway on standby where possible at night between 2300 and 0659 has already been recommended as a specific noise mitigation measure that will be implemented as standard HKIA operating procedures in the operation of the 3RS under the primary operating mode, as described in Para. 7.3.3.11 and included in the Implementation Schedule in Table 20.1, Chapter 20 (see page 20-13) of the EIA report.</p> <p>As described in Para. 7.3.3.21, it was assumed that the south runway would only be used for 1% of total yearly night period to take into account operational requirements such as recovering from an incident or other major operational disruption (e.g. typhoon). This assumption has already been confirmed with CAD.</p>
	<p><i>Methodology?</i></p>	
19	<p>1. In Appendix 7.3.1, para. 2.0 and 3.0 mention "IATA reviewed the historical data of Years 2008, 2009</p>	<p>Historical flight data were provided by CAD.</p> <p>When reviewing the historical data, IATA found that the conversion factors from busy day to average day for years 2008, 2009 and 2011 are consistent and close:</p>

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	<p>and 2011...", Who provided these data ? and why did IATA estimated conversion factors based only on 2011 operational data ? If the data of three year are available, why did IATA not show the worst scenario estimation?</p>	<ul style="list-style-type: none"> <li>• 2008 and 2009: Busy day had 5% more air traffic movements than the average day (conversion factor of 0.95)</li> <li>• 2010: Busy day had 9% more air traffic movements than the average day (conversion factor of 0.91)</li> <li>• 2011: Busy day had 6% more air traffic movements than the average day (conversion factor of 0.94)</li> </ul> <p>Choosing 2008 or 2009 would have led to a slightly higher conversion factor. However, it was estimated that airline operations have changed dramatically over the studied period as a consequence of the crisis that affected those years: Airlines downsized their operations, grounded aircraft temporarily and even took extraordinary measures such as phasing out permanently some airplanes. Because of the crisis and very strong impact it had on demand, using these years as a base for the forecasts would have resulted in a much lower number of passengers in the long-term hence discounting the future traffic growth and future environmental impacts.</p> <p>Year 2010 would have led to define a much lower conversion factor hence decreasing the long-term environmental impacts on an average daily basis.</p> <p>After detailed analysis, IATA considered that 2011 was an appropriate base for characterizing the average day. It was the most recent year available when launching the study hence including the most recent trends. It was also checked that operations were balanced and representative of the normal functioning of the airport. Additionally, the estimated conversion factor of 0.94 was very close to the worst conversion factor of 0.95 measured over the studied period.</p>
20	<p>2. Appendix 7.3.2 states a substitution list, i.e., the aircrafts using or will be using HKIA to be substituted in the INM if they are not in the INM database. What criteria has been adopted to fix the substitutes? What are the percentages of the current aircraft</p>	<p>As described in Para. 7.3.3.2 and in Section 2 of Appendix 7.3.2, INM includes a standard aircraft substitution database relating aircraft with similar noise footprints.</p> <p>For aircraft that are not in the database and not on the substitution list, reasonable and conservative assumptions were made. The general criteria in that case is that the aircraft in questions is substituted with an aircraft of similar size, number of engines, and use. These relate to future aircraft which are not included in the INM aircraft databases, nor in the standard INM substitution database as described in Section 3 of Appendix 7.3.2.</p>

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	fleet using HKIA that have to be substituted in INM in various model years?	Taking into account aircraft substitution that would also be required for aircraft variation (e.g., A330-343 is used to represent the A330, A332, A333, and A33F in INM) in addition to new aircraft, it could be estimated that the percentage of aircraft that requires substitution is up to about 65% which applies to both the assessment years 2030 and 2032. Since data of current aircraft types have only been used to substitute the listed new aircraft models that are expected to be quieter, the adopted approach would give more conservative results in the INM modelling.
21	3. Appendix 7.3.4 describes the sequential INM analysis. Paragraph 2.0 states that a simplified INM was developed to provide an estimate of changes in noise contour areas. At the end of the same paragraph, it states that the simplified INM model developed for the Sequential INM analysis cannot be directly compared with the detailed INM analysis that focused on the worst assessment year. Can the project proponent explain how do the results, especially the noise contours output from the simplified INM compared with the detailed INM?	As described in Para. 7.3.3.8, the purpose of the sequential INM analysis is to determine the average change in noise cumulative noise due only to the change in number of operations and fleet mix forecast each year in terms of noise contour area, and the year with the largest total area may then be determined to represent the maximum noise emission scenario. The distribution of aircraft over runways and flight tracks is held constant; thus, cancelling out when compared to each other. Therefore, a comparison between the simplified INM model and the actual INM model may not be meaningful and essential.
22	4. In the same appendix, it states that operation data including fleet mix, day/night split, and operational levels was extracted from the detailed flight schedules prepared by IATA. While IATA does not operate the HKIA, how does IATA come up	Appendix 2.1 of the EIA outlines the Air Traffic Forecasting Methodology followed by IATA. Sections 8 and 9 of the appendix discussed how the future schedules were built. In brief, the approach adopted has taken into account the best available information, including the outcome of a wide survey seeking detailed inputs from 40 airlines representing 80% of the ATMs on the 2011 HKIA busy day. The survey was organised by IATA to collect available information direct from airlines on growth plans, fleet plans and operational procedures of HKIA's airlines and reflect these information in the air traffic forecast. 31 airlines representing 67% of the air traffic movements recorded during



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	with these schedules? Can the project proponent explain the data source and methodology?	the 2011 busy day responded to the survey.
23	5. In Appendix 7.4.6, the crucial assumption in Table 1 to Table 4 is the change of aircraft traffic mix over the years. It is apparent that there will be more Boeing 777/ Airbus A350 Family aircraft. Can the project proponent provide evidence of this assumed change of aircraft traffic mix over the year?	<p>For a long time, B747 and A330 have been amongst the most common types of aircraft at HKIA. Cathay Pacific and many other carriers operating at HKIA started to replace their fleet of B747 by introducing B777 in particular. In 2011, A330 was accounting 23% of the air traffic movements, B747 18% and B777 15%. These three aircraft families altogether represented 56% of the total air traffic movements and almost 85% of the air traffic movements operated by wide-body aircraft.</p> <p>Given their current age, most of the B747 will be replaced before 2020 while a large part of the A330 and B777 will be replaced between 2020 and 2030.</p> <p>Aircraft to be available in those years are already well known:</p> <ul style="list-style-type: none"> <li>• Three versions of the A350 will be rolled out between 2015 and 2020. The technical specifications of this aircraft make it a good substitute to the A330/A340 family and some B777 models.</li> <li>• Boeing has announced that their enhanced version of the B777 (named B777X) will be available in 2020+. The B777X family targets the B777, B747 and A350 segments.</li> <li>• Super large jumbo jets, namely A380 and B747-8I, have entered in service at the end of the last decade and will be operated at least until 2040. Given their size and specifications, they will replace some of the B747.</li> </ul> <p>Based on the current fleet plans and aircraft orders, Cathay Pacific's future long haul fleet will be made of A350 and B777X while Hong Kong Airlines will have A330 and A350 for their long-haul operations. Similarly IATA have projected the future fleet of the foreign carriers operating at HKIA reflecting their orders for new aircraft, communicated fleet plan and the results of a survey conducted with the largest HKIA airlines.</p> <p>It results from this analysis that B777X and A350 will be the dominant wide-body aircraft operated at HKIA in 2030.</p>

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24	6. Has local measurement of aircraft noise (taxing, taking off or landing) been done? If not, how can the INM be validated?	<p>The latest available version of the INM released by the US FAA has been adopted in the aircraft noise modelling of the EIA study. The methodology adopted for the assessment is in accordance with ICAO Doc 9911 Recommended Method for Computing Noise Contours Around Airports.</p> <p>Local measurements of aircraft noise associated with departure, landing or taxiing is not considered necessary, as the aircraft noise footprint information (presented in form of noise-power-distance (NPD) curves) for individual aircraft that are supplied and endorsed by the aeroplane manufacturers have already been validated and verified by FAA before they could be incorporated into the INM. Besides, the INM database includes ICAO and FAA standard profiles that are consistent with the most recent update of the international ANP database and these have been adopted in the noise modelling.</p>
	<u>EIA Report Chapter 13: Marine Ecology</u>	
25	1. One of the major mitigation measures is to create a Marine Park of a total area of approximately 2400 hectares, there are a number of questions:	
	a. AAHK has no authority to create a marine park, how can the project proponent ensure this measure can be implemented	<p>As detailed in section 13.11.5.37 of the EIA Report, the Administration has made a firm commitment to seek to designate the proposed marine park in accordance with the statutory process stipulated in the Marine Parks Ordinance, as a mitigation measure for the permanent habitat loss arising from the 3RS project. AAHK will assist in completing the designation tentatively around 2023 to tie in with the full operation of the 3RS.</p> <p>AA is committed to working with all relevant Departments and Bureaux of the HK Government both to ensure the proposed Marine Park designation goes through all appropriate statutory processes in a timely manner and that designation is implemented as has been committed in the EIA.</p>

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	<p>b. If this marine park can be implemented and AAHK is the holder of the environmental permit, who has the responsibility of the management of the Marine park?</p>	<p>The designation, control and management of marine parks are governed by the Marine Parks Ordinance (Cap. 476), which stipulates the Director of Agriculture, Fisheries and Conservation as the Marine Parks Authority and sets out the necessary procedures for marine park designation. Nevertheless, should the EIA report be approved, all mitigation measures as recommended in the EIA report including designation of the proposed marine park will become the statutory requirements of the project proponent under the EIA Ordinance.</p> <p>As detailed in EIA section 13.11.5.40, a management plan for the proposed marine park will be developed, in consultation with AFCD, covering information on the responsible departments for operation and management (O&amp;M) of the marine park, as well as the O&amp;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.</p>
	<p>c. To ensure the effectiveness of this remedial measure, the project proponent must have some assessment criteria, for example, measurable ecological targets, management plan to achieve these targets. Can the project proponent elaborate on this?</p>	<p>As detailed in section 13.16 of the EIA Report, it is proposed to conduct ecological monitoring surveys during the baseline, construction, post-construction and operation phases of the 3RS project, with the aims to:</p> <ul style="list-style-type: none"> <li>• Monitor the effects on the CWDs over the construction period, including the potential shift in the CWD travelling areas and habitat use;</li> <li>• Determine the effectiveness of the reduction in HSF speeds on the acoustic impacts and disturbance to the CWDs; and</li> <li>• Determine the effectiveness of the mitigation (i.e. after the proposed marine park comes into operation) on CWD numbers.</li> </ul>
	<p>d. If the above targets are not met, will AAHK be held responsible as a EP holder? Can the authority provide a clear answer?</p>	<p>An overarching goal of the surveys is to provide datasets that can be compatible with the AFCD long term monitoring, be stratified in such a way as to allow the calculation of density and abundance for the various different phases listed above and to facilitate the calculation of trends from these estimates, providing some assessment of how the project may be impacting the CWDs.</p> <p>As detailed in chapter 10 of the EM&amp;A Manual, regular meetings with AAHK and the relevant Government Departments e.g. EPD and AFCD will be arranged on a quarterly basis when the construction phase surveys commence to review CWD distribution and abundance trends. It is expected that the 3RS reclamation activities would result in the temporary movement of CWDs away</p>

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		<p>from 3RS works areas during the construction period and this may be reflected in a further decline in CWD abundance in the Northwest Lantau survey area over the period of construction. 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, which should be based on the latest CWD survey findings including those collected from the baseline monitoring in the EM&amp;A programme. Actions may also be explored where necessary for remediating unpredictable impacts or changes in abundance that are identified during the monitoring, recognising that actions that serve to prolong the period of reclamation activity may in themselves have an adverse impact on CWDs.</p>
26	<p>2. How will the project proponent mitigate the ecological damages during the construction phase? There will be a total of approximately 981 hectares of marine space loss. Would it be possible to provide a temporary shelter for the CWD ?</p>	<p>The temporary works area will be demarcated by floating booms and these are 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 650 ha land formation 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 direct habitat loss. However in terms of indirect disturbance, the EIA stated that there would be much vessel and other construction related activities, and that dolphins would likely and to large degree avoid the area in and near the construction activity. We stand by the assessment that large-scale vessel activity related to construction will likely have dolphins avoid the general area of said construction. Overall, this is adaptive behaviour by dolphins, as it gets them out of potential harm's way. It is important that remaining areas after construction are protected as well as absolutely possible, so that the remaining habitats are allowed to return to a healthier state, and dolphins can re-inhabit the general area(s).</p> <p>Available literature identifies that most CWDs identified in Hong Kong have variable-sized home ranges of 100-150 km<sup>2</sup>, these usually extending into Mainland waters and generally covering an overall area much larger than the proposed 3RS land formation area.</p> <p>As there are alternative habitats available for CWDs during the 3RS construction phase, temporary shelter for the CWD, for example designation of a marine park in West Lantau, was not considered necessary as a mitigation for the 3RS project; rather 3RS mitigations focus on the areas immediately affected by the project. A set of mitigation measures has also been proposed in the EIA for the 3RS construction phase intended to reduce identified moderate to high impacts on CWDs to acceptable levels. These include use of construction methods with minimal risk/disturbance (e.g., non-dredge</p>

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		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.
	<u>EIA Report Chapter 18: Environmental Monitoring and Audit</u>	
27	1. Para. 5.4.1.2 states that monitoring and audit of daily RSP and daily FSP levels are not proposed because no significant impacts are anticipated. For such a huge construction project with numerous dust/particulate generation activities, would that be against common sense to propose no monitoring and audit exercise is required? Can EPD explain whether the HZMB related projects which are being undertaken and probably overlap with the construction of this 3RS are required to conduct air quality monitoring and audit? If the current HZMB project proponents have to conduct M&A and this project proponent will not be required to do the same, would that create a case of injustice?	As explained in Section 5.4.1.2 of the EIA Report, monitoring and audit of daily RSP and daily FSP levels are not proposed because even under the hypothetical worst case Tier 1 (i.e., 100% active areas) mitigated scenario, both daily RSP and daily FSP would comply with the corresponding AQOs at all ASRs throughout the construction period, except the limited non-compliance with the AQO for daily RSP at up to three ASRs in three of the nine construction years. Hence, no significant RSP or FSP impacts are anticipated. Nevertheless, hourly TSP concentrations, which may serve as a good indicator of dust level when construction works are carried out, will be monitored and audited at appropriate locations as detailed in section 2.1 of the EM&A Manual.
	<u>EIA Report Chapter 20: Implementation Schedule</u>	

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28	<p>1. For some of the recommended measures such as the consideration of aircraft noise in developing MLP for planned development at CDA site in Lok On Pai, the Planning Department is the responsible party; how can the project proponent ensure Planning Department will implement this measure?</p>	<p>We have liaised with the Planning Department (PlanD) as part of the EIA process and confirmed with PlanD the requirement on the non-noise sensitive uses within the NEF 25 contour line for its preparation of the Planning Brief to control the future development in the CDA site in Lok On Pai through the established planning mechanism and also in the lease. PlanD also showed no objection that the Implementation Schedule in Chapter 20 of the EIA report may name PlanD as the agent responsible for implementation of this recommended measure.</p>