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Paper for the House Committee meeting on 17 June 2016

**Report of the Subcommittee to Follow Up Issues Relating to the
Three-runway System at the Hong Kong International Airport**

Purpose

This paper reports on the deliberations of the Subcommittee to Follow Up Issues Relating to the Three-runway System at the Hong Kong International Airport ("the Subcommittee").

Background

2. Hong Kong International Airport ("HKIA") is operated and maintained by Airport Authority Hong Kong ("AAHK"), a statutory body wholly owned by the Government and whose functions, powers and duties are governed by the provisions of the Airport Authority Ordinance (Cap. 483) ("AAO").
3. For the purpose of assessing and planning for HKIA's long-term needs, AAHK has been preparing 20-year Master Plans, reviewed and updated every five years. Since 2001, AAHK has published Master Plan 2020, Master Plan 2025 and Master Plan 2030.
4. At the time of its commissioning in 1998, HKIA had a single runway. In 1999, it was expanded into two runways.
5. In Master Plan 2030 ("MP2030"), which was published on 2 June 2011 for public consultation, AAHK put forward two options for expansion of HKIA's runway system. The first involved expanding the existing two-runway system ("2RS"), and the second involved the construction of a three-runway system ("3RS"). According to the assessment of AAHK's

financial consultant, both options would involve significant financial investment, with the latter costing more, but delivering 1.5 times the air traffic movements ("ATMs") of the former.

6. Between 3 June and 2 September 2011, AAHK conducted a three-month public consultation exercise on MP2030 to seek public views on the future development of HKIA. Of the 24 242 questionnaires received, 73% preferred the three-runway option overall, whilst 11.1% preferred the two-runway option overall. Accordingly, AAHK made a submission to the Government on 29 December 2011 recommending the 3RS option.

7. On 20 March 2012, the Executive Council ("ExCo") granted AAHK its in-principle approval to adopt, for planning purpose, the 3RS as the future development option for HKIA; and for AAHK to proceed with the planning work related to the development of the 3RS, namely, the statutory Environmental Impact Assessment ("EIA"), the associated design details, and the financial arrangements. AAHK was asked to report to the Government after completion of the planning work. A final decision on whether to proceed with the implementation of the three-runway system would be made when the relevant inputs are available. The relevant Legislative Council ("LegCo") Brief is available on LegCo's website at <http://www.legco.gov.hk/yr11-12/english/panels/eDEV/papers/eDEV-thbtr393008-e.pdf>.

8. AAHK completed the above planning work in January 2015 and submitted its recommendations to the Government for consideration.

9. On 17 March 2015, ExCo affirmed the need for the 3RS for maintaining Hong Kong's competitiveness as a global and regional aviation hub, and for catering to Hong Kong's long-term economic and development needs. The relevant LegCo Brief is available on LegCo's website at <http://www.legco.gov.hk/yr14-15/english/panels/eDEV/papers/eDEV20150323-thbtr258208-e.pdf>.

10. On 8 May 2015, the Lands Department published a Government Notice in the Gazette under the Foreshore and Sea-Bed (Reclamations) Ordinance (Cap. 127) for the reclamation works of HKIA's expansion into a 3RS for public inspection¹. On the same day, the Town Planning Board also published a Government Notice in the Gazette under the Town Planning Ordinance

¹ On 26 April 2016, ExCo granted the authorization of the reclamation for the 3RS project under Cap. 127.

(Cap. 131) announcing the amendments to the approved Chek Lap Kok Outline Zoning Plan for public inspection².

The Subcommittee

11. In view of the wide public concern about the 3RS and as the issues involved straddle various policy areas, the Panel on Economic Development and the Panel on Environmental Affairs jointly submitted a proposal for the appointment of a subcommittee under the House Committee ("HC") to follow up issues relating to the 3RS at HKIA to HC for its consideration on 15 May 2015. The proposal was agreed to by HC. The terms of reference and membership of the Subcommittee are in **Appendices I and II** respectively.

12. Since its activation in October 2015, the Subcommittee has held a total of 10 meetings and received views from organizations/individuals at two of these meetings. A list of the organizations/individuals which/who have given views to the Subcommittee is in **Appendix III**.

Declaration of interests

13. Hon Jeffrey LAM, Hon Steven HO and Hon Frankie YICK declared that they are members of AAHK Board. Hon Albert HO and Hon CHAN Kam-lam also declared that they were AAHK Board members from 1 January 2010 to 31 December 2015.

Deliberations of the Subcommittee

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² On 26 April 2016, ExCo granted the approval for the draft Chek Lap Kok Outline Zoning Plan under Cap.131.

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Need and urgency of the 3RS

15. Whilst many members have expressed support for the early implementation of the 3RS project to maintain Hong Kong's status as an aviation hub as well as long-term economic competitiveness, some members remain unconvinced about the need and urgency of the 3RS.

16. The Administration and AAHK have explained the justifications for the 3RS as follows:

- (a) as at end October 2015, the HKIA's two runways³ are already handling a total of 68 ATMs per hour at two peak hours (i.e. during 11 am - 12 noon, and 4 pm - 5 pm), which is the 2RS' hourly maximum capacity. Actual ATM growth is a few years ahead of the original MP2030 forecast, and based on the latest projection, the existing 2RS will likely reach its maximum practical capacity of 420 000 ATMs per annum in 2016 or 2017;
- (b) there is limited room for further increase in the capacity of the existing two runways, which is mainly constrained by two factors about which the International Civil Aviation Organization ("ICAO")

³ At present, the two runways at HKIA are operating under a segregated mode. Under normal circumstances, the South Runway is exclusively for departures whilst the North Runway exclusively for arrivals.

has strict requirements and standards, i.e. (i) the need for safe distance between aircraft due to the spiral air vortex generated by operating aircraft; and (ii) the surrounding terrain near the runway;

- (c) expanding HKIA into a 3RS is the only option to significantly increase the runway capacity as well as the ground handling capacity of HKIA to meet Hong Kong's long-term air traffic growth. According to the latest traffic projection updated in 2012 for the purpose of the 3RS EIA study, HKIA's annual traffic demand is projected to reach 102.3 million passengers, 8.9 million tonnes of cargo and 607 000 ATMs by 2030⁴;
- (d) in view of the long time required, i.e. about eight years, to construct the 3RS and the rising competition from Hong Kong's neighbouring airports (including Singapore Changi, Seoul Incheon, Guangzhou and Shenzhen) which have all rolled out expansion plans, it is necessary for AAHK to act promptly so as to maintain Hong Kong as an international business centre and Asia's World City; and
- (e) a one year delay in implementing the 3RS project (at the estimated costs of HK\$141.5 billion in money-of-the-day ("MOD") prices) will increase the project cost by HK\$7 billion.

17. In noting that HKIA's annual traffic demand is projected to reach 102.3 million passengers and 8.9 million tonnes of cargo by 2030, question was raised as to how these figures were arrived at. AAHK has advised as follows:

- (a) in 2008, AAHK commissioned IATA Consulting⁵ to produce a set of preliminary forecasts up to 2030 to facilitate the preparation of MP2030. At that time, there were a lot of uncertainties around the economic outlook so the forecast tended to be very conservative. In 2012, IATA Consulting fine-tuned the traffic forecast by taking into account the latest actual traffic figures, the capacity constraint and short-term outlook to reflect market conditions;

⁴ In 2014, HKIA received 63.3 million passengers, 4.38 million tonnes of cargo and handled 391 000 ATMs, representing a year-on-year growth of 5.7%, 6.0% and 5.1% respectively.

⁵ According to AAHK, IATA Consulting, the commercial arm of International Air Transport Association, is a highly regarded organization in providing traffic forecast for aviation clients.

- (b) the model adopted for the 20-year, long-term traffic forecast is an econometric model based on gross domestic product ("GDP") regression. Past data have confirmed Hong Kong's passenger traffic bears a close relationship with Hong Kong's GDP, whilst cargo traffic is closely correlated to world GDP. Whilst the baseline forecast is GDP-driven, adjustment factors⁶, including runway capacity constraint, have been considered through relevant research, benchmarking and interviews by IATA Consulting. This forecasting approach is proven and follows airport forecasting best practices. Similar approach has been used by airports around the world and institutions such as ICAO, Airports Council International, Boeing and Airbus; and
- (c) after taking into account the relevant adjustment factor considerations, the passenger and cargo forecasts of HKIA are estimated to grow at a Compound Annual Growth Rate of 3.4% and 4.5% respectively, from 56.5 million passengers and 4.0 million tonnes of cargo in 2012, to 102.3 million passengers and 8.9 million tonnes of cargo by 2030.

Economic benefits of the 3RS

18. Members note that an independent consultant, Enright, Scott & Associates ("ESA"), was commissioned by AAHK to conduct an Economic Impact Study in 2011 to assess the potential impact of airport expansion on Hong Kong's economy as part of the MP2030. In early 2015, ESA updated the Economic Impact Study of the 3RS in accordance with the latest economic data, traffic demands and costs. A summary of the 2015 economic impact analysis results is shown below:

	2012 (Actual)	2030	
		2RS	3RS
Economic contribution (Direct + Indirect + Induced)	HK\$ 94 billion	HK\$ 133 billion	HK\$ 184 billion
% of GDP	4.6%	3.6%	4.9%
Direct employment	63,000	89,000	123,000
Indirect + induced employment	85,000	119,000	165,000
		2012-2061	
Economic Net Present Value	—	HK\$ 591 billion	HK\$ 1,046 billion

Note: Economic contribution in 2012 dollars
Source: Enright, Scott & Associates Ltd (2015)

⁶ Adjustment factor is any abrupt change in market environment, airline and airport strategies and the anticipated development of the competitive intensity.

Detailed explanation of the methodology adopted in the economic impact study can be found in Chapter 3 and Appendix A of both the 2011 and 2015 reports, which are available on AAHK's website at <http://info.threerunwaysystem.com/pdf/en/ESA.pdf> and http://info.threerunwaysystem.com/pdf/en/economic_impact_study_of_the_three_runway_system.pdf respectively.

19. Members also note that HKIA supports Hong Kong's four economic pillars: financial services; trading and logistics; tourism; and producer and professional services. Together, these four sectors accounted for around 58% of the GDP of Hong Kong in 2013.

Enhancement of the existing 2RS

20. As HKIA would soon reach its design capacity in 2016 or 2017, question was raised as to whether there was any room to increase the runway capacity of the existing 2RS in the interim.

21. AAHK has advised as follows:

- (a) AAHK has commissioned a study to identify possible means to stretch the runway capacity at HKIA before the full commissioning of the 3RS in 2023-2024. As a key task of the study, assumptions adopted for the previous Airspace and Runway Capacity Study ("ARCS") for HKIA⁷ would be re-assessed and adjusted based on the latest operational data and observation of key performance metrics of the ATM operation. The study will review many aspects of the air traffic operation, including airspace design and management; departure and arrival control; runway modes of operation; ground control and airfield infrastructures etc. In addition, the possibility of increasing night-time capacity declaration (i.e. 10 pm - 7 am) as well as noise management measures associated with recommendations on means to increase the existing airport capacity will also be studied. The study will cover both the existing 2RS scenario and the Interim 2RS scenario (i.e. when the new runway and the existing South Runway are used whilst the existing North Runway is closed for construction);
- (b) AAHK is currently conducting a study on the need of introducing a

⁷ ARCS for HKIA was commissioned by AAHK and conducted also by the National Air Traffic Services ("NATS") in 2008. NATS is the main air navigation service provider in the United Kingdom. It has also conducted similar study for London Heathrow Airport.

noise charge on aircraft to encourage airlines to use quieter aircraft at night (i.e. 11 pm - 7 am). If such a noise charge on aircraft is introduced, it is envisaged that more airlines will use quieter aircraft to land in or depart from HKIA;

- (c) although the maximum capacity of the existing 2RS may at best marginally increase from 68 to 70 ATMs per hour owing to the constraints posed by the terrain surrounding HKIA, such an increase will help to ease the pressure of HKIA in meeting the growing demand for its aviation services;
- (d) the Third Runway is planned for commissioning in 2021-2022 upon which the existing North Runway will cease operation temporarily for modification before becoming the new Centre Runway. As the Third Runway and the existing South Runway will be some three kilometres apart, there may be a greater runway capacity gain than as the wide distance between the Third Runway and the existing South Runway may be able to support independent mixed mode operation (i.e. each runway can accommodate both take-off and landing concurrently and separately). At present, the existing 2RS is operating under segregated mode (i.e. one runway exclusively for approaches and the other exclusively for departures);
- (e) in the short to medium term, AAHK is implementing the Midfield Development Project⁸ by phases to increase the handling capacity of the HKIA. The Midfield Phase I Project includes the building of a new midfield concourse with 20 aircraft parking stands, a new cross-field taxiway and the extension of the existing automated people mover to the Midfield Concourse. The Midfield Phase 1 Project has been completed by end 2015 to increase handling capacity by 10 million passengers per annum. AAHK also has plans to proceed promptly with the Remaining Midfield Development to provide an extra 34 full service stands, with a view to fully developing the entire Midfield apron by 2020 to provide for continued smooth operation of the 2RS before the planned commissioning of the 3RS in 2023-2024; and
- (f) AAHK plans to brief LegCo on the subject of 2RS capacity once ready.

⁸ The Midfield Concourse is an extension to the existing Terminal 1 ("T1") which is designed to serve an additional 10 million passengers per year.

Runway capacity

22. Noting that the 1992 New Airport Master Plan ("the 1992 NAMP") estimated that the HKIA's two runways could handle a maximum of 86 ATMs per hour, question was raised as to why the 2RS at HKIA could presently achieve at most 68 ATMs per hour.

23. The Administration has explained as follows:

- (a) the 1992 NAMP is only a concept plan setting out the strategic development for the new airport. The report of the 1992 NAMP pointed out that a pair of parallel runways under different modes of operation could in theory achieve different capacities, and the theoretical capacity of 86 ATMs per hour could only be achieved through the adoption of independent mixed mode of operation. However, the same report had also made clear that the presence of Lantau Island to the south of HKIA imposed physical constraints on the design of flight paths and procedures. As a result, independent mixed mode of operation could not meet ICAO's safety requirements, hence such operation was neither safe nor practicable;
- (b) following the report of NAMP, Civil Aviation Department ("CAD") engaged Washington Consulting Group in 1994 to conduct in-depth study of air traffic control operations, surrounding terrain and airspace conditions etc. to design the flight procedures for HKIA at Chek Lap Kok in accordance with the ICAO standards. The study confirmed that constrained by the surrounding terrain, the maximum capacity of the two runways at HKIA was no more than 63 ATMs per hour;
- (c) in 2008, AAHK commissioned NATS to conduct the ARCS for HKIA, taking into account the latest air traffic control technology and international standards. NATS confirmed that, after implementing 46 improvement recommendations, such as "Airfield Infrastructure Improvements", "Air Traffic Control System Upgrade", "Air Traffic Control and Flight Procedures Enhancement", increasing the number of Air Traffic Control staff and enhancement in relevant training, etc., the capacity of the two runways at HKIA under segregated mode could be increased to 68 ATMs per hour; and
- (d) NATS had also studied if there would be capacity gain by changing the mode of operation of the two runways at HKIA from

segregated mode to dependent mixed mode⁹, or even independent mixed mode¹⁰. NATS re-affirmed findings in previous studies that independent mixed mode could not be supported by the two runways owing to the surrounding terrain. On the other hand, NATS stated that whilst dependent mixed mode can be supported by the existing two runways at HKIA, the maximum capacity of the 2RS under this mode of operation would still be 68 ATMs per hour.

24. On the suggestion that if the peaks of Tai Yam Teng (大陰頂) (610 feet) and Fa Peng Teng (花瓶頂) (810 feet) were removed, the runway capacity of 2RS at HKIA could be further increased, the Administration has pointed out as follows:

- (a) a similar suggestion could indeed be found in the 1992 NAMP report, but the report only made this suggestion within the specific context of possible options to lower the climb gradient of contingency departure procedures for departures on engine out during initial climb (i.e. to reduce restriction on the aircraft engine out climb performance), not as a measure to increase runway capacity. To set the record straight, the NAMP report categorically stated that the terrain in and around Hong Kong precluded constraint-free operations within the low altitude airspace surrounding Chek Lap Kok¹¹; and
- (b) both the 1992 NAMP and subsequent consultancy studies confirmed that what really limits HKIA's maximum runway capacity from achieving the high-end hypothesized runway capacity (i.e. 86 ATMs per hour) is the entire stretch of North Lantau terrain. In other words, unless most of the high peaks on Lantau Island are leveled, HKIA would not be able to operate the existing 2RS at noticeably higher capacity than 68 ATMs per hour whilst at the same time meeting ICAO safety requirements. If

⁹ Under dependent mixed mode, both runways are used for departures and arrivals. However, for safety reason, arrivals to different runways are required to be staggered as if they are approaching the same runway. Similarly, departures from different runways are required to be staggered as if they are departing from the same runway.

¹⁰ Under independent mixed mode, both runways are used for a mixture of departures and arrivals. Simultaneous approaches to and departures from both runways can be conducted without the requirement of staggering of aircraft.

¹¹ "NAMP, Master Plan and Civil Engineering, First Interim Report" (vol. 1) 1992, paragraph 5.2.3 "Airspace Utilization".

those high mountains are to be leveled, some crucial infrastructures/landmarks such as the Ngong Ping Cable Car, Big Buddha and Po Lin Monastery would be affected, not to mention that most of these areas fall within the boundaries of the Lantau Country Parks.

"Air wall" constraint

25. Some members opine that "air wall" is also one of the factors restricting runway capacity. At present, an aircraft departing from Hong Kong must reach an altitude of over 15 700 feet before it could enter the Mainland airspace. They have pointed out that unless the problem of "air wall" could be solved, the effectiveness of the 3RS in expanding the runway capacity of HKIA to the target maximum capacity of 102 ATMs per hour remains very doubtful.

26. The Administration has explained that "air wall" is not relevant to runway capacity. The term "air wall" is a misconception of an air traffic management measure which is related to the boundary between adjacent airspaces. To ensure that aircraft in adjacent airspaces operated concurrently in a safe and efficient manner, an aircraft must reach a certain altitude before an air traffic control ("ATC") unit handed over the control in respect of that aircraft to another ATC unit. This ATC arrangement seeks to safeguard flight safety, and is commonly applied by busy airports all over the world. After discussions between Hong Kong and the Mainland, the handover altitude had been lowered to 12 800 feet for aircraft entering the Mainland airspace during specified non-peak hours at night. CAD would maintain close liaison with the Mainland ATC unit in this respect.

Pearl River Delta ("PRD") airspace

27. Members note that within the PRD region, there are five major airports (namely, HKIA, Guangzhou Baiyun Airport, Macau International Airport, Shenzhen Bao'an Airport and Zhuhai Jinwan Airport) and all have experienced phenomenal growth in air traffic volume. In order to enhance flight safety in the PRD airspace whilst supporting air traffic growth, the Civil Aviation Administration of China, the CAD of Hong Kong SAR and the Civil Aviation Authority of Macao SAR jointly established a Tripartite Working Group ("TWG") in 2004 to formulate measures to harmonize air traffic management arrangements in the PRD region. The TWG drew up the "Pearl River Delta Region Air Traffic Management Planning and Implementation Plan (Version 2.0)" ("the 2007 Plan") in 2007, based on the principles of joint airspace planning, use of common standards, and harmonized flight procedure design (統一規劃、統一標準、統一程序的原則).

28. Some members have raised queries as to whether Hong Kong airspace would come under the control of the Mainland under the principles mentioned in paragraph 27 above, having regard to the planned development of other key airports in the PRD region (including three runways in Shenzhen and eventually five runways in Guangzhou).

29. The Administration has advised that the term "統一" is a generic term used by the Mainland which means, in the context of the 2007 Plan, that the whole PRD airspace is considered as one entity. The 2007 Plan sets out various ATM enhancement measures to be adopted. In a nutshell, it is a joint effort of the three sides with an aim to ensuring that the use of airspace would be optimized and flight procedures of the major airports in the PRD region would be compatible with each other. The overarching objective of the 2007 Plan is to optimize the utilization and management of PRD airspace in a safe and efficient manner for the mutual benefits of the five major airports in the PRD region.

30. Members further note that due to the close proximity of HKIA and Shenzhen Airport to the Flight Information Region ("FIR") boundary, a degree of "shared use" of airspace between Hong Kong and the Mainland, an ICAO-endorsed air traffic management arrangement known as "delegation of airspace", would be adopted. Concern was raised as to whether such "delegation of airspace" arrangement would be in breach of Article 130 of the Basic Law ("BL") which stipulated that "The Hong Kong Special Administrative Region shall be responsible on its own for matters of routine business and technical management of civil aviation, including the management of airports, the provision of air traffic services within the flight information region of the Hong Kong Special Administrative Region, and the discharge of other responsibilities allocated to it under the regional air navigation procedures of the International Civil Aviation Organization".

31. The Administration has advised that "delegation of airspace" arrangement would not violate BL130 as such arrangement, when implemented, would not in any sense involve the allocation or alienation of civil aviation airspace from Hong Kong to other jurisdiction. In fact, to enhance air traffic management efficiency, ICAO has been advocating that air route structure and air traffic management efficiency, rather than national boundaries, should be the prime considerations in planning the airspace. Agreements to permit the delineation of airspace lying across national boundaries are advisable when such action can facilitate the provision of air traffic services. This kind of airspace management methodology is a common international practice which has been adopted, for instance, between Singapore and Malaysia, and between Germany and Switzerland. The Administration has pointed out that the adoption of "delegation of airspace" arrangement is necessary for achieving the

target maximum capacity of 102 ATMs per hour under the 3RS at HKIA, based on the present air traffic management technology.

32. The Administration has further advised that designating a portion of Hong Kong airspace to the Mainland for the purpose of air traffic service provision would not compromise Hong Kong's jurisdiction over its FIR designated by ICAO. The recent High Court judgment on three applications for leave to apply for judicial review seeking to challenge the legality of, amongst others, the principle of "shared use of airspace" under the 2007 Plan (*HCAL 99, 102 & 104/2015*) affirmed that "delegation of airspace" arrangement would not violate BL130, as delegating a small portion of Hong Kong's airspace to the Mainland does not mean Hong Kong is giving up control over its airspace.

33. Some members are of the view that the fact that the court has ruled that "delegation of airspace" arrangement would not be in breach of BL130 does not necessarily mean that members of the public would accept such arrangement and/or their concerns about allowing Mainland's ATC unit to control air traffic within Hong Kong airspace have been addressed. The Administration was urged to make public the "delegation of airspace" arrangement under the 2007 Plan.

34. The Administration has advised that it will make public the "delegation of airspace" arrangement under the 2007 Plan once all the technical and associated details have been hammered out and agreed to between Hong Kong and the Mainland. No decision has yet been made on the details of the "delegation of airspace" arrangement between Hong Kong and the Mainland.

35. To convince the public that the HK\$141.5 billion in MOD prices to be spent on developing a 3RS at HKIA is value for money, some members urged the Administration to at least make public certain information contained in the 2007 Plan, such as assumptions and data used and the short, medium and long term measures to be implemented.

36. The Administration has advised that as the 2007 Plan is a government-to-government agreement, the full content of which has to be kept confidential¹². However, to balance the need to keep the public, including the aviation sector, posted of key progress made by the TWG, the three governments have announced from time to time the progress made upon successful phased implementation of short to medium term initiatives. A

¹² High Court's judgment on *HCAL 21/2* on 6 June 2016 upheld Government's position not to disclose the 2007 Plan.

summary of the progress made thus far by the TWG and the press releases relating to PRD airspace between 2004 and 2016 are in **Appendices IV and V** respectively.

37. At the meeting of the Subcommittee held on 12 April 2016, the following motion was passed:

"As the overall runway capacity of the Hong Kong International Airport under a Three-runway System operation was based on the "Pearl River Delta Region Air Traffic Management Planning and Implementation Plan (Version 2.0)" ("the 2007 Plan") signed by Hong Kong, the Mainland and Macao, this Subcommittee requests the Government to provide this Subcommittee with the content of the 2007 Plan concerning the basis for coming up with 102 air traffic movements per hour."

38. The Administration's response to the motion passed is as follows:

- (a) the target maximum capacity of 102 ATMs per hour at HKIA under a 3RS was derived by NATS, which was commissioned by AAHK in 2008 to conduct the ARCS to assess the maximum practical capacity of the 3RS. In summary, the maximum practical hourly capacity of the 3RS was derived by NATS via the ARCS in 2008, which had taken into consideration the projected flight tracks anticipated in the 2007 Plan as well as a number of factors, such as surrounding terrain, minimum separation between aircraft operating on the runways, the mode of operation of each runway which may be arrivals only, departures only or mixed mode comprising arrivals and departures; and
- (b) after studying various possible modes of operations, NATS concluded that the primary mode of operations of the 3RS should be the one offering the highest balanced capacity between departures and arrivals, which would see the North/Centre/South runways operating in arrival/departure/mixed mode respectively, giving 33 + 35 + 34 ATMs per hour, i.e. a total of 102 ATMs per hour. This is the highest balanced capacity that could be achieved for the 3RS under independent operation.

39. As the target maximum capacity of 102 ATMs per hour under the 3RS operation at HKIA is not stipulated in the 2007 Plan, some members have questioned whether such a target could be achieved. They were concerned that Hong Kong might be forced to make compromises on the target maximum capacity of 102 ATMs per hour under the 3RS operation at HKIA in its

discussion with the Mainland on the utilization of PRD airspace.

40. The Administration considers that there is no cause for concern that the target maximum capacity of 102 ATMs per hour under the 3RS operation at HKIA cannot be eventually achieved for the following reasons:

- (a) the 2007 Plan has taken into account the operational need for 3RS of HKIA, as well as the planned development of other key airports in the PRD. The phased implementation of the 2007 Plan, which was agreed by all parties concerned, provides the basis for achieving the eventual target maximum capacity of 102 ATMs per hour under the 3RS operation at HKIA;
- (b) in the Guiding Opinion on Deepening Cooperation within the Pan-Pearl-River Delta Region (《國務院關於深化泛珠三角區域合作的指導意見》) ("the Guiding Opinion") issued by the State Council on 15 March 2016, the Central People's Government ("CPG") supports the development of 3RS at HKIA to reinforce Hong Kong's position as an international aviation hub. The CPG also encourages closer cooperation between HKIA and airports in the nine provinces/regions of the Mainland. The Guiding Opinion clearly supports the co-ordinated management and utilization of pan-PRD airspace resources, to realize a healthy and orderly development of the cluster of airports in the PRD region; and
- (c) with the rapid advent in air traffic management technology, the eventual target maximum capacity of ATMs per hour under the 3RS operation at HKIA may exceed 102.

41. Some members remain of the view that it is necessary for the Administration to make public the full content of the 2007 Plan to allay public concern that the 3RS would turn out to be a "white elephant" if HKIA could not achieve 102 ATMs per hour. These members have suggested that the Administration could redact certain parts of the 2007 Plan which contained sensitive information of the three governments, and allow LegCo Members to have sight of the redacted 2007 Plan under closed doors.

42. Members have requested the Administration to come up with a target maximum number of ATMs per hour at HKIA upon the commissioning of the 3RS at HKIA in 2023-2024, if the 2007 Plan could not be fully implemented then to achieve 102 ATMs per hour, as well as the action plan and the estimated timeline to achieve 102 ATMs per hour.

43. The Administration has advised that it is conducting a study to explore various means to increase the capacity of the 3RS before the full implementation of the 2007 Plan. The Administration plans to brief LegCo on the findings of the study in due course. The Administration has pointed out that in any case, it is not envisaged that projected traffic demand will already add up to 102 ATMs per hour when the 3RS is commissioned. The maximum capacity of 102 ATMs per hour is a target to be reached in the longer run.

44. On whether Hong Kong would discuss with the Mainland on adopting the "delegation of airspace" arrangement to increase the number of ATMs per hour at HKIA under the existing 2RS, the Administration has advised that adopting the arrangement under the existing 2RS would not improve runway capacity, as the existing runway capacity is constrained by factors such as (a) the need for maintaining safe distance between aircraft due to the spiral air vortex generated by operating aircraft; and (b) the surrounding terrain near the runway where the ICAO had strict safety requirements and standards.

New ATC system at CAD

45. Members note that the existing ATC system at CAD has reached its usable life by the end of 2012. Some components are already out of production and the system is being sustained through redeployment of existing parts where possible. Hence, replacement of the ATC system is required in order to ensure the continued provision of safe, reliable, efficient and effective ATC services in line with air traffic growth. Although the new ATC system was targeted for commissioning in December 2012, it has yet to come into operation. As the provision of a safe, reliable, effective and efficient ATC system is of paramount importance to Hong Kong and essential for Hong Kong to maintain itself as an international and regional aviation hub, question was raised as to when the new ATC system would be fully commissioned and operated by CAD.

46. The Administration has advised that in response to the recommendation of the LegCo Public Accounts Committee in its Report No. 63A, NATS was appointed by the Administration in November 2015 to assess and ascertain the readiness and human factor effectiveness of the new ATC system to further ensure safety management and operational readiness of the new system. Taking into account the consultant's suggestion on phased functional implementation and CAD's own assessment on the overall operational readiness in terms of system safety, reliability, stability, and integrity requirements, the new Air Traffic Management System ("ATMS"), a centerpiece of the new ATC system, is planned for implementation incrementally from June 2016 onwards. The use of the new ATMS would be progressively expanded in terms of operating time and the scope of service coverage over a period of about five

months. Subject to actual experience and progress, and upon independent consultant's advice, the new ATMS would be fully commissioned and operated by October/November 2016.

47. The Administration has further advised that although NATS, which had also conducted review on the ATC system of the London Heathrow Airport, concluded that the new ATMS procured by CAD was ready for operation, the consultant suggested that it would be more prudent to adopt a phased functional implementation of the new ATC system so as to allow ATC staff to gradually familiarize themselves with the new operating environment, and to minimize the risk of providing full functional services during the typhoon and peak travel seasons which would induce additional workload and pressure on ATC staff.

Scope and cost of the 3RS project

Overview of the project

48. Members note that the 3RS project broadly comprises the following seven core components:

- (a) formation of approximately 650 hectares ("ha") of land north of the existing airport island by reclamation;
- (b) construction of the Third Runway, taxiways and apron;
- (c) construction of the TRC with 57 parking positions upon 3RS commissioning;
- (d) modification/expansion of the existing Terminal 2 ("T2") and construction of associated road network;
- (e) provision of a new Automated People Mover ("APM") System and an integrated maintenance depot;
- (f) provision of a new high-speed Baggage Handling System ("BHS") serving TRC and T2; and
- (g) construction of airport support infrastructure, utilities and facilities.

The layout plan for the 3RS project is in **Appendix VI**. Construction of the 3RS will take some eight years to complete, counting from the date when reclamation commences.

49. Members further note that AAHK is actively taking forward the

implementation of the 3RS project. In particular, AAHK has commenced the detailed design of the new reclamation to the north of the existing airport and the modification/expansion works to T2. The designs of other components of the 3RS project have also commenced progressively starting from end 2015/early 2016. These components include, for example, the TRC, runways and airfield facilities, associated infrastructure and support facilities, etc. Preparation of tender documents by AAHK for various works contracts is underway.

Cost control

50. Some members have queried whether the 3RS project could be completed within the total estimated cost of HK\$141.5 billion in MOD prices, having regard to the substantial cost overrun in several major infrastructural projects, i.e. the reclamation and superstructures for the Hong Kong-Zhuhai-Macao Bridge ("HZMB") Hong Kong Boundary Crossing Facilities ("HKBCF") project had increased by some 18% from HK\$30,433.9 million to HK\$35,895.0 million; the construction of the Hong Kong section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link project had increased by some 30% from HK\$65 billion to HK\$85 billion; and the construction of Liantang/Heung Yuen Wai Boundary Control Point had increased by some 50% from HK\$16,253.2 million to HK\$24,803.2 million. As shortage of construction manpower and construction materials are major factors attributing to the cost overrun as well as delay in the aforesaid projects and as these projects are still ongoing, AAHK was urged to postpone taking forward the implementation of the 3RS project until it could ensure that there are adequate supplies of construction manpower and materials so as to avoid substantial cost overrun and delay in completing the 3RS project.

51. The Administration has emphasized that as the existing 2RS at HKIA would likely reach its maximum practical capacity of 420 000 ATMs per annum (or 68 ATMs per hour) in 2016 or 2017 and as the 3RS project would take some eight years to complete, it is necessary for AAHK to commence the reclamation and construction works of the 3RS project as soon as practicable in order to maintain Hong Kong's competitiveness as a global and regional aviation hub.

52. AAHK has assured members that it will do its best to deliver the project within time and budget. For instance, to avoid cost overrun of the 3RS project, AAHK has been identifying and addressing all possible risks prior to project implementation. A matrix project management structure will also be adopted to ensure effective communication so that problems could be detected and tackled in the first instance and to prevent project management "optimism bias" from the Project Delivery Team. Details of the measures that AAHK will adopt for project management and cost control are in **Appendix VII**.

53. On how the Government would monitor the implementation of the 3RS project, the Administration has advised as follows:

- (a) given the immense investment involved and the tight timeframe for the commissioning of 3RS, a high-level Steering Committee chaired by the Financial Secretary has been formed to steer the implementation of the project to ensure a proper and timely implementation of the 3RS project with due regard to cost-effectiveness. Key members include the Secretary for Transport and Housing ("STH"), Secretary for Commerce and Economic Development, Secretary for Development, Secretary for the Environment, and Secretary for Financial Services and the Treasury;
- (b) the Airport Expansion Project Coordination Office ("AEPCO"), set up in July 2012 under the Transport Branch of the Transport and Housing Bureau, will continue to closely monitor and scrutinize the work undertaken by AAHK in taking forward the 3RS project. On environmental matters, AEPCO will monitor AAHK's efforts in fulfilling, in a timely manner, its commitments made in the 3RS EIA Report and the conditions in the Environmental Permit ("EP") issued by the Director of Environmental Protection ("DEP"), in particular, the work of AAHK in the formulation of implementation plans and details for the committed environmental mitigation and conservation measures. Where necessary, AEPCO will help to liaise with relevant bureaux and departments. In the design stage, AEPCO will employ independent expert consultants to carry out monitoring and verification ("M&V") on the works of AAHK. In the construction stage, AEPCO will employ separate M&V consultants to monitor the overall construction process with particular emphasis on AAHK's cost control measures, work progress and quality, and contract interfacing arrangements; and
- (c) the Aviation Development and Three-runway System Advisory Committee was also set up by the Government in August 2015. It is chaired by STH, and comprises members who are experts and professionals in relevant fields, such as aviation, engineering, architecture, quantity surveying, business and finance, environment, legal, logistics and transport, tourism and hotels, academic and research.

54. Noting that the Administration plans to employ consultants at an estimated cost of HK\$184.4 million for the provision of M&V during the detailed design stage (HK\$90.7 million) and the construction stage

(HK\$93.7 million) of the 3RS project, a member has asked whether the contracts to be entered into with the consultants would contain a demerit points scheme whereby consultancy fees would be deducted for unsatisfactory performance, and whether there would be a noise expert on the consultancy team.

55. The Administration has advised that it has yet to draw up relevant details for the concerned consultancy contracts. Whilst these consultancies would not include noise expert, the consultants would be tasked to ensure that AAHK's work would fully comply with relevant statutory requirements and technical standards including the conditions as imposed in the EP for 3RS granted by DEP on 7 November 2014.

56. In noting that the estimated total project cost under the MP2030 Study was HK\$136.2 billion (MOD prices), whilst that under the 3RS Scheme Design is HK\$141.5 billion (MOD prices), question was raised about the reasons for the differences between the estimated total project costs.

57. AAHK has explained that the estimated project cost in the MP2030 Study was only a preliminary estimate. As the design of the 3RS project progressed since MP2030, the cost estimate has been refined, primarily in the light of the revised design (e.g. inclusion of more green features where possible) and updated inflation adjustment factors. An explanation on the major cost differences is in **Appendix VIII**.

Project scope

Land formation

58. Members note that one of the major components of the 3RS project is the formation of approximately 650 ha of land north of the existing airport island by reclamation. Members further note that the ground conditions of the reclamation area comprise a thick layer of soft marine mud of varying thickness (averaging 15 metres ("m")), underlain by a layer of stiffer alluvium of 15 to 20m. About 40% of the reclamation is underlain by disused Contaminated Mud Pits ("CMPs") within the layer of marine mud. The contaminated mud is generally highly disturbed and is softer than the surrounding mud. Having considered the possible impacts on the environment, AAHK would use a non-dredge reclamation method, i.e. Deep Cement Mixing ("DCM"), in the CMP areas.

59. As DCM has never been implemented in Hong Kong, albeit such technique has been widely used in Asia (principally Japan and Korea) and Europe and America, members have asked about the measures that had been

taken by AAHK to ensure that DCM would be successful for land formation for the 3RS project.

60. AAHK has advised that a series of site trials had been conducted to study the engineering and environmental feasibility and acceptability of DCM for land formation for the 3RS project. The trials and the associated monitoring and testing had all been proven successful.

61. As the source of the marine sand would have a significant bearing on the cost of the reclamation works for the 3RS project, members have asked where the marine sand for the reclamation works of the 3RS project would come from and the estimated cost of the marine sand per tonne. Question was also raised as to whether AAHK had put in place a contingency plan in the event of difficulty in procuring adequate quantity of marine sand in the course of carrying out the reclamation works.

62. AAHK has advised that the marine sand for the reclamation works of the 3RS project would be sourced from the PRD region. AAHK is presently unable to inform members of the cost of the marine sand for using in the reclamation works of the 3RS project, but the cost estimate of the reclamation works has already taken into account that the marine sand would be procured from outside Hong Kong, the associated inflation rates and contingency arrangements. AAHK and the Administration are actively in discussion with the Mainland authorities concerned on the procurement of the marine sand.

63. Question was further raised about the differences in the method(s) used in constructing the artificial island for the HZMB HKBCF project and that to be used for the formation of land by reclamation for the 3RS project, so as to avoid the problem being encountered by the HZMB HKBCF project in that movements of up to 6 or 7m had occurred in various parts of the reclamation built by using a non-dredge seawall construction method.

64. AAHK has advised that the reclamation works of the 3RS comprise three main components, i.e. ground improvement, seawall formation and land formation. In view of the ground conditions and environmental considerations, a combination of meticulous techniques and procedures, which would comply with both the geotechnical as well as environmental requirements, would be adopted to strengthen the soft marine mud which would be left in place but, at the same time, strong enough to ensure the formation of a stable platform.

65. As to whether the progress of implementing the land formation by reclamation would be affected by the prescribed airport height restrictions, AAHK replied in the negative as the heights of all the DCM barges or marine vessels (upon which the DCM rigs would be accommodated) for carrying out

the reclamation works would not exceed the prescribed airport height restrictions imposed by CAD.

Construction of the TRC

66. Noting that the design of the TRC has been changed from a double "Y" design proposed in MP2030 to the present single "Y" design, question was raised as to whether this was to compress the cost of the 3RS project. There are views that AAHK should construct the TRC using the double "Y" design at the outset, instead of expanding the TRC from a single to a double "Y" design later to cater for additional passengers.

67. AAHK has advised that as the study on the scheme design of the 3RS project conducted by AAHK in the past two years had confirmed that the single "Y" design of the TRC could already handle the additional 30 million passengers per annum as stipulated in MP2030, AAHK therefore did not see an immediate need to use a double "Y" design for the TRC in the 3RS project. Nevertheless, space has been set aside to expand the TRC to cater for a further additional 20 million passengers per annum if such need should arise after 2030.

68. On the question as to why the 3RS project does not include the development of North Commercial District ("NCD") on the airport island, AAHK has explained that this is because the development of NCD is not intended to meet HKIA's growing traffic demand but to provide hotels, retail and complementary facilities with unique concept with a view to enhancing overall airport ambience and passengers' experience. AAHK is still in the course of examining the detailed strategy and arrangements to be adopted for developing the NCD.

69. Members hope that AAHK would hire more local architectural firms to participate in the detailed design of the TRC, so as to broaden their experience and skills in undertaking major infrastructural projects.

70. AAHK has advised that selection of architectural firms to design for the 3RS project is through open tender. That said, open tender would not necessarily result in international architect firms getting the jobs. For example, elements of the scheme design for the 3RS project had been awarded to local architectural firms. Even if an overseas firm got the design job, the firm still requires the assistance of local practitioners who are well-versed in the local context.

71. Members also hope that HKIA would let in more local brand name shops at the airport, including the TRC.

72. AAHK has advised that the TRC will have a floor area of 283 000 m². AAHK has not yet begun to consider the concept of the retail space at the TRC, as the construction of the TRC is still several years away. AAHK is a keen supporter of local culture. An area in T1 is recently designated to showcase only local brand name shops.

Modification/expansion of T2

73. Noting that T2 will be modified/expanded into a full service processing terminal arising from the expansion of HKIA into a 3RS, members have asked about the modifications to be made and the associated costs. AAHK agrees to provide the information after the design of the modified/expanded T2 is finalized. That said, over 60% of the existing T2 will be retained. According to the latest design, the entire T2 foundation, substructures, and coach hall at Level 3, together with most of the building services facilities and airport system works, such as generators and transformers, chillers, lifts, etc., will be retained. Other floor levels will also be retained as far as possible but with modifications necessary to suit the expanded T2 layout.

Expansion of SkyPier

74. On whether AAHK has any plan to expand the SkyPier at HKIA, AAHK has replied in the negative for the following reasons. First, SkyPier could cope with transit passengers' demand for ferry services to and from the nine ports in the PRD region and Macao. Second, a limit is imposed by the Environmental Protection Department ("EPD") for marine ecology conservation under the EP of 3RS on the number of ferry services which SkyPier could operate daily.

Connectivity

75. Members note that currently, T1 and T2 are connected by an APM and the Midfield Concourse is connected with T1 by an extended APM. A new APM system will connect the TRC with T2, and an APM Interchange Station will be provided at the basement of T2 to serve as the central transfer between T1, T2, TRC and SkyPier. AAHK would ensure that the connecting time for passengers arriving at and departing from the TRC to T2, T1 or the Midfield Concourse and vice versa would be within 50 minutes.

76. Members further note that in view of the relatively long distance between T2 and the TRC which is beyond walking distance, a high level of operational redundancy is required for the new APM system. In the event of failure of either two of the normal tracks, the third and backup track could

substitute the failed track and maintain the pinched loop operation. A pinched loop consists of a dual guideway configuration whereby trains travelled in a loop by reversing direction and changing lanes at the end stations.

77. On how AAHK could ensure that the new systems for the 3RS will be compatible with the existing ones, AAHK has advised that a comprehensive control and integration plan for all the new and expanded airport systems, including the BHS, will be designed and implemented holistically with due consideration of the interfaces and compatibility between the new and existing systems. In particular, extensive integrated commission testing will be conducted to ensure the systems are functioning properly and seamlessly before putting in operation. Similar control and integration plan was successfully implemented for the APM system¹³ and the BHS at the recently commissioned Midfield Concourse.

Immigration arrangements

78. On whether passengers would make use of the existing immigration halls in T1 and T2 for immigration clearance and whether such facilities would have to be modified, AAHK has advised that T1 and T2 will have separate immigration facilities. The existing immigration facilities in T1 will remain unchanged. However, as part of the 3RS project, the existing T2 will be modified and expanded to provide arrivals, departures and full-fledged passenger services to further support increased passenger demand. As such, new immigration facilities will be provided in the modified/expanded T2 to cater for the increased passenger flow. AAHK has been working closely with relevant Government departments to finalize the detailed arrangement for the immigration facilities in T2 for the 3RS project.

Marine safety

79. Members note that as part of the 3RS project scheme design, AAHK conducted two Marine Traffic Impact Assessment ("MTIA") studies, namely:

- (a) Contract P281 - Third Runway Reclamation Design Consultancy Services - Preliminary Construction Marine Traffic Impact Assessment for Land Formation Works (December 2014); and
- (b) Contract P283 - Third Runway Scheme Design Consultancy Services - Marine Traffic Impact Assessment Report (March 2015).

¹³ According to AAHK, the APM system for the 3RS will be operating independently from the existing system and will not have compatibility issues.

80. The main objective of the first study (i.e. under contract P281) was to assess the marine traffic and navigation risks associated with marine activity generated by the construction of the third runway, in particular during the land formation stage, and to reduce any risks to an acceptable level. The objectives of the second study (i.e. under contract P283) were to assess the marine traffic impacts arising from (a) the operation of the third runway and the 3RS; (b) the marine ecological mitigation measures proposed under the 3RS during the operation and peak construction; and (c) the marine traffic arising from any infrastructure and concourse works.

81. Findings of the MTIA studies affirm that marine safety will not be compromised by the expansion HKIA into a 3RS with the implementation of the recommended marine traffic mitigation and enforcement measures. Specifically:

- (a) the marine traffic risk in the future navigable water space as a result of the 3RS project (both during construction and operation) remains within acceptable levels with respect to the Hong Kong Societal Risk criteria¹⁴; and
- (b) the navigation simulation workshops concluded that the simulated water space is viable and safe for navigation.

According to AAHK, the marine industry stakeholders in general considered the MTIA conclusion acceptable.

82. Referring to the ferry accident in October 2015 near Lantau Island when a high-speed ferry on the way to Macau from Hong Kong was struck by an unknown object resulting in over 100 people injured, question was raised about the measure(s) that would be adopted by AAHK to avoid release of objects to the water column during the reclamation works for the 3RS project.

83. AAHK has advised that adequate safeguards would be put in place to avoid release of objects to the water column during the reclamation works for the 3RS project, as AAHK is required to use non-dredge methods during land formation under the EP for the 3RS project granted by DEP on 7 November 2014 to protect water quality.

84. Members have pointed out that there were also numerous incidents of

¹⁴ Societal risk expresses the average risks to the whole population living, working or travelling near a hazardous installation/operation. Risk acceptability may be considered a matter of personal viewpoint but in order to provide a yardstick for potentially hazardous installation/operation sited close to local populations, a clear and unambiguous Societal Risk Guideline is provided in Annex 4 of the EIAO Technical Memorandum.

fishing boats struck by heavy construction objects, such as silt curtains, associated with the construction of the artificial island with respect to HZMB in Hong Kong waters when these fishing boats sailed along the aforesaid construction site on high speed at night-time, as a result of which injuries were caused to the fishermen on board. The Administration and AAHK were urged to step up monitoring of marine construction works to avoid putting the safety of fishermen and other persons whilst at sea at risk.

85. AAHK has advised that under the EP granted for the 3RS project, AAHK is required to, amongst others, devise a Silt Curtain Deployment Plan and draw up detailed technical guidelines to avoid adverse water quality impacts for compliance of contractors over the operation of barges and construction vessels to be deployed in the project. Such measures should in turn prevent the occurrence of accidents similar to those referred to in paragraph 84 above. Besides, AAHK would continue to maintain a close dialogue with the fisheries industry to understand its concerns about the 3RS project. In addition to liaising closely with the Marine Department, a Marine Traffic Control Centre will be set up as part of the reclamation works contract to manage and co-ordinate the movement of working vessels in relation to the 3RS project so that the impact of working vessels on regular marine activities, including those of fishing vessels, are practically minimized. Furthermore, the reclamation works areas will be clearly delineated and patrolled to prevent unintentional entry of unauthorized vessels that may pose danger to themselves as well as to other working vessels.

86. The Administration has also advised that stringent conditions have been imposed by the Administration on contractors to comply. The Administration would continue to step up monitoring of contractors' performance to ensure such compliance.

Financial arrangement plan of the 3RS project

Overview of the financial arrangement plan

87. Members note that AAHK has proposed to fund the 3RS project, estimated to be around HK\$141.5 billion in MOD prices, through the following three sources:

- (a) retaining AAHK's operating surplus including, inter alia, reviewing and optimizing existing fees and charges;
- (b) introducing a new ACF; and
- (c) raising third party debts from the market leveraging on AAHK's

financial capability and excellent credit rating.

Breakdown of the total estimated construction cost of the 3RS project is in **Appendix IX**.

88. Some members expressed strong dissatisfaction that the Administration and AAHK bypassed LegCo in implementing the 3RS project, as this had deprived LegCo Members the opportunities to exercise their duties to scrutinize and approve or otherwise public expenditure.

89. Members note that as part of its MP2030, AAHK commissioned The Hongkong and Shanghai Banking Corporation Limited ("HSBC") in 2009 to conduct a financial feasibility assessment study which was completed in 2011. AAHK also commissioned HSBC in 2013 to conduct a study on the possible financial arrangement plan for implementing the 3RS project which was completed in 2015. In noting that the financial internal rate of return ("IRR") mentioned in the 2011 and 2015 HSBC's financial reports was 3% and 8% respectively, question was raised about the reason(s) for such a difference.

90. AAHK has pointed out that the two financial reports prepared by HSBC are very different in nature. The baseline against which the IRRs were calculated, as well as many of the assumptions adopted in the two reports are also different. The two sets of IRR figures therefore do not offer any meaningful comparison. The key differences between the two reports are as follows:

- (a) the 2011 study was a "financial feasibility study" undertaken as part of the MP2030. Its primary purpose was to assess the financial feasibility between the 2RS and 3RS development options. For the purpose of calculating the financial IRRs, the 2011 study has adopted the traffic forecast projected in 2010 and capped at approximately 60 million passengers per annum in financial year 2015-2016 as the basis for comparing the 2RS and 3RS scenarios;
- (b) on the contrary, the 2015 study was a "financial arrangement study" for the 3RS. Its primary purpose is to develop a financial arrangement plan to fund the 3RS. The financial IRR for 3RS in the 2015 study is calculated based on incremental cashflows (i.e. revenues, operating expenses and capital expenditure) generated by the 3RS project relative to a two-runway baseline (i.e. traffic capped at 77 million passengers per annum or 420 000 ATMs per annum) until financial year 2046-2047, after taking into account incremental tax plus terminal value. Moreover, the 2015 study has adopted, amongst others, updated working assumptions

to reflect developments since 2011, such as (i) the most updated 3RS cost estimate (increased from HK\$136.2 billion under MP2030 to HK\$141.5 billion), both in MOD terms; (ii) traffic forecast updated in 2012 for the purpose of the 3RS EIA study (as opposed to the traffic forecast estimated in 2010); and (iii) the incremental cash flow with the known sources of funding, such as ACF, increases in airport charges, etc.;

- (c) the 2011 financial feasibility assessment showed that the project financial IRR was 3% (pre-tax) whilst the 2015 financial IRR was approximately 8% (post-tax); and
- (d) it should be noted that at the time when the 2011 study was conducted, only the size of funding gap was determined. Neither the source nor the cost of funding had been assessed. Hence, without these key financial data which have impacts on the tax expenses, only the pre-tax IRR was assessed. In the 2015 study, with the size of funding gap updated and the source of funding determined, HSBC was able to assess the post-tax IRR. In any event, HSBC assessed that the difference between the pre-tax and post-tax IRRs for the 2015 study was immaterial (i.e. both were approximately 8%). Most importantly, it is the economic benefits, rather than the financial IRR, that matters most in developing the 3RS.

91. A summary of the key differences between the 2011 and 2015 HSBC's financial reports are set out in **Appendix X**.

92. Members note that AAHK had undertaken "what-if" analysis to test the financial robustness and prudence of the 3RS financial arrangement plan by assessing the impact of potential downside scenarios on the financial position of AAHK, including: (a) decline in all revenues; (b) overspending in capital cost; (c) single adverse event similar to the SARS outbreak in 2003; or (d) increase in the cost of borrowing. Results of the test indicated that it would be viable for AAHK to increase borrowing to HK\$69 billion under base case and provide flexibility for AAHK to handle downside scenarios. If any of the four aforesaid downside scenarios are to occur, AAHK could still maintain an investment grade rating. Another buffer built into the financial model is the 5% per annum cost of borrowing throughout the entire period, which is a conservative assumption under current market condition. Members further note that the financial arrangement plan of the 3RS project had been assessed by independent financial advisors engaged by AAHK and the Government respectively to be viable and robust, and was in compliance with the requirement of AAO that AAHK should conduct its business according to

prudent commercial principles.

93. On the measures that AAHK would take in case of downside situations which have a more severe financial impact than the four scenarios referred to in paragraph 92 above, AAHK considers the occurrence of such would be most unlikely. Should circumstances arise such that AAHK reasonably expects a funding shortfall that could not be prudently met with additional indebtedness, AAHK would, as recommended by HSBC, re-visit its financial plan. AAHK may look to develop other revenue streams or access alternative forms of financing. Under the current 3RS financial arrangement plan, the Hong Kong Government is not required to provide any form of financial guarantees or undertaking to AAHK.

94. In view of the recent downgrading of the credit rating outlook for AAHK from stable to negative by Standard and Poor's on 31 March 2016, concern was raised about the impact on the financial arrangement plan for the 3RS project.

95. AAHK has advised that with the downgrading of Standard and Poor's credit rating outlook for Hong Kong from stable to negative on 31 March 2016, the credit rating outlook for AAHK has correspondingly been downgraded from stable to negative given that AAHK is 100% owned by the Government. However, the aforesaid downgrading has not affected the credit rating of Hong Kong as well as AAHK at AAA. In deciding whether to lend or not lend money to AAHK for the 3RS project, lenders will only consider the issuer credit rating on AAHK and not AAHK's stand-alone credit rating. AAHK has further advised that so long as AAHK can maintain its investment grade rating, which is a very wide spectrum in the credit rating methodology, AAHK can still raise sufficient debt from the market at reasonable costs to meet its funding shortfall for the 3RS project. It should be borne in mind that the methodologies adopted by the credit rating agencies had been revised since 2008.

96. Some members have asked whether the Government, being the sole shareholder of AAHK, would provide funding to AAHK in the event AAHK encountered difficulties in repaying the borrowings for the 3RS project.

97. The Administration has advised that the independent financial consultant engaged by the Government has confirmed that the financial arrangement plan for the 3RS project is viable. Financial support/guarantee from the Government will not be required. Being the sole owner of AAHK, the Government has the responsibility to ensure the smooth implementation of the 3RS project, including compliance with relevant statutory requirements. However, the Government is not required to provide financial support or

guarantee to AAHK.

Introduction of an ACF

98. Members note that taking into account feedback from the Government, AAHK has revised the charging level of the ACF scheme. Under the original proposal, the ACF would be set at HK\$180 per departing passenger (excluding transit passengers). Under the revised ACF regime¹⁵, the charging level of ACF for the majority passengers has been substantially reduced and with differential charging levels as set out below:

ACF (HK\$ per departing Passenger) ¹⁶	Origin/Destination	Premium Class	Economy Class
	Long	\$180	\$160
	Short	\$160	\$90
	Transfer/Transit	Premium Class	Economy Class
	Long	\$180	\$160
Short	\$160	\$70	

99. Members further note that AAHK hopes to levy the new ACF in mid-2016, once all 3RS statutory gazettal processes are completed¹⁷. The levying of ACF will discontinue after all 3RS-related borrowings have been repaid, the timing of which is forecast to be by 2030-2031. AAHK will review the timing for the cessation of ACF in 2023-2024, as the financial situation of AAHK should become clearer following the completion of the 3RS project then. The different ACF charges will remain unchanged throughout the levying period.

¹⁵ With the revised ACF scheme, AAHK estimates that there will be some HK\$16 billion less in net revenue (after deducting tax and airlines' handling fees) as compared to the original proposal for funding the 3RS project. AAHK will need to raise an additional debt of HK\$16 billion from the market to cover the shortfall. The independent financial consultant engaged by the Government is satisfied that, given AAHK's strong balance sheet and excellent credit rating, AAHK's proposed borrowing in the order of 4.5 times EBITDA in the financial year 2022-2023 is still viable without adversely affecting its credit ratings, although the proposed debt level may possibly approach the practical limit achievable in the market benchmarking from the experience in overseas airports (Paragraph 16 of the LegCo Brief on HKIA's ACF issued by THB on 29 September 2015).

¹⁶ According to AAHK, it is expected that about 70% of passengers departing from HKIA will pay an ACF of HK\$90 or less.

¹⁷ On 30 May 2016, AAHK announced that ACF will be collected on air tickets issued on or after 1 August 2016.

100. A member is of the view that setting a rate of HK\$90 for short-haul economy passengers represents a high percentage of the air ticket price, whereas setting a rate of HK\$180 for long-haul premium passengers represents a very low percentage of the air ticket. AAHK was urged to re-consider setting a higher rate for long-haul premium passengers and a lower rate for short-haul economy passengers, albeit this might lengthen the time for AAHK to repay all 3RS-related borrowings.

101. AAHK considers it not desirable to set a higher rate for long-haul premium passengers and a lower rate for short-haul economy passengers, as to do so will adversely impact on the cashflow requirement, and this in turn will push AAHK to borrow beyond the practical borrowing limit during the 3RS construction period.

102. On the suggestion of adjusting downwards the ACF to be charged for transfer and transit ("TT") passengers at HK\$70, AAHK considers it not necessary. AAHK had consulted passengers, airlines and other stakeholders on the charging mechanism of the revised ACF regime, all of whom generally considered the ACFs to be charged, including HK\$70 for TT passengers, reasonable.

103. Instead of levying ACF as one of the sources to fund the 3RS project, a member considers that AAHK should bridge the funding gap by further increasing airport charges.

104. AAHK has pointed out that only 18% of the funding for the 3RS project (or about HK\$26 billion) will be sourced from ACF, whilst 49% (or about HK\$69 billion) will be sourced from incremental borrowing and 33% (or about HK\$47 billion) from operating surplus. AAHK intends to optimize all its revenue sources, including raising the landing and parking charges to the level of 16 years ago when the landing and parking charges were reduced by 15% in 2000 due to the Asian Financial Crises, with subsequent airport charges increases to be introduced in line with inflation.

Legal basis of levying an ACF

105. A member considers that it is unclear whether section 7(1) and (2) of AAO provides the statutory power for AAHK to levy the new ACF. In his view, AAHK should have applied section 34 of AAO to levy ACF, as it had been done in 1998 to levy a scheme of airport charges (including a Terminal Building Charge ("TBC") at HK\$39 per departing passenger, excluding transit passengers) which were subject to approval by ExCo and the by-laws concerned subject to scrutiny by LegCo.

106. AAHK has explained that section 34 of AAO does not apply to the introduction of an ACF because section 34 of AAO only concerned "airport charges" which are specially defined in section 2 of AAO. Under section 2 of AAO, "airport charges" is defined to mean only "charges payable in connection with the landing, parking or taking off of aircraft at the Airport". AAHK has further explained that TBC was not levied at passengers, but was used for calculating fees chargeable to airlines if their passengers used the facilities at the main airport's Passenger Terminal Building. According to legal opinion sought by AAHK, section 7 of AAO provides statutory power for AAHK to levy any fees, except airport charges, without the prior approval from ExCo and scrutiny by LegCo so long as such fees meet the objective set out in section 5(1)(a) of AAO which states that AAHK "shall, in accordance with this Ordinance and also in accordance with the objective of maintaining Hong Kong's status as a centre of international and regional aviation, provide, operate....., develop and maintain, at... Chek Lap Kok, an airport for civil aviation".

107. The recent High Court judgment on three applications for leave to apply for judicial review seeking to challenge the legality of, amongst others, the financial arrangement concerning the 3RS project (*HCAL 99, 102 & 104/2015*) ruled that AAHK has express power under AAO to charge the ACF. The Court considered that the construction of the 3RS falls within AAHK's function to develop HKIA, and that the imposition of the ACF is requisite or expedient for the performance by AAHK of that function and thus falls squarely within AAHK's power under section 7(2)(i) of AAO.

Raising funds from the market

108. Members urged AAHK to allocate a larger portion of its borrowings for funding the 3RS in the form of retail bonds to allow more members of the public to participate and be engaged in the 3RS project. They have pointed out that with savers receiving zero or near zero interest rate from their deposits, for AAHK to offer retail bonds at an interest rate equal or approximate to its borrowing costs at 5% (5% per annum is the assumption of cost of borrowing in the financial model throughout the period) for the 3RS would be a welcome move for the people of Hong Kong. Suggestion was also made for AAHK to issue different forms of bonds, such as the green bond and Islamic bond, to reduce its costs in raising debts from the market.

109. AAHK has advised that it would shortly engage a financial advisor to draw up a comprehensive plan on the financial arrangement plan for the 3RS project this year. Subject to the recommendation of the study, it is AAHK's plan to offer some of its bonds to Hong Kong residents. AAHK has however pointed out that the cost for issuing retail bonds would be higher than the costs

for using other sources of raising debts because the tenor of retail bonds is likely to be short when compared to the long term nature of institutional bonds and the pricing might be less competitive when compared to other sources, such as borrowing from the banks and maintaining revolving credit facilities. As such, a balance needs to be struck on allowing public participation on the one hand and keeping the borrowing costs at affordable and reasonable levels on the other. AAHK has also clarified that AAHK might not offer an interest rate of 5% per annum for the retail bonds to fund the 3RS project, as the 5% borrowing costs for the 3RS project are only an assumption and a lenient one, in anticipation of a rise in interest rate.

Retain operating surplus

110. Members note that AAHK intends to optimize all its revenue sources, including the airport charges which would be brought back to the level of 16 years ago (when the charges were reduced in January 2000 due to the Asian Financial Crisis), with subsequent increases to be introduced in line with inflation. The increase in airport charges is targeted to be implemented in 2016-2017. AAHK also plans to retain all distributable profits¹⁸ from 2014-2015 onwards until the commissioning of the 3RS. AAHK estimates that about HK\$47 billion (or 33%) of the required capital funding for the 3RS project would be raised through optimizing revenues and retaining distributable profits.

111. Although the overall airport charges of HKIA ranked 55th amongst the 56 international airports studied, question was raised as to whether consideration could be given to implementing the increase in airport charges in phases.

112. AAHK has advised that it is currently discussing with airlines on the proposed increase of airport charges to be targeted for implementation in 2016-2017. The discussion thus far has been smooth. Some airlines did indeed suggest increasing the airport charges in phases. AAHK is open-minded to the suggestion, so long as the total amount of charges to be received by AAHK remains unchanged¹⁹.

¹⁸ According to AAHK, section 26 of AAO states that AAHK "may" declare and pay dividends to the Government. It is for the AAHK Board to decide whether to declare dividend, and the amount of such dividend, if any. The proposal of not declaring dividend for the purpose of financing the 3RS project was duly considered and approved by AAHK Board.

¹⁹ On 7 June 2016, ExCo approved the revised Scheme of Airport Charges proposed by AAHK under section 34 of AAO to increase the landing and parking charges at HKIA to the pre-2000 level with effect from 1 September 2016. The airbridge and terminal building charges will remain unchanged.

Mitigation and enhancement measures in connection with the conservation of marine ecology and CWDs

Key milestones of the 3RS EIA Report under the Environmental Impact Assessment Ordinance (Cap. 499) ("EIAO")

113. Members note the following key milestones of the 3RS EIA Report under the EIAO:

- (a) AAHK submitted a Project Profile to EPD on 28 May 2012 applying for an EIA Study Brief for the 3RS project. Following a public inspection process, EPD issued an EIA Study Brief to AAHK on 10 August 2012;
- (b) AAHK had conducted the EIA, covering 12 environmental aspects, viz: (i) air quality; (ii) hazard to human life; (iii) noise impact; (iv) water quality; (v) sewerage and sewage treatment; (vi) waste management; (vii) land contamination; (viii) ecology (terrestrial and marine ecology, including CWDs); (ix) fisheries; (x) landscape and visual; (xi) cultural heritage; and (xii) health impact (air emissions and aircraft noise). The 3RS EIA Report was submitted by AAHK to EPD on 17 April 2014 for approval, together with an application for an EP;
- (c) the 3RS EIA Report was then exhibited for public inspection for 30 days from mid-June to mid-July 2014, upon EPD's consent that the Report had met the requirements of the EIA Study Brief and the EIAO Technical Memorandum. As required by EPD, AAHK also submitted the 3RS EIA Report to the Advisory Council on the Environment ("ACE") on 23 July 2014. The EIA Subcommittee of ACE ("EIASC") held five meetings from mid-August to September 2014, during which the presentation and question-and-answer sessions were open to the public, to deliberate the 3RS EIA Report. An ACE full council meeting was held on 15 September 2014 to discuss the recommendation of EIASC and the 3RS EIA Report;
- (d) ACE provided written comments to EPD on 19 September 2014. Whilst ACE recommended approval of the 3RS EIA Report, it also set out a total of 18 proposed measures to be imposed as conditions in the EP and four recommendations to enhance protection of ecology particularly in relation to CWDs; fisheries; water quality; landscape and visual aspects; waste management; and environmental monitoring and audit requirements, for implementation of the 3RS project;

- (e) DEP was informed of ACE's advice on 19 September 2014. Pursuant to the EIAO and upon DEP's request, AAHK provided on 10 October 2014 the further information as presented to and discussed at the ACE meeting held on 15 September 2014; and
- (f) on 7 November 2014, DEP approved the 3RS EIA Report and granted the associated EP to AAHK. There are 56 conditions set out in the EP for the 3RS project, details of which are available on AAHK's website at <http://www.epd.gov.hk/eia/register/permit/latest/ep4892014.pdf>.

114. Members further note that following the granting of the EP, progress has been made by AAHK on the following areas:

- (a) three environmental services contracts for (i) a full-time on-site Environmental Team to carry out comprehensive environmental monitoring and audit ("EM&A") in connection with CWDs, ecology, air, noise, water etc., (ii) a full-time on-site Independent Environmental Checker to audit, review and verify all EM&A data and EP submissions and (iii) an EP Consultant to support AAHK in the delivery of marine ecology and fisheries-related EP requirements, have been awarded;
- (b) a Marine Travel Routes and Management Plan has been devised following negotiations with the SkyPier high speed ferry ("HSF") operators. The Plan sets out the required route diversion and speed limit within Hong Kong waters for HSFs travelling between SkyPier and Macau/Zhuhai during the construction phase to ensure marine traffic safety and minimize disturbance to CWDs. The Plan has been submitted to DEP for approval after consultation with ACE; and
- (c) five Community Liaison Groups ("CLGs") have been set up by AAHK in 2012 in the neighbouring districts of HKIA, namely, Islands, Kwai Tsing, Shatin, Tsuen Wan and Tuen Mun, to enhance transparency and communication with the community. The CLGs have a total of 160 members, including district councillors and community leaders. In September 2015, AAHK also set up the Professional Liaison Group ("PLG") comprising 22 relevant professional/experts in different relevant environmental fields to facilitate communications, enquiries and complaints handling on all environmental issues relating to the 3RS project²⁰.

²⁰ According to AAHK, in setting up the PLG, AAHK had issued invitation letters to 18 green groups in June 2015. Despite AAHK's efforts and goodwill, some of the green groups refused to join the PLG.

115. Members also note that out of the estimated capital cost of HK\$141.5 billion for the 3RS, about HK\$22 billion will be used to employ various environmentally friendly construction methods (e.g. DCM for reclamation ground improvements and horizontal directional drilling for undersea aviation fuel pipeline diversion) and to implement green features in its design.

Mitigation measures for CWDs

116. Members note that in order to reduce the acoustic disturbance, risk of injury or mortality and changes to abundance and patterns of habitat use of CWD, SkyPier HSFs travelling to/from Zhuhai and Macau are required by AAHK to divert to the north of the Sha Chau and Lung Kwu Chau Marine Park ("SCLKCMP") with their speed restricted to 15 knots or below across areas with higher CWD abundance starting from 28 December 2015. However, it was reported in the newspapers that AAHK would not issue warning letters to the operators of the SkyPier HSFs whose HSFs had failed to observe the 15-knot speed limit whilst travelling within CWD hotspots if the reason was on navigational safety. Concern was raised that such relaxation of speed limit would endanger CWDs and in breach of the relevant condition stipulated in the EP for the 3RS project granted by DEP on 7 November 2014.

117. AAHK has advised that in accordance with the relevant provision in the Marine Travel Routes and Management Plan for HSFs of SkyPier ("SkyPier Plan") under the relevant EP, any non-compliance with the requirements and arrangements for speed control shall result in warnings to operators. That said, the SkyPier Plan also provides that vessel captains may decide to deviate from the requirements in response to an emergency or in the interest of public safety, for instance, in case of adverse sea conditions. On this basis, when speeding is observed, AAHK will issue notices to the ferry operators asking for an explanation. If the operator is unable to provide a valid explanation, AAHK will consider issuing a warning. AAHK can further revoke the licence of an operator of SkyPier HSFs for repeated non-compliance, until submission of report explaining the reason of non-compliance with preventive measures in place to the satisfaction of AAHK.

118. AAHK has further advised that during the initial implementation period, the SkyPier HSFs encountered occasional difficulties in strictly observing the 15-knot speed limit throughout the journey. In accordance with the SkyPier Plan, further training workshops for the SkyPier operators were held in January 2016 to ensure their full understanding of and adherence to the routing and speed control requirements. The situation considerably improved in February 2016, and the implementation and monitoring requirements stipulated in the

SkyPier Plan were fully complied with. In response to AAHK's enquiry on the reason(s) for speeding, the concerned ferry operators advised that most of the cases were related to local strong water current, including those associated with head-on large vessels such as container and ocean-going vessels, as well as anchored vessels. In those cases, the HSF captains considered that speeding up or overtaking for a short duration was necessary for public safety.

119. To minimize the occurrence of SkyPier HSFs failing to reduce their speed to 15 knots or below across areas with high CWD abundance due to unpredictable local strong current, suggestion was made to further reduce the 15-knot speed limit of SkyPier HSFs across areas with higher CWD abundance by one or two knots.

120. As the daily number of incidents where SkyPier HSFs failing to restrict their speed at 15 knots or below across areas with high CWD abundance had drastically reduced following a number of workshops organized by AAHK for the operators and captains of SkyPier HSFs since the implementation of the speed limit on 28 December 2015, AAHK considers it not necessary to reduce the speed limit. AAHK would continue to engage with the operators and captains of SkyPier HSFs to ensure their full compliance of the speed limit except in response to an emergency and in the interest of public safety.

121. Question was raised as to whether marine construction activities would be suspended for a period of 30 minutes if CWDs were sighted to be in the 24-hour dolphin exclusion zone, as committed by AAHK in its 3RS EIA Report, to avoid the cause of injury/noise disturbance to CWDs.

122. AAHK has advised that it is committed to ensuring that marine construction activities will be suspended for a period of 30 minutes if CWD is/are sighted within a 250m radius dolphin exclusion zone for the concerned marine construction activity. AAHK has implemented the dolphin exclusion zone last year for the marine works of DCM site trial, the performance of which was satisfactory. In addition to the establishment of the dolphin exclusion zone, the following measures will be put in place during the construction of the 3RS project in connection with the protection of CWDs:

- (a) adoption of advanced designs and specific construction methods (such as using non-dredge methods to carry out reclamation during land formation, DCM over CMPs, and horizontal directional drilling for submarine pipeline diversion) that minimize environmental impact;
- (b) complete avoidance of marine percussive piling and avoidance of bored piling during the peak calving season for CWDs;

- (c) acoustic decoupling of construction equipment mounted on construction barges to minimize disturbance to CWDs; and
- (d) implementation of spill response plan as precautionary measure for protection of marine water quality.

123. Noting that AAHK has capped the number of SkyPier HSFs at an annual daily average of 99 prior to designation of the proposed 3RS marine park to minimize disturbance to CWD habitat due to HSF traffic, question was raised as to whether AAHK would consider lowering the cap on the daily number of SkyPier HSFs prior to designation of the proposed 3RS marine park. AAHK has advised that there is little room to lower the cap on the daily number of SkyPier HSFs prior to the successful designation of the proposed 3RS marine park, as to do so would mean cancellation of some existing ferry sailings.

124. As to whether there is any room to lower the cap on the daily number of SkyPier HSFs upon the opening of the HZMB Hong Kong Boundary Crossing Facilities targeted at end of 2017, AAHK has advised that although some people would choose to use the HZMB HKBCF to travel to/from Zhuhai and Macau to HKIA, the growing cross-boundary traffic between HKIA and the PRD region in the past few years should leave little room for AAHK to lower the existing level of service at SkyPier.

125. As the marine construction phase of the 3RS project might overlap with that of the HZMB HKBCF project, the Administration was urged to work closely with AAHK to minimize potential impacts on the marine ecology and CWDs and to share its experience on implementing the measures to minimize the potential impact of marine construction on marine ecology and CWDs with AAHK. The Administration has advised that such tasks will be actively carried out by AEPCO.

126. Some members note that it was suggested by some green groups that instead of diverting SkyPier HSFs travelling to/from Zhuhai and Macau to the north of the SCLKCMP, a better approach was for SkyPier HSFs to use its previous route, i.e. southern boundary of the SCLKCMP, but restrict their speed to 10 knots or below across areas with higher CWD abundance. Members have asked about the reason(s) for not adopting such suggestion.

127. AAHK has explained that the dolphin experts engaged by AAHK to lead the impact assessment on CWDs confirmed that the existing route diversion for SkyPier HSFs was the most suitable route to mitigate potential impacts of marine traffic on CWDs. Using the previous travel route of SkyPier HSFs was considered not suitable for the following reasons. First,

once the 3RS project construction was underway, the navigation corridor from the east side of the airport platform to the waters west of Hong Kong would be further narrowed, pushing SkyPier and other vessels further to the north and closer to the southern boundary of the SCLKCMP. Having the same number of high-speed vessels using a narrower navigation corridor would result in closer spacing of the vessels and less area for CWDs to surface, and thus higher risk of CWDs being hit by a vessel. It would also result in higher levels of anthropogenic noise, which was known to cause behavioural disturbance to dolphins. Second, the previous route crossed the travelling area between the two existing CWD hotspots, namely, West Lantau and the SCLKCMP, and directly crossed the core zone of the Pearl River Estuary ("PRE") CWD National Nature Reserve.

128. On whether AAHK has laid down the minimum number of CWDs in Hong Kong waters as a baseline for evaluating the effectiveness of the mitigation and enhancement measures in connection with the conservation of marine ecology and CWD for the 3RS project, AAHK has advised that it has embarked on a baseline survey, covering Northeast Lantau, Northwest Lantau, West Lantau and Southwest Lantau waters on CWD density and abundance in the vicinity of the 3RS project, to be completed in six months' time. Based on the results of the aforesaid baseline survey, AAHK will consult the Agriculture, Fisheries and Conservation Department ("AFCD") on drawing up the details of an event action plan for CWDs and the plan will be submitted to the EPD for approval. Although there has been a declining trend in the estimated abundance of CWDs within Hong Kong waters since 2003, the estimated abundance of CWDs within Hong Kong waters since 2011, i.e. during the construction of the HZMB HKBCF project, largely remain the same.

129. As to whether AAHK would conduct a study on the distribution, abundance and movements of CWDs within the Hong Kong and PRE waters, so as to assess whether CWDs would come back to Hong Kong waters after the completion of the marine construction phase of the 3RS project, AAHK has advised that it plans to conduct a relevant study on CWDs within the Hong Kong and PRE waters. Such a study is complicated and will be conducted in phases. The HKIA Environmental Fund had recently granted a funding to the Ocean Park Conservation Foundation on the first phase of a study on the development of a CWD conservation research framework covering Hong Kong and PRE waters. As regards the future phases of the study, AAHK will encourage the Ocean Park Conservation Foundation to file application under the proposed Marine Ecology Enhancement Fund ("MEEF") to be set up by AAHK in late 2016.

130. AAHK has further advised that the establishment of the proposed 3RS marine park (with a size of about 2 400 ha), which will connect the Hong Kong

International Airport Approach Areas with the existing SCLKCMP to its north and with the committed marine park in the Brothers Islands to the east (to be designated under the HZMB HKBCF project), should provide a favourable habitat for CWD displaced elsewhere to return. Although the designation of the proposed 3RS marine park can only be completed at completion of the 3RS project construction, AAHK has already submitted a Marine Park Proposal describing the preparatory work for the proposed 3RS marine park designation to the ACE in November 2015 for comment. Subject to the approval of the Marine Park Proposal by DEP, AAHK will proceed with the stakeholder consultations and the detailed studies accordingly.

131. Some members are of the view that the most effective way to ensure compliance of all environmental mitigation measures during the marine construction stage of the 3RS project is to enact law to make non-compliance of any such measures an offence with penalty. The Administration considers it not necessary to do so. In accordance with the EIAO, DEP will take enforcement actions for any non-compliance with the EP conditions. These members remained unconvinced that the mitigation measures to be adopted by AAHK and the Administration to protect the CWD habitat are sufficient.

Marine ecology and fisheries enhancement strategy

132. Members note as part of the 3RS EIA Study, AAHK has committed to formulating and implementing a Marine Ecology and Fisheries Enhancement Strategy ("MEFES") for the 3RS project. The MEFES would be set up for the purpose of enhancing the marine environment for the benefit of marine ecology (including CWDs) and fisheries resources in the vicinity of the project area, in Hong Kong western waters and further afield into the PREs. The MEFES also provides support and assistance to affected fishermen to promote more sustainable fishing operations. In accordance with the EP conditions, AAHK shall, inter alia,:

- (a) establish a MEEF and submit a Marine Ecology Conservation Plan for the conservation of marine life within the Hong Kong and the PRE waters; and
- (b) establish a Fisheries Enhancement Fund ("FEF") and submit a Fisheries Management Plan for supporting the fishing industry and enhancing fisheries resources in the western Hong Kong waters, especially the Lantau waters²¹.

²¹ The MEEF and FEF form part of the Marine Ecology Conservation Plan and Fisheries Management Plan respectively. The two plans have been approved by EPD in March 2016.

133. Members further note that HK\$150 million will be put under an endowment arrangement to generate a targeted annual budget income of about HK\$6 million to support the MEEF initiatives. As regards funding for the FEF, HK\$50 million (out of HK\$150 million) at the outset will be set aside to support the FEF initiatives. The remaining HK\$100 million will be put under an endowment arrangement to generate a targeted annual income of about HK\$4 million. To ensure stable funding support for both the MEEF and the FEF, any shortfall on the targeted annual return of HK\$6 million and HK\$4 million for the MEEF and the FEF respectively (due to possible fluctuations in investment income) will be topped up by an additional HK\$100 million "top-up" fund established for both Funds.

134. To better enhance fisheries resources in the project area, AAHK was urged to expeditiously implement measures such as deployment of artificial reefs and releasing of fish fry. AAHK has advised that apart from deploying artificial reefs and releasing fish fry in the waters of 3RS project site, the incorporation of eco-enhancement design features into suitable sections of the future extended artificial seawall will also be considered for enhancing the fisheries resources in the surrounding water.

135. Members have pointed out that although the Government had set up a HK\$500 million Sustainable Fisheries Development Fund ("SFDF") in 2014 to help the local fishing community move towards sustainable or high value-added operations so that the trade could enhance its overall competitiveness and cope with new challenges, only subsidies totalling HK\$28 million had been granted under the SFDF. In the light of this, AAHK was urged to lower the threshold for approving applications under the FEF. AAHK was also urged to increase funding to the FEF so that more money could be set aside as seed money to generate more income, having regard to the fact that the applications approved under the SFDF was on average HK\$7 million.

136. AAHK takes note of members' views on the annual budget for supporting the FEF. As regards the suggestion on having a lenient funding criteria under the FEF, AAHK has advised that the suggestion will be considered by the Steering Committee to be set up under AAHK to provide overall directional guidance and policies for both the MEEF and the FEF. Invitation for applications for the FEF will start before the end of 2016. Fishermen's association representatives will be invited to become members of the FEF Management Committee tasked to, amongst others, approve qualifying funding applications.

137. To compensate fishermen whose livelihood is affected by marine works projects, the Administration was urged to:

- (a) expedite the disbursement of ex-gratia allowance ("EGA") to the affected fishermen; and
- (b) review the existing mechanism for providing EGA to affected fishermen, in view of the increasing longer time taken to complete a marine works project.

138. Members also draw the Administration's attention to the following proposals made by a fisheries association:

- (a) amend the Marine Parks Ordinance (Cap. 476) to allow succession and transfer of marine park fishing permits, so as to promote the sustainable fishing in Hong Kong; and
- (b) minimize the core zone of marine parks to avoid further loss of fishing grounds.

Illegal fishing activities within marine parks

139. On the actions to be taken against illegal fishing activities within marine parks in Hong Kong, the Administration has advised that AFCD conducts regular patrols at marine parks in Hong Kong and take enforcement actions, where appropriate, in combating illegal fishing within marine parks. AFCD maintains a close relationship with the fishing communities in obtaining updated illegal fishing information so as to enhance the patrolling and enforcement operations. On the law enforcement fronts, AFCD will continue to work with Hong Kong Marine Police and Enforcement Unit of the Guangdong Provincial Bureau of Oceans and Fisheries to take joint enforcement actions against illegal cross-border fishing activities within marine parks. AFCD will also keep in view the timing for the designation of new marine parks and seek additional resources to enhance the effort in patrolling and enforcement.

Aircraft noise impact on North Lantau

140. Concern was raised that residents of North Lantau, including Ma Wan and Tung Chung New Town, would suffer even more aircraft noise upon the full commissioning of the 3RS. Noting that the noise generated by aircraft using Option J (also called "Radius to Fix Standard Instrument Departure ("RF SID")) flight path for taking off is lower, question was raised as to whether AAHK would consider reducing the landing and departure fees charged to those airlines which deployed aircraft equipped to use the RF SID flight path to depart from HKIA at night.

141. The Administration has advised that to reduce the impact of aircraft noise on residents of Ma Wan particularly during the night time, subject to acceptable operational and safety consideration, arriving aircraft are required to land from the southwest direction over the sea in order to reduce the number of aircraft overflying populated areas. Besides, CAD has already prohibited noisier aircraft types (i.e. those non-Chapter 3 compliant aircraft) from landing and taking off in Hong Kong. To strengthen this noise mitigation measure, from 2014, CAD no longer allows aircraft which are marginally compliant with the ICAO Chapter 3 noise standards to land and take off in Hong Kong. According to the statistics, although the number of aircraft flying in the vicinity of Ma Wan during the night time is on the rise in recent years, the noise level records of the aircraft noise monitoring terminal at Ma Wan have been on the decrease.

142. AAHK has also advised that with the 3RS in place, aircraft noise impact on North Lantau would be significantly improved as the existing South Runway would be put on standby mode at night then. AAHK has further advised that apart from the fact that aircraft must be equipped with the necessary equipment to use the RF SID flight path, pilots must also receive the required training to operate such equipment. AAHK is in discussion with CAD and airlines on introducing a noise charge to encourage more airlines to use quieter aircraft.

143. The Administration has supplemented that to mitigate the impact of aircraft noise on residents of Ma Wan during the 3RS operation, AAHK is required under the EP for the 3RS project to implement a series of noise mitigation measures, including phasing out noisier aircraft with reference to international practice and adopting RF SID flight path. The Government would closely monitor the compliance of all noise mitigation measures stipulated in the EP for the 3RS project by AAHK.

144. Despite the assurances given by AAHK and the Administration in mitigating the aircraft noise nuisance on North Lantau, some members remained very worried that the problem of aircraft noise nuisance would get worse upon the full commissioning of the 3RS.

Compensation for affected villages

145. AAHK has advised that in recognition of the fact that San Tau Village and seven other villages in North Lantau are above the Noise Exposure Forecast 25 contour and that such noise nuisance on the villages would aggravate during the 3RS construction works, a one-off cash allowance previously offered to the residents of Sha Lo Wan Village at the commencement of HKIA operation in 1998 had been offered to residents of San Tau Village and six other affected villages in North Lantau for the installation of double-glazed windows and air

conditioners. According to AAHK's latest arrangement, a sum of HK\$96,000 one-off cash allowance has been offered to each storey of village house in the above villages other than Sha Lo Wan for installing similar facilities. To further assist residents of the affected villages, including residents of Sha Lo Wan Village, to improve their living environment, AAHK plans to provide a one-off payment of HK\$65,000 for each storey of village house for carrying out improvement works. AAHK will continue to maintain a regular dialogue with the affected villagers to address their concerns about noise nuisance. AAHK has further advised that with the 3RS in place, the noise impact on the villages in North Lantau will be greatly abated. For instance, the existing South Runway will be put on standby mode at night, where possible, to minimize aircraft noise impact on North Lantau.

146. Members note that residents of San Tau Village have been asked by AAHK to sign an agreement that the Government and AAHK would not be held liable for any nuisance or damage later caused to their living environment once they accepted the one-off cash allowance of HK\$96,000. Although residents of Sha Lo Wan were offered similar one-off cash allowance at the level of HK\$55,000 from AAHK in 1998 for the installation of double-glazed windows and air conditioners, members consider that this does not make it right for AAHK to offer the same, albeit at HK\$96,000, for residents of San Tau and the other six affected villages in North Lantau, as the allowance offered to residents of Sha Lo Wan was made when legislation against aircraft noise had yet to be enacted, not to mention that all these villagers have to endure 17 more years of aircraft noise nuisance before the 3RS operation. AAHK was urged to expeditiously review and enhance the compensation to affected villagers.

Green features for the TRC and related terminal facilities ("3RS Buildings")

Air quality management

147. Members have asked whether AAHK had conducted any estimation of the total carbon cost arising from the 3RS at HKIA and whether it would buy carbon credits to compensate for its carbon footprints arising from the 3RS.

148. AAHK has advised that AAHK had commissioned a consultancy study in 2013 to assess carbon emissions arising from the 3RS. As to whether and how AAHK should offset its carbon footprint arising from the 3RS, AAHK considers that it is an important decision that warranted more in-depth consideration and AAHK has yet to come to a decision on the matter.

149. On whether AAHK had bought carbon credits to offset its carbon footprints arising from the existing 2RS, AAHK has advised that AAHK currently does not have a corporate plan on carbon offsetting, as HKIA was

designed with minimizing environmental footprint, including that of carbon, in mind. That said, AAHK has a small-scale scheme to purchase carbon credits to offset carbon emissions generated by a pre-defined scope of activities and events held by HKIA.

150. Members are of the view that one of the most effective ways to improve air quality in the airport is to require all airside vehicles to be electric vehicles ("EVs"). Question was raised about the measures that had been/would be taken by AAHK to facilitate the transition of all airside vehicles to EVs.

151. AAHK has advised that since July 2013, AAHK has required all newly registered airside saloon vehicles to be EVs. By the end of 2017, all airside saloon vehicles will be EVs. The number of charging stations for EVs and electric ground support equipment will be increased to 290 by end of 2018. As part of AAHK's ongoing efforts to facilitate the transition to EVs and electric ground service equipment, charging stations will be installed widely as part of the 3RS project.

152. Members note that as an on-going commitment of AAHK to reduce emissions from the aircraft parked at the gates in the TRC, aircraft stands will be equipped with fixed ground power and pre-conditioned air to maintain the aircraft systems running whilst the engine was shut off. Question was raised as to whether aircraft which need to park at HKIA are all able to use aircraft stands equipped with fixed ground power and pre-conditioned air. AAHK replied in the positive.

153. Some members remain of the view that air emissions generated from HKIA under a 3RS will increase, thereby posing a threat to people residing or working in Tung Chung.

Energy efficiency

154. On the estimated electricity consumption by the 3RS Buildings and whether such consumption would be economical, AAHK has advised that the energy saving features of the 3RS Buildings will be modelled on the success of the energy saving features adopted in T1 and the Midfield Concourse. In general, to reduce energy consumption for the 3RS Buildings, passive and active design techniques will be adopted where practicable to draw natural daylight into the building as much as possible to offset demand for artificial light use. The availability of daylight in the building will be optimized by featuring a mixture of high performance façade glazing and roof glazing strategy whilst maintaining visual comfort and preventing excessive cooling load at the same time.

155. A member has asked whether AAHK would consider using the District Cooling System ("DCS") at Kai Tak Development ("KTD"), which is a centralized cooling system utilizing seawater to produce chilled water at the central plants and distributing the chilled water to consumer buildings in the KTD through underground water piping network, for the air-conditioning systems at HKIA under a 3RS.

156. AAHK has advised that HKIA already has an extensive seawater cooling system for use by the air-conditioning systems inside the existing T1 and T2 and other HKIA buildings. AAHK plans to expand the existing seawater cooling system to cater for the modification/expansion of T2 into a full service processing terminal. Although the Midfield Concourse does not use seawater for cooling due to its long distance from the existing seawater cooling system located at T1, condensate water from air-conditioning system and recycled grey-water are used to cool the chiller systems in the Concourse to reduce the use of potable water.

157. On whether the seawater cooling system at HKIA would be made a centralized one, as in the case of the DCS at KTD, under a 3RS, AAHK has advised that an expanded seawater cooling system will be constructed to serve both the existing and the 3RS Buildings that will also provide a level of backup for the existing system in case of a contingency situation.

158. To enhance energy efficiency, AAHK was urged to use more solar panels for the TRC. AAHK would strive to source the most efficient solar panels available in the market for the TRC. Although it is difficult to tell at this stage how the energy to be saved for the 3RS Buildings compared to the energy saved for the existing HKIA's buildings, AAHK has pointed out that with the use of more advanced energy efficient materials for the 3RS Buildings, the energy that could be saved for the 3RS Buildings should surpass the energy saved for the existing HKIA's buildings which have exceeded the energy efficiency targets under the Building Energy Codes or equivalent by some 20%.

Waste management

159. Members note that food waste collected on the airport island is composted into soil conditioner for airport landscaping. As the food waste processing facility at HKIA is only designed to compost food waste into soil conditioner and in view of the limited need for soil conditioner on-site, AAHK has also contracted a company to convert food waste into fish feed in its plant in Tseung Kwan O.

160. On the question as to whether AAHK would consider using biological treatment to turn food waste, collected from the airport island, into renewable

energy, AAHK has advised that it will discuss with the Government on the possible use of its future Organic Waste Treatment Facilities in Siu Ho Wan of North Lantau, which will adopt biological technologies to stabilize the organic waste and turn it to useful compost products and biogas for energy generation.

Innovation and technology in HKIA

Overview

161. Members note that to enable the transformation of HKIA into a smart airport, AAHK is progressively implementing plans to improve and upgrade the smart infrastructure to connect the silo systems to the main airport network with a view to building a seamless integration of information from all airport processes at real-time such that timely and comprehensive information will be collaborated for better decision making and enhanced airport operation. In addition, new sensing networks for Internet-of-Things²², such as i-Beacon²³ infrastructure, platforms to enable data analytics and open data will be built to further enrich the infrastructure. Furthermore, the HKIA is studying various options of next generation wireless communication platform to further improve the wireless coverage, throughput and reliability to facilitate an agile workforce and to enhance passenger connectivity. Leveraging on the enhanced smart infrastructure, AAHK envisions that the application of innovation and technology in HKIA will achieve four major objectives:

- (a) increasing automation to become less labour-dependent;
- (b) enhancing personalized services;
- (c) maximizing self-services; and
- (d) facilitating efficient processes.

162. Members further note that HKIA has been applying and would continue to apply new technologies, where feasible, to improve passenger experience and operation efficiency. For instance, baggage arrival notification and location-based boarding alerts will be added to HKIA's mobile application

²² Internet of Things refers to the ever-growing network of smart physical objects (things) connected to internet and the communication that occurs between these objects and other internet-connected devices and systems. An example applied to an airport is smart sensors (environmental, traffic, object tracking etc.) which provides enormous opportunities for monitoring, control and process optimization.

²³ iBeacon technology, through the use of its Bluetooth Low Energy, allows Mobile Apps to understand their position on a micro-local scale, and deliver hyper-contextual content to users based on location.

"HKG MyFlight" and automatic document check (i.e. passport and travel VISA check), flight rebooking, self-boarding and late/lost bag recovery are being planned. Nevertheless, as innovation and technologies advancement are fast changing, their implementation at HKIA may be refined later taking into account the availability and readiness of the technologies and applications available at that time.

Enhancing personalized services

163. Members are of the view that to provide more personalized services to arriving passengers, particularly those on transit, HKIA should consider providing information on places to visit on Lantau Island, such as Hong Kong Disneyland and Ngong Ping Cable Car, through its mobile application "HKG MyFlight" and other means.

164. AAHK has advised that it will consider the suggestion in paragraph 163 above in its continued efforts in enhancing personalized services for passengers. In addition to the more personalized notification (including baggage arrival notification and location based boarding alerts, and location-based way finding solution²⁴ with augmented reality, next generation displays and customer services with wearables) that are in the pipeline for the carrying out of feasibility study and/or implementation, other personalized services in the pipeline include allowing overseas travellers to buy air tickets together with SkyPier ferry tickets online and to notify arriving passengers who wish to take taxi the car plate numbers of the taxis which will carry them and the estimated fares.

Increasing automation to become less labour-dependent

165. Members note that a tool-assisted baggage loading system, which was successfully trialled at HKIA in 2015, is planned for full implementation in 2016-2017. Members hope that AAHK could make available the technology of the tool-assisted baggage loading system to other organizations for use in their own baggage handling environment, if the technology is proven to have greatly reduced the risk of strain and injury caused by heavy lifting tasks to workers.

166. Members further note that Radio Frequency Identification ("RFID") has been implemented to track baggage handling at HKIA. Although using RFID to track baggage handling at HKIA help prevent loss of departure luggage at HKIA, questions was raised about the measure(s) that had been/would be taken

²⁴ Location-based way-finding solution means that the system will provide a point-to-point detailed path from the current location of the requester to his point-of-interest.

by AAHK to ensure that all checked departure baggage will arrive at the destination airports on time for retrieval by the passengers concerned.

167. AAHK has advised that in 2005, HKIA was the first international airport to adopt RFID for its BHS. Since then, only a few airports outside Hong Kong have adopted RFID for their BHSs. AAHK hopes that with more airports using RFID to track baggage, the risk of baggage going missing should be greatly reduced. RFID is not a new technology and has long been widely used by, say, logistics companies, to track items. AAHK has however pointed out that whether departure baggage will arrive on time for retrieval by the passengers concerned will also depend on the BHS of the destination airport. With the use of the integrated RFID baggage tags at HKIA in future, the chance of arrival baggage attached with such tags being misplaced should be greatly reduced.

168. Whilst welcoming the use of the tool-assisted baggage loading system for handling baggage at HKIA to prevent workers from getting injured caused by lifting heavy luggage, concern was raised by some members that the use of this new system would result in some workers being made redundant.

169. AAHK has explained that the reason for using the tool-assisted baggage loading system for handling baggage at HKIA is to prevent workers from getting injured caused by lifting heavy luggage and not to cut down the number of workers in handling baggage. Presently, HKIA has difficulty in attracting and retaining adequate number of workers to handle baggage. With the full implementation of the tool-assisted baggage loading system to complement the BHS in 2016-2017, the baggage handling environment will become more amenable to workers, including female workers.

170. Responding to the enquiry about the amount of time that could be shortened from using the tool-assisted baggage loading system to handle baggage, AAHK has advised that whilst using the tool-assisted baggage loading system to handle baggage will enhance efficiency, the amount of time that could be saved will not be significant.

Providing platform to promote innovation and technology

171. Members hope that AAHK will engage more local technology companies to develop new technologies for application at HKIA to enhance efficiency and operation.

172. AAHK has advised that a Technovation Board was established by AAHK in 2015 to drive systematic technology application and development for supporting HKIA's long-term vision as a smart airport. Representatives from

the aviation industry, research and development experts and technology professionals have been contributing professional and technological inputs to innovative ideas and business challenges faced by HKIA; advised on visionary and futuristic technology and innovation for HKIA; and facilitated the participation and development of local technologies at HKIA. Hitherto, HKIA has invited three companies in the HK Science and Technology Park to develop new technologies that will offer greater efficiency in its operation, the results of which have been positive. A case in point is the successful use of imaging for fault detection in HKIA's daily runway maintenance. AAHK has also set up a HK\$20 million Technovation Fund to provide funding support for local start-up companies to develop prototypes which offer high potential to facilitate operational efficiency at the airport.

Recommendations

173. The Subcommittee urges the Administration and AAHK to take into account the views and concerns expressed by members on various issues of concern set out above. The Subcommittee also recommends that:

Need and urgency of the 3RS

- (a) the Administration and AAHK should step up efforts in explaining to members of the public, such as through the CLGs, on why the development of the 3RS is the best option to maintain Hong Kong's status as an aviation hub as well as long-term economic competitiveness, including the economic benefits foregone if the 3RS is not pursued;

Enhancement of the existing 2RS

- (b) AAHK should expeditiously come up with measures to enhance the capacity of the 2RS prior to the full commissioning of the 3RS, and report to LegCo;

Runway capacity

- (c) the Administration should expeditiously come up with means to increase the runway capacity of the 3RS before the full implementation of the 2007 Plan, and report to LegCo;

PRD airspace

- (d) the Administration should consider:
- (i) providing more information on achieving the target maximum capacity of 102 ATMs per hour under the 3RS operation at HKIA;
 - (ii) ensuring that Hong Kong's jurisdiction over its airspace would not be compromised through the implementation of the 2007 Plan;
 - (iii) allowing LegCo Members to have sight of the 2007 Plan in camera; and
 - (iv) making public, where possible, the details, new development(s) and/or progress made in its discussion with the Mainland authorities concerned on taking forward the implementation of the 2007 Plan, particularly with regard to the "delegation of airspace" arrangement;

New ATC System at CAD

- (e) the Administration should guarantee smooth and seamless transition of the existing ATC System to the new ATC System, including critically reviewing system safety, staff readiness and resources before finalizing the transition arrangement to commence in June 2016, so as to ensure that the new system will be launched only when CAD has attained the highest level of system and staff readiness;

Project scope and cost

- (f) AAHK should:
- (i) take all necessary project management and cost control measures, including measures to ensure timely and adequate supply of manpower and construction materials, to ensure that the 3RS will be delivered within time and budget;
 - (ii) take all precautionary measures to ensure stability of the reclamation works for the 3RS project, with a view to avoiding possible technical problems as have occurred in the construction of the artificial island reclaimed for the HZMB HKBCF project;
 - (iii) retain the existing structures and facilities of T2 as far as possible in expanding T2 into a full-fledged terminal serving departure,

arrival and transfer operations;

- (iv) encourage overseas architectural firm(s) engaged for the detailed design of the TRC (as the case may be) to hire more local practitioners; and
- (v) set aside more retail space in its terminals and concourses for shops selling local brand name goods;
- (g) the Administration should closely monitor and scrutinize AAHK's implementation of the 3RS project in view of its unprecedented scale, cost and complexity;

Connectivity

- (h) AAHK should ensure that:
 - (i) the connecting time for passengers arriving at and departing from the TRC to T2, T1 or the Midfield Concourse and vice versa will be within 50 minutes; and
 - (ii) the BHS and APM systems for the 3RS will be compatible with the existing ones, so as to avoid the chaotic situation occurred during the commencement of HKIA in 1998;

Immigration arrangements

- (i) the Administration and AAHK should ensure that the new immigration facilities to be provided in the modified/expanded T2 will be adequate to cater for the increased passenger flow upon the full commissioning of the 3RS;

Marine safety

- (j) AAHK should implement measures to ensure marine safety during the reclamation works for the 3RS project, so as to avoid the release of heavy construction objects to the water column and collisions between working vessels and other vessels, amongst others;
- (k) the Administration should step up monitoring of contractors' performance in complying with the conditions imposed by the relevant government departments in carrying out marine construction works;

Financial arrangement plan of the 3RS project

- (l) AAHK should consider:
 - (i) allocating a larger portion of its borrowings for funding the 3RS project in the form of retail bonds; and
 - (ii) issuing different types of bonds, such as green bonds and Islamic bonds, to reduce costs;
- (m) AAHK should periodically inform LegCo of the implementation of the financial arrangement plan for the 3RS project;

Mitigation and enhancement measures in connection with the conservation of marine ecology and CWDs

- (n) AAHK should closely monitor the compliance by SkyPier HSF captains that they have to reduce the speed of their vessels to 15 knots or below when crossing areas with high CWD abundance; and AAHK should take enforcement actions to deter such non-compliance;
- (o) the Administration should:
 - (i) closely monitor the full compliance by AAHK of the conditions stipulated in the EP for the 3RS project to avoid, minimize and/or mitigate the impact of the construction of the 3RS on marine ecology and CWDs; and
 - (ii) work closely with AAHK to mitigate potential impacts on marine ecology and CWDs in Hong Kong waters, as the timing for implementing the reclamation works for the 3RS project may overlap with that of the HZMB HKBCF project the site of which is located to the north east of HKIA;

Marine ecology and fisheries enhancement strategy

- (p) AAHK should consider:
 - (i) increasing funding to the FEF, so that more money can be put under an endowment arrangement to generate more income to support FEF initiatives; and
 - (ii) having a more lenient funding criteria under the FEF;

- (q) the Administration should:
 - (i) expedite the disbursement of EGA to fishermen whose livelihood is affected by marine works projects; and
 - (ii) review the existing mechanism for providing EGA to fishermen, in view of the increasing longer time taken to complete a marine works project;
- (r) the Administration should study the proposal put forward by a fisheries association of amending the Marine Parks Ordinance (Cap. 476) to allow succession and transfer of marine park fishing permits, so as to promote the sustainable fishing in Hong Kong;

Stakeholder engagement

- (s) AAHK should step up efforts in engaging those green groups, which had refused to join the PLG, on the 3RS issues;

Illegal fishing activities within marine parks

- (t) the Administration should:
 - (i) step up regular patrolling at marine parks in Hong Kong and take enforcement actions, where appropriate, in combating illegal fishing activities within marine parks; and
 - (ii) where necessary, seek additional resources to enhance the effort in patrolling and enforcement;

Aircraft noise impact on North Lantau

- (u) AAHK should:
 - (i) introduce a noise charge scheme as soon as practicable to encourage airlines to use quieter aircraft types, particularly, during night-time, so as to mitigate aircraft noise nuisance on North Lantau, including Ma Wan and Tung Chung New Town; and
 - (ii) expedite the completion of the Third Runway, so that the existing South Runway can be put on standby mode, where possible, at night then;

- (v) the Administration should closely monitor the compliance by AAHK of all noise mitigation measures stipulated in the EP for the 3RS project;

Compensation for affected villages

- (w) AAHK should consider:
 - (i) reviewing the amount of one-off cash allowance to affected villages in North Lantau for the installation of double-glazed windows and air conditioners; and
 - (ii) removing the provision that the recipients could not hold the Government and AAHK liable for any nuisance or damage later caused to their living environment, having accepted the one-off cash allowance in (i) above;

Green features in HKIA

- (x) AAHK should consider:
 - (i) using more and the most efficient solar panels available in the market for the TRC; and
 - (ii) exploring the possibility of using the Government's future Organic Waste Treatment Facilities in Siu Ho Wan of North Lantau to turn food waste collected on the airport island to useful compost products and biogas for energy generation;

Innovation and technology in HKIA

- (y) AAHK should:
 - (i) engage more local technology companies to develop new technologies for application at HKIA to enhance efficiency and operation; and
 - (ii) develop more personalized services for passengers, such as providing information on places to visit on Lantau Island through its mobile application "HKG MyFlight" and other means;

Manpower

- (z) the Administration and AAHK should:
 - (i) formulate measures, such as mapping out long-term manpower plans and the associated qualifications framework and developing better transport connectivity, to better facilitate and encourage more people to work at HKIA; and
 - (ii) consult the views of the relevant stakeholders in the formulation of such measures; and

Way forward

- (aa) the next LegCo term should appoint a subcommittee under HC to continue to follow up the above recommendations and issues relating to 3RS at HKIA.

Council Business Division 4
Legislative Council Secretariat
16 June 2016

ACRONYMS AND ABBREVIATIONS

AAHK	Airport Authority Hong Kong
AAO	Airport Authority Ordinance (Cap. 483)
ACE	Advisory Council on the Environment
ACF	Airport Construction Fee
AEPCO	Airport Expansion Project Coordination Office
AFCD	Agriculture, Fisheries and Conservation Department
APM	Automated People Mover
ARCS	Airspace and Runway Capacity Study
ATC	Air traffic control
ATMs	Air traffic movements
ATMS	Air Traffic Management System
BHS	Baggage Handling System
BL	Basic Law
CAD	Civil Aviation Department
CLGs	Community Liaison Groups
CMPs	Contaminated Mud Pits
CPG	Central People's Government
CWDs	Chinese White Dolphins
DCM	Deep Cement Mixing
DCS	District Cooling System
DEP	Director of Environmental Protection
EGA	Ex-gratia allowance
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance (Cap. 499)
EIASC	EIA Subcommittee (of ACE)
EM&A	Environmental monitoring and audit
EP	Environmental Permit

EPD	Environmental Protection Department
ESA	Enright, Scott & Associates
EVs	Electric vehicles
ExCo	Executive Council
FEF	Fisheries Enhancement Fund
FIR	Flight Information Region
GDP	Gross Domestic Product
ha	Hectare
HC	House Committee
HKBCF	Hong Kong Boundary Crossing Facilities
HKIA	Hong Kong International Airport
HSBC	The Hongkong and Shanghai Banking Corporation Limited
HSF	High Speed Ferry
HZMB	Hong Kong-Zhuhai-Macao Bridge
ICAO	International Civil Aviation Organization
IRR	Internal Rate of Return
KTD	Kai Tak Development
LegCo	Legislative Council
m	Metre
M&V	Monitoring and verification
MEEF	Marine Ecology Enhancement Fund
MEFES	Marine Ecology and Fisheries Enhancement Strategy
MOD	Money-of-the-day
MP2030	Master Plan 2030
MTIA	Marine Traffic Impact Assessment
NATS	National Air Traffic Services
NCD	North Commercial District
PLG	Professional Liaison Group
PRD	Pearl River Delta

PRE	Pearl River Estuary
RFID	Radio Frequency Identification
RF SID	Radius to Fix Standard Instrument Departure
SCLKCMP	Sha Chau and Lung Kwu Chau Marine Park
SFDF	Sustainable Fisheries Development Fund
STH	Secretary for Transport and Housing
T1	Terminal 1
T2	Terminal 2
TBC	Terminal Building Charge
The 1992 NAMP	The 1992 New Airport Master Plan
The 2007 Plan	Pearl River Delta Region Air Traffic Management Planning and Implementation Plan (Version 2.0)
The Guiding Opinion	The Guiding Opinion on Deepening Cooperation within the Pan-Pearl-River Delta Region (《國務院關於深化泛珠三角區域合作的指導意見》)
TRC	Third Runway Concourse
TT	Transfer and Transit
TWG	Tripartite Working Group
2RS	Two-runway System
3RS	Three-runway System
3RS Buildings	TRC and related terminal facilities

**Subcommittee to Follow Up Issues Relating to the Three-runway
System at the Hong Kong International Airport**

Terms of reference

To study and follow up issues relating to three-runway system at Hong Kong International Airport, including the feasibility of the three-runway system, its scope and design details, financial arrangement, existing capacity of Hong Kong International Airport, environmental impacts, and related matters.

**Subcommittee to Follow Up Issues Relating to the Three-runway System
at the Hong Kong International Airport**

Membership list

Chairman Hon Andrew LEUNG Kwan-yuen, GBS, JP

**Deputy
Chairman** Hon Dennis KWOK

Members

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 Hon LEE Cheuk-yan
 Hon CHAN Kam-lam, SBS, JP
 Hon Abraham SHEK Lai-him, GBS, JP
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 Hon WONG Ting-kwong, SBS, JP
 Hon Cyd HO Sau-lan, JP (up to 3 May 2016)
 Dr Hon LAM Tai-fai, SBS, JP
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 Hon LEUNG Kwok-hung (since 12 April 2016)
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 Dr Hon Kenneth CHAN Ka-lok
 Hon Kenneth LEUNG
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 Dr Hon Fernando CHEUNG Chiu-hung (up to 19 November 2015)
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 Ir Dr Hon LO Wai-kwok, SBS, MH, JP
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 Hon Alvin YEUNG Ngok-kiu (since 8 March 2016)

(Total : 31 Members)

Clerk Mary SO

Legal Adviser Clara TAM

**Subcommittee to Follow Up Issues Relating to the Three-runway
System at the Hong Kong International Airport**

**List of organizations/individuals that have given views to
the Subcommittee**

1. Airport Development Concern Network
2. Our Bus Terminal
3. North Kwai Chung Transport Concern Group
4. Mr LOUIE Him-hoi
5. Ms LI Shee-lin
6. Hong Kong Professionals and Senior Executives Association
7. The Democratic Party
8. Miss Sammi FU
9. Young Civics
10. Mr Albert Cleisthenes WONG
11. Mr WONG Ping-fai
12. Mr Manuel SUM Siu-wah
13. The Federation of All Sectors of Tsuen Wan Co. Ltd
14. Islands Youth Association
15. Hong Kong Association of China Travel Organisers Ltd
16. Miss WONG Yuk-ting
17. Civic Party
18. Hong Kong Strategy
19. Mr Ringo YU
20. Hong Kong Tourism Association Limited
21. Mr CHAN Wan-sang
22. Hong Kong Project Management Exchange Centre
23. Mr Jacky LIM
24. Hong Kong Fishermen Consortium

25. Democratic Progressive Party of Hong Kong
26. Hong Kong Taxi Owners' Assn. Ltd
27. New People's Party
28. International Federation of Air Traffic Controllers' Associations
29. Hong Kong Tourism Industry Employees General Union
30. Hong Kong Certified Tour Escort Association
31. Mr TSE Yuet-houn
32. Outlying Islands Women's Association
33. Hong Kong Economic & Trade Association
34. Hong Kong Industrial & Commercial Association Limited Islands Branch
35. People's Aviation Watch
36. Mr FU Ka-ho
37. Mr WONG Wai-kit
38. Liberal Party Youth Committee
39. Miss TSE Kwei-ying
40. Mr AU Chun-chung
41. Liberal Party
42. Cathay Pacific Airways Flight Attendants Union
43. Hong Kong Dragon Airlines Flight Attendants Association
44. Hong Kong Tianjin Women Association
45. Hong Kong Construction Professionals Association
46. JCI Lantau
47. Tai O San Tau Village
48. Mr LUN Chi-wai
49. Cathay Pacific Airways Limited
50. Cathay Pacific Services Limited
51. Hong Kong Dragon Airlines Limited
52. Pichia Sister
53. Cathay Pacific Catering Services (HK) Limited

54. AHK Air Hong Kong Limited
55. Board of Airline Representatives Hong Kong
56. Miss YAU Wai-ching
57. Hong Kong Airport Services Limited
58. 第三條跑道德紀律委員會
59. Green Sense
60. Miss Melonie CHAU*
61. Mr Daniel TSANG Ying-cheuk*
62. Hong Kong Aircraft Engineering Company Limited*
63. Airport Freight Forwarding Centre Co. Ltd*
64. Mr LAM Chiu-ying*
65. Hong Kong Institution of Highways and Transportation*
66. Mr Singa LO*
67. HongKong Association of Freight Forwarding and Logistics Ltd*
68. The Chinese General Chamber of Commerce*
69. China Aircraft Services Limited*
70. Airline Operators' Committee Hong Kong*
71. Hong Kong Airline Service Providers Association Limited*
72. Hong Kong Air Cargo Terminals Limited*
73. Tradeport Hong Kong Limited*
74. Worldwide Flight Services*
75. Federation of Hong Kong Industries*
76. O Brave New Hong Kong*
77. 民主新香港*
78. Chahar (1948) Community of Societies*
79. Air Cargo Carrier Liaison Group*
80. Hong Kong Islands District Association*
81. Mr YUNG Ming-chau*

82. Construction Industry Council*
83. Youngspiration*
84. Mr AU-YEUNG Kwok-wah*
85. Hong Kong Cabin Crew Federation*
86. Ms LAW Mei-mei*
87. HK Conservation Association*
88. Miss YUEN Choi-wah*
89. Real Hong Kongers View*
90. Mr LAW Kwan-ping*

* Written submission only

Summary of Progress of Implementation of the 2007 Plan

The Tripartite Working Group has been dedicated to implement the 2007 Plan over the years. Some of the measures have already been implemented to enhance air traffic management, including:

- (i) establishment of two additional handover points and corresponding air routes between the Guangzhou and Hong Kong Flight Information Regions (“FIRs”) to cater for flights overflying Hong Kong and landing in Guangzhou and Shenzhen;
- (ii) establishment of new air routes for the eastern part of the Mainland and an additional handover point between the Hong Kong and Guangzhou FIRs for flights operating between Hong Kong, Macao and the eastern part of the Mainland with effect from 7 January 2016; and
- (iii) adjustment of the Zhuhai airspace structure and establishment of peripheral flight paths in the PRD region.

Press Releases relating to PRD Airspace between 2004 – 2016
(Civil Aviation Department of Hong Kong)

Exhibit No.	Date	Title
C1	February 22, 2004	High-level Meeting to Enhance Air Traffic Management in PRD
C2	August 12, 2011	New handover point through Pearl River Delta Region
C3	September 1, 2011	Pearl River Delta Region Air Traffic Management Planning and Implementation Supervisory Group meeting
C4	June 18, 2012	Pearl River Delta Region Air Traffic Management Planning and Implementation Supervisory Group Meeting
C5	March 10, 2015	CAD's statement to media reports on PRD airspace
C6	April 2, 2015	Constraints on HKIA Dual-runway Operation and Airspace Issue (Translation of Op-ed by DGCA)
C7	Oct 20, 2015	CAD and CAAC reach agreement on new air routes for traffic to and from eastern part of the Mainland
C8	May 9, 2016	CAAC, CAD and AACM sign agreement on liaison mechanism to enhance co-operation and exchange

C1. High-level Meeting to Enhance Air Traffic Management in PRD

The Director-General of Civil Aviation, Mr Albert Lam, will participate in a high-level meeting with his Mainland and Macao counterparts to map out the future Air Traffic Management (ATM) Plan in the Pearl River Delta (PRD) area.

As a continuous effort to ensure the safety and efficiency of air traffic management in one of the busiest airspaces in the world, Mr Lam will lead a team of air traffic and engineering professionals to participate in the 1st PRD ATM Planning and Implementation Working Group Meeting in Dalian beginning Wednesday (February 25).

The meeting will be chaired by the Director-General of Air Traffic Management Bureau, General Administration of Civil Aviation of China (CAAC), Mr Su Langen. Other senior CAAC officials from Beijing will also join the two-day meeting.

Amongst the issues to be covered are the development of a working model on the strategic planning and implementation of air traffic control (ATC) procedures in PRD, means to further enhance the efficiency of ATC operations in PRD, and introduction by CAAC of flight procedures of the new Guangzhou Baiyun International Airport scheduled to commence operations in mid-2004 in Huadu.

“I am very pleased to be able to participate in this meeting to join hands with the ATC experts in the Mainland and Macao to devise a long-term and comprehensive ATM plan for PRD. This area, which commands a strategic location in Asia Pacific region, is experiencing rapid growth in air traffic,” Mr Lam said.

He noted that the overall air traffic volume in PRD was steadily on the rise despite some unfortunate setbacks caused by the September 11 incidents and the outbreak of SARS.

“The aviation market in PRD has tremendous potential for stronger growth. I hope that through the joint efforts with my Mainland and Macao counterparts, we will further enhance the use of airspaces and air traffic management in this area. In so doing, we can better promote the development of the aviation sector in PRD and ensure its continuous growth in a wholesome manner,” Mr Lam added.

Mr Lam will also visit the Middle and Southern Administration of CAAC in Guangzhou and meet with its Director-General, Mr Wang Jiwu and other senior officials of the Administration before returning to Hong Kong.

22 February 2004

C.2 New handover point through Pearl River Delta Region

The civil aviation authorities of the Mainland, Hong Kong and Macao have made concerted efforts in establishing an additional handover point between the Hong Kong and Guangzhou Flight Information Regions (FIRs). Named "LANDA", the new handover point will deal with flights transiting through Hong Kong FIR and landing at Shenzhen with effect from September 22, thus achieving a further step in the continuing enhancement of the Pearl River Delta (PRD)'s airspace management.

Through the tripartite co-operation platform, the Civil Aviation Department (CAD) will continue working with the Mainland and Macao civil aviation authorities in formulating improvement measures, with a view to gradually enhancing the PRD's peripheral flight route structure and actively promoting co-operation and exchange in regional air traffic management to rationalise flight routes and flight procedures design. This will further enhance efficiency in the use of PRD airspace to cater for the ongoing rapid growth in the volume of air traffic across the region.

Presently, these flights for Shenzhen are transiting through the busiest airspace around Hong Kong International Airport (HKIA). As the new handover point and its associated air routes are located away from this airspace sector, traffic complexity around the HKIA will be significantly reduced, thereby enhancing air traffic management efficiency.

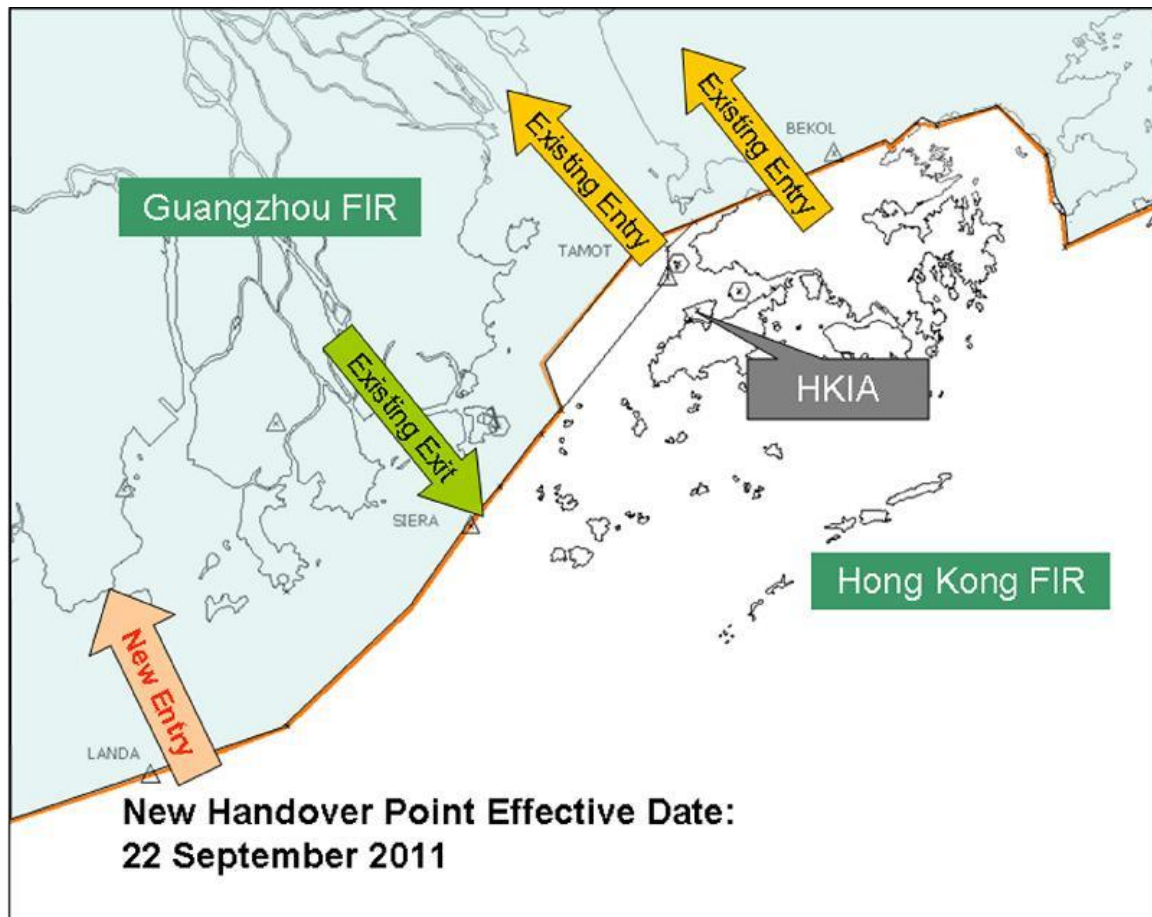
After the introduction of this new handover point, the total number of handover points for flights operating through the PRD airspace will increase from the existing two entries (from Hong Kong to the Mainland) and one exit (from the Mainland to Hong Kong) to three entries and one exit (please refer to the attached photo). The new handover point will alleviate the burden on the existing handover points and around 18 per cent of the route capacity will be released for use by flights originating from Hong Kong for the Mainland. This is conducive to the continued growth of air traffic between the Mainland and Hong Kong.

The civil aviation authorities of the Mainland, Hong Kong and Macao will continue to study and implement enhancement measures to further rationalise the airspace design and management of the PRD region.

Moreover, with effect from July 1 this year, the traffic spacing requirement between flights on air route M750/B576 transiting through the Hong Kong and Taipei FIRs for South Korea has been reduced from the original 10 minutes to five minutes with a significant increase in the route's capacity.

CAD will continue to enhance airspace management efficiency and increase the capacity of air routes within the Hong Kong FIR so as to provide a safe and efficient service to the travelling public.

Ends/Friday, August 12, 2011



C.3 Pearl River Delta Region Air Traffic Management Planning and Implementation Supervisory Group meeting

The Pearl River Delta (PRD) Region Air Traffic Management Planning and Implementation Supervisory Group, which was jointly established by the Civil Aviation Administration of China, Civil Aviation Department Hong Kong, and Civil Aviation Authority of Macao, held its latest meeting in Zhuhai on August 31, to further discuss enhancement measures regarding the PRD's air traffic control procedures and airspace structure.

At the meeting, the fruitful outcomes of collaborative efforts made by the tripartite meeting in recent years were summarised. A number of airspace enhancement measures have been implemented, including the establishment of peripheral flight routes in the PRD region and the adjustment of the Zhuhai Terminal Area boundary. An additional handover point (with associated flight routes) will also be established between the Hong Kong and Guangzhou Flight Information Regions with effect from September 22 to further enhance air traffic management in the PRD region.

The meeting also formulated a work plan for the next stage of work in accordance with the principles of joint airspace planning, use of common standards and harmonised flight procedure design to enhance airspace planning and air traffic management in the region. Taking the actual operational needs into full consideration, the three sides agreed to further study the enhancements to the planning proposals of the Guangzhou and Southern PRD Terminal Areas. The three sides also agreed to expedite the development of the related ancillary systems and to strengthen co-ordination at the operational level for the implementation of continued enhancement measures to address operational needs. A feasibility study will also be conducted on the use of common standards in the operational environment in the Southern PRD Terminal Area and the implementation arrangements. These measures will further enhance the efficiency in the use of the PRD's airspace to cater for the continued growth in the air traffic volume of the region in the future.

The civil aviation authorities of the Mainland, Hong Kong and Macao will continue to study and implement other enhancement measures to further rationalise the airspace design and management of the PRD region. These relevant enhancement measures would adequately cater for the future development of the airports in the region, including the operating mode at the Hong Kong International Airport if a third runway is built, i.e. 102 movements per hour and an estimated 620,000 landing and take-offs per year.

Ends/Thursday, September 1, 2011

C.4 Pearl River Delta Region Air Traffic Management Planning and Implementation Supervisory Group Meeting

The Pearl River Delta Region Air Traffic Management Planning and Implementation Supervisory Group, which was jointly established by the Civil Aviation Administration of China, the Hong Kong Civil Aviation Department (CAD) and the Civil Aviation Authority of Macao, held its latest meeting in Macao today (June 18) and finalised the way forward in respect of air traffic control procedures and airspace enhancements to meet future air traffic demand, and to increase the efficiency of air traffic operations in the Pearl River Delta (PRD) region.

The Supervisory Group reviewed the rationalised PRD flight procedures and air routes, as well as related ancillary systems provision that will enhance collaboration among the three sides and improve airspace utilisation and air traffic management in the PRD region, following the medium- and long-term targets and work plan previously set by the Group. Consensus was reached to push forward the removal of airspace constraints within the PRD region to progressively establish a Southern PRD Terminal Area encompassing all PRD airports in Hong Kong, Macao, Shenzhen and Zhuhai. This will increase regional air transport capability and achieve the ultimate objectives of realising joint airspace planning, use of common standards and harmonised flight procedure design by 2020 as planned.

At the meeting, the CAD introduced the Hong Kong International Airport Master Plan 2030 to the other two civil aviation authorities. Members of the Group expressed full support for the Hong Kong International Airport (HKIA) adopting the three-runway system as the future development option, and to the CAD using such a proposal for airspace management and planning purposes. Full consideration had been given to the future development of all airports in the PRD region. The Group pledged to work in collaboration to study and implement enhancement measures of PRD airspace design and management. These enhancement measures would adequately address the future development of airports within the region, including the three-runway mode of operations at the HKIA, which would handle a maximum of 102 aircraft movements per hour and about 620 000 landings and take-offs per year.

Ends/Monday, June 18, 2012

C.5 CAD's statement to media reports on PRD airspace

In response to media reports concerning Pearl River Delta (PRD) airspace issues, a spokesperson for the Civil Aviation Department (CAD) today (March 10) gave the following statement:

In order to meet the rapid growth of the aviation industry and the need for future expansion of the five airports (Hong Kong, Shenzhen, Macau, Zhuhai and Guangzhou) in the PRD region, CAD, Civil Aviation Administration of China and Civil Aviation Authority of Macao jointly established the PRD Region Air Traffic Management Planning and Implementation Tripartite Working Group (TWG) in 2004. The objective of the TWG was to enhance the overall flight handling capacity of PRD airspace. During the period of 2004 to 2007, the TWG convened 10 meetings. Through the meticulous evaluation of fast time simulation and based on the principles of joint airspace planning, use of common standards and harmonised flight procedure design, the three sides jointly established the "Pearl River Delta Region Air Traffic Management Planning and Implementation Plan (Version 2.0)" (the Plan) in 2007. The Plan, which clearly stipulated the short, medium and long term optimisation targets and measures to be achieved and implemented before 2020, has taken into consideration the needs for additional runways, associated flight procedures and airspace design of all the airports in the region, which included the Three Runway System (3RS) at Hong Kong International Airport (HKIA) and its compatibility with the development plan of neighbouring airports. The three sides had also agreed to optimise the use of airspace resources in PRD region through shared use of airspace and adoption of common units of measurement in a mutually beneficial manner. Enhancement measures in the Plan including new peripheral air routes in the PRD area, additional handover points between Air Traffic Control units and adjusted Zhuhai Terminal Airspace have been successfully implemented. The Plan aims to enhance the overall air traffic handling capacity of the PRD airspace. Under the principle of shared use of airspace, although the flight procedures of both sides (the Mainland and Hong Kong) will make use of a small portion of each other's airspace, both sides will utilise different flight altitude layers to facilitate air traffic control. Therefore, the ownership of the concerned airspace still belong to the original air traffic control unit and there is no intention for Hong Kong to expand its airspace up to Guangzhou or manage military flights. The most vital task for CAD is to continue the discussion with the Mainland and Macau aviation authorities through the TWG platform in order to take forward the enhancement items in the Plan in a progressive manner, and to tie over the development of the 3RS of the HKIA.

Regarding the reports concerning Performance-based Navigation (PBN), as the objective of implementing PBN is to improve the flexibility of air traffic management through the enhancement of flight navigation accuracy and flight procedure efficiency, it does not lead to

reduction of the approach or departure separation standard between aircraft or enhancement of runway capacity. In this regard, CAD has been implementing PBN procedures progressively in accordance with the guidance issued by the International Civil Aviation Organisation. In fact CAD has fully implemented PBN departure and arrival procedures at HKIA since January 2013. Currently most of the aircraft operating at HKIA are capable to conduct PBN procedures. PBN procedures are also implemented at Guangzhou and Shenzhen airports.

Ends/Tuesday, March 10, 2015

C.6 Constraints on HKIA Dual-runway Operation and Airspace Issue

Mr Norman Lo, Director-General of Civil Aviation April 2, 2015

Recently some members of the public have challenged the planning of the three-runway system (3RS) at the Hong Kong International Airport (HKIA) on two issues: (1) whether the current capacity of two-runway system (2RS) can be expanded (and hence, the third runway would be unnecessary); and (2) whether the airspace issue can be resolved.

The maximum capacity of the existing two runways

Various studies had been conducted in the past to assess the capacity of the 2RS. The latest study was the Airspace and Runway Capacity Study commissioned by the Airport Authority of Hong Kong (AAHK) and carried out by National Air Traffic Services (NATS) in 2008, which was based on the latest air traffic control technology and international standards. According to this study, in full compliance with the safety standards/requirements of the International Civil Aviation Organization (ICAO), the maximum practical capacity that can be achieved with the existing 2RS would be 68 movements per hour.

Can the maximum capacity of the existing 2RS be further increased?

The capacity of the existing 2RS is constrained by two factors in which the ICAO has strict requirements and standards: (1) the need for spacing between aircraft due to the spiral air turbulence generated by operating aircraft (known as wake turbulence); and (2) the surrounding terrain near the runway.

Wake turbulence

Strong wake turbulence can cause the following aircraft to lose balance, thus affect flight safety. Therefore, the ICAO requires that a minimum spacing be maintained between aircraft during takeoff and landing. The heavier the aircraft, the stronger the wake turbulence and the larger the spacing would be required. Consequently, the capacity of a runway is limited.

Terrain constraints

The report of New Airport Master Plan (NAMP) in 1992 from the former Provisional Airport Authority, pointed out that, a pair of parallel runways under different modes of operation could in theory achieve different capacity ranging from 52 to 86 movements per hour (See table below). However, the NAMP report made clear that due to the mountains on the nearby Lantau Island, in order to achieve higher runway capacity, it would not be possible to operate

in compliance to relevant ICAO standards on flight procedure, hence such operation was neither safe nor practicable.

Mode of Operation	Practical Hourly Capacity Estimate
(a) Single-runway system	43 movements
(b) Dual-runway system with Segregated Operation (i.e. one runway used exclusively for approaches and the other exclusively for departures)	52 movements
(c) Dual-runway system in Mixed Operation	
(i) Dependent Mixed Modes: departures and approaches on one runway must take into consideration an aircraft landing or departing on the parallel runway. The possible modes are as follow:	
(a) Dependent Approaches and Departures	69 movements
(b) Independent Approaches and Dependent Departures; and	71 movements
(c) Dependent Approaches and Independent Departures	79 movements
(ii) Independent Mixed Mode: Operation on one runway can take place completely separately and without interference from the parallel runway, as if the two runways were two different airports.	86 movements

The consultant commissioned by the Civil Aviation Department (CAD) in 1994 also pointed out that, due to the constraints from surrounding terrain, the maximum capacity of the 2RS could only be about 63 movements per hour. As previously mentioned, in 2008 NATS had conducted a thorough review of runway capacity of HKIA and confirmed that after implementing some 40 improvement recommendations, in full compliance to ICAO safety standards/requirements, the maximum runway capacity of 2RS could be increased to 68 movements per hour.

Some comments suggested that if the peak of Tai Yam Teng (610 feet) and Fa Peng Teng (810 feet) which are located at the North East of Lantau were removed, the runway capacity of the 2RS could be further increased. These comments claimed that removal of Tai Yam Teng and Fa Peng Teng were suggested in the 1992 NAMP report. In fact, the suggestion in the NAMP report was made in connection with possible options to enhance the climb gradient of contingency departure procedures for departing aircraft on engine out during initial climb (i.e. to reduce restriction on the aircraft engine out climb performance). In order to attain the theoretical maximum runway capacity outlined in the NAMP report, i.e. 86 movements per hour, and conforming to the safety standards/requirements of the ICAO, most of the high peaks on Lantau Island, including Lantau Peak, Sunset Peak and other high

mountains, would have to be levelled. Major infrastructure and landmarks like Ngong Ping Cable Car, Big Buddha and Po Lin Monastery would also be affected, not to mention that most of these areas fall within the boundaries of the Lantau Country Parks. . Therefore, the proposed removal of high peaks is neither practical nor feasible.

The "Air wall" issue

There have also been concerns on the constraints imposed by the so-called "air wall". In fact this is not an appropriate term as in reality there is no "wall"-type segregation between different airspaces. To ensure that aircraft in adjacent airspaces can operate concurrently in a safe and efficient manner, every aircraft must reach a certain altitude and geographic location before an air traffic control (ATC) unit may hand over control of that aircraft to another ATC unit. This is to ensure that aircraft in adjacent airspace flying in opposite directions can fly at various altitudes and prevent collisions. This air traffic management arrangement of "Transfer of control point" aims to safeguard flight safety, and is commonly applied at busy airports all over the world, including those in London and New York.

Airspace issue

The Tripartite Working Group (TWG), set up by the Civil Aviation Administration of China (CAAC), CAD of Hong Kong and the Civil Aviation Authority of Macao (CAAM), drew up the "Pearl River Delta Region Air Traffic Management Planning and Implementation Plan (2007 Plan)" after three years of work and more than 10 rounds of meetings at various working levels. The maximum capacity of 102 movements per hour under the 3RS operation at HKIA as proposed by AAHK is based on this 2007 Plan.

2007 Plan

The 2007 Plan has clear objectives and contents. As per the press release issued by the CAAC on 15 February 2007, the Plan "aiming at strengthening the synergy of collaborative operations between all three parties, taken into consideration of terminal airspace structure, ATC operation standards and ATC operation procedures, defined three phases of the planning and development of Pearl River Delta (PRD) air traffic management. With the use of state-of-the-art computer-simulation and evaluation techniques, technical experts from the three parties conducted analysis and concluded that the Plan could generally satisfy the development needs of aviation industry in the PRD region in 2020".

At the TWG meeting held on 18 June 2012, all parties expressed their support for HKIA adopting the 3RS as the future development option, and to the CAD using such a proposal for air traffic management and planning purposes. The Central Government has always

supported Hong Kong in cementing its position as an international aviation hub and developing the 3RS. We strongly believe that the Mainland, Hong Kong and Macau will be able to implement, in accordance with the 2007 Plan, all enhancement and collaborative measures conducive to the development of the five major airports in the PRD region.

C.7 CAD and CAAC reach agreement on new air routes for traffic to and from eastern part of the Mainland

Through the co-operation platform of the Pearl River Delta (PRD) Region Air Traffic Management Planning and Implementation Working Group, the Civil Aviation Department (CAD) of Hong Kong today (October 20) reached an agreement with the Air Traffic Management Bureau of the Civil Aviation Administration of China (CAAC) in which new air routes for the eastern part of the Mainland and an associated additional handover point between the Hong Kong and Guangzhou Flight Information Regions (FIRs) called LELIM would be established for flights operating between Hong Kong, Macau and the eastern part of the Mainland with effect from January 7, 2016.

At present, flights departing from the Hong Kong or Macau airports, as well as those from Southeast Asia, Australia and New Zealand transiting the Hong Kong FIR, to and from the eastern part of the Mainland are going into and out of the Mainland FIRs on one single air route. The increase in air traffic volume led to the overloading of the existing flight path while the busy airspace also increased the complexity in flight handling.

The launching of new air routes for the eastern part of the Mainland was one of the key enhancement measures set out by the PRD Region Air Traffic Management Planning and Implementation Plan (Version 2.0). To achieve it, the CAD has been in close liaison with the CAAC and has held several co-ordination meetings to exchange views on technical arrangements. This measure aims to optimise the efficiency of the air routes for the eastern part of the Mainland, on the premise that the safety, order and efficiency of its implementation can be safeguarded.

The introduction of the new air routes and handover point will split the flights departing from Hong Kong and Macau, and those transiting the Hong Kong FIR. This will help ease the traffic load of the existing air routes. Furthermore, this may enhance the airspace capacity and air traffic flow, as well as the air traffic management efficiency to cater for the ongoing growth in the volume of air traffic between Hong Kong and the Mainland.

The CAD, as in the past, will continue to proactively promote exchanges on PRD region air traffic management co-operation. It will also study and implement other measures to further rationalise the airspace management in the region to cope with the rapid growth in the volume of air traffic in future.

Ends/Tuesday, October 20, 2015

C8. CAAC, CAD and AACM sign agreement on liaison mechanism to enhance co-operation and exchange

The Air Traffic Management Bureau (ATMB) of the Civil Aviation Administration of China (CAAC), the Civil Aviation Department and the Civil Aviation Authority of the Macau Special Administrative Region (AACM) signed an agreement in Hong Kong today (May 9) on establishing a strengthened liaison mechanism to enhance co-operation and exchange among the civil aviation authorities in the Mainland, Hong Kong and Macau on air traffic management planning and implementation in the Pearl River Delta (PRD) region.

Witnessed by the Deputy Administrator of the CAAC, Mr Wang Zhiqing, and the Secretary for Transport and Housing, Professor Anthony Cheung Bing-leung, the agreement was signed by the Director General of the ATMB of the CAAC, Mr Che Jinjun; the Director-General of Civil Aviation, Mr Norman Lo and the President of the AACM, Mr Chan Weng-hong.

Specific contents of the agreement on the strengthened liaison mechanism to enhance tripartite co-operation and exchange include:

(1) The top management of the three civil aviation authorities will host high-level meetings in the Mainland, Hong Kong and Macau on a rotational basis and/or tele-conferencing twice a year to proactively strengthen the close co-operation among the three sides on the planning and implementation of air traffic management in the PRD region, enhance communication at the top management level, and synergy in overall planning, and foster co-operation in the PRD region; and

(2) Air traffic control technical personnel of the three sides will have more interaction and communications where necessary, share experience with each other, and conduct more meetings and exchanges at the technical level, with no limitation on the scale and number of meetings to be held.

Professor Cheung said at the signing ceremony that the agreement on the strengthened liaison mechanism to enhance co-operation and exchange helped to take forward the PRD Region Air Traffic Management Planning and Implementation Plan progressively and was also one of the means to implement the Guiding Opinions of the State Council on Deepening the Cooperation within the Pan-PRD Region. The signing of the agreement marked an enhanced partnership among the Mainland, Hong Kong

and Macau in the planning of airspace resources in the PRD region which helped strengthen synergies, ensure efficient use of the airspace, and bring mutual benefits, thus achieving a win-win situation. Together, a world-class airport cluster in the PRD region would be built and the unique strengths of the region would be given full play.

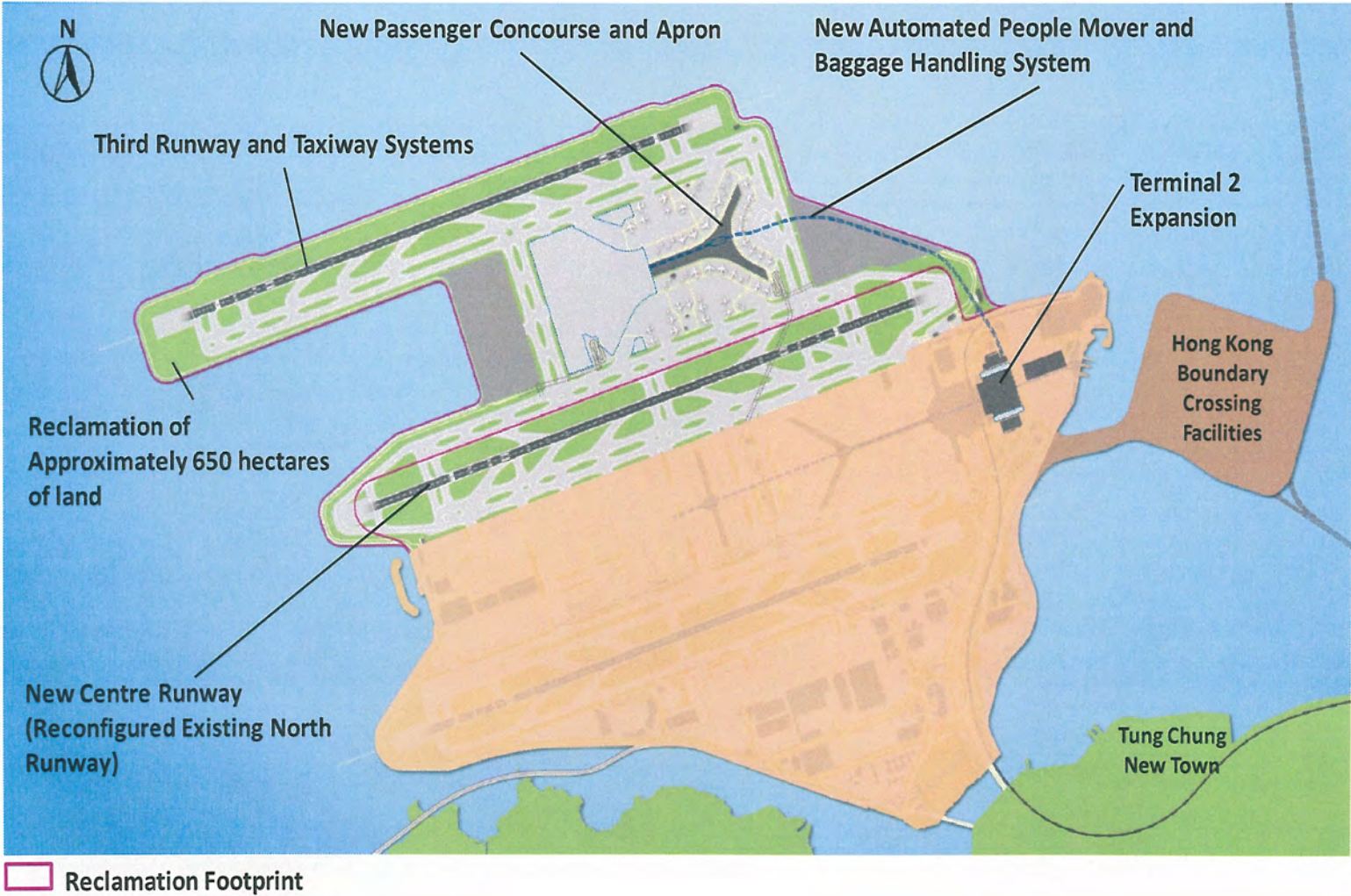
Mr Wang noted that over the years, the Mainland, Hong Kong and Macau have all along been maintaining close working relationships and have established a good rapport in the field of civil aviation. The signing of the agreement on the strengthened liaison mechanism to enhance co-operation and exchange among the civil aviation authorities in the Mainland, Hong Kong and Macau on air traffic management is a good example. In line with the concept of "Innovation, Co-ordination, Integration and Mutual Benefits", the CAAC will work with the civil aviation authorities in Hong Kong and Macau to create a safer, smoother and healthier environment for sustainable development of the civil aviation industry in the PRD region through the approach of collaborative decision making, coordinated operations and development.

Professor Cheung also held a meeting today with Mr Wang to exchange views on various issues, including enhancement of flight procedures and airspace structure of the PRD region, optimising the airspace utilisation in the region, and the three-runway system (3RS) project at the Hong Kong International Airport. Mr Wang said that, under the national directive of supporting the development of the 3RS project, the CAAC will provide full support with the aim of enabling the 3RS to maximise its potential and achieve the target runway capacity of 102 air traffic movements per hour in the long run.

Ends/Monday, May 9, 2016

Issued at HKT 20:43

Three-Runway System Project Layout Plan



Source: Appendix A to LC paper No. CB(4)275/15-16(01)

**Extract of the AAHK's paper for the Subcommittee to Follow Up
Issues Relating to the Three-runway System at the Hong Kong
International Airport on "Project Scope and Cost"**

Project Management and Cost Control

45. Operating along prudent commercial principles and having committed to self-financing the 3RS Project, AAHK will do its best to deliver the project within time and budget. Cost control is vitally important with the objectives of delivering the project within budget, achieving value for money, securing early certainty of the out-turn cost and obtaining competitive prices through healthy competition.

46. Project cost control is not an isolated project management issue but will be integrated with other key planning, design, procurement and construction management activities of the project. Accordingly, in achieving the cost control objectives, it will be imperative to have effective organisation/leadership, robust planning and strong project control and execution, each of these aspects is described in the ensuing paragraphs.

(a) Organisation/Leadership

47. Airport construction is highly specialised and requires in-depth design and construction knowledge of the full range of airport infrastructure works; specialised systems; their relationship with the existing airport facilities; and an appreciation of the logistic and construction constraints imposed by the existing airport operations. The Third Runway Division ("TRD") within AAHK, which is responsible for managing the 3RS Project, has over 20 years of experience in project management construction at HKIA since the commencement of the original airport construction in the early 1990s. The TRD, comprising a compact structure of key in-house professionals, will expand its in-house project management team to cope with the challenging tasks ahead. External augmentation will be engaged to provide additional professionals, specialists and experts required for the 3RS Project as and when necessary.

48. The proposed project management approach is based on that used in the implementation of the original airport expansion, but adapted to take on lessons learnt from subsequent works at the airport, together with

other major projects in Hong Kong and international benchmarks. The organisation comprises a Project Management Office (“PMO”) that provides a centralised functional leadership role and the Project Delivery Team (“PDT”) which focuses on managing the construction delivery.

49. The central PMO will set a clear governance structure and provide embedded resources through a matrix organisation into the PDT to ensure accountability for the overall project programme and budget with a “single-source of truth” and prevents project management “optimism bias” from the PDT. The key roles of PMO are as follows:

- a. **Programme Control** – The central PMO develops the integrated master programme, sets the programme management strategy and maintains a fully integrated suite of updated programmes.
- b. **Risk management** – This is a key discipline within the central programme office that drives risk management capability across the sub-projects. It regularly performs schedule analysis, risk analysis, “what-if” scenarios and contingency planning.
- c. **Cost Control** – The PMO establishes the full suite of cost, programme, risk, change and reporting tools and require these to be utilised by all sub-projects and interfaced to contractors’ performance data.
- d. **Coordination and Reporting** – The central PMO establishes a clear set of performance measures, baselines to report performance against and quantitative reporting to show performance, trends and forecasts.
- e. **Peer Review** – The PMO provides the capability to establish a small team of highly experienced, independent design, construction, programme and project management professionals that are able to provide a peer review/assurance function at key project milestones and gateways.

(b) Planning

50. Robust project planning provides a sound basis for effective cost control which must be integrated with programme and risk management.

51. AAHK has completed comprehensive **Scheme Designs** with extensive site investigations to establish the basis for the project budget estimate. These scheme designs were prepared by experienced local and

international design and specialist system consultants, providing a robust basis for establishing the project definition and scope agreed with the internal “clients” including operations, maintenance, commercial, etc.

52. An independent consultant was appointed to further develop a detailed **Project Master Programme, Project Procurement Strategy and Project Risk Management Plan** with a view to providing a robust basis for taking the project forward with programme and cost certainty.

(c) Controlling

53. A high performance project team that executes effective cost control requires strong leadership, both at the board, management and working levels. One crucial aspect of project management is the capacity to make sound and timely decisions throughout the project cycle, with appropriate levels of delegated authority.

54. While the PMO is responsible for making decisions at working levels, it is supported and overseen by the AAHK Board and its committees. To give due attention to the 3RS Project, special committees have been set up, including a Steering Committee chaired by the AAHK Chairman; and the 3RS Coordination Committee led by CEO/AAHK, supported by other AAHK executive directors. This organisational setup facilitates development of close working relationship between the AAHK senior management and the PMO and enables regular consultation with and direction from the AAHK Board and its committees on key issues. Regular progress and budget updates are given to the AAHK Board with a high level of transparency.

(d) Execution

55. AAHK has an established cost control system to manage its capital works project, comprising the following key tasks.

56. **Establishment of Project Budget:** The project budget estimate has been established based on comprehensive scheme designs through a robust process, providing a high level of confidence in the sufficiency and accuracy of the estimated project out-turn cost.

57. **Design Phase Cost Control:** Continuous engineering analyses will be carried out during the detailed design stage to freeze the design scope and achieve cost-effectiveness and operational needs of the 3RS to ensure that the design will be fit-for-purpose and value-for-money,

avoiding extravagant or unnecessary design or architectural features. Regular cost checks on the detailed designs will be carried out by independent professional QS consultants to ensure that the project cost based on the final design will not exceed the project budget estimate established in the scheme design phase.

58. **Development of Procurement Strategy:** The Project Procurement Strategy, supported by global benchmarking and market sounding, will enhance competitiveness of tenders e.g. use of appropriate contract packaging strategies to promote competition and reduce interfaces.

59. **Commitment Control (Change Management):** Each contract will be awarded with a contract budget which will become the basis of cost control for the works covered in the contract. In the event that adjustments to the contract sum are necessitated by genuine needs, a detailed assessment of the need, justification, cost and programme implications of the proposed change will be carried out to ensure vigorous cost control.

60. **Continuing Risk Management:** AAHK will carry out proactive risk management in accordance with the Project Risk Management Plan as described above to identify risks for early mitigation, thereby minimizing the probability of cost overrun.

61. **Project Cost Monitoring and Reporting:** Regular cost reports will be prepared by the PMO for submission to Senior Management and Board and its committees, detailing the project budget status.

62. With the above robust systems and stringent measures in place, AAHK will be making its best endeavours for programme and budget control for the delivery of the 3RS Project.

3RS Project Cost Comparison
MP2030 vs Scheme Design

<u>Scope of Works</u>	<u>MP2030 Estimate</u>	<u>3RS Scheme Design</u>	<u>Major Reasons for the Cost Differences Between (a) and (b)</u>
	MOD* Total (HK\$Bn) (a)	MOD# Total (HK\$Bn) (b)	
1. Land Formation and Marine Works	53.4	56.2	Increased cost of reclamation.
2. Runway and Airfield Facilities	12.4	11.5	Savings arising from the change of the planned full provision of the western vehicular tunnel across the new Centre Runway to an empty tunnel box structure only. The tunnel is planned to meet future operation needs as construction of the tunnel box in future underneath an operating new Centre Runway is impractical, highly disruptive and unacceptable.
3. Apron Works	3.6	5.0	Expansion of utilities services and apron systems including green operations initiatives.
4. Terminal 2 Modification/ Expansion	15.3	16.5	<ul style="list-style-type: none"> • Increased bag hall size to accommodate a high speed and fully automated baggage handling system.

<u>Scope of Works</u>	<u>MP2030 Estimate</u>	<u>3RS Scheme Design</u>	<u>Major Reasons for the Cost Differences Between (a) and (b)</u>
	MOD* Total (HK\$Bn) (a)	MOD# Total (HK\$Bn) (b)	
			<ul style="list-style-type: none"> Increased APM interchange station size to provide a high level of operational redundancy and safeguard for possible future expansion.
5. Third Runway Concourse	23.2	26.3	Increased construction floor area and size of fixed link bridges to accommodate larger aircraft.
6. Automated People Mover (“APM”) System	7.4	10.9	Inclusion of an additional APM tunnel and associated auxiliary services to cater for possible future expansion in the light of anticipated further passenger demand. It will be highly difficult and expensive if further tunnelling works were to be constructed after completion of the APM system.
7. Baggage Handling Systems	7.4	7.8	Adoption of the latest technology using Individual Carrier System for the provision of a high service level of baggage delivery systems.
8. Airport Support Facilities and Utilities	7.7	7.3	Cost reduction due to design optimization for utilities services.

<u>Scope of Works</u>	<u>MP2030 Estimate</u>	<u>3RS Scheme Design</u>	<u>Major Reasons for the Cost Differences Between (a) and (b)</u>
	MOD* Total (HK\$Bn) (a)	MOD# Total (HK\$Bn) (b)	
9. Midfield and Freighter Apron Expansion	5.8	-	The Midfield development was examined as part of the MP2030 Study but was subsequently taken forward as a separate project which is financed entirely by AAHK's own resources to handle the anticipated increase in passenger volume under the existing two-runway system.
Total Project Cost :	136.2	141.5	

Note :

* For MP2030 Estimate, the MOD estimate was derived on the basis of the Government's price adjustment factors as set out in PWSCI (2010-11)11 issued in Oct 2010. The prices of public sector building and construction output were assumed to increase by 5% per annum in 2014 and 5.5% per annum from 2015 to 2020.

For 3RS Scheme Design, the MOD estimate is derived on the basis of the Government's price adjustment factors as set out in PWSCI (2013-14)15 issued in Mar 2014. The prices of public sector building and construction output were assumed to increase by 6% per annum from 2014 to 2018; 5% per annum from 2019 to 2021 and 4.5% per annum from 2022 to 2024.

Breakdown of the Total Estimated Construction Cost for the 3RS Project

Scope of Works		4Q2010		MOD (Mar 2014)	
		Sub-total (HK\$B)	Total (HK\$B)	Sub-total (HK\$B)	Total (HK\$B)
1.	Land Formation and Marine Works		36.8		56.2
	- Ground Improvement	18.8		28.8	
	- Fill Management	17.0		25.9	
	- Utilities Diversion	1.0		1.5	
2.	Airfield Facilities		6.5		11.5
	- Runway, Taxiway & Taxilane	2.9		5.2	
	- Airfield Support Area	1.0		1.7	
	- Airside Road Network	2.6		4.6	
3.	Apron Works		2.7		5.0
4.	Terminal 2 Modification/Expansion		9.5		16.5
	- Foundation, Basement and Structure	3.3		5.7	
	- Architectural Works	2.4		4.2	
	- E&M and Airport Systems Works	3.8		6.6	
5.	Third Runway Concourse		14.1		26.3
	- Foundation, Structure and FLB & ALB	6.6		12.3	
	- Architectural Works	2.4		4.5	
	- E&M and Airport Systems Works	5.1		9.5	
6.	APM System		6.1		10.9
7.	Baggage Handling Systems		4.5		7.8
8.	Airport Support Facilities and Utilities		4.3		7.3
	TOTAL		84.5		141.5

Key differences between the MP2030 financial feasibility study and 3RS financial arrangement plan

	MP2030 financial feasibility study	3RS financial arrangement study
Report date	2011	2015
Study purpose	Financial feasibility assessment for both 2RS and 3RS as development option	Financial arrangement plan for 3RS
Study scope	<p>Assess the financial viability for both 2RS and 3RS such as IRR, net present value (“NPV”), WACC assessments, etc.</p> <p>Determine the size of funding gap (but not the source of funding).</p>	<p>Determine the size of funding gap and study the detailed source of funding</p> <p>(include updating IRR)</p>
Conclusion	<p>Size of funding gap was calculated.</p> <p>Source of funding was yet to be concluded.</p> <p>Incremental external borrowing could be one of the funding sources.</p>	<p>Source of funding includes retaining operating surplus, levying of ACF and external borrowing.</p> <p>In the event of downside scenarios tested by AAHK’s financial advisor, AAHK can raise additional debt to meet the funding shortfall if such arises.</p>