RURAL AND NEW TOWN PLANNING COMMITTEE

RNTPC Paper No. 5/15

For Consideration by the
Rural and New Town Planning Committee on 17.4.2015

PROPOSED AMENDMENTS TO THE APPROVED CHEK LAP KOK OUTLINE ZONING PLAN NO. S/I-CLK/12

RNTPC Paper No. 5/15
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on 17.4.2015

PROPOSED AMENDMENTS TO THE
APPROVED CHEK LAP KOK OUTLINE ZONING PLAN NO. S/I-CLK/12

1. Introduction

It is recommended that

1.1 the proposed amendments to the approved Chek Lap Kok Outline Zoning Plan (OZP) No. S/I/CLK/12 (**Appendix II**) and its Notes (**Appendix III**) are suitable for exhibition for public inspection under section 5 of the Town Planning Ordinance (the Ordinance); and

1.2 the revised Explanatory Statement (ES) of the OZP (**Appendix IV**) should be adopted as an expression of the Town Planning Board (the Board)'s planning intention and objectives of the various land use zonings of the OZP and is suitable for exhibition together with the draft OZP.

2. Status of the Current Approved Chek Lap Kok Outline Zoning Plan No. S/I-CLK/12

2.1 On 18.10.2011, the Chief Executive in Council (CE in C), under section 9(1)(a) of the Ordinance, approved the draft Chek Lap Kok OZP, which was subsequently renumbered as S/I-CLK/12. On 21.10.2011, the approved Chek Lap Kok OZP No. S/I-CLK/12 (**Appendix I**) was exhibited for public inspection under section 9(5) of the Ordinance.

2.2 On 5.9.2014, the Board considered TPB Paper No. 9703 and agreed that CE in C should be requested under s.12(1)(b)(ii) of the Ordinance to refer the Chek Lap Kok OZP to the Board for amendment. On 23.9.2014, the Secretary for Development, under the delegated authority of CE, directed the Board under section 3(1)(a) of the Ordinance to extend the planning scheme boundary of the Chek Lap Kok OZP to cover the proposed reclamation area for the new third runway of the Hong Kong International Airport (HKIA). On 24.2.2015, the CE in C referred the approved Chek Lap Kok OZP No. S/I-CLK/12 to the Board for amendment.

3. Background and Scope of Proposed Amendments to the OZP

3.1 Since the opening of the HKIA at Chep Lap Kok in 1998, airport facilities and operations have been progressively expanding throughout the years to meet the increasing air traffic demand. The existing two-runway system (2RS) at the airport is expected to reach its maximum capacity within the next few years. In late 2010, the Airport Authority Hong Kong (AAHK) drew up the HKIA Master Plan 2030 and recommended two options: maintaining the existing two-runway system or expanding into three-runway system (3RS). On the basis of the clear majority support for HKIA to continue to be expanded to cope with the future air traffic demand and the clear majority preference for adopting the three-runway option, AAHK submitted its recommendations to the Government in late 2011 for in-principle approval to adopt the option of expanding into a 3RS as the future development option for HKIA for planning purpose.

3.2 Through a comprehensive evaluation and selection process, AAHK has formulated a preferred airport layout plan for the 3RS development (**Plan 1**). The proposed 3RS development for HKIA involves reclamation of about 650 ha new land to the immediate north of HKIA and comprises the new third runway with associated taxiways, aprons and aircraft stands, a new passenger concourse building, expansion of the existing Terminal 2 building, related airside and landside works with associated ancillary and supporting facilities.

3.3 The Government gave in-principle approval to AAHK in March 2012 to adopt for planning purpose the option of expanding HKIA into a 3RS. Since then, AAHK has embarked on the necessary planning work, namely, the statutory environmental impact assessment (EIA), the associated design details and the financial arrangements. On 7.11.2014, the 3RS EIA report was approved by the Director of Environmental Protection (DEP) under the EIA Ordinance. The Environmental Permit (EP) was also granted with conditions on the same day[1]. On 17.3.2015, the Executive Council affirmed the need for the 3RS project. AAHK is actively exploring ways, in consultation with the Government, to facilitate early implementation of the project.

3.4 A Planning Report has been prepared and is attached at **Appendix V** to provide Members the background information on the proposed 3RS of the HKIA. The Planning Report has been circulated for departmental comments. No adverse comments were received from the concerned departments.

Consideration by the Board

3.5 On 10.4.2015, AAHK provided Members in TPB Paper No. 9877 (**Appendix VII**) a brief overview on the proposed 3RS development of the HKIA.

[1] Two applications for leave to judicial review against the decision of DEP to approve the 3RS EIA report and grant the EP were received by the High Court on 6.2.2015.

3.6 The Chek Lap Kok OZP currently does not include the proposed reclamation area for the 3RS development (a total of about 650 ha). In order to facilitate the proposed expansion of HKIA to 3RS, amendments to the OZP are necessary.

4. Public Consultation

4.1 AAHK reached out to a wide spectrum of stakeholders to seek their views and explain the airport's development plans for the preparation of the HKIA Master Plan 2030. From late 2008 to late 2014, AAHK organized and took part in more than 1,100 engagement activities such as public forums, roundtable meetings, workshops, airport visits, briefings, exhibitions and seminars with a variety of stakeholder groups including green groups, media, students, residents, professional bodies, business/industry associations, business partners, consultative bodies, fishermen groups, think tanks, academia and opinion leaders.

4.2 Among the various engagement initiatives, AAHK has set up four Technical Briefing Groups to collect the professional views from experts and academia with technical expertise in specific environmental aspects (i.e. air quality, noise, marine ecology and fisheries, as well as Chinese White Dolphins); and five Community Liaison Groups in HKIA's neighbouring districts (i.e. Islands, Kwai Tsing, Shatin, Tsuen Wan and Tuen Mun) in order to exchange views with District Councillors and the community leaders on the 3RS development.

4.3 The 3RS EIA report has been made available for public inspection between 20.6.2014 and 19.7.2014 in accordance with the EIA Ordinance. During the EIA public inspection period, AAHK has organized briefings for business partners and media, roving exhibition, as well as two sessions of public forums to update the public on the findings of the EIA and the initiatives to mitigate the potential impacts of the 3RS development.

5. Development of Three-runway System

5.1 The key components of the 3RS development mainly include:

(a) land formation of 650 ha north of the existing airport island by reclamation to provide a platform for the 3RS development;
(b) construction of the 3,800m long third runway parallel to the existing two runways, a dual parallel taxiway system, associated airfield infrastructure, aircraft navigational aids, approach lighting systems and new approach area beacons;
(c) construction of the third runway concourse accommodating 57 parking positions at the apron;
(d) eastern support area providing ground service equipment and other supporting facilities, flight catering facilities, government facilities and other utilities;

(e) western support area providing aircraft maintenance facilities, ground service equipment and other supporting facilities, air cargo staging area, government facilities and supporting utilities; and

(f) other ancillary/supporting facilities required for the operation, safety and security of the airport such as new automated people mover system, airfield ground lighting vault, aviation fuel system, vehicle storage facilities, aircraft washing facilities, communication equipment and masts, high-speed baggage handling system, security gatehouses and security screening facilities, etc.

5.2 In order to complement the 3RS development, the existing Terminal 2 will be modified and reconfigured into a full service processing terminal serving the arrivals, departures and transfer passengers. The scope of works and design details of the 3RS development will be fine-tuned at the detailed design stage to ensure the final project design is well justified with due considerations for economy as well as safety and operational efficiency. The construction of the 3RS project is targeted to commence tentatively in 2016 for completion tentatively in 2023.

6. Technical Assessments

6.1 An EIA study has been conducted to support the application for an EP in accordance with the requirements of the EIA Ordinance. It has identified and assessed the potential environmental impacts that may arise from the construction and operation of the 3RS project in a comprehensive and scientifically robust manner. Overall, it concludes that the 3RS project would be environmentally acceptable and in compliance with the relevant environmental legislation and standards. With the implementation of the recommended environmental impact avoidance, minimization and mitigation measures, no unacceptable adverse residual impacts are anticipated.

6.2 The Executive Summary of the EIA report for the 3RS development of the HKIA is attached at **Appendix VI** for Members' information. A full set of the EIA report is also deposited at the meeting for Members' inspection.

6.3 A traffic impact assessment (TIA) has been carried out in order to assess and evaluate the possible traffic impacts of the 3RS project. The transport model forecast is carried out for year 2026 and year 2031 under both 2RS and 3RS scenarios. The forecast results show that all major roads will operate within the practical capacity in years 2026 and 2031 under both scenarios.

7. Proposed Amendments to Matters shown on the Plan (Appendix II and Plans 1 to 5)

The proposed 3RS development will involve a new reclamation area of about 650 ha extending beyond the current planning scheme boundary of the Chek Lap Kok OZP. Two

zones to reflect the intended land use/planned developments for the reclamation area are proposed:

(a) **Item A** – Designation of an area on the proposed reclamation to the north of HKIA as "Other Specified Uses" annotated "Airport" ("OU(Airport)")

A major part of the proposed reclamation (about 576 ha) is proposed to be zoned "OU(Airport)" for the development of airport operational facilities including the third runway and taxiway systems, air passenger concourse and aircraft parking aprons.

(b) **Item B** – Designation of two areas in the east and west of the proposed reclamation as "Other Specified Uses" annotated "Airport Service Area" ("OU(Airport Service Area)"

Two areas (total area of about 74 ha) are proposed to be zoned as "OU(Airport Service Area)" for the development of airport support facilities to facilitate the airport operation.

(c) Annotations indicating the authorized road schemes of the Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road and the Tuen Mun-Chek Lap Kok Link are added. The authorized road schemes shall be deemed to be approved pursuant to section 13A of the Ordinance.

(d) An annotation indicating the authorized railway scheme of the Mass Transit Railway Lantau and Airport Railway – Airport Exhibition Centre Station is deleted. Construction works for the railway scheme have been completed.

8. Proposed Amendment to the Notes (Appendix III)

The proposed amendment to the covering Notes of the OZP which is shown on the revised Notes with the proposed addition highlighted in ***bold and italics*** at **Appendix III**. To facilitate the proposal to set up an integrated maintenance depot of about 3.5 ha to serve the existing and new automated people mover system, 'depot' is incorporated in the list of uses always permitted on land falling within the boundaries of the Plan in the covering Notes.

9. Revision of the Explanatory Statement of the OZP (Appendix IV)

The ES of the OZP has been revised to take into account the proposed amendments as mentioned in the above paragraphs and updated information. A copy of the updated ES with the proposed amendments and additions highlighted in ***bold and italics*** and deletions in '~~double crossed out~~' is at **Appendix IV** for Members' consideration.

10. Plan Number

Upon gazetting, the Plan will be re-numbered as S/I-CLK/13.

11. Consultation

11.1 The proposed amendments have been circulated to relevant government departments. No adverse comments were received and relevant comments received have been incorporated into the above proposed amendments as appropriate.

11.2 It is intended that reclamation for the proposed 3RS development would be gazetted in accordance with the provisions of the Foreshore and Seabed (Reclamations) Ordinance (Cap 127), and the proposed amendments to the Chak Lap Kok OZP would be gazetted in accordance with the provisions of the Ordinance in tandem.

11.3 Upon gazetting of the proposed amendments to the Chak Lap Kok OZP, the Islands District Council will be consulted during the public inspection period.

12. Decision Sought

Members are invited to:

(a) agree to the proposed amendments to the approved Chek Lap Kok OZP No. S/I-CLK/12 and that the draft Chek Lap Kok OZP No. S/I-CLK/12C at **Appendix II** (to be renumbered to S/I-CLK/13 upon gazetting) and its Notes at **Appendix III** are suitable for exhibition for public inspection under section 5 of the Ordinance;

(b) adopt the revised ES at **Appendix IV** for the draft Chek Lap Kok OZP No. S/I-CLK/12C (to be renumbered to S/I-CLK/13 upon gazetting) as an expression of the planning intention and objectives of the Board for various land use zonings on the Plan; and

(c) agree that the revised ES is suitable for exhibition for public inspection together with the draft Chek Lap Kok OZP No. S/I-CLK/12C (to be renumbered to S/I-CLK/13 upon gazetting) and issued under the name of the Board.

13. Attachments

Plan 1	Preferred Airport Layout Plan for the 3RS Development
Plan 2	Comparison of the Existing and Proposed Zonings for the Proposed Amendment Items A and B
Plan 3	Location Plan for the Proposed Amendment Items A and B
Plan 4	Aerial Photo of the Proposed Amendment Items A and B
Plan 5	Photomontages of the 3RS Development

Appendix I	Approved Chek Lap Kok Outline Zoning Plan No. S/I-CLK/12 (reduced scale)
Appendix II	Draft Chek Lap Kok Outline Zoning Plan No. S/I-CLK/12C
Appendix III	Schedule of Amendments and Notes of the Draft Chek Lap Kok Outline Zoning Plan No. S/I-CLK/12C
Appendix IV	Explanatory Statement of the Draft Chek Lap Kok Outline Zoning Plan No. S/I-CLK/12C
Appendix V	Planning Report of the 3RS Development
Appendix VI	Executive Summary of the EIA Report of the 3RS Development
Appendix VII	TPB Paper No. 9877

PLANNING DEPARTMENT
APRIL 2015

N

Third Runway Concourse and Apron
新跑道客運廊及停機坪

Third Runway and Taxiway Systems
第三條跑道及滑行道系統

Eastern Support Area
東面航空輔助設施用地

Underground APM Depot
地下旅客捷運系統車廠

① ▽

Formation of approximately
650 hectares of land
拓地約650公頃

Terminal 2 Expansion
擴建二號客運大樓

② ◁

Western Support Area
西面航空輔助設施用地

圖例 LEGEND

① ◁ 合成照片的觀景點
（參閱圖5）
VIEWING POINT OF PHOTOMONTAGE
(REFER TO PLAN 5)

本摘要圖於2015年3月24日擬備
所根據的資料為香港機場管理局所提供的圖則

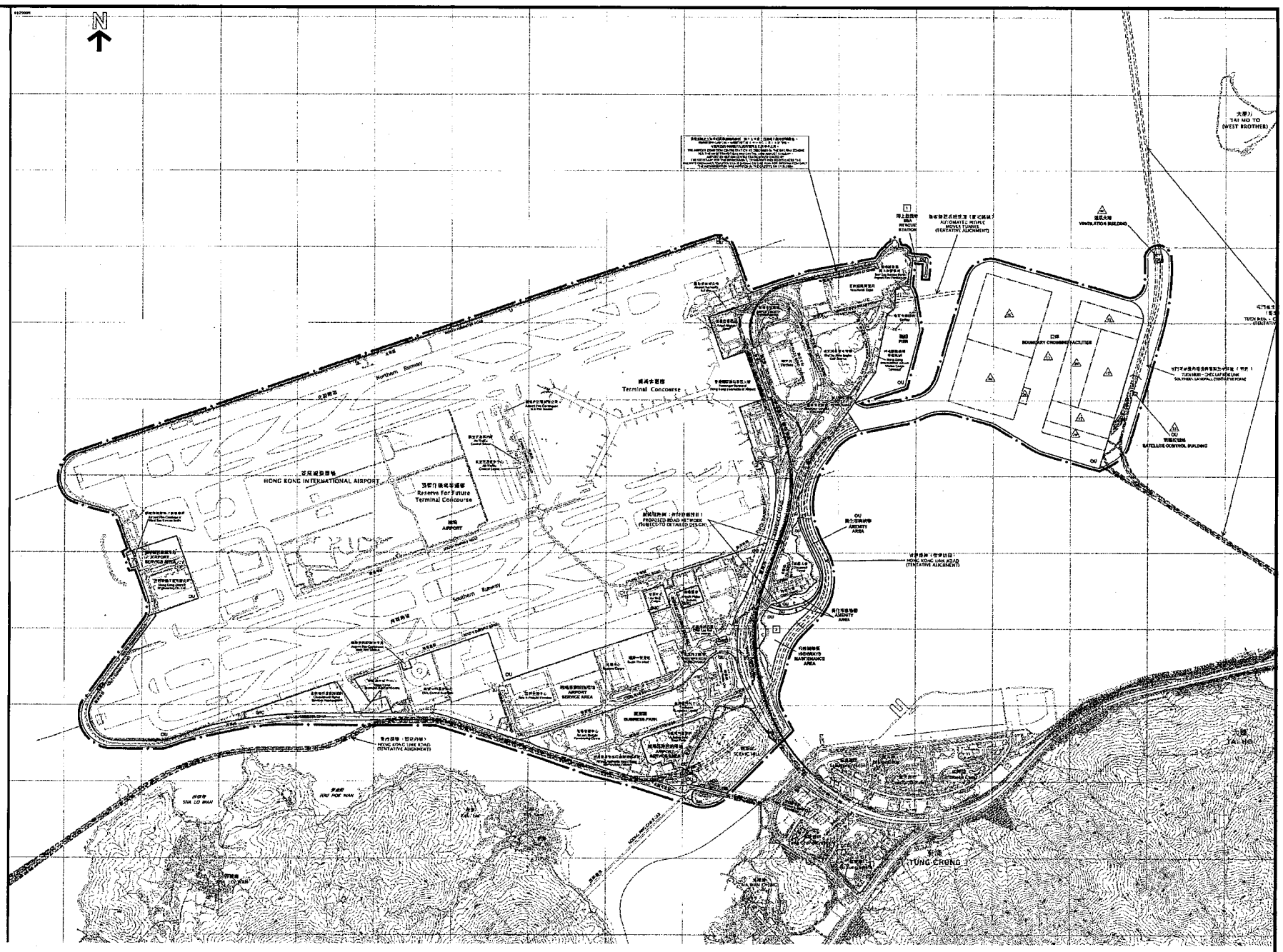
EXTRACT PLAN PREPARED ON 24.3.2015
BASED ON PLAN PROVIDED BY THE AIRPORT AUTHORITY HONG KONG

三跑道系統藍圖
LAYOUT OF THREE-RUNWAY SYSTEM

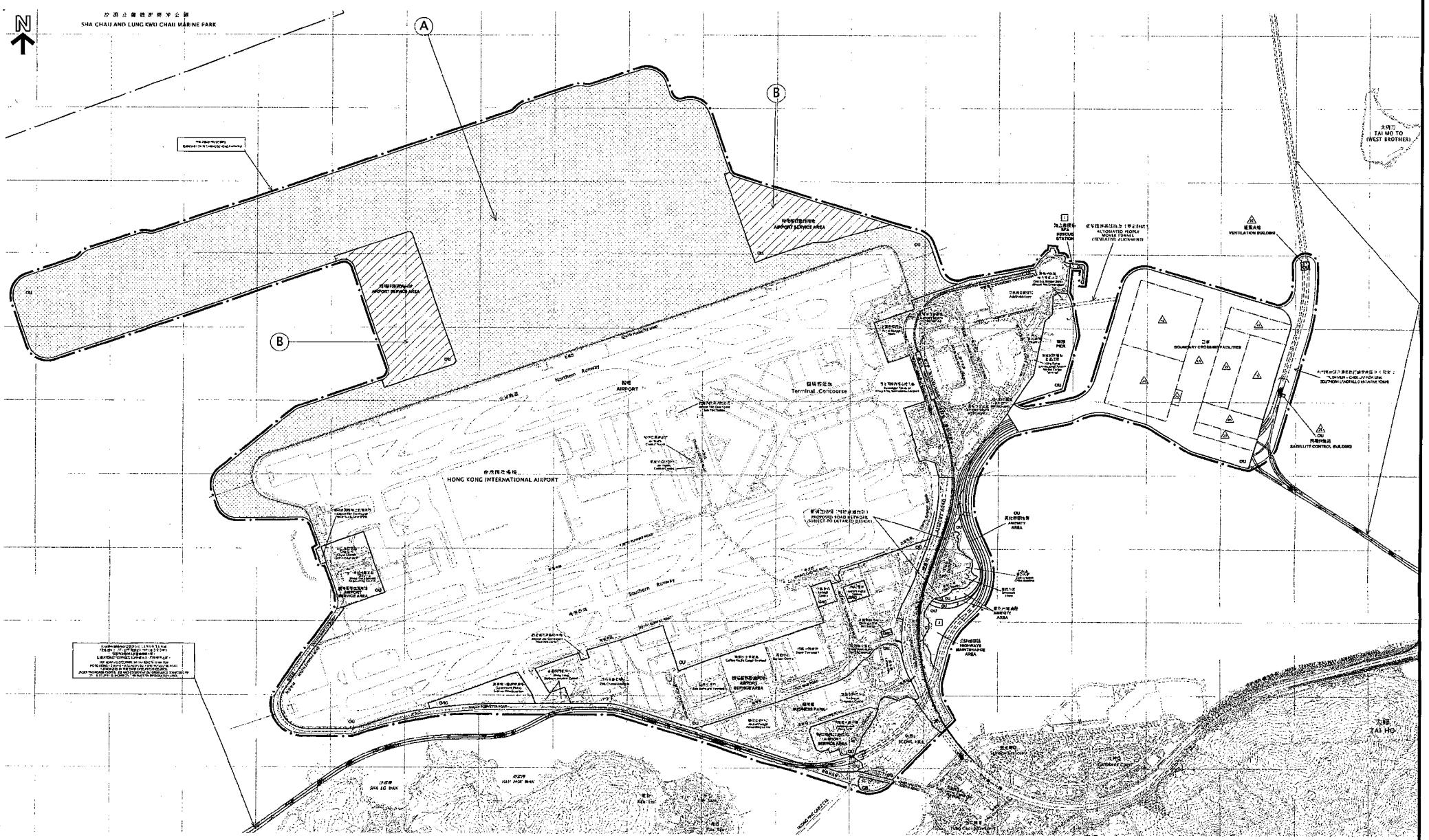
規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/LI/15/18

圖 PLAN
1



赤鱲角分區計劃大綱核准圖編號 S/I-CLK/12
APPROVED CHEK LAP KOK OUTLINE ZONING PLAN No. S/I-CLK/12



赤鱲角分區計劃大綱核准圖編號 S/I-CLK/12 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED CHEK LAP KOK OUTLINE ZONING PLAN No. S/I-CLK/12

Ⓐ 擬議修訂項目
PROPOSED AMENDMENT ITEMS

本摘要圖於2015年2月27日擬備，
所根據的資料為於2011年10月18日
分區計劃大綱核准圖編號S/I-CLK/12
EXTRACT PLAN PREPARED ON 27.2.2015
BASED ON OUTLINE ZONING PLAN
No. S/I-CLK/12 APPROVED ON 18.10.2011

位置圖 LOCATION PLAN

赤鱲角分區計劃大綱核准圖編號 S/I-CLK/12 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED CHEK LAP KOK OUTLINE ZONING PLAN No. S/I-CLK/12

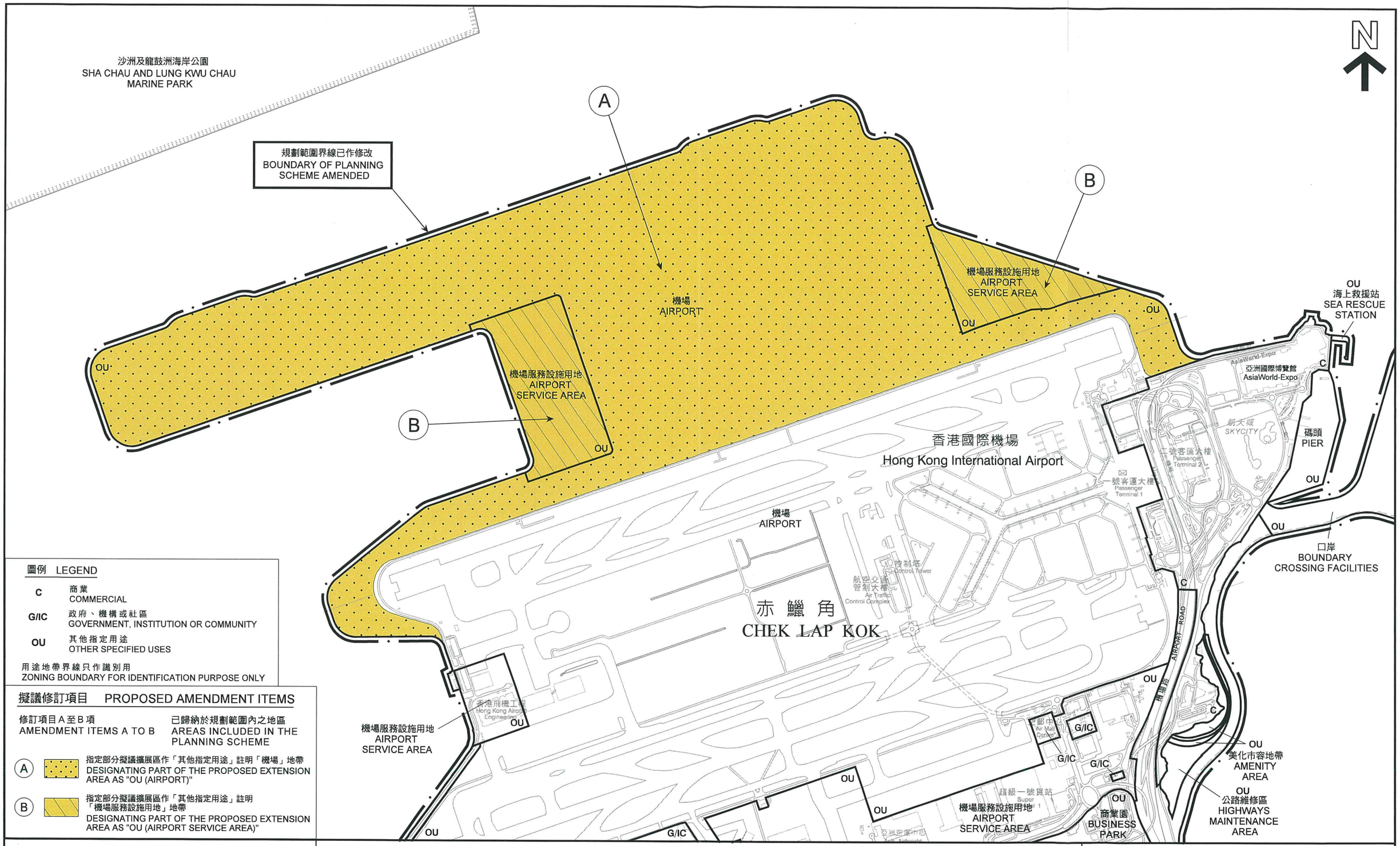
SCALE 1 : 35 000 比例尺

米 METRES 350 0 350 700 1050 1400 1750 2100 2450 2800 3150 3500 米 METRES

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/LI/15/18

圖 PLAN
2



圖例 LEGEND

C	商業 COMMERCIAL
G/IC	政府、機構或社區 GOVERNMENT, INSTITUTION OR COMMUNITY
OU	其他指定用途 OTHER SPECIFIED USES

用途地帶界線只作識別用
ZONING BOUNDARY FOR IDENTIFICATION PURPOSE ONLY

擬議修訂項目 PROPOSED AMENDMENT ITEMS

修訂項目A至B項
AMENDMENT ITEMS A TO B

已歸納於規劃範圍內之地區
AREAS INCLUDED IN THE PLANNING SCHEME

(A) 指定部分擬議擴展區作「其他指定用途」註明「機場」地帶
DESIGNATING PART OF THE PROPOSED EXTENSION AREA AS "OU (AIRPORT)"

(B) 指定部分擬議擴展區作「其他指定用途」註明「機場服務設施用地」地帶
DESIGNATING PART OF THE PROPOSED EXTENSION AREA AS "OU (AIRPORT SERVICE AREA)"

本摘要圖於2015年4月10日擬備，
所根據的資料為測量圖編號T9

EXTRACT PLAN PREPARED ON 10.4.2015
BASED ON SURVEY SHEET No. T9

平面圖 SITE PLAN

赤鱲角分區計劃大綱核准圖編號 S/I-CLK/12 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED CHEK LAP KOK OUTLINE ZONING PLAN No. S/I-CLK/12

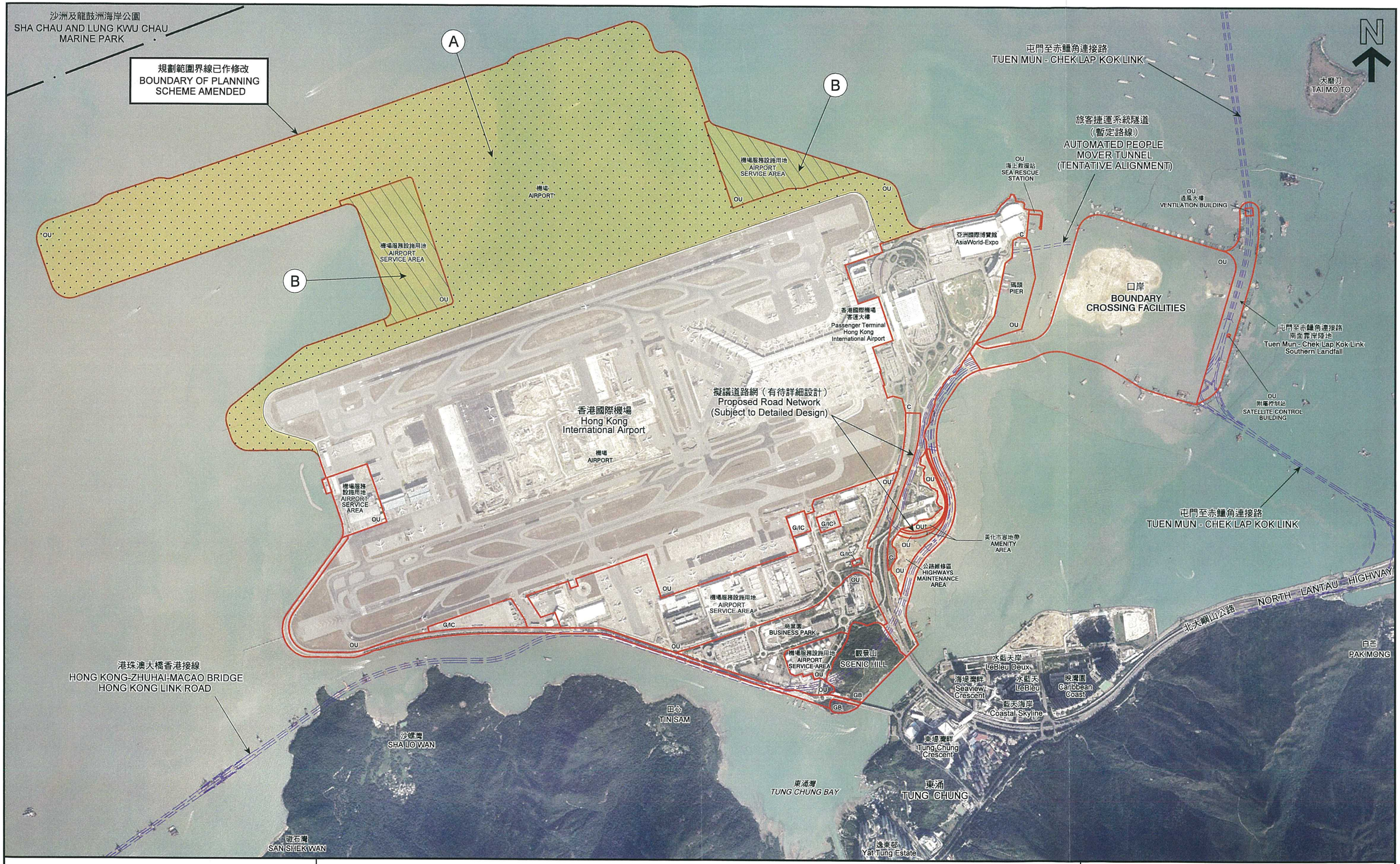
SCALE 1 : 20 000 比例尺

米 METRES 200 0 200 400 600 800 1 000 1 200 1 400 1 600 1 800 2 000 米 METRES

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/LI/15/18

圖 PLAN
3



Ⓐ 擬議修訂項目
PROPOSED AMENDMENT ITEMS

本摘要圖於2015年2月27日擬備，所根據的資料為地政總署於2013年12月5日拍得的航攝照片編號CW104629和CW104630r
EXTRACT PLAN PREPARED ON 27.2.2015 BASED ON AERIAL PHOTOS No.CW104629 AND CW104630r TAKEN ON 5.12.2013 BY LANDS DEPARTMENT

航攝照片 AERIAL PHOTO

赤鱲角分區計劃大綱核准圖編號 S/I-CLK/12 的擬議修訂
PROPOSED AMENDMENTS TO THE APPROVED CHEK LAP KOK OUTLINE ZONING PLAN No. S/I-CLK/12

規劃署
PLANNING DEPARTMENT

參考編號
REFERENCE No.
M/LI/15/18

圖 PLAN
4

觀景點 VIEWING POINT 1

觀景點 VIEWING POINT 2

本摘要圖於2015年3月23日擬備，
所根據的資料為香港機場管理局/
運輸及房屋局提交的合成照片

PLAN PREPARED ON 23.3.2015
BASED ON PHOTOMONTAGE SUBMITTED
BY THE AIRPORT AUTHORITY HONG KONG/
THE TRANSPORT AND HOUSING BUREAU

合成照片 PHOTOMONTAGE

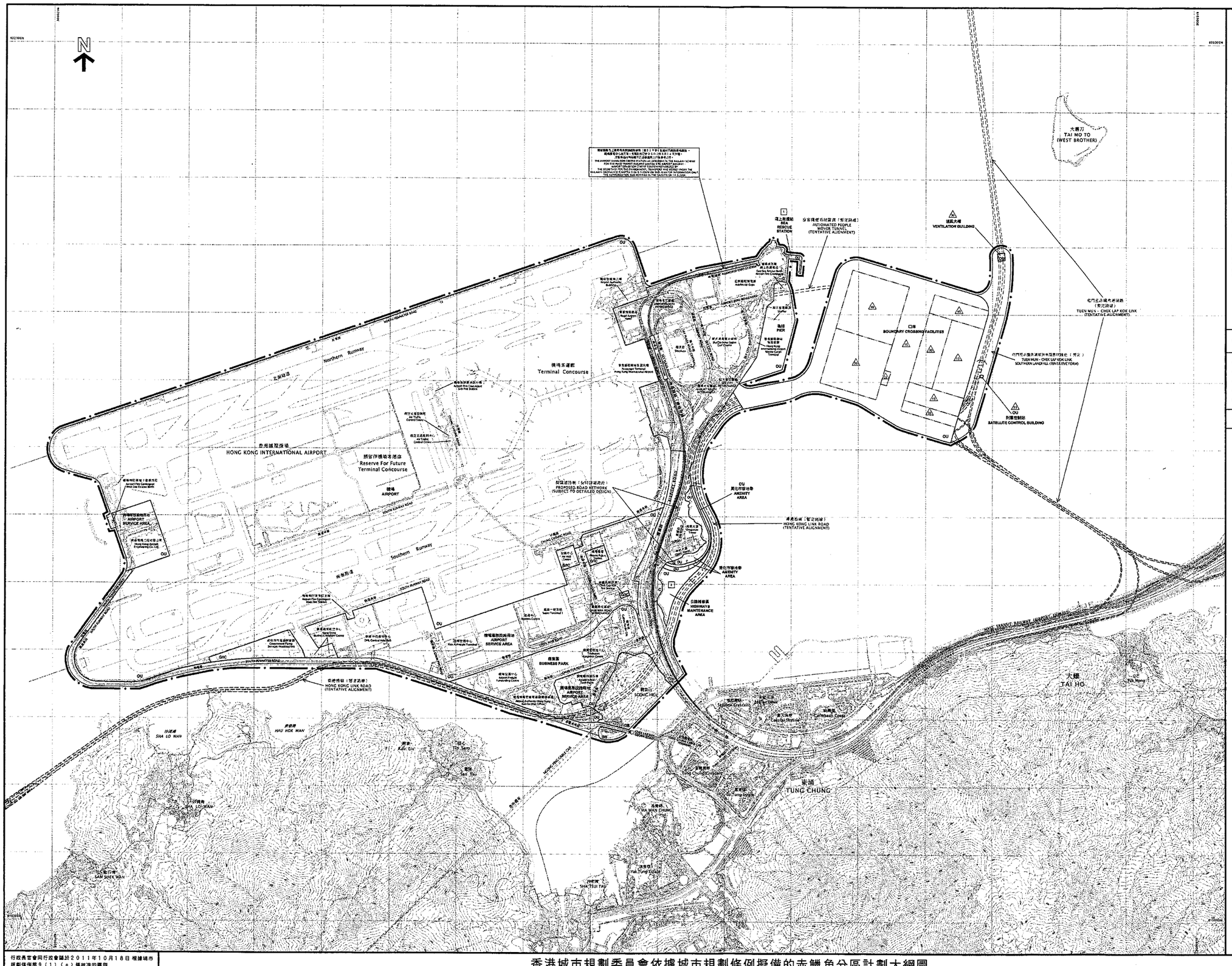
赤鱲角分區計劃大綱核准圖
編號S/I-CLK/12的擬議修訂

PROPOSED AMENDMENTS TO
THE APPROVED CHEK LAP KOK
OUTLINE ZONING PLAN No. S/I-CLK/12

規劃署
PLANNING
DEPARTMENT

參考編號
REFERENCE No.
M/LI/15/18

圖 PLAN
5



圖例
NOTATION

ZONES		**地帶**
COMMERCIAL	C	商貿
GOVERNMENT, INSTITUTION OR COMMUNITY	G/IC	政府、機構或社區
OTHER SPECIFIED USES	OU	其他指定用途
GREEN BELT	GB	綠化地帶
COMMUNICATIONS		**交通**
RAILWAY AND STATION	AIRPORT EXPRESS STATION	鐵路及車站
MAJOR ROAD AND JUNCTION		主要道路及路口
ELEVATED ROAD		高架道路
MISCELLANEOUS		**其他**
BOUNDARY OF PLANNING SCHEME		規劃範圍界線
BUILDING HEIGHT CONTROL ZONE BOUNDARY		建築物高度管制區界線
MAXIMUM BUILDING HEIGHT (IN METRES ABOVE PRINCIPAL DATUM)	120	最高建築物高度（在主水平基準上若干米）
MAXIMUM BUILDING HEIGHT (IN NUMBER OF STOREYS)	2	最高建築物高度（樓層數目）

土地用途及面積一覽表
SCHEDULE OF USES AND AREAS

USES	大約面積及百分率 APPROXIMATE AREA & %		用途
	公頃 HECTARES	% 百分率	
COMMERCIAL	118.18	8.16	商貿
GOVERNMENT, INSTITUTION OR COMMUNITY	12.30	0.85	政府、機構或社區
OTHER SPECIFIED USES	1200.12	84.41	其他指定用途
GREEN BELT	21.30	1.47	綠化地帶
MAJOR ROAD ETC.	73.64	5.09	主要道路等
TOTAL PLANNING SCHEME AREA	1448.54	100.00	規劃範圍總面積

夾附的《註釋》屬這份圖則的一部分
THE ATTACHED NOTES ALSO FORM PART OF THIS PLAN

行政長官會同行政會議於２０１１年１０月１８日根據城市規劃條例第９（１）（ａ）條核准的圖則
APPROVED BY THE CHIEF EXECUTIVE IN CAUNCIL UNDER SECTION 9(1)(a) OF THE TOWN PLANNING ORDINANCE ON 18 OCTOBER 2011

Ms Manda CHAN 陳詠雯女士
CLERK TO THE EXECUTIVE COUNCIL 行政會議秘書

香港城市規劃委員會依據城市規劃條例擬備的赤鱲角分區計劃大綱圖
TOWN PLANNING ORDINANCE, HONG KONG TOWN PLANNING BOARD
CHEK LAP KOK - OUTLINE ZONING PLAN

SCALE 1:10000 比例尺

0 500 1,000 1,500 METRES 米

規劃署僅因城市規劃委員會指示擬備
PREPARED BY THE PLANNING DEPARTMENT UNDER THE DIRECTION OF THE TOWN PLANNING BOARD

圖則編號 PLAN No. S/I-CLK/12

圖例
NOTATION

ZONES		地帶
COMMERCIAL	C	商業
GOVERNMENT, INSTITUTION OR COMMUNITY	G/IC	政府、機構或社區
OTHER SPECIFIED USES	OU	其他指定用途
GREEN BELT	GB	綠化地帶

COMMUNICATIONS		交通
RAILWAY AND STATION	車站 STATION	鐵路及車站
MAJOR ROAD AND JUNCTION		主要道路及路口
ELEVATED ROAD		高架道路

MISCELLANEOUS		其他
BOUNDARY OF PLANNING SCHEME		規劃範圍界線
BOUNDARY OF MARINE PARK		海岸公園界線
BUILDING HEIGHT CONTROL ZONE BOUNDARY		建築物高度管制區界線
MAXIMUM BUILDING HEIGHT (IN METRES ABOVE PRINCIPAL DATUM)	45	最高建築物高度（在主水平基準上若干米）
MAXIMUM BUILDING HEIGHT (IN NUMBER OF STOREYS)	1	最高建築物高度（樓層數目）

土地用途及面積一覽表
SCHEDULE OF USES AND AREAS

USES	大約面積及百分率 APPROXIMATE AREA & %		用途
	公頃 HECTARES	% 百分率	
COMMERCIAL	118.18	5.64	商業
GOVERNMENT, INSTITUTION OR COMMUNITY	12.30	0.59	政府、機構或社區
OTHER SPECIFIED USES	1869.73	89.24	其他指定用途
GREEN BELT	21.30	1.02	綠化地帶
MAJOR ROAD ETC.	73.64	3.51	主要道路等
TOTAL PLANNING SCHEME AREA	2095.15	100.00	規劃範圍總面積

夾附的《註釋》屬這份圖則的一部分，
現經修訂並按照城市規劃條例第5條展示。
THE ATTACHED NOTES ALSO FORM PART OF THIS PLAN AND HAVE BEEN AMENDED FOR EXHIBITION UNDER SECTION 5 OF THE TOWN PLANNING ORDINANCE

核准圖編號 S/I-CLK/12 的修訂
AMENDMENTS TO APPROVED PLAN No. S/I-CLK/12

AMENDMENTS EXHIBITED UNDER SECTION 5 OF THE TOWN PLANNING ORDINANCE		按照城市規劃條例第5條展示的修訂
AMENDMENT ITEM A		修訂項目A項
AMENDMENT ITEM B		修訂項目B項

（參看附表）
(SEE ATTACHED SCHEDULE)

按照城市規劃條例第5條展示的核准圖編號 S/I-CLK/12 的修訂
AMENDMENTS TO APPROVED PLAN No. S/I-CLK/12 EXHIBITED UNDER SECTION 5 OF THE TOWN PLANNING ORDINANCE ON

SECRETARY
TOWN PLANNING BOARD
城市規劃委員會秘書

香港城市規劃委員會依據城市規劃條例擬備的赤鱲角分區計劃大綱圖
TOWN PLANNING ORDINANCE, HONG KONG TOWN PLANNING BOARD
CHEK LAP KOK - OUTLINE ZONING PLAN

SCALE 1:10 000 比例尺

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規劃署遵照城市規劃委員會指示擬備
PREPARED BY THE PLANNING DEPARTMENT UNDER THE DIRECTION OF THE TOWN PLANNING BOARD

圖則編號 PLAN No. S/I-CLK/12C

~~APPROVED~~ *DRAFT* CHEK LAP KOK OUTLINE ZONING PLAN NO. S/I-CLK/12*C*

(Being a~~n Approved~~ ***Draft*** Plan for the Purposes of the Town Planning Ordinance)

NOTES

(N.B. These form part of the Plan)

(1) These Notes show the uses or developments on land falling within the boundaries of the Plan which are always permitted and which may be permitted by the Town Planning Board, with or without conditions, on application. Where permission from the Town Planning Board for a use or development is required, the application for such permission should be made in a prescribed form. The application shall be addressed to the Secretary of the Town Planning Board, from whom the prescribed application form may be obtained.

(2) Any use or development which is always permitted or may be permitted in accordance with these Notes must also conform to any other relevant legislation, the conditions of the Government lease concerned, and any other Government requirements, as may be applicable.

(3) (a) No action is required to make the existing use of any land or building conform to this Plan until there is a material change of use or the building is redeveloped.

(b) Any material change of use or any other development (except minor alteration and/or modification to the development of the land or building in respect of the existing use which is always permitted) or redevelopment must be always permitted in terms of the Plan or, if permission is required, in accordance with the permission granted by the Town Planning Board.

(c) For the purposes of subparagraph (a) above, "existing use of any land or building" means –

(i) before the publication in the Gazette of the notice of the first statutory plan covering the land or building (hereafter referred as 'the first plan'),

- a use in existence before the publication of the first plan which has continued since it came into existence; or

- a use or a change of use approved under the Buildings Ordinance which relates to an existing building; and

(ii) after the publication of the first plan,

- a use permitted under a plan which was effected during the effective period of that plan and has continued since it was effected; or

- a use or a change of use approved under the Buildings Ordinance which relates to an existing building and permitted under a plan prevailing at the time when the use or change of use was approved.

(4) Except as otherwise specified by the Town Planning Board, when a use or material change of use is effected or a development or redevelopment is undertaken, as always permitted in terms of the Plan or in accordance with a permission granted by the Town Planning Board, all permissions granted by the Town Planning Board in respect of the site of the use or material change of use or development or redevelopment shall lapse.

(5) Road junctions, alignments of roads and railway tracks, and boundaries between zones may be subject to minor adjustments as detailed planning proceeds.

(6) Temporary uses (expected to be 5 years or less) of any land or building are always permitted as long as they comply with any other relevant legislation, the conditions of the Government lease concerned, and any other Government requirements, and there is no need for these to conform to the zoned use or these Notes. For temporary uses expected to be over 5 years, the uses must conform to the zoned use or these Notes or in accordance with a permission granted by the Town Planning Board. Notwithstanding that the use is not provided for in terms of the Plan, the Board may grant, with or without conditions, or refuse to grant permission.

(7) The following uses or developments are always permitted on land falling within the boundaries of the Plan except where the uses or developments are specified in Column 2 of the Notes of individual zones:

(a) provision, maintenance or repair of plant nursery, amenity planting, open space, rain shelter, refreshment kiosk, road, bus/public light bus/people mover stop or lay-by, cycle track, railway ***track,*** ~~/~~people mover track ***and depot***, railway station, railway station entrance, railway structure below ground level, taxi rank, nullah, public utility pipeline, aviation fuel pipeline, electricity mast, lamp pole, telephone booth, telecommunications radio base station, automatic teller machine, shrine, and facility required for the operation, safety and security of the airport including any radar, navigational aid and communication devices;

(b) geotechnical works, local public works, road works, sewerage works, drainage works, environmental improvement works, marine related facilities, waterworks (excluding works on service reservoir) and such other public works co-ordinated or implemented by Government; and

(c) maintenance or repair of watercourse and grave.

(8) In any area shown as 'Road', all uses or developments except those specified in paragraph (7) above and those specified below require permission from the Town Planning Board:

toll plaza, on-street vehicle park and railway track.

(9) Unless otherwise specified, all building, engineering and other operations incidental to and all uses directly related and ancillary to the permitted uses and developments within the same zone are always permitted and no separate permission is required.

(10) In these Notes, "existing building" means a building, including a structure, which is physically existing and is in compliance with any relevant legislation and the conditions of the Government lease concerned.

~~APPROVED~~ *DRAFT* CHEK LAP KOK OUTLINE ZONING PLAN NO. S/I-CLK/12*C*

Schedule of Uses

COMMERCIAL

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Air Passenger Terminal Ambulance Depot Broadcasting, Television and/or Film Studio Cargo Handling and Forwarding Facility (Distribution Centre only) Commercial Bathhouse/ Massage Establishment Eating Place Educational Institution Exhibition or Convention Hall Ferry Terminal Government Use (not elsewhere specified) Helicopter Landing Pad Hotel Information Technology and Telecommunications Industries Institutional Use (not elsewhere specified) Off-course Betting Centre Office Petrol Filling Station Place of Entertainment Place of Recreation, Sports or Culture Private Club Public Clinic Public Convenience Public Transport Terminus or Station Public Utility Installation Public Vehicle Park (excluding container vehicle) Recyclable Collection Centre Refuse Disposal Installation Religious Institution Shop and Services Social Welfare Facility Training Centre Utility Installation for Private Project Wholesale Trade	Cargo Handling and Forwarding Facility (Freight Forwarding Service Centre only) Government Refuse Collection Point Research, Design and Development Centre

Planning Intention

This zone is intended primarily for commercial developments and airport related and other business activities.

GOVERNMENT, INSTITUTION OR COMMUNITY

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Airmail Centre Ambulance Depot Government Refuse Collection Point Government Use (not elsewhere specified) Public Utility Installation	Dangerous Goods Godown Office Place of Entertainment Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Sewage Treatment/Screening Plant Utility Installation for Private Project

Planning Intention

This zone is intended primarily for the provision of Government, institution or community facilities to support the airport operations and to serve the needs of other developments on the airport island**.**

OTHER SPECIFIED USES

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board

For "Airport" only

Air Cargo Handling System and Facility
Air Passenger and Freight Handling and Processing System/Facility
Air Passenger Terminal and Concourse
Air Traffic Control Tower and Centre
Aircraft Maintenance Facility and Service
Airfield
Airport Apron
Airport Runway
Airport Supporting and Servicing Facility
Airport Taxiway
Apron Control Centre
Aviation Fuel Storage Facility
Government Refuse Collection Point
Government Use (not elsewhere specified)
Petrol Filling Station
Pier
Public Utility Installation
Utility Installation for Private Project

Planning Intention

This zone is intended for the development of airport operational facilities.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board

For "Airport Service Area" only

Air Cargo Handling System and Facility
Air Catering Facility and Service
Aircraft Maintenance Facility and Service
Aviation Fuel Storage Facility
Cargo Handling and Forwarding Facility
Eating Place
Educational Institution
Exhibition or Convention Hall
Government Refuse Collection Point
Government Use (not elsewhere specified)
Helicopter Landing Pad
Office
Open Storage (excluding Open Storage of Dangerous Goods)
Petrol Filling Station
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Recyclable Collection Centre
Refuse Disposal Installation
Shop and Services
Training Centre
Utility Installation for Private Project
Vehicle Repair Workshop
Vehicle Staging
Warehouse (excluding Dangerous Goods Godown)
Wholesale Trade
Dangerous Goods Godown
Industrial Use
Place of Entertainment
Place of Recreation, Sports or Culture
Public Clinic

Planning Intention

This zone is intended for the development of airport support facilities to facilitate the airport operation.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
For "Boundary Crossing Facilities" only	
Ambulance Station Boundary Crossing Facilities Eating Place Fire Station Government Refuse Collection Point Petrol Filling Station Pier (Government use only) Police Station Public Convenience Public Transport Terminus or Station Public Utility Installation Radar, Navigational Aid, and Communication Devices Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Sewage Treatment/Screening Plant Shop and Services Utility Installation for Private Project	Government Use (not elsewhere specified)

Planning Intention

This zone is intended primarily for the development of the boundary crossing facilities and related activities for the Hong Kong-Zhuhai-Macao Bridge.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building heights, in terms of metres above Principal Datum, as stipulated on the Plan.

(2) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restrictions stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board

For "Business Park" only

Broadcasting, Television and/or Film Studio
Cargo Handling and Forwarding Facility (Distribution Centre, Freight Forwarding Services and Logistics Centre only)
Eating Place
Educational Institution
Exhibition or Convention Hall
Government Refuse Collection Point
Government Use (not elsewhere specified)
Helicopter Landing Pad
Hotel
Information Technology and Telecommunications Industries
Off-course Betting Centre
Office
Petrol Filling Station
Place of Entertainment
Place of Recreation, Sports or Culture
Private Club
Public Clinic
Public Convenience
Public Transport Terminus or Station
Public Utility Installation
Public Vehicle Park (excluding container vehicle)
Recyclable Collection Centre
Refuse Disposal Installation
Religious Institution
Research, Design and Development Centre
Shop and Services
Social Welfare Facility
Training Centre
Utility Installation for Private Project
Vehicle Staging
Warehouse (excluding Dangerous Goods Godown)
Wholesale Trade

Dangerous Goods Godown
Industrial Use
Vehicle Repair Workshop

Planning Intention

This zone is intended primarily for airport related business activities.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board

For "Highways Maintenance Area" only

Amenity Area Government Use Highways Maintenance Area Public Utility Installation (Electric Substation Only)	Public Utility Installation (not elsewhere specified)

Planning Intention

This zone is intended to designate areas for the provision of backup area for operation and maintenance of the Hong Kong Link Road.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building height, in terms of number of storeys, as stipulated on the Plan.

(2) In determining the relevant maximum number of storeys for the purposes of paragraph (1) above, any basement floor(s) may be disregarded.

(3) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restriction stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

For "Pier" only

Government Use Pier Sea Rescue Station	Eating Place Exhibition or Convention Hall Marine Fuelling Station Office Public Vehicle Park (excluding container vehicle) Shop and Services (not elsewhere specified)

Planning Intention

This zone is intended to designate land for piers to facilitate marine access to the airport island.

Remark

Kiosks not greater than $10m^2$ each in area and not more than 10 in number for use as Shop and Services are considered ancillary to "Pier" use.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
For "Satellite Control Building" only	
Satellite Control Building	Government Use Public Utility Installation

Planning Intention

This zone is intended primarily to reserve land for the development of a satellite control building.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building height, in terms of metres above Principal Datum, as stipulated on the Plan.

(2) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restriction stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

For "Sea Rescue Station" only

Sea Rescue Station	Government Use Public Utility Installation

Planning Intention

This zone is intended primarily to reserve land for the reprovisioning of the existing Fire Services Department East Sea Rescue Facilities.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building height, in terms of number of storeys, as stipulated on the Plan.

(2) In determining the relevant maximum number of storeys for the purposes of paragraph (1) above, any basement floor(s) may be disregarded.

(3) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restriction stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

(Please see next page)

OTHER SPECIFIED USES (Cont'd)

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
For "Ventilation Building" only	
Ventilation Building	Government Use Public Utility Installation

Planning Intention

This zone is intended primarily to reserve land for the development of a ventilation building.

Remarks

(1) No new development, or addition, alteration and/or modification to or redevelopment of an existing building shall result in a total development and/or redevelopment in excess of the maximum building height, in terms of metres above Principal Datum, as stipulated on the Plan.

(2) Based on the individual merits of a development or redevelopment proposal, minor relaxation of the building height restriction stated in paragraph (1) above may be considered by the Town Planning Board on application under section 16 of the Town Planning Ordinance.

For "Amenity Area" Only	
Amenity Area	Government Use Public Utility Installation Utility Installation for Private Project

Planning Intention

This zone is intended to designate land for major roadside amenity areas and landscape buffers.

GREEN BELT

Column 1 Uses always permitted	Column 2 Uses that may be permitted with or without conditions on application to the Town Planning Board
Government Use (Police Reporting Centre only) Nature Reserve Nature Trail Picnic Area Public Convenience Wild Animals Protection Area	Cable Car Route and Terminal Building Field Study/Education/Visitor Centre Government Refuse Collection Point Government Use (not elsewhere specified) Petrol Filling Station Place of Recreation, Sports or Culture Public Utility Installation Public Vehicle Park (excluding container vehicle) Radar, Telecommunications Electronic Microwave Repeater, Television and/or Radio Transmitter Installation Utility Installation for Private Project

Planning Intention

This zone is intended to preserve the existing natural landscape at the knoll in the southeastern tip of the airport island to provide a visual and environmental buffer for the adjacent new town development. There is a general presumption against development in this zone.

~~APPROVED~~ *DRAFT* CHEK LAP KOK OUTLINE ZONING PLAN NO. S/I-CLK/12*C*

EXPLANATORY STATEMENT

EXPLANATORY STATEMENT

~~APPROVED~~ *DRAFT* CHEK LAP KOK OUTLINE ZONING PLAN NO. S/I-CLK/12*C*

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~~APPROVED~~ *DRAFT* CHEK LAP KOK OUTLINE ZONING PLAN NO. S/I-CLK/12*C*

(Being a~~n Approved~~ ***Draft*** Plan for the Purposes of the Town Planning Ordinance)

EXPLANATORY STATEMENT

Note: For the purposes of the Town Planning Ordinance, this statement shall not be deemed to constitute a part of the Plan.

1. INTRODUCTION

This Explanatory Statement is intended to assist an understanding of the ~~approved~~ ***draft*** Chek Lap Kok Outline Zoning Plan (OZP) No. S/I-CLK/12***C***. It reflects the planning intention and objectives of the Town Planning Board (the Board) for various land use zonings of the Plan.

2. AUTHORITY FOR THE PLAN AND PROCEDURE

2.1 On 22 May 1996, under the power delegated by the then Governor, the then Secretary of Planning, Environment and Lands, directed the Board, under section 3(1)(a) of the Town Planning Ordinance (the Ordinance), to prepare an OZP for the airport island at Chek Lap Kok. On 13 December 1996, the draft Chek Lap Kok OZP No. S/I-CLK/1 was exhibited for public inspection under section 5 of the Ordinance. The draft OZP was subsequently amended and exhibited for public inspection under section 7 of the Ordinance. On 10 April 2001, the Chief Executive in Council (CE in C), under section 9(1)(a) of the Ordinance, approved the draft Chek Lap Kok OZP, which was subsequently renumbered as S/I-CLK/3. On 20 April 2001, the approved Chek Lap Kok OZP No. S/I-CLK/3 was exhibited for public inspection under section 9(5) of the Ordinance.

2.2 On 25 September 2001, the CE in C referred the approved OZP No. S/I-CLK/3 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The OZP was subsequently amended and exhibited for public inspection under section 5 of the Ordinance. On 8 October 2002, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Chek Lap Kok OZP, which was subsequently renumbered as S/I-CLK/5. On 18 October 2002, the approved Chek Lap Kok OZP No. S/I-CLK/5 was exhibited for public inspection under section 9(5) of the Ordinance.

2.3 On 8 July 2003, the CE in C referred the approved OZP No. S/I-CLK/5 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. ***The OZP was subsequently amended four times and exhibited for public inspection under section 5 or 7 of the Ordinance.*** ~~On 31 October 2003, the draft OZP No. S/I-CLK/6, incorporating amendments to the Notes to reflect the revised Master Schedule of Notes to Statutory Plans endorsed by the Board and technical amendments with minor zoning boundary adjustments, was exhibited for public inspection under section 5 of the Ordinance. During the exhibition period, no objection was received.~~

~~2.4 On 27 August 2004, the draft OZP No. S/I-CLK/7, incorporating refinement to the covering Notes to clarify the planning intention of "existing use" and to the Notes of the "Coastal Protection Area" zone, was exhibited for public inspection under section 7 of the Ordinance. Opportunity was also taken to show the Airport Exhibition Centre Station on the Plan for information. During the exhibition period, no objection was received.~~

~~2.5 On 15 April 2005, the draft Chek Lap Kok OZP No. S/I-CLK/8, incorporating mainly amendment to the definition of "existing building" in the covering Notes, was exhibited for public inspection under section 7 of the Ordinance. During the exhibition period, no objection was received.~~

~~2.6 On 30 June 2005, the draft Chek Lap Kok OZP No. S/I-CLK/9, incorporating the rezoning of an area to the west of an existing aviation fuel tank farm on Chun Yue Road from "Other Specified Uses" annotated "Business Park" to "Other Specified Uses" annotated "Airport Service Area", was exhibited for public inspection under section 7 of the Ordinance. During the exhibition period, no objection was received.~~

2.4 On 9 May 2006, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Chek Lap Kok OZP, which was subsequently renumbered as S/I-CLK/10. ~~On 19 May 2006, the approved Chek Lap Kok OZP No. S/I-CLK/10 was exhibited for public inspection under section 9(5) of the Ordinance.~~

2.5 On 28 March 2009, the Secretary for Development, under the delegated authority of the Chief Executive, directed the Board under section 3(1)(a) of the Ordinance to extend the planning scheme boundary of the Chek Lap Kok OZP to cover the ~~proposed reclamation~~ areas for the Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities (HKBCF), HZMB Hong Kong Link Road ~~(HKLR)~~, the Southern Landfall of Tuen Mun – Chek Lap Kok Link (TM-CLKL) and other proposed road works, and the proposed reprovisioning site for Fire Services Department's Sea Rescue Facilities.

2.6 On 5 May 2009, the CE in C referred the approved Chek Lap Kok OZP No. S/I-CLK/10 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. ~~The reference back was notified in the Gazette on 15 May 2009 under section 12(2) of the Ordinance.~~

2.7 On 12 June 2009, the draft Chek Lap Kok OZP No. S/I-CLK/11, incorporating the transport infrastructures and land use proposals on the proposed reclamation areas for the ~~HZMB~~ HKBCF, HZMB ***Hong Kong Link Road*** ~~HKLR~~ and TM-CLKL Southern Landfall, was exhibited for public inspection under section 5 of the Ordinance. During the exhibition period, a total of 789 representations were received. Subsequently, 7 representations were withdrawn and one was considered invalid. On 21 August 2009, the representations were published for three weeks for public comments. No comments were received. On 13 November 2009, the Board decided not to propose any amendment to the draft OZP to meet the representation under section 6B(8) of the Ordinance.

2.8 On 18 October 2011, the CE in C, under section 9(1)(a) of the Ordinance, approved the draft Chek Lap Kok OZP, which was subsequently renumbered as S/I-CLK/12. On 21 October 2011, the approved Chek Lap Kok OZP No. S/I-CLK/12 ~~(the Plan)~~ was exhibited for public inspection under section 9(5) of the Ordinance.

2.9 On 23 September 2014, the Secretary for Development, under the delegated authority of the Chief Executive, directed the Board under section 3(1)(a) of the Ordinance to extend the planning scheme boundary of the Chek Lap Kok OZP to cover the proposed reclamation area for the new third runway of the Hong Kong International Airport (HKIA).

2.10 On 24 February 2015, the CE in C referred the approved Chek Lap Kok OZP No. S/I-CLK/12 to the Board for amendment under section 12(1)(b)(ii) of the Ordinance. The reference back was notified in the Gazette on 27 March 2015 under section 12(2) of the Ordinance.

2.11 On xx.xx.xxxx, the draft Chek Lap Kok OZP No. S/I-CLK/13 (the Plan), incorporating the land use proposals on the proposed reclamation area for the new third runway of the HKIA, was exhibited for public inspection under section 5 of the Ordinance.

3. OBJECT OF THE PLAN

3.1 The object of the Plan is to indicate the broad land use zonings and major transport network for the airport island***,*** ~~and the HZMB~~ HKBCF ***and HZMB Hong Kong Link Road*** at Chek Lap Kok so that development and redevelopment ***within the Planning Scheme Area*** ~~on the island~~ can be put under statutory planning control.

3.2 The Plan is to illustrate the broad principles of development within the Planning Scheme Area. As it is a small-scale plan, the alignments of roads and railways and boundaries between land use zones may be subject to minor adjustments as detailed planning and development proceed.

4. NOTES OF THE PLAN

4.1 Attached to the Plan is a set of Notes which shows the types of uses or developments which are always permitted within the Planning Scheme Area and in particular zones and which may be permitted by the Board, with or without conditions, on application. The provision for application for planning permission under section 16 of the Ordinance allows greater flexibility in land use planning and control of development to meet changing needs.

4.2 For the guidance of the general public, a set of definitions that explains some of the terms used in the Notes may be obtained from the Technical Services Division of the Planning Department and can be downloaded from the Board's website at http://www.info.gov.hk/tpb.

5. THE PLANNING SCHEME AREA

5.1 The Planning Scheme Area (the Area), covering the ***existing*** airport island ***and the proposed reclamation for the third runway of HKIA***, the ~~HZMB~~ HKBCF, ***part of the*** HZMB ***Hong Kong Link Road*** ~~HKLR~~ and the Southern Landfall of TM-CLKL at Chek Lap Kok, is located off the north shore of Lantau and separated physically from the new town development in Tung Chung by a 200m wide water channel.

5.2 The boundary of the Area is shown in a heavy broken line on the Plan. The total area covered by the Plan, including the area designated for pier development, is approximately ~~1,445~~ ***2,095*** ha.

5.3 Complex geological conditions are known to exist within the Northshore Lantau Area, which can have significant effects on foundation design and construction in terms of both development costs and construction programme. The affected area is referred to as "the Designated Area of Northshore Lantau". Information on the geology of Northshore Lantau and technical guidance on foundation works are available from Civil Engineering and Development Department.

6. POPULATION

6.1 There is no residential population other than those taking accommodation in the hotels and staff quarters on the airport island.

6.2 Currently, the number of workers within the Area is around ~~45,000~~ ***65,000***. ~~It is anticipated that this would rise to about 95,000 upon full development, including 5,000 workers at the HZMB - HKBCF.~~ ***Upon full development, it is anticipated that the number of workers at the airport island with the third runway would rise to about 123,000 and the number of workers at the HKBCF would rise to about 5,000.***

6.3 ***Upon the completion of HKIA's Midfield development, t*** ~~T~~he existing airport passenger terminal with dual runway operations is capable of handling ***about*** ~~45~~ ***74*** million air passengers a year ~~at present~~. ~~Future e~~***E***xpansion of the airport ***with the third runway and associated passenger terminal facilities*** will be able to bring up the annual throughput to ***about*** ~~87~~ ***102*** million air passengers ***upon completion, with provision for further increase if needed***.

6.4 The planned HKBCF aims to provide necessary facilities for government departments to carry out police, customs, immigration and quarantine control for vehicles and passengers using the HZMB, as well as other necessary supporting facilities. It is anticipated that the daily two-way traffic of the HZMB will be about 36,000 to 49,000 vehicles per day and 191,000 to 234,000 passengers per day at 2035.

7. LAND USE ZONINGS

7.1 "Commercial" ("C"): Total Area: 118.18 ha

7.1.1 This zone is intended primarily for commercial developments and airport related and other business activities. The eastern part of the airport island is under this zoning to provide an aesthetically pleasant environment for airport-related enterprises and other business activities that require prominent and accessible locations on the airport island. Hotel, office, retail, exhibition centre, recreational and other supporting facilities are planned in this zone. Land is also set aside ***to cover*** ~~for the expansion of~~ the air passenger terminal, ground transportation centre and ~~the development of~~ passenger ferry terminal.

7.1.2 There is a comprehensive transport network to link up the commercial developments, terminal buildings, ground transportation centre and Airport Express Airport Station within the "Commercial" zone. Public car parks are also included. Hence, a large percentage of the area within this zone would be taken up by transport infrastructure.

7.2 "Government, Institution or Community" ("G/IC"): Total Area: 12.30 ha

7.2.1 This zone is intended primarily for the provision of Government, institution or community facilities to support the airport operations and to serve the needs of other developments on the airport island**.**

7.2.2 The existing major GIC facilities within the zone include a Government flying services centre, a fire station, a police complex and an airmail centre.

7.3 "Other Specified Uses" ("OU"): Total Area: ~~1,220.12~~ ***1869.73***ha

7.3.1 This zoning covers land allocated for the following specific uses:

7.3.2 Airport: ~~880.90~~ ***1456.80*** ha

This zone is intended for the development of airport operational facilities. The northern part of the airport island is under this zoning. Major facilities include runways, airfield, air traffic control towers, air passenger terminal and concourses, and aircraft parking aprons. The uses of such facilities are unique and special. They are put under Column 1 as always permitted uses in the Notes to allow maximum flexibility for airport operational development. Other uses permitted include 'Aviation Fuel Storage Facility', 'Air Passenger and Freight Handling and Processing System/Facility' and 'Air Cargo Handling System and Facility' that comprise aircraft parking apron, cargo staging and loading/unloading apron, etc.

7.3.3 Airport Service Area: ~~137.99~~ ***211.70*** ha

This zone is intended for the development of airport support facilities to facilitate the airport operation. The area***s*** to the ***east,*** west and south of the airport proper

***are*~~is~~** under this zoning. The major support facilities include air cargo terminals, facilities for airline catering, aircraft fuelling, aircraft maintenance and the aviation fuel tank farms.

7.3.4 Boundary Crossing Facilities: 130.64 ha

7.3.4.1 This zone is intended primarily for the development of boundary crossing facilities and related activities for the HZMB. Major facilities include vehicle clearance facilities, passenger clearance building, transit halls, pick-up/drop–off zones for passengers, public transport interchange, government offices and other necessary supporting facilities. These facilities are arranged so as to achieve proper and smooth operation of the clearance procedures and traffic movements. The key design parameters for HKBCF include the following:

(a) the design flow of respective types of vehicles and passengers using HKBCF;
(b) the processing times for each type of vehicles and passengers;
(c) the area and other requirements for the accommodation of operational departments / supporting facilities; and
(d) the operational flow for clearance of vehicles / passengers.

7.3.4.2 Most of the planned buildings on the HKBCF will be low-rise with building heights ranging from 10m to 25m, except the Passenger Clearance Building, which act as the main gateway building for passengers travelling via coaches, shuttle buses and/or other public transports, police tower and the Fire Services Department's fire drill tower which may have building heights of about 30m to 40m to meet operational requirements.

7.3.4.3 Development and redevelopment within this zone are subject to maximum building height restrictions ranging from 15mPD to 45mPD as stipulated on the Plan. Minor relaxation of the building height restrictions stipulated on the Plan may be considered by the Board through the planning permission system. Each application for minor relaxation of the building height restriction will be considered on its own merits.

7.3.4.4 Provision has also been made to provide an underground automated people mover in the transit hall building to connect the HKBCF with ~~Hong Kong International Airport (~~HKIA~~)~~ to serve air/land transit passengers.

7.3.4.5 All developments within this zone would also have to satisfy the Airport Height Restrictions at their respective locations of the buildings.

7.3.5 Business Park: 44.74 ha

This zone is intended primarily for airport related business activities. An area to the southern part of the airport island is under this zoning. It is intended to accommodate, inter alia, freight forwarding centres, airport-related offices, airline headquarters and operational buildings, hotel and retail uses.

7.3.6 Highways Maintenance Area: 5.59 ha

7.3.6.1 This zone is intended to designate areas for the provision of backup area for operation and maintenance of the ***HZMB Hong Kong Link Road*** ~~HKLR~~. The area~~s~~ to the south of Dragonair Tower and CNAC Tower ***is***~~are~~ under this zoning.

7.3.6.2 Development and redevelopment within this zone are subject to maximum building height restriction of 2 storeys as stipulated on the Plan. Minor relaxation of the building height restriction may be considered by the Board through the planning permission system. Each application for minor relaxation of the building height restriction will be considered on its own merits.

7.3.7 Pier: 14.19 ha

This zone is intended to designate land for piers to facilitate marine access to the airport island. An area at the northeastern coast is under this zoning~~. The area covers the SkyPier I and SkyPier II, together with an area just beyond the coastline~~ to facilitate ~~future~~ pier development providing ferry services to the airport.

7.3.8 Satellite Control Building: 0.04 ha

7.3.8.1 This zone is intended primarily to reserve land for the development of a satellite control building. The satellite control building will be located near the portal of the Southern Landfall of the TM-CLKL Tunnel.

7.3.8.2 Development and redevelopment within this zone are subject to maximum building height restriction of 25mPD as stipulated on the Plan. Minor relaxation of the building height restriction may be considered by the Board through the planning permission system. Each application for minor relaxation of building height restriction will be considered on its own merits.

7.3.9 Sea Rescue Station: 0.40 ha

7.3.9.1 This zone is intended primarily to reserve land for the reprovisioning of the existing Fire Services Department East Sea Rescue Facilities. The existing facilities will be affected by the proposed automated people mover.

7.3.9.2 Development and redevelopment within this zone are subject to maximum building height of 1 storey as stipulated on the Plan. Minor relaxation of the building height restriction may be considered by the Board through the planning permission system. Each application for minor relaxation of the building height restriction will be considered on its own merits.

7.3.10 Ventilation Building: 0.30 ha

7.3.10.1 This zone is intended primarily to reserve land for the development of a ventilation building. The ventilation building will be located at the northern end of the southern landfall reclamation of the TM-CLKL tunnel.

7.3.10.2 Development and redevelopment within this zone are subject to maximum building height restriction of 30mPD as stipulated on the Plan. Minor relaxation of the building height restriction may be considered by the Board through the planning permission system. Each application for minor relaxation of building height restriction will be considered on its own merits.

7.3.11 Amenity Area: 5.33 ha

This zone is intended to designate land for major roadside amenity areas and landscape buffers. This zone covers the proposed amenity area as landscape buffer between the ***"C" zone*** ~~Dragonair Tower and CNAC Tower~~ and the proposed carriageway***s*** from HKBCF to the airport island and the ***HZMB Hong Kong Link Road*** ~~HKLR~~.

7.4 "Green Belt" ("GB"): Total Area: 21.30 ha

7.4.1 The planning intention of this zone is to preserve the existing natural landscape at the knoll in the southeastern tip of the airport island to provide a visual and environmental buffer for the adjacent new town development. There is a general presumption against development in this zone. This zone also serves the purpose of providing a passive recreational outlet. The Scenic Hill is under this zoning.

7.4.2 Development within this zone will be strictly controlled. Development proposals will be considered on individual merits taking into account the relevant Town Planning Board Guidelines. Planning permission has been granted by the Board for the Airport Island Angle Station, Support Tower and Cable Car Route, which are essential components of the Tung Chung Cable Car Project, at the foothill of the Scenic Hill.

7.4.3 A section of the ***HZMB Hong Kong Link Road*** ~~HKLR~~ would run through Scenic Hill by means of a tunnel, and daylights at the new reclamation at the east coast of the airport island.

8. COMMUNICATIONS

8.1 Roads

8.1.1 Only the major road networks are shown on the Plan. As the Plan is drawn at a small scale, details of road junctions and interchanges, local roads and footpaths are not indicated. They are subject to detailed design.

8.1.2 The North Lantau Highway (NLH) running along the north shore of Lantau provides the strategic link between the airport and other areas in the territory. External road access to and from the airport is mainly via the NLH and the Lantau Link which feeds into Route 3 via a major interchange on Tsing Yi Island and leads to Central via the West Kowloon Highway and the Western Harbour Crossing. From the major interchange on Tsing Yi Island, there is a road link to the North West New Territories via Ting Kau Bridge.

8.1.3 Two separate road bridges link up the airport with Tung Chung. The bridge of NLH caters for express road traffic whilst the bridge of Chek Lap Kok South Road serves local traffic between Tung Chung and the airport.

8.1.4 A comprehensive local road network and a people mover system provide convenient access to the passenger terminals, ground transportation centre, airport support facilities and other developments. Public access to airside roads is restricted for security reasons.

8.1.5 The HKBCF is connected to the HZMB Main Bridge at the Hong Kong Special Administrative Region (HKSAR) boundary by the ***HZMB Hong Kong Link Road***~~HKLR~~. An internal road network is provided within the HKBCF to allow all necessary public traffic movements. A system of service roads designated for operational staff only to circulate within various parts of HKBCF, without conflicting with normal traffic, will also be provided.

8.1.6 The ***HZMB Hong Kong Link Road***~~HKLR~~ is a dual 3-lane carriageway of about 12 km in length connecting the proposed HZMB Main Bridge at the HKSAR boundary with the proposed HKBCF. It comprises (i) a sea viaduct from the HKSAR boundary to the landing point on the airport island near South Perimeter Road and a land viaduct from the landing point on the airport island to Scenic Hill with about 9.4 km in total length; (ii) a tunnel of about 1km in length at Scenic Hill; and (iii) an at-grade road of about 1.6km in length at the eastern coast of the airport island to the HKBCF.

8.1.7 The HKBCF is connected to the road network of Hong Kong territory by:

(a) road links to the airport island for traffic to/from the HKIA and Tung Chung;
(b) TM-CLKL main tunnel for traffic to/from Tuen Mun and North West New Territories; and

(c) TM-CLKL southern connection for traffic to/from Lantau Island and other parts of Hong Kong.

8.1.8 The TM-CLKL is a dual 2-lane carriageway in the form of bridge-cum-tunnel structure comprising about 5 km undersea tunnel and 4 km viaduct from Tuen Mun Pillar Point to North Lantau and HKIA via the proposed HKBCF. Its purpose is to form a new strategic corridor between North West New Territories and Lantau Island in order to relieve anticipated future congestion on the Lantau Link. It also provides an alternative direct link between Tuen Mun and HKIA, serving the needs of the travelers and the logistics industry.

8.1.9 The HZMB Hong Kong Link Road and TM-CLKL were authorized by the CE in C under the Roads (Works, Use and Compensation) Ordinance (Chapter 370) on 18 October 2011 and are shown on the Plan for information only. Pursuant to section 13A of the Ordinance, the road schemes authorized under the Roads (Works, Use and Compensation) Ordinance (Chapter 370) shall be deemed to be approved under the Ordinance.

8.2 Rail

8.2.1 The Airport Express provides a high speed and high frequency service specifically designed for air passengers. It runs between Hong Kong Island and the airport with intermediate stops at Kowloon and Tsing Yi. The Airport Express Airport Station is located immediately adjacent to the air passenger terminal building ***and***~~.~~ ~~The railway scheme incorporating the Airport Exhibition Centre Station (also known as~~ the AsiaWorld-Expo Station~~)~~ ***is*** located to the north of an exhibition centre (AsiaWorld-Expo). ~~was authorized by the Secretary for Environment, Transport and Works under the Railways Ordinance (Chapter 519) in May 2004 and is shown on the Plan for information only. Pursuant to section 13A of the Ordinance, the railway scheme authorized under the Railways Ordinance (Chapter 519) shall be deemed to be approved under the Ordinance.~~

8.2.2 The Mass Transit Railway (MTR) Tung Chung Line provides a local service following the same route as the Airport Express, except that it terminates at Tung Chung Town Centre. Alternative access to the airport by rail can be made via the MTR Tung Chung Line to Tung Chung where there are direct bus service connections to the airport.

8.2.3 The air passenger terminal***s*** ~~is connected to~~ ***and*** the SkyPier ***are connected*** by an underground Automated People Mover (APM) system. The APM may be extended to connect the HKBCF and HKIA to serve transit passengers.

8.2.4 The Airport Rail Link (ARL) Project, which intends to provide a rail link between Shenzhen Airport and HKIA, is at planning stage. Among various options, one possibility is to locate the ARL's southern terminal in HKBCF. The design of the HKBCF has catered for such possibility.

8.3 Ferry

~~An~~***The*** existing ferry pier***, i.e. SkyPier,*** is located at the north-eastern coast of the Area. Ferry terminal and additional pier could be developed within the "OU" annotated "Pier" zone to facilitate expansion of ferry services. Operation of ~~Phase 1 Cross-Boundary Passenger Ferry Terminal (~~SkyPier~~ I)~~ to serve transit passengers at the airport by the Airport Authority Hong Kong has commenced~~ in September 2003. Phase 2 (SkyPier II) is scheduled for completion within~~ ***since*** 2009.

8.4 Public Transport

8.4.1 Apart from trains and ferries, franchised buses and taxis are also important modes of public transport to the Area.

8.4.2 The ground transportation centre is integrated with the Airport Express Airport Station and attached to the air passenger terminal building for the convenience of the passengers, greeters and well-wishers. The ground transportation centre includes a public transport interchange to accommodate different transport modes, pick-up areas for arrival traffic as well as setting-down areas for departure traffic.

8.4.3 A public transport interchange will be provided at the HKBCF to serve the needs of the cross-boundary passengers.

9. UTILITY SERVICES

9.1 Water Supply

9.1.1 Fresh water supply to the Area is obtained from the Tung Chung Fresh Water Service Reservoir via the distribution mains (including a dedicated main for direct supply to the airport area).

9.1.2 A salt water reticulation system has been built in the airport island to provide the dual function of cooling for air-conditioning system and flushing.~~ A new salt water reticulation system will be provided at the HKBCF to provide the same dual functions.~~

9.2 Electricity

Electricity is supplied to the Area through a new distribution network. Adequate sites have been reserved for electric substations to meet the demand in both short and long terms.

9.3 Telephone

Telephone services are available through a telephone exchange in the Area.

9.4 Gas

Gas supply is extended from the existing network in the New Territories to the Area via submarine pipelines. The gas pipeline lands at Ta Pang Po and leads to the Area via the Pigging/Offtake Station at Tai Ho in North Lantau.

9.5 Sewerage and Drainage

9.5.1 Sewage from the airport island is collected and conveyed by sewers to a sewage pumping station and transferred to the sewage treatment works at Siu Ho Wan in North Lantau for treatment. A sewage treatment plant will be provided at the HKBCF for treating sewage to be generated ***there*** ~~in the HKBCF~~.

9.5.2 The stormwater drainage system in the airport island is connected to the outfalls on the perimeter of the island. Airport Authority Hong Kong is responsible for the maintenance and operation of the sewerage and stormwater drainage systems in the airport island. For the HKBCF, all new stormwater drains and culverts will be positioned to align with the carriageways where possible.

10. CULTURAL HERITAGE

A heritage site with kilns dated back to Yuan Dynasty, namely Ha Law Wan Archaeological Site, is located at the Scenic Hill. The site is worthy of preservation, thus any development or redevelopment on it should be avoided as far as possible. Prior consultation with the Antiquities and Monuments Office of the Leisure and Cultural Services Department is required for any development proposals which may affect this site and its immediate environs.

11. IMPLEMENTATION

11.1 Although existing uses non-conforming to the statutory zonings are tolerated, any material change of use and any other development/redevelopment must be always permitted in terms of the Plan or, if permission is required, in accordance with the permission granted by the Board. The Board has published a set of guidelines for the interpretation of existing use in the urban and new town areas. Any person who intends to claim an "existing use right" should refer to the guidelines and will need to provide sufficient evidence to support his claim. The enforcement of the zonings mainly rests with the Buildings Department, the Lands Department and the various licensing authorities.

Airport Island

11.2 The airport development was one of the ten Airport Core Programme projects. The main site preparation works for the airport began in 1992 and all site formation works were completed in June 1995.

11.3 In December 1995, the airport island was granted to Airport Authority Hong Kong for the development and operation of the airport. Under the land grant conditions, the Airport Authority Hong Kong was required to prepare the Airport Concept Plan and Master Layout Plans for specific building projects to the satisfaction of the Government.

11.4 The airport was commissioned on 6 July 1998 with a single runway, a passenger terminal complex, associated airport facilities and commercial developments. The second runway came into operation in August 1999. Additional elements of the airport will be built in phases to tie in with the growth in air traffic volume.

11.5 The strategic transport links comprising the NLH and the Airport Railway were components of the Airport Core Programme projects implemented by the Highways Department and the Mass Transit Railway Corporation Limited respectively.

11.6 On 17 March 2015, the Executive Council affirmed the need for the three-runway system for HKIA. The proposed three-runway system comprises the new third runway with associated taxiways, aprons and aircraft stands, a new passenger concourse building, expansion of the existing Terminal 2 building, related airside and landside works with associated ancillary and supporting facilities.

Hong Kong Boundary Crossing Facilities for Hong Kong-Zhuhai-Macao Bridge

11.7 On 7 January 2007, the Hong Kong-Zhuhai-Macao Bridge Task Force led by the National Development and Reform Commission with representatives from the Ministry of Transport, the Hong Kong and Macao Affairs Office, and the governments of the Hong Kong Special Administrative Region, Guangdong Province and the Macao Special Administrative Region recommended that the boundary crossing facilities of each government should be set up within their respective territories. The HZMB, with the HKBCF and ***Hong Kong Link Road***~~HKLR~~, will provide a land transport link between HKSAR and the Pearl River West and would contribute to the development of tourism, logistics, finance and trade in HKSAR. This would reinforce HKSAR's status as an international shipping and aviation centre, and promote the economic integration between HKSAR and the Pearl River West.

11.8 The projects of HKBCF, ***HZMB Hong Kong Link Road***~~HKLR~~ and TM-CLKL ~~are scheduled to~~ ***have*** commence***d*** the construction works~~ in~~ ***since*** 2011/2012~~ for completion in 2016/2017~~.

Planning Application

11.9 Planning applications to the Board will be assessed on individual merits. In general, the Board, in considering planning applications, will take into account all relevant planning considerations that may include the guidelines published by the Board. Guidelines published by the Board are available from the Board's website, the Secretariat of the Board and the Technical Services Division of the Planning Department. Application forms and Guidance Notes for planning applications can be downloaded from the Board's website and are available from the Secretariat of the Board, and the Technical Services Division and the relevant District Planning Office of the Planning

Department. Applications should be supported by such materials as the Board thinks appropriate to enable it to consider the applications.

TOWN PLANNING BOARD
~~OCTOBER~~*APRIL* 201~~4~~*5*

香港機場管理局 | AIRPORT AUTHORITY HONG KONG

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

Proposed Amendment to the Chek Lap Kok Outline Zoning Plan No. S/I-CLK/12

Planning Report

April 2015

AECOM

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1 BACKGROUND

1.1 Introduction

1.1.1 This Planning Report is prepared for the proposed amendments to the Chek Lap Kok Outline Zoning Plan (OZP) No. S/I-CLK/12 under Section 5 of Town Planning Ordinance (TPO) for the planned expansion of the Hong Kong International Airport (HKIA) into a Three-Runway System (3RS).

1.1.2 In March 2012, the Executive Council (ExCo) granted Airport Authority Hong Kong (AAHK) an 'in-principle' approval to adopt, for planning purposes, the 3RS as the future development direction for HKIA, and also approved AAHK's recommendation to proceed with the statutory Environmental Impact Assessment (EIA) process. AAHK formally submitted the 3RS EIA report under the EIA Ordinance (EIAO) to the Director of Environmental Protection (DEP) in April 2014. Following the approval of the EIA Report in November 2014, ExCo affirmed the need for the 3RS in March 2015. Amendments to the statutory OZP are needed to facilitate the timely implementation of the 3RS development.

1.2 Hong Kong International Airport (HKIA) – An Overview

1.2.1 Following the relocation of the HKIA from Kai Tak to Chek Lap Kok in July 1998, the new HKIA has witnessed significant growth rates of passengers, cargo and aircraft movements in recent decade. The passenger and cargo throughput reached 63.3 million and 4.38 million of tonnes in 2014 respectively. Connecting to about 180 destinations through over 1,100 daily flights operated by more than 100 airlines, HKIA has emerged as the world's busiest cargo gateway since 2010 and the fourth largest international passenger airport in 2012.

1.2.2 Not merely a piece of large transport infrastructure that provides inter-modal transfers, HKIA has been playing an important role in the local economy and generating huge social and economic values, in which in 2008 Hong Kong's aviation industry had contributed HKD$78 billion to the city's gross domestic product (GDP). It has also created over 65,000 direct jobs and provided enormous support to the city's pillar industries and six industries where Hong Kong enjoys clear advantages. Key figures of HKIA have been summarized in **Table 1.1**.

1.2.3 Leveraging on the prime location at the centre of Asia Pacific and the unique position as the gateway to mainland China, HKIA has strengthened its role as regional hub airport over the past decade, serving a more significant volume of transfer traffic of passengers and transshipment of cargo in addition to the origin-and-destination traffic. Its leading position has also been further enhanced by the progressive liberalization policy on Air Services Agreements (ASAs) adopted by the Government that expands HKIA's access to a wider network of worldwide

destinations. However, HKIA has been encountering challenges from other major airports in Pearl River Delta (PRD) region and Asia Pacific which already mapped out plans for infrastructural enhancement (incl. construction of new runways and terminals).

1.2.4 In response to the opportunities and challenges above, AAHK had published Master Plan 2030 (MP2030) and invested a total of about HKD$18 billion on upgrading HKIA's infrastructure since its opening in 1998 (see **Table 1.2**). Apart from Western Apron Expansion has completed by end-2014, Midfield Development Phase 1, accommodating 20 aircraft parking positions and a 105,000 sqm concourse, is anticipated to be completed by end-2015. Midfield Development Phase 2, Remaining Midfield and North Commercial District (NCD) development are currently under planning.

Table 1.1: Key Figures of HKIA

Total Site Area	1,255 ha
Runways	2 Runways (i.e. North and South Runways, with the length of 3,800m each)
Flight Handling Capacity	68 Air Traffic Movements (ATMs) per hour at peak hours
Connectivity	Over 100 airlines with about 180 destinations worldwide
Passenger Terminals	2 Terminals (i.e. Terminal 1 (T1) of about 570,000 sqm, and Terminal 2 (T2) of about 140,000 sqm)
Passenger Aprons	86 positions (incl. 59 frontal positions and 27 remote positions)
Cargo Terminals	4 (incl. Asia Airfreight Terminal (AAT), DHL Central Asia Hub (DHL), Hong Kong Air Cargo Terminals (HACTL) and Cathay Pacific Cargo Terminal (CPCT))
Cargo Aprons	41 positions
In-flight Catering Services	3 franchisees (incl. Cathay Pacific Catering Services (HK) Limited, LSG Lufthansa Service Hong Kong Limited and Gate Gourmet Hong Kong Limited, with a combined capacity of 158,000 meals per day)
Aircraft Maintenance Services	3 franchisees (incl. Hong Kong Aircraft Engineering Company Limited (HAECO), China Aircraft Services Limited (CASL) and Pan Asia Pacific Aviation Services Limited (PAPAS), operating 14 aircraft maintenance positions and 4 maintenance hangars)
Airport Workforce	Over 65,000

Table 1.2: Major Projects Undertaken in Recent Years

Completion Year	Major Project
2003	Provision of cross-boundary ferry service at SkyPier
2006	Enhancement to the airfield facilities for A380 operation
2007	Commencement of Terminal 2 (T2)
2008	Addition of 10 cargo positions and taxiways
2010	Completion of North Satellite Concourse
2011	Completion of Enhanced Baggage Handling System (BHS)
2011	Capacity and service enhancement to Terminal 1 (T1)

1.3 The Need for a Three-Runway System (3RS) – HKIA Master Plan 2030

1.3.1 Regardless of continuous upgrading of HKIA's infrastructure and facilities over the years, the existing Two-Runway System (2RS) will not be able to cope with soaring demand in the future, since the air traffic demand is forecast to reach 102 million passengers, 8.9 million tonnes of cargo and 607,000 Air Traffic Movements (ATMs) per year by 2030, which are much higher than those originally envisaged by the 1992 New Airport Master Plan at the time HKIA was designed. Despite all possible modes of runway operation, the practical maximum capacity of 2RS can only be increased to 68 ATMs per hour given the aircraft fleet mix, topographical constraints, complicated airspace management as well as the full compliance with International Civil Aviation Organization (ICAO)'s safety and minimum separation requirements. The latest air traffic statistics show that the handling capacity of the 2RS would likely reach its maximum practical capacity in 2016 or 2017, a few years earlier than the projection made in Master Plan 2030 (MP2030) published in 2011. This would pose great constraints to the competitiveness of HKIA as a leading regional aviation hub as well as undermining the economic and social benefits brought to the city.

1.3.2 In view of the challenges mentioned above, AAHK had suggested in their MP2030 to expand HKIA into 3RS on top of the option to maintain the airport's 2RS with infrastructural enhancement. With the construction of the Third Runway, associated taxiways, airfield facilities, passenger concourse and aprons, as well as other facilities for operation, such as Automated People Mover (APM) and Baggage Handling System (BHS), the 3RS option could support a practical maximum capacity of 102 ATMs per hour, which could be translated into about 620,000 ATMs per year. It could be further increased subject to aircraft technology enhancements, and improvement in air traffic control (ATC) technology and airspace management.

1.3.3 With regard to the tentative programme of the 3RS, the construction of the 3RS project is targeted to commence tentatively in 2016 for completion tentatively in 2023.

1.4 Public Consultation

1.4.1 HKIA is one of the most important infrastructures in Hong Kong. It connects the people of Hong Kong and its businesses with the rest of the world and plays a key role in supporting and driving the city's economic growth and development.

1.4.2 Following the preparation of MP2030 in 2008, AAHK reached out to a wide spectrum of stakeholders to seek their views and explain the Airport's development plans.

1.4.3 A survey was conducted in 2011 independently by the Social Sciences Research Centre (SSRC) of the University of Hong Kong (HKU) to gauge the public's views about their preferred option for airport expansion which included two options for the long-term development of HKIA. These options were to maintain the airport's two-runway system, or to develop HKIA into a 3RS. A total of 24,242 questionnaires were received online, by mail, and from collection boxes located at HKIA and the roving exhibitions that were held during the three-month public consultation. The views were then studied by the SSRC. The survey result revealed that nearly 80% of the respondents agreed or strongly agreed that AAHK should make a decision urgently on HKIA's future expansion plans, and 73% of respondents preferred the three-runway option. The extract of report is provided in **Appendix A**, whereas the full report can be accessed through 3RS website[1].

1.4.4 From late 2008 to late 2014, AAHK organized and took part in more than 1,100 engagement activities such as public forums, roundtable meetings, workshops, airport visits, briefings, exhibitions and seminars with a variety of stakeholder groups including green groups, media, students, residents, professional bodies, business/industry associations, business partners, consultative bodies, fishermen groups, think tanks, academia and opinion leaders.

1.4.5 Among the various engagement initiatives, AAHK also set up four Technical Briefing Groups to collect the professional views from experts and academia with technical expertise in specific environmental aspects (i.e. air quality, noise, marine ecology and fisheries, as well as Chinese White Dolphins (CWDs)); and five Community Liaison Groups in HKIA's neighbouring districts (i.e. Islands, Kwai Tsing, Shatin, Tsuen Wan and Tuen Mun) in order to exchange views with District Councilors and the community leaders on the 3RS development.

[1] http://www.threerunwaysystem.com/en/Information/Publications.aspx

1.4.6 During the EIA public inspection period, AAHK also organized briefings for business partners and media, roving exhibition, as well as two sessions of public forums to update the public on the findings of the EIA and the initiatives to mitigate the potential impacts of the 3RS.

2 SITE CONTEXT

2.1 Site History and Surrounding Context

2.1.1 The 3RS project is proposed to be developed to the north of the existing Airport Island and to the south of Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP). The site is currently part of Hong Kong western waters with its southern tip adjoining to the existing HKIA North Runway, and subject to land formation by future reclamation. The boundary of proposed reclamation area of about 650 ha is shown in **Figure 2.1**.

2.1.2 The Subject Site was historically part of open waters off the northern shore of Lantau Island, but part of the site area was utilized by the Government as Contaminated Mud Pits (CMPs) for disposal of contaminated sediments since early 1990s. Although the CMPs are still in use, the pits within the site boundary had been already filled up and are no longer active. Besides, within the site boundary there is a section of existing submarine aviation fuel pipelines maintaining continuous fuel supply to HKIA, and the existing 11kV submarine power cables providing continuous power supply to the facilities at Sha Chau by China Light and Power Company (CLP) aligned adjacent to the fuel pipelines.

2.1.3 The site is adjacent to Tung Chung New Town, a well-established community currently home to about 78,000 residents. An on-going study is being carried out by other project proponent for the expansion of Tung Chung New Town with total extension area of about 235 ha (incl. about 120 ha of reclamation in Tung Chung East) and reclamation of about 9 ha would also be required for a section of the proposed Road P1 from Tung Chung to Tai Ho Interchange. The site is within the proximity of the potential reclamation area at Siu Ho Wan and Sunny Bay as identified by the Enhancing Land Supply Strategy in 2012. The former has potentials for the development of Lantau Logistics Park (LLP) and associated facilities, while the latter could be developed as a regional tourism, entertainment and commercial hub.

2.1.4 As an extension part of the Airport Island, the Subject Site is connected to the urban area by the existing North Lantau Highway/ Lantau Link and Airport Express Line. To the east of the site is the Hong Kong Boundary Crossing Facilities (HKBCF) (under construction), an artificial island of about 130 ha which serves as a strategic transport hub for cargo and passenger clearance and transfer between cross-boundary and local traffic, given its direct connection to the Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Link Road to the south/ southwest of the site and Tuen Mun-Chek Lap Kok Link (TM-CLKL) to the

northeast of the site. There will be local roads linking up the Airport Island with the HKBCF, a gateway to western PRD via HZMB, and northwest New Territories and eastern PRD via TM-CLKL and Hong Kong-Shenzhen Western Corridor.

2.2 Statutory Planning Context

2.2.1 Although the Subject Site is not covered by any statutory plan, it borders on the northern edge of existing Chek Lap Kok OZP No. S/I-CLK/12. Amendments to the OZP are necessary to accommodate the 3RS development.

3 AIRPORT LAYOUT PLAN

3.1 Runway Alignment/ Airport Layout Options

3.1.1 In determining and formulating the recommended Third Runway alignment and airport layout for the 3RS option as suggested in the MP2030, AAHK went through a comprehensive evaluation and selection process. Taking into consideration a combination of factors including operational safety, ATC and airspace management issues, capacity gain potential and environmental issues, a total of 16 options for the Third Runway alignment, which fell into three groups as illustrated below, were sorted out.

- **Third Runway near-perpendicular to the existing runways** – It could only be used for northbound departures and in certain wind conditions, posing restrictions on the optimal runway capacity.
- **Third Runway aligned at an angle to the existing runways** – It would create conflicts with air traffic procedures between the Third Runway and the existing runways, resulting in dependent operations and little/ no increase in overall runway capacity.
- **Third Runway parallel to the existing runways** – It would allow independent operations of all three runways given adequate runway separation.

3.1.2 Eliminating all non-parallel alignment options considering the terrain and operational constraints, three parallel alignment options were shortlisted as summarized below.

- **Far-spaced alignment** – Situated far north of the Airport Island, the alignment could avoid overlapping with the CMPs but is relatively close to the existing SCLKCMP.
- **Normal-spaced alignment** – Located halfway between the existing North Runway and SCLKCMP, the alignment would overlap part of the CMPs.
- **Close-spaced alignment** – To the immediate north of the existing North Runway, the alignment would greatly avoid overlapping with CMPs but is nearest to more sensitive marine ecology along the north Lantau shore.

3.1.3 The above three options were subsequently taken forward for the preparation of 18 airport layout options which cover the overall arrangement of the passenger terminals, concourses, aprons and related supporting facilities in addition to the alignment of all three runways. Taking into account the major criteria including airfield efficiency, passenger convenience, cargo operations efficiency, surface

access and environmental impacts, the preferred layout for the 3RS development was selected among four shortlisted layout options.

3.1.4 The preferred option adopted the normal-spaced alignment for the Third Runway, with new passenger concourse and aprons sandwiched between the New North Runway and the New Centre Runway. Instead of being fully parallel to the existing two runways, the New North Runway would stagger westward with respect to the threshold position of the New Centre Runway, avoiding an unacceptable climb gradient for missed approach and departure of eastbound flights.

3.2 3RS Development – Proposed Layout Plan

3.2.1 The proposed Airport Layout Plan primarily consists of the Third Runway with associated taxiways, aprons and a new passenger terminal and concourse building. **Figure 2.1** shows an overall layout plan for the 3RS development with the key components, while details are elaborated below:

3.2.2 **Land formation** – Based on the preferred option as described in previous part, land formation of about 650 ha is required to the north of the existing Airport Island by reclamation, in order to provide a platform for the future 3RS development. Part of the reclaimed land would be formed above the CMPs, while the existing seawall at the northern, western and eastern sides of the North Runway would be modified and incorporated into the new reclamation area.

3.2.3 **Third Runway and associated airfield facilities** – It involves the construction of a 3,800m long Third Runway with its alignment parallel to the existing two runways. This supports the running of the optimal 3RS operation mode, i.e. New North Runway dedicated for arrivals; New Centre Runway dedicated for departure; and Existing South Runway for both arrivals and departures. It also includes the construction of a dual parallel taxiway system, associated airfield infrastructure, aircraft navigational aids, approach lighting systems and new HKIA Approach Area beacons.

3.2.4 **Third Runway Concourse (TRC) and Aprons** – In line with MP2030 recommendations, the 3RS project will provide additional capacity for 30 million passengers per annum (mppa) by the planning year of 2023, with provisions for expansion to cater for further approximately 20 mppa, i.e. 50 mppa, if and when necessary. It involves the construction of TRC that accommodates 57 parking positions. TRC will comprise several levels and mainly include departure/ arrivals/ transfer areas and other airport operational facilities. TRC will also accommodate APM stations, tunnels, associated maintenance/ stabling areas, and BHS facilities and tunnels. It would connect to the main ATC Tower at southern TRC Apron with link bridges.

3.2.5 **Eastern Support Area (ESA)** – Located to immediate east to the TRC, ESA is mainly home to the ground service equipment (GSE) and other supporting facilities, flight catering facilities, Government facilities and other utilities. It also accommodates the underground APM and BHS facilities, and their associated above-ground facilities (e.g. ventilation buildings and early bag store).

3.2.6 **Western Support Area (WSA)** – Situated to the immediate west to the TRC, WSA mainly accommodates maintenance and servicing facilities to support the operational needs of the 3RS development. These mainly include aircraft maintenance facilities (e.g. maintenance hangars and aprons, engine run-up facilities, and aircraft recovery equipment facilities), GSE and other supporting facilities, air cargo staging area, Government facilities as well as supporting utilities.

3.2.7 **Other Ancillary/ Supporting Facilities required for the Operation, Safety and Security of the Airport** – Apart from the above major airport facilities, there are other ancillary facilities required for the operation, safety and security of the Airport, for example, APM system and associated infrastructures, an APM depot (about 3.5 ha), Airfield Ground Lighting (AGL) vault, Aircraft Maintenance facilities, Aviation Fuel System, Ground Support Equipment and Vehicles Storage facilities, Aircraft Washing facilities, Antenna Farms, Communication Equipment and Masts, BHS and associated facilities, Passenger Baggage Trolley Recirculation facilities, Security Gatehouses, Security Screening facilities, associated operational ancillary facilities, etc.

3.3 T2 Expansion

3.3.1 In order to complement the future 3RS development, the existing T2, which accommodates a departure terminal, coach station and various other airport operational facilities, will be modified and reconfigured into a full service terminal serving the arrivals, departures and transfer passengers, which will be functionally different to the existing T2. This main terminal building will be home to departures, arrivals, immigration and security areas with baggage reclaim facility and other airport operational facilities/ utilities. To streamline the passenger and baggage flow between the terminal and boarding area, APM and BHS facilities are located at T2 basement level. As such, passengers can make use of the APM Interchange Station (AIS) at T2 which serve as the transfer hub between T1, T2, TRC and SkyPier, while their baggage will be delivered from and to the apron area through the expanded and enhanced BHS system.

3.3.2 In addition to the main T2 building, the project will also include two new annex buildings which consist of landside supporting facilities/ utilities including carparks, coach staging, limousine lounge and loading/unloading areas.

3.4 Proposed Amendments to the OZP

3.4.1 Amendments to the OZP are necessary to incorporate the proposed reclamation area (about 650 ha) by extending the existing zoning boundary. Appropriate land use zonings are to be designated to reflect the proposed uses/ facilities of 3RS development on the OZP.

4 TECHNICAL ASSESSMENTS

4.1 General

4.1.1 Environmental Impact Assessment (EIA), Traffic Impact Assessment (TIA) and Scheme designs including various technical analyses have been carried out for the expansion of Hong Kong International Airport into a Three-Runway System. The following paragraphs provide the key summaries of the relevant EIA and TIA completed in view of the planning concerns.

4.2 Summary of Environmental Impact Assessment (EIA)

4.2.1 To support the application for an Environmental Permit (EP), an EIA study was conducted in accordance with the requirements of the EIAO. The EIA identified and assessed the potential environmental impacts that may arise from the construction and operation of the 3RS project in a comprehensive and scientifically robust manner, according to EIA Study Brief and relevant requirements of the EIAO - Technical Memorandum (EIAO-TM). The Full Report and Executive Summary could be accessed via EPD's website[2].

4.2.2 Based on the preliminary engineering and environmental assessments undertaken during the preparation of MP2030 and the further EIA Study, AAHK identified a series of impact avoidance, minimization and mitigation measures which are committed to be integrated into the project in order to minimize the potential environmental impacts.

Air Quality

4.2.3 The potential air quality impact is mainly associated with dust emission during construction phase of the 3RS project. With the adoption of mitigation measures stipulated in Air Pollution Control (Construction Dust) Regulation and relevant EPD's Guidance Notes as well as good site practices, no adverse residual Total Suspended Particulates (TSP), Respirable Suspended Particulates (RSP) or Fine Suspended Particulates (FSP) impacts are anticipated at any Air Sensitive Receivers (ASRs) during the construction phase. Besides, no adverse residual dust impacts due to cement transfer or storage are anticipated.

4.2.4 During operation phase, the possible air emission sources include emissions from aircraft landing and take-off, the use of auxiliary power unit (APU) during aircraft ground operation and other maintenance and servicing activities. The model results for Year 2031 3RS scenario indicate that cumulative nitrogen dioxide (NO_2), RSP, FSP, sulphur dioxide (SO_2) and carbon monoxide (CO) levels comply with the relevant Air Quality Objectives (AQOs) at all ASRs. It

[2] http://www.epd.gov.hk/eia/register/report/eiareport/eia_2232014/html/index.htm

should be noted that AAHK had already been implementing a number of initiatives which aim at reducing air emission arising from airport operations (e.g. banning of all idling vehicles engines on airside since 2008 and banning of the use of APU for all aircraft at frontal positions since end-2014).

4.2.5 No adverse residual impact is foreseen during the construction and operation stage.

Noise

4.2.6 The potential sources of noise impact include aircraft noise, fixed noise sources, construction noise and traffic noise. Regarding aircraft noise, with the proposed mitigation measures (e.g. Existing South Runway will remain 'standby' where possible at night between 23:00 and 07:00), noise impact level would be acceptable for most of the noise sensitive receivers (NSRs). With the recommended avoidance and mitigation measures in place, the cumulative noise levels arising from fixed noise sources during operation phase (including the aircraft operation on ground level, APM, BHS and ventilation systems) would comply with the relevant daytime/ evening and night-time criteria at all representative NSRs.

4.2.7 With the implementation of the proposed mitigation measures in the form of quiet plant and the use of movable noise barriers/ enclosures and fabric, the construction noise levels at all representative NSRs are predicted to comply with the noise standards stipulated in the EIAO-TM. No adverse noise impact due to road and marine traffic is expected as all representative NSRs are beyond the Assessment Area.

4.2.8 As such, no adverse residual impact is foreseen during construction and operation stage.

Water Quality

4.2.9 The potential key sources of water quality impact during construction phase include land formation works, modification of existing northern seawall, diversion of submarine aviation fuel pipelines and 11kV submarine cable, and other relevant construction activities. With the adoption of non-dredge methods for land formation, horizontal directional drilling (HDD) method for submarine fuel pipelines, and deep cement mixing (DCM) method for ground improvement at the CMPs, together with the implementation of good site practices, the possible water quality impacts would be substantially reduced. Regardless of cumulative exceedance predicted at a few water sensitive receivers (WSRs) mainly due to conservative assumptions for the concurrent projects rather than owing to 3RS project, no adverse residual water quality impacts are anticipated during construction stage.

4.2.10 During the operation stage, the changes in hydrodynamics as a result of permanent new landform, embayment of water at the western end of HKIA, sewage and stormwater discharge and reuse of treated greywater constitute the major sources of water quality impacts. Despite minor exceedances in suspended solids (SS), total inorganic nitrogen (TIN) and unionized ammonia (NH_3) predicted at some WSRs, they were assessed as not attributable to the implementation of the project, but due to the high background levels. Together with appropriate design and precautionary measures, it would not lead to adverse changes on hydrodynamics and water quality in the study area.

Marine Ecology

4.2.11 The potential marine ecological impact arising from construction and operation phase has been assessed, with an emphasis on the impacts upon CWDs. The proposed land formation will result in direct loss of 672 ha of seabed (incl. 650 ha of open waters for marine fishes, CWDs and associated marine benthos). The land formation and impacts from SkyPier high-speed ferries (HSFs) traffic would contribute to the loss of CWD habitat, reducing the size of CWD travelling areas between the east and the west of the Airport whilst paving way to habitat fragmentation and carrying capacity reduction. With the implementation of mitigation/ protection measures including establishing a new marine park of about 2,400 ha connecting to the planned Brothers Marine Park (BMP) and existing SCLKCMP, setting up dolphin exclusion zones during ground improvement works, water jetting works and other related constructions, the proposed diversion of SkyPier HSFs travelling to/ from Zhuhai and Macau to the north of SCLKCMP and restricting their speed to 15 knots across areas with high CWD abundance, the residual impacts associated with the CWDs would be considered to be acceptable. There will also be no significant residual impacts associated with the other marine ecology resources.

Fisheries

4.2.12 The proposed land formation associated with the project will lead to a temporary loss of approximately 1,392 ha of fishing ground during construction phase and a permanent loss of approximately 768 ha of fishing ground during operation phase.

4.2.13 The loss of fisheries habitats is deemed to be of moderate impact. The proposed new marine park would compensate for the loss of fisheries habitat (and resources)/ fishing ground by improving the ecological connectivity between the existing SCLKCMP, the planned BMP, the Pearl River CWD Nature Reserve and the existing/ future HKIA Approach Areas. With the implementation of the proposed new marine park, conservation of fisheries resources within the proposed new marine park and adjacent waters would be promoted, and there would be a positive synergistic effect on fisheries resources conservation. Therefore, no adverse residual impact on loss of fisheries habitats (and

resources) is anticipated after the establishment of the proposed new marine park.

Terrestrial Ecology

4.2.14 Key terrestrial ecological sensitive receivers within the study area or the areas that may potentially be affected by the 3RS project was identified, including Tai Ho Stream Site of Special Scientific Interest (SSSI), San Tau Beach SSSI, and Lung Kwu Chau, Tree Island and Sha Chau SSSI. The field survey findings show that the proposed land formation area is not an important habitat for waterbirds and landbirds including ardeid community, while the flight movement adjacent to the Airport island is not prominent for all identified bird species. The loss of about 650 ha of open waters due to 3RS development is foreseen to cause no direct loss of terrestrial habitat and low impact on the foraging ground. It is concluded that the identified impacts on the terrestrial habitats, flora and fauna species in North Lantau (including Airport island) would be low or negligible in general during both construction and operation phase, except for the potential moderate impacts on Sha Chau egretry due to the fuel pipeline installation works during construction stage. With the recommended mitigation measures including locating the HDD daylighting away from Sha Chau egretry, and avoiding construction activities at Sheung Sha Chau Island during nighttime and ardeid breeding season, the potential impacts on terrestrial ecology would be minimized to low.

Sewerage and Sewage Treatment

4.2.15 The sewerage system for 3RS project will be designed, operated and maintained by AAHK in accordance with all relevant standards and guidelines published by Drainage Services Department (DSD). Apart from continuing the odour control arrangements, AAHK would monitor the hydrogen sulphide (H_2S) level and adopt active septicity management measures that can effectively contain any future septicity problems in the design for 3RS sewerage system. No adverse impacts in terms of septicity and odour from the new sewerage system are anticipated.

4.2.16 As the existing gravity sewers from the Airport discharge manhole to Tung Chung Sewage Pumping Station (TCSPS) will reach full capacity by 2027, the construction of a new gravity sewer with a diameter of 1,200mm adjacent to the existing one is proposed. AAHK will monitor, implement and complete the gravity sewer upgrading works. Moreover, EPD will monitor the sewage flow and coordinate the necessary upgrading works for the Siu Ho Wan Sewage Treatment Works (SHWSTW) when needed, and will reserve capacity at the TCSPS for the total sewage discharge from the expanded Airport, while DSD will upgrade the rising main between TCSPS and SHWSTW for conveying the planned sewage flow from Tung Chung and the Airport. Based on the mentioned measures, no adverse residual impacts would be anticipated.

Waste Management

4.2.17 Inert construction and demolition (C&D) materials of about 9,543,500m^3, non-inert C&D materials of about 96,200m^3, marine sediment of about 777,860m^3, and small amount of chemical waste, general and floating refuse are expected during the construction phase of 3RS project. The possible mitigation measures include adopting non-dredge methods for ground improvement, maximizing the use of on-site reuse of inert C&D materials and suitable fill materials available from other concurrent projects and the Government's Public Fill Reception Facilities, and minimizing the extent of excavation. Together with good site practices, employment of a reputable licensed waste collector, and careful handling of chemical wastes, no adverse residual impacts would be foreseen.

4.2.18 General refuse of about 46,190 tons/year arising from the airport operation, chemical waste from maintenance works, floating refuse and dewatered sludge from the proposed greywater treatment plant are anticipated during operation stage. Apart from recycling of waste materials and properly designed artificial seawall, employment of reputable licensed waste collector and regular cleaning of floating refuse accumulated on the seawall would be carried out. As such, no adverse residual impacts arising from waste management would be expected.

Hazard to Human Life

4.2.19 The potential risks during 3RS construction phase are associated with the construction works near existing aviation fuel pipeline and storage facilities. As the societal risk level is anticipated to be within the acceptable region, mitigation measure is not necessary. However, in order to achieve best practice, precaution measures are recommended, including evacuation order of barges during typhoons, establishment of an appropriate marine traffic management system and clear identification of all existing hydrant networks prior to any construction works.

4.2.20 The total societal risk during operation phase is mainly associated with operation of aviation fuel hydrant pit valves, and it was assessed to be within as low as reasonably practicable (ALARP) region and would not exceed the Hong Kong Risk Guidelines. In order to further reduce the risk level, mitigation measures including implementation of precautionary measures for marine traffic management, clear working instructions on avoidance of existing hydrant networks/ pipeline locations and improvement audits for reinforcing the existing refueling practices are proposed. As such, the risk is considered to be within the ALARP region and complies with the Hong Kong Risk Guidelines.

Health Impacts

4.2.21 The potential health impacts in relation to air emissions and aircraft noise during operation phase were assessed. The findings revealed that toxic air pollutants (TAP) concentrations due to 3RS operation would comply with respective risk criteria. Besides, the short-term concentrations of CO, NO_2 and SO_2 comply with the AQO in the assessment areas. Therefore the short-term health risk associated with short-term exposure to the concerned air pollutants is considered acceptable. In view of insignificant incremental change of annual concentrations for NO_2, RSP, FSP and SO_2 arising from the operation of 3RS, as well as relatively small long-term mortality risk associated with long-term exposure to FSP, the long-term health impacts in relation to long-term exposure to the concerned air pollutants is also considered acceptable.

Comparing the changes of health impacts between the operation of 3RS and 2RS in 2030, which is the expected year with the maximum total aircraft noise emission, it was concluded that under the 3RS mode, there would be a reduction in the population who are subject to potential annoyance and self-reported sleep disturbance in the assessment area, while cognitive effects on the school children in Siu Lam is not apparent. The overall health impact associated with aircraft noise in the assessment area is minimal.

Land Contamination

4.2.22 In accordance with the land contamination assessment of the past/ present land uses within or in the vicinity of the project area, the potential contaminative areas have been identified, including golf course area, T2 expansion area, and existing airside facilities. For the golf course area, artificial chemical fertilizers and pesticides are not allowed to be used according to the EP issued for the golf course. It is anticipated that upon the return of golf course area to AAHK, there are no land contamination issues or would be satisfactorily cleaned up if necessary. The demolition of fuel tanks and emergency power generation units within T2 building, as well as relocation of airside petrol filling station and fuel tank room would be carried out according to a sampling and testing plan. Prior to the construction works at the above areas, a Contamination Assessment Report will be prepared and submitted to EPD. Therefore no unacceptable impact due to land contamination is anticipated.

Landscape and Visual Impacts

4.2.23 Within the landscape and visual impact assessment study area, a total of 19 landscape resources (LRs), 11 landscape character areas (LCAs) and 79 representative visual sensitive receivers (VSRs) were identified that may be affected by the 3RS. With the implementation of mitigation measures including minimizing construction works areas, construction periods, construction plants

and construction-related marine/ road traffic, separating the construction works into phases, providing screen hoarding and transplanting affected trees, all LRs, LCAs and VSRs are expected to experience moderate to slight/ insignificant, or even no residual landscape and visual impacts, except for passengers/ drivers of recreational marine craft in North Lantau waters and Urmston Road and recreational users of Sha Chau islands during the construction phase.

4.2.24 With sensitive and aesthetic design of building, structure facades, streetscape and lighting, slight or even no residual impacts on all LRs and LCAs are expected except the substantial residual impacts due to permanent loss of about 650 ha of coastal waters. However, this permanent loss is the absolute minimum necessary for the 3RS development, and there remains a much larger area of coastal waters of North Lantau landscape. Similar findings apply to all VSRs, except for the passengers/ drivers of recreational marine craft in North Lantau waters and Urmston Road and recreational users of Sha Chau islands who may experience moderate residual impacts. In accordance with the relevant criteria and guidelines for evaluating and assessing impacts, it is considered that the overall residual landscape and visual impacts of the 3RS project are marginally acceptable with mitigation measures.

Cultural Heritage

4.2.25 Based on the findings of marine archaeological investigation (MAI), it was concluded that there are no resources of marine archaeological value located within the MAI study area. For the terrestrial cultural heritage impact assessment, it was found that there will be no impacts on the identified sites of archaeological interest within the site boundary. Besides, no direct impacts were anticipated as there are no built heritage resources situated within the project boundary. As such, no adverse impacts on cultural heritage are expected during the construction and operation stage of 3RS project.

Conclusion

4.2.26 The EIA Study concludes that the project would be environmentally acceptable and in compliance with the relevant environmental legislation and standards. With the implementation of the recommended environmental impact avoidance, minimization and mitigation measures, no unacceptable adverse residual impacts are anticipated.

4.3 Summary of Traffic Impact Assessment (TIA)

4.3.1 Under the EIA Study, a Traffic Impact Assessment (TIA) was carried out in order to assess and evaluate the possible traffic impacts of 3RS project. The TIA Study adopted a two-tier modeling approach. The CTS-compatible Transport Model (TM) was applied for the traffic forecast at a strategic level, while Local Area Traffic Model (LATM) was used for traffic forecast at a district level. The area of influence in the Study was defined by 5km catchment area of HKIA, covering part of North Lantau and Tuen Mun South.

4.3.2 The 2009-based Territorial Population and Employment Data Matrices (TPEDM) were incorporated into the transport model as the major planning data input. Other development assumptions including Airport developments (e.g. air passengers and cargo forecast) and major North Lantau developments (e.g. Tung Chung New Town, public housing developments in Tung Chung Areas 39 and 56, and Lantau Logistics Park) were also taken into account when formulating the transport model.

4.3.3 The transport model forecast was carried out for year 2026 and year 2031 assessing both 2RS and 3RS scenarios. The forecast results showed that all major roads will operate within the practical capacity in year 2026 under both scenarios. For year 2031 under 2RS and 3RS scenarios, the major roads will still operate within practical capacity. However, in the case of 2RS, Lantau Link will perform at practical capacity and still be under the manageable level of congestion. In the 3RS scenario, Lantau Link will experience slightly over the manageable degree of congestion and the traffic conditions will still be tolerable. The forecast is consistent with the findings of previous studies, which state that additional strategic road link is required to cater for the traffic demand arising from North Lantau developments in long run.

4.3.4 Under the scenario of 3RS in year 2031, the sensitivity test indicated that the operation of North Lantau Highway will still be under the manageable degree of congestion even without Transport Department's proposed Lantau Road P1 linked between Tung Chung and Sunny Bay. As a summary, the TIA Study revealed that all major roads will operate within the practical capacity, which is acceptable from the traffic point of view. For the upcoming changes due to different developments and projects, such as Tung Chung Remaining Development, AAHK will study the traffic impact assessment reports from these project proponents and review the potential traffic impacts to Airport Island due to these developments. AAHK will closely liaise with the project proponents of these projects to provide them the relevant traffic data required for their relevant traffic impacts.

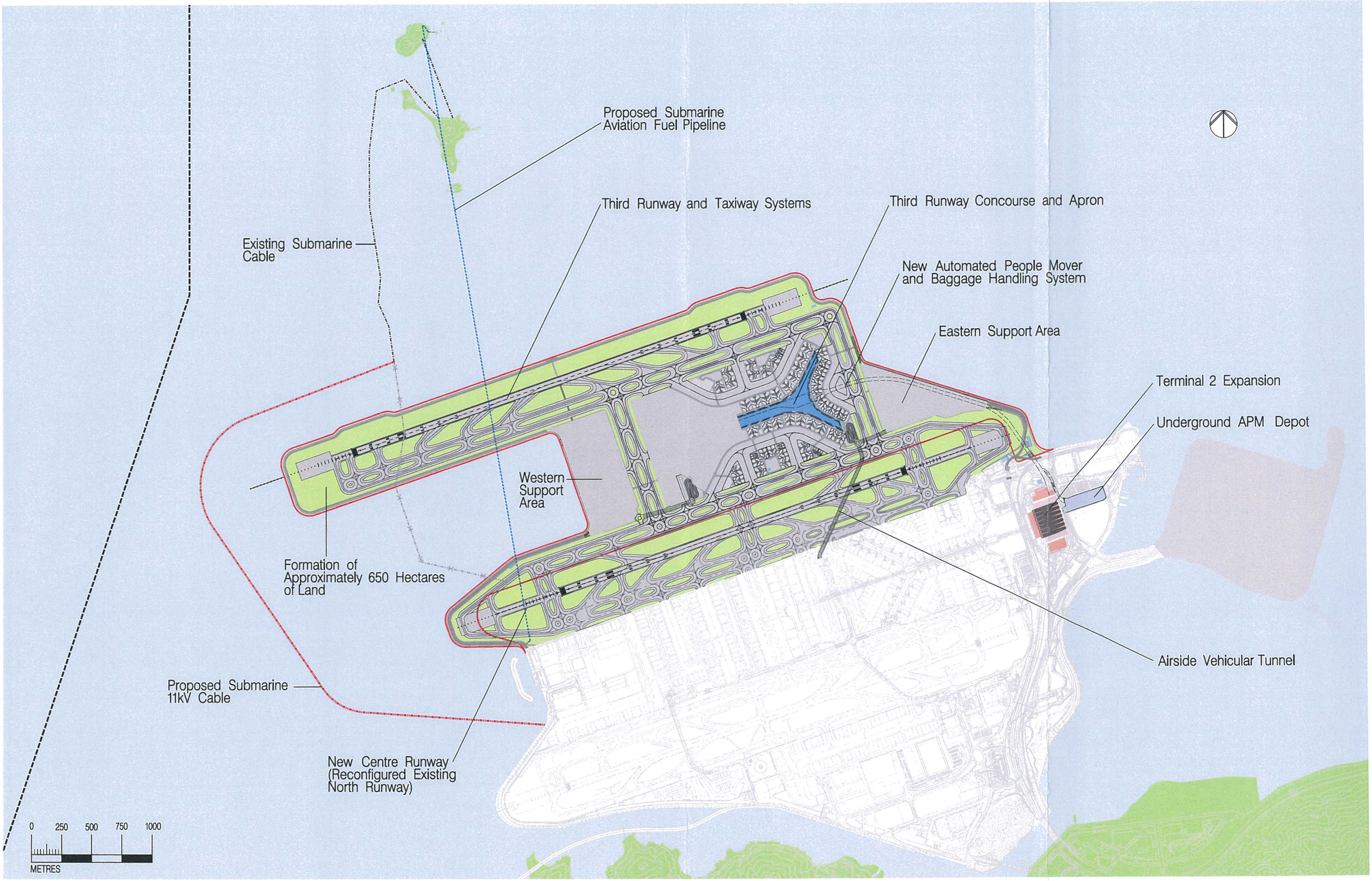
5 CONCLUSION

5.1 This Planning Report is prepared for the proposed amendments to the OZP for the planned expansion of HKIA into a 3RS. It aims to provide the background information, layout plan and major uses of 3RS development.

5.2 The Subject Site, which is currently part of Hong Kong western waters with its southern tip adjoining to the existing HKIA North Runway, is subject to land formation by future reclamation of about 650 ha. The 3RS development will include the Third Runway with associated taxiways, aprons and a new passenger terminal and concourse building, together with two supporting areas. The existing T2 will be modified and reconfigured into a full service terminal so as to meet the future needs. Minor adjustment to the proposed layout may be required during the detailed design and construction stage.

5.3 Technical assessments were carried out to assess and evaluate the possible impacts of 3RS project. The EIA Study concludes that the project would be environmentally acceptable. With the recommended environmental impact avoidance, minimization and mitigation measures, no unacceptable adverse residual impacts are anticipated. Based on the TIA result, it is concluded that under 3RS development all major roads in the Study Area will operate within the practical capacity, which is acceptable from the traffic viewpoint.

5.4 Amendments to the OZP are necessary to incorporate the proposed reclamation area, as well as the land use zonings to reflect the proposed uses/ facilities.



香港國際機場 HONG KONG INTERNATIONAL AIRPORT	Title: Overall Layout Plan for 3RS Development	Fig. Figure 2.1 Date Feb 2015

Appendix A

Extract of the
Independent Compilation of Views and Reporting for
HKIA Master Plan 2030
Public Consultation Exercise

(For Full Report, please refer to the website:
http://www.threerunwaysystem.com/en/Information/Publications.aspx)

REPORT

SUBMITTED TO

AIRPORT AUTHORITY HONG KONG

Independent Compilation of Views and Reporting for

HKIA Master Plan 2030

Public Consultation Exercise

Social Sciences Research Centre

The University of Hong Kong

23 December 2011

Executive Summary

Introduction

1.1 The Master Plan 2030 ("MP2030") is a 20-year development plan for the Hong Kong International Airport ("HKIA"). It outlines the airport facility expansions and capacity enhancements required to meet long-term air traffic demand, which are critical to maintaining Hong Kong's status as an aviation hub and sustaining the city's future competitiveness and economic growth. MP2030 presents two airport development options: (1) maintaining the existing two-runway system; or (2) expanding into a three–runway system.

1.2 The Public Consultation Exercise ("PCE") lasted for three months from 3rd June 2011 to 2nd September 2011. The Social Sciences Research Centre of The University of Hong Kong ("SSRC"), an independent analysis and reporting consultant with strong experience in research and public surveys has been appointed to collect, compile, analyse and report views of various stakeholder groups, including those of the general public, expressed during the PCE.

Research Team

1.3 The team is led by Professor John Bacon-Shone with assistance from Ms. Linda Cho, processing and analysis by Mr. Kelvin Ng, Mr. Thomas Lo, Mr. Dicky Yip, Ms. Hung Fong Fong and Ms. Lee Hiu Ling and logistics support from all the staff of the Social Sciences Research Centre.

The Public Consultation Exercise

1.4 The PCE started on 3rd June 2011 and finished on 2nd September 2011, with all feedback collected before the closing date included in the analysis. The Airport Authority Hong Kong ("AAHK") and/or third parties organized a large number of events, seminars, briefings, forums, three roving exhibitions at HKCEC between 3rd and 12th June, at CityWalk between 16th and 24th June and at InnoCentre between 27th June and 10th July respectively, and two exhibitions at Terminal 1 of HKIA between 19th July and 2nd September and at Terminal 2 of HKIA from 9th June respectively.

Types of Feedback Received

1.5 The SSRC assisted AAHK in designing a bilingual feedback questionnaire for wide distribution in the community (Please refer to **Annex J**: Feedback Questionnaire). It was designed to be simple enough to be understood by anyone with secondary education. The feedback questionnaire was also made available online to facilitate widespread use. In addition, feedback from the public was also received through written submissions, signature campaigns, on-line forums and electronic and printed media. Lastly, the SSRC was invited to attend 56 events out of the 194 events related to MP2030 during the PCE and those events were recorded and summarized by the SSRC as an important source of feedback during the PCE by stakeholders. The 56 events included 3 public fora, 18 District Council meetings, 2 meetings of the Panel on Economic Development of the Legislative Council and 33 conferences/round tables/seminars/briefings.

Analysis of Feedback

1.6 The feedback provided using the feedback questionnaire (other than open-ended comments) received and processed was analyzed using quantitative methods and the results can be found in Chapter 3. All other feedback was analyzed using qualitative methods and the framework can be found in Chapter 5 (Please refer to **Annex K**: Public View Analytical Framework).

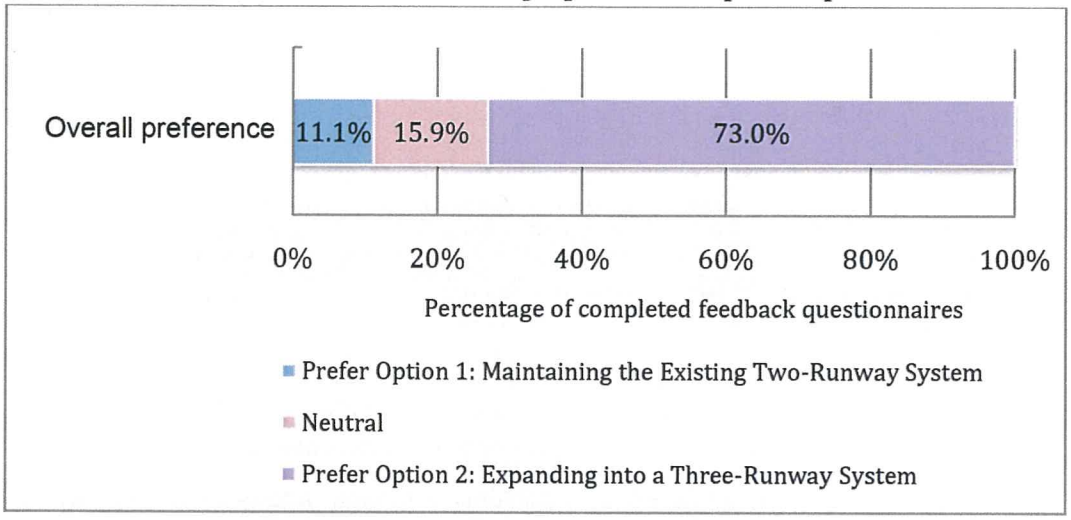
Quantitative Feedback Summary

1.7 A total of 24,242 feedback questionnaires received during the consultation were analysed in the main text of the report, while 5,640 feedback questionnaires received from collection boxes located in HKIA with living district missing were analysed in **Annex A**.

1.8 In the consultation, two proposed development options were presented for the respondents to indicate which one they preferred after the given considerations for investment in expanding HKIA's capacity. Option 1 is to maintain the airport's two-runway system and Option 2 is to expand into a three-runway

system. About three quarters of respondents (73.0%) preferred Option 2 overall, while about 10% of them (11.1%) preferred Option 1 overall (Figure 1.1).

Figure 1.1: Overall preference for the two proposed development options



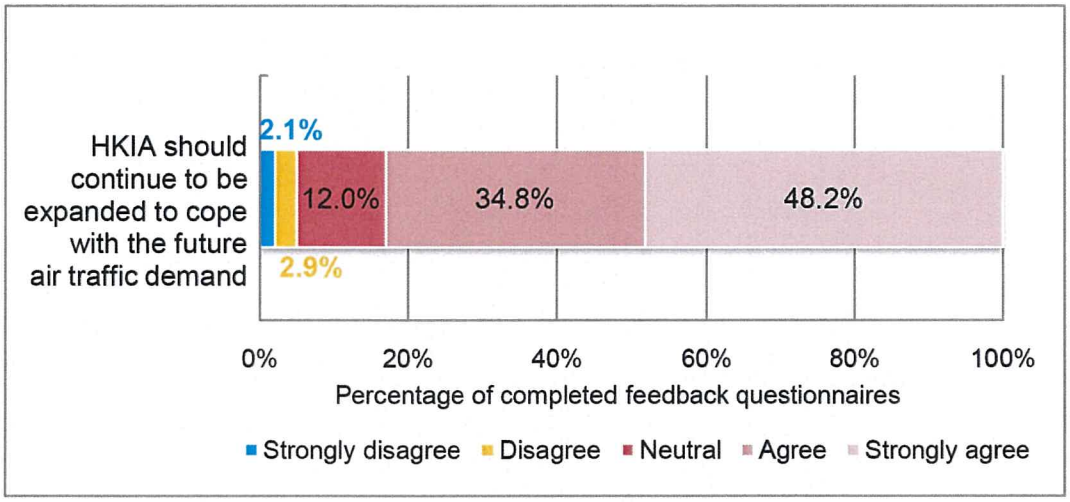
(Base: 20,893 excluding 3,349 missing data)

1.9 The results revealed that most respondents agreed with the following descriptions about the contribution of HKIA and only a tiny proportion of them disagreed:

- connecting Hong Kong with the world and enabling the city to be an international aviation hub (92.5% strongly agreed or agreed vs 1.3% strongly disagreed or disagreed);
- providing quality airport services and facilities (91.8% vs 1.6%);
- promoting Hong Kong's economic growth (90.1% vs 1.7%);
- strengthening the overall competitiveness of Hong Kong (88.9% vs 2.0%);
- creating employment as the contribution of HKIA (87.1% vs 2.0%); and
- making it more convenient for the respondents and their families to travel (86.0% vs 2.6%).

1.10 Similarly, most respondents agreed that HKIA should continue to be expanded to cope with the future air traffic demand (83.0%) (Figure 1.2).

Figure 1.2: Agreement with whether HKIA should continue to be expanded to cope with the future air traffic demand



(Base: 23,796 excluding 446 missing data)

1.11 For investment in expanding HKIA's capacity, most respondents agreed that the following considerations were important:

- benefit to Hong Kong's air connectivity with the rest of the world (89.7% vs 2.2%);
- benefit to the quality of airport services and facilities (89.1% vs 2.1%);
- benefit to Hong Kong's competitiveness (87.5% vs 2.7%);
- benefit to Hong Kong's economic growth (87.1% vs 2.6%);
- creating more job opportunities for Hong Kong's workforce (85.1% 2.9%); and
- making it more convenient for the respondents and their families to travel (78.5% vs 4.4%).

1.12 A lower proportion of the respondents agreed that environmental impact (69.4% vs 5.5%) and construction cost (66.5% vs 6.3%) were important considerations for investment in expanding HKIA's capacity.

1.13 The majority of respondents preferred Option 2 and about 10% of them preferred Option 1 after consideration of each of the following criteria in isolation:

- benefit to Hong Kong's air connectivity with the rest of the world (71.1%

vs 10.2%);

- benefit to Hong Kong's competitiveness (69.2% vs 9.4%);
- benefit to Hong Kong's economic growth (67.6% vs 9.9%);
- creating more job opportunities for Hong Kong's workforce (67.9% vs 9.3%);
- benefit to the quality of airport services and facilities (66.0% vs 12.9%); and
- making it more convenient for the respondents and their family to travel (55.6% vs 11.9%).

1.14 However, less than half of the respondents preferred Option 2 and about a quarter of them preferred Option 1 after consideration of each of the following criteria in isolation:

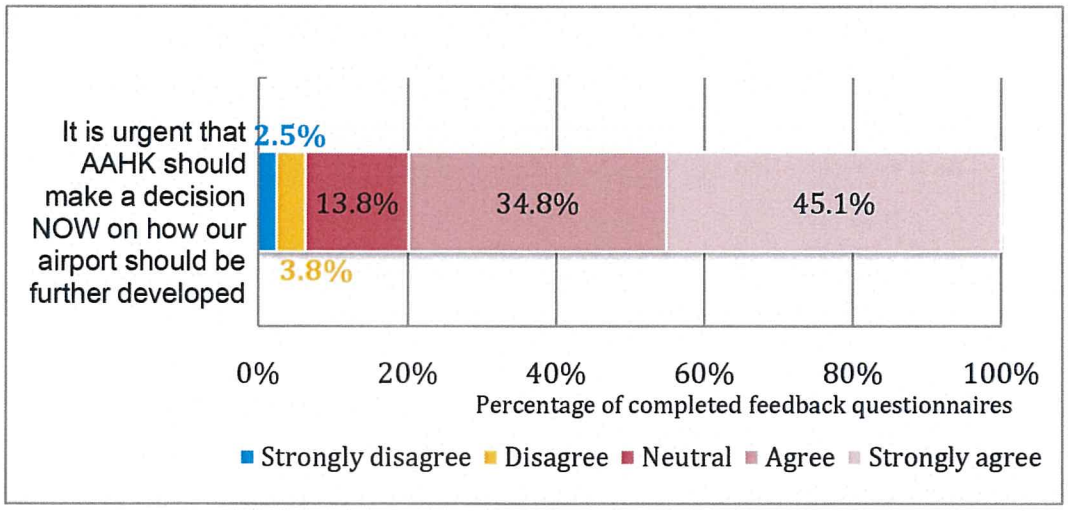
- environmental impact (37.4% vs 29.5%); and
- construction cost (41.6% vs 24.8%).

1.15 Supplementary cross tabulation tables are provided in **Annex B** to show:

- the relationship between respondents' overall preference and their level of agreement with each of the eight considerations being important for investment in expanding HKIA's capacity; and
- the relationship between respondents' overall preference and their preference after taking into account each consideration in isolation.

1.16 Nearly 80% of the respondents (79.9%) either strongly agreed or agreed that it was urgent that AAHK should make a decision NOW on how the airport should be further developed, while a small proportion of them (6.3%) either strongly disagreed or disagreed with it (Figure 1.3).

Figure 1.3: Agreement that it is urgent that AAHK should make a decision NOW on how the airport should be further developed



(Base: 23,681 excluding 561 missing data)

Qualitative Feedback Summary

1.17 All comments received during the consultation were divided into ten channels as below:

1. Public Forum (PF): 3 Public Fora (**Annex C**) - public fora are distinguished from other events as a separate channel because they were widely advertised by AAHK as open to all participants, whereas some of the other events were not open to everyone or not broadly advertised;
2. Event (E): 33 events including conferences, round tables, seminars and briefings (**Annex D**);
3. Legislative Council (LC): 105 written submissions to the Legislative Council and 2 meetings of the Council's Panel on Economic Development (**Annex E**);
4. District Council (DC): 18 District Council meetings (**Annex F**);
5. Written submission (WS): 296 written submissions either by soft or hard copies (**Annex G**);
6. Feedback questionnaire (Q): 4,882 written comments in the feedback questionnaires;
7. Media (M): 885 summaries from printed media and broadcasting (**Annex H**);
8. Internet and Social Media (IM): 644 comments from 99 webpages (**Annex I**) - comments were included if they were covered by WiseNews during the consultation period as this is a reputable indexing method for Internet activity in Hong Kong;
9. Signature Campaign (SC): 4 signature campaigns:
    i. Green Sense, from which SSRC received 1,226 signatures with names;
    ii. Park Island Owners' Committee, from which SSRC received 793 signatures with living units;
    iii. Airport Development Concern Network, from which SSRC received 62 signatures and names (SSRC have only included those with a name provided); and
    iv. WWF with 6,314 names and email addresses – SSRC has randomly selected 5% of the e-mails for verification and the verification was positive, so we have included them all.

The signature campaign comments were all counted based on the number of verifiable supporters as there is no clear distinction between signature campaigns, petition letters and any other form of letter or email.

10. Opinion Survey (OS): 5 opinion surveys were included:
    i. Residential survey conducted by Park Island Owners' Committee;
    ii. Survey conducted by eight aviation related unions;
    iii. Member survey conducted by 30s Group;
    iv. Survey presented by Professor WM Cheung of The Chinese University of Hong Kong in Hong Kong Shippers' Council Joint Conference; and
    v. Member survey conducted by Hong Kong Logistics Management Staff Association.

    The survey results were included as single submissions as verification of the participants was not possible. They are coded on the basis of any view expressed by a simple majority (more than 50%).

1.18 There was consensus about the benefits of enhanced connectivity on HKIA and Hong Kong from a very wide range of perspectives, especially in terms of economic growth and competitiveness, and of the negative impact on HKIA and Hong Kong if the third runway is not built. There was consensus about the third runway yielding economic benefits of specific industries and increased job opportunities, although there were some concerns about the calculation of the benefits.

1.19 There was consensus that the passenger and cargo demand will increase, although there were concerns that the air traffic forecasts need to be adjusted to account for the growth of other GPRD airports, direct flights between Taiwan and the Mainland, oil prices, Mainland economic growth, global economic cycles, use of wide-body aircraft and the high-speed rail links being built. There was consensus that the demand for the current airport will exceed capacity limits in future, triggering the need for a third runway, although there was disagreement about when that limit will be reached. One shared concern was about the need for the government to negotiate more airspace with Mainland authorities, regardless of whether the third runway is built, while recognizing this is not easy.

1.20 There were mixed views on whether HKIA's capacity can or should be increased through other airports in the GPRD.

1.21 There were many comments about high construction costs for the third runway and consensus that any delay will raise the costs higher, so there is a need for careful monitoring to keep the costs within budget. There were very mixed views on funding of the third runway with taxpayer support, borrowing and user pays and an IPO suggested as options, but agreement that funding considerations should be carefully reviewed. There was concern that money spent on the third runway should not mean that money is not spent to address important social issues or that balanced development is ignored. There were suggestions that the airport development should follow the principles of sustainable development and of the need to focus on service and training to remain competitive despite our limited land. There were concerns about construction speed, airport design, reclamation, better linkage with the GPRD and Hong Kong urban areas and of the need to hire local construction workers.

1.22 There were many comments about excessive environmental impact, especially on carbon emissions, noise and the Chinese White Dolphins and of the need to minimize impact. There were also many comments about the need to evaluate both social and environmental costs and then doing the EIA promptly and properly to avoid delay in construction. There were very mixed views about how to balance environmental protection and economic growth, with most comments preferring balance, but some comments insisting on preference for development or environmental protection. There is widespread support for a range of environmental mitigation methods to address noise, air pollution, dolphin protection and reclamation impact. Some concern was expressed about the social costs from the third runway making Hong Kong less attractive due to environmental impact, damage to health and increased land traffic impact.

1.23 Compensation for people affected by the third runway, better working conditions in the airport and enhanced flight routes were raised.

1.24 There was broad agreement with the need to start construction of the third runway as soon as possible. There were also suggestions to consider other options now, such as a fourth runway or second airport.

1.25 There was a broad concern about insufficient information in the consultation paper, especially on carbon emissions, air quality, noise, but also about negative impacts in general, airspace limitations, economic benefits, social costs and mitigation measures. Concern was also expressed about a conflict of interest as AAHK, the manager of the airport, was also conducting the process, and insufficient options being presented.

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Quantitative Feedback Conclusion

1.26 In conclusion, based on the quantitative feedback, there is broad consensus that HKIA connects Hong Kong with the world, enabling the city to be an international aviation hub; HKIA provides quality airport services and facilities; HKIA promotes Hong Kong's economic growth; HKIA strengthens Hong Kong's economic growth; HKIA creates employment; HKIA makes it more convenient for travel and that HKIA should continue to be expanded to cope with future demand.

1.27 There is broad consensus that the benefits to Hong Kong's air connectivity, competiveness, economic growth; creation of jobs and convenience for travel, environmental impact and construction cost are all important considerations for investment in expanding HKIA's capacity.

1.28 Taking into account each of the above considerations in isolation, there was strong preference for Option 2, except for construction cost, where there was still clear preference for Option 2 (41.6% vs 24.8%) and environmental impact, where there was almost as much support for Option 1 (29.5%) as Option 2 (37.4%).

1.29 When considered overall, there is a clear preference for Option 2.

Qualitative Feedback Conclusion

1.30 In conclusion, based on the qualitative feedback, there is broad consensus about the benefits of enhanced connectivity from the third runway to HKIA and Hong Kong from a very wide range of perspectives, especially in terms of economic growth and competitiveness, and of the negative impact on HKIA and Hong Kong if the third runway is not built, with little in the way of dissent, other than concern that some of the projected growth may be transferred to GPRD airports and the high-speed rail or not appear due to lower economic growth or higher oil prices.

1.31 There is broad consensus that air traffic demand will increase in future, exceeding the capacity constraint of two runways, although some disagreement whether this will happen in the timeframe projected by AAHK and a shared concern about the need for the government to negotiate more airspace.

1.32 However, it is clear that the primary areas of concern are the environmental impact of the third runway and whether there was enough information in the consultation paper documents to adequately evaluate the impact of the options. There is a clear concern that the environmental costs have not been fully addressed and sufficient information about the environmental impact and possible mitigation has not been provided in order to have an informed public debate about the options.

1.33 There is consensus that the EIA should be done as soon as possible to allow the necessary informed debate about how the environmental costs could be mitigated and to avoid delay in construction. However, it is clear that different stakeholders have very different views on how or even whether the environmental costs and economic benefits can be balanced.

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

Environmental Impact Assessment Report – Executive Summary

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Abbreviations

2RS	Two-Runway System
3RS	Three-Runway System
AAHK	Airport Authority Hong Kong
ACABAS	The Advisory Committee on the Appearance of Bridges and Associated Structures
ADWF	Average Dry Weather Flow
AERMOD	AERMIC (American Meteorological Society / Environmental Protection Agency Regulatory Model Improvement Committee) Model
AFCD	Agriculture, Fisheries and Conservation Department
AFTF	Aviation Fuel Tank Farm
ALARP	As Low As Reasonably Practicable
AMO	Antiquities and Monuments Office
AMSL	Airport Management Services Limited
ANA	Aircraft Noise Assessment
APM	Automated People Mover
APU	Auxiliary Power Unit
AQO	Air Quality Objectives
ASR	Air Sensitive Receiver
ATCT	Air Traffic Control Tower
ATM	Air Traffic Movement
BHS	Baggage Handling System
BMP	Brothers Marine Park
C&D	Construction and Demolition
CAD	Civil Aviation Department
CALINE4	CAlifornia LINE Source Dispersion Model, version 4
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CCC	Criterion Continuous Concentration
CDA	Comprehensive Development Area
CEDD	Civil Engineering and Development Department
CLG	Community Liaison Group
CMC	Criteria Maximum Concentration
CMP	Contaminated Mud Pit
CO	Carbon Monoxide
CWD	Chinese White Dolphin

DCM	Deep Cement Mixing
DEVB	Development Bureau
DG	Dangerous Goods
DSD	Drainage Services Department
E&M	Electrical and Mechanical
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
EIAO-TM	Technical Memorandum on Environmental Impact Assessment Process Issued Under the Environmental Impact Assessment Ordinance
EM&A	Environmental Monitoring and Audit
EP	Environmental Permit
EPD	Environmental Protection Department
ERUF	Engine Run-Up Facility
ETWB	Environment, Transport and Works Bureau
EV	Electric Vehicles
FAA	Federal Aviation Administration
FCZ	Fish Culture Zone
FES	Fisheries Enhancement Strategy
FSD	Fire Services Department
FSP	Fine Suspended Particulates
GDP	Gross Domestic Product
GEO	Geotechnical Engineering Office
GESF	Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0
GFS	Government Flying Service
GSE	Ground Service Equipment
H_2S	Hydrogen sulphide
HDD	Horizontal Directional Drilling
HIA	Health Impact Assessment
HKSAR	Hong Kong Special Administrative Region
HKIA	Hong Kong International Airport
HKIAAA	Hong Kong International Airport Approach Area
HKO	Hong Kong Observatory
HKU	The University of Hong Kong
HSF	High Speed Ferry
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association

IAQ	Indoor Air Quality
ICAO	International Civil Aviation Organization
INM	Integrated Noise Model
IRIS	Integrated Risk Information System
LAOI	Land Administration Office Instruction
LCA	Landscape Character Area
LDPN	Land Department Practice Note
LLP	Lantau Logistics Park
LPG	Liquefied Petroleum Gas
LR	Landscape Resources
LTO	Landing and Take-off
MAI	Marine Archaeological Investigation
MCC3	Marginally Compliant Chapter 3
MLP	Master Layout Plan
MP2030	Hong Kong International Airport Master Plan 2030
MTR	Mass Transit Railway
NAMP	New Airport Master Plan
NATS	National Air Traffic Services
NEF	Noise Exposure Forecast
NH_3	Unionised Ammonia
NO_2	Nitrogen Dioxide
NSR	Noise Sensitive Receiver
OEHHA	Office of Environmental Health Hazard Assessment
OZP	Outline Zoning Plan
PAM	Passive Acoustic Monitoring
PATH	Pollutants in the Atmosphere and their Transport over Hong Kong
PDZ	Planning Data Zone
PFRF	Public Fill Reception Facilities
PM10	Particulate Matter 10
PM2.5	Particulate Matter 2.5
PME	Powered Mechanical Equipment
PNAP	Practice Note for Authorized Persons
PRCWDNR	Pearl River Chinese White Dolphin Nature Reserve
PRD	Pearl River Delta
PRE	Pearl River Estuary
QRA	Quantitative Risk Assessment
RAP	Remediation Action Plan

RNP	Required Navigation Performance
RR	Remediation Report
RSP	Respirable Suspended Particulates
SCLKCMP	Sha Chau and Lung Kwu Chau Marine Park
SEA	Strategic Environmental Assessment
SHWSTW	Siu Ho Wan Sewage Treatment Works
SI	Site Investigation
SM1	Sewerage Manual – Part 1
SO_2	Sulphur Dioxide
SS	Suspended Solids
SSRC	Social Sciences Research Centre
SSSI	Site of Special Scientific Interest
SWL	Sound Power Level
SWLMP	Southwest Lantau Marine Park
T2	Terminal 2
TAAM	Total Airspace and Airport Modeler
TAP	Toxic Air Pollutants
TBG	Technical Briefing Group
TCNTE	Tung Chung New Town Extension
TCSPS	Tung Chung Sewage Pumping Station
TIN	Total Inorganic Nitrogen
TRC	Third Runway Concourse
TSP	Total Suspended Particulates
USEPA	US Environmental Protection Agency
VSR	Visually Sensitive Receiver
WCZ	Water Control Zone
WHM	Western Harbour Model
WHO	World Health Organization
WPCO	Water Pollution Control Ordinance
WQO	Water Quality Objectives
WSD	Water Supplies Department
WSR	Water Sensitive Receiver

1. Introduction

1.1.1.1 This Executive Summary summarises the results of the Environmental Impact Assessment (EIA) for the expansion of Hong Kong International Airport (HKIA) into a three-runway system (3RS). The EIA accompanies an application for an Environmental Permit (EP) and has been prepared in accordance with the requirements of the Environmental Impact Assessment Ordinance (EIAO).

1.1.1.2 Since the opening of the existing HKIA in 1998, airport facilities and operations have been progressively expanding throughout the years to meet increasing demand. At the same time, the development needs of the airport have been reviewed by Airport Authority Hong Kong (AAHK) every five years through the preparation of a 20-year Master Plan, as part of a continuous master planning process, which also considers the need for airport expansion. The HKIA Master Plan 2030 (MP2030) is the latest master plan prepared by AAHK.

1.1.1.3 As part of MP2030, a three-month extensive public consultation, including a questionnaire survey, was conducted in 2011. Members of the public were invited to comment on the possible options as the strategic direction of the future development of HKIA. Option 1 was to "maintain the existing two-runway system", and Option 2 was to "expand into a 3RS". The survey results, compiled by Social Sciences Research Centre (SSRC) of the University of Hong Kong (HKU), an independent research centre, showed that 73 % of more than 24,000 respondents preferred the 3RS. In light of this finding, the Government of the Hong Kong Special Administrative Region (HKSAR) approved in principle the adoption of the 3RS as the future development option for HKIA for planning purposes on 20 March 2012, and also approved the recommendation of AAHK to proceed with the statutory EIA.

1.1.1.4 The 3RS project (henceforth referred to as the 'project') is proposed to be located on a new land formation immediately north of HKIA in North Lantau, covering a permanent footprint of approximately 650 ha. The project primarily comprises:

- New third runway with associated taxiways, aprons and aircraft stands;
- New passenger concourse building;
- Expansion of the existing Terminal 2 (T2) building; and
- Related airside and landside works, and associated ancillary and supporting facilities.

1.1.1.5 An EIA study brief (ESB-250/2012) for the project was issued by the Environmental Protection Department (EPD) on 10 August 2012. The EIA report has been prepared according to the study brief requirements, which identified 12 key environmental assessment aspects to be addressed as part of the EIA study. The findings of these assessments are described in **Chapter 5** of this Executive Summary.

1.1.1.6 From late 2008 to early 2014, AAHK organised and took part in 970 stakeholder engagement activities with a variety of stakeholder groups to explain the airport's long-term development plan. Key channels for which some of the stakeholder engagement activities were conducted include:

- Four Technical Briefing Groups (TBGs) comprising experts and academia with technical expertise in specific environmental aspects to discuss issues of noise, air quality, marine ecology and fisheries, and Chinese White Dolphins (CWD); the first round of meetings were held in September and October 2012, the second round in April and June 2013, and the last round in November and December 2013;

- Five Community Liaison Groups (CLGs) comprising District Councillors and Community Leaders from HKIA's neighbouring districts (Islands, Kwai Tsing, Shatin, Tsuen Wan and Tuen Mun); meetings were held in October 2012 and June, July and December 2013;
- Focused consultations held with green groups in September 2012 and June, August, November and December 2013; and
- A Public Exhibition, held from 1 to 4 August 2013, and two sessions of public forums, which took place on 3 and 4 August 2013; both were held to update the public on the progress of the EIA and the direction for avoiding / mitigating the potential impacts of the project.

1.1.1.7 The other stakeholder engagement activities included meetings, briefings, seminars, discussion forums, exhibitions and airport visits. They covered a broad spectrum of stakeholders, including professional bodies, community representatives, industry representatives, businesses, political parties, academia, non-government organisations, green groups, youth and media.

1.1.1.8 The feedback and advice obtained from the various stakeholder engagement activities have been considered and incorporated, where applicable, as part of the technical assessments under the EIA study.

2. Need of the Project

2.1 Development of Hong Kong International Airport

2.1.1.1 HKIA has long been recognised as an important infrastructure asset supporting the economic development of Hong Kong. When the original airport at Kai Tak began to experience constrained operation, increasing adverse impacts on both the economy and the environment (particularly in terms of noise) were apparent. A strategic study was carried out including a Strategic Environmental Assessment (SEA) to consider alternative sites for the airport. The site that was ultimately selected was Chek Lap Kok. The relocation of the airport to Chek Lap Kok was a strategic decision to meet the growth demand for aviation service, prevent long-term economic loss and improve the environmental quality of the urban Kowloon area. This decision was pivotal to enabling the success that Hong Kong continues to enjoy, namely as one of the key players in the international arena for the city's economic pillars, which include finance, trade and logistics, tourism and professional services. From an environmental perspective, the Chek Lap Kok location was chosen primarily because it involved much less impact when compared to other viable options. Therefore, the Chek Lap Kok location was seen as the best way forward at the time for both economic and environmental considerations.

2.1.1.2 As an international aviation hub at the heart of the Asia Pacific region, HKIA serves traffic originating or terminating in Hong Kong (origin-destination traffic) as well as transfer traffic of passengers and trans-shipment of cargo around the world, facilitated by its capacity and 24-hour operations. With its advantageous geographical location and highly efficient operation, air traffic demand at HKIA has been steadily growing each year. HKIA is ranked as the world's busiest international cargo airport since 1996, and third busiest airport for international air passengers in 2013. To meet increasing demand, HKIA has grown within the physical limits of the airport island footprint, providing new facilities and services over the years that include terminal expansion, cross-boundary ferry service, a new satellite concourse, and the more recent expansion of the apron and midfield areas for additional aircraft parking stands. HKIA is now reaching its maximum handling capacity within the existing airport island footprint.

2.2 Demand Projection

2.2.1.1 The maximum handling capacity of HKIA was originally designed to meet the air traffic demand projected under the 1992 New Airport Master Plan (NAMP), which estimated 376,000 air traffic movements (ATMs)[1] per year by 2040[2]. However, air traffic demand has increased much faster than originally predicted. It was estimated in MP2030 as published in 2011 that the existing two-runway system at HKIA would reach its practical maximum capacity sometime between 2019 and 2022. Nevertheless, the latest review by the International Air Transport Association (IATA) on MP2030 suggests that this practical maximum capacity may be reached one to three years earlier than what was previously projected and presented in MP2030.

2.2.1.2 The increase in demand is mainly attributed to the connectivity advantages of HKIA, coupled with the rapid development of Hong Kong as a business and financial centre. These factors have converted HKIA from the originally envisaged origin-destination airport (primarily serving air traffic

[1] Also known as flight movements and comprises both passenger and cargo flights.

[2] 1992 NAMP forecast capacity by 2040 is at 87 million passengers and 8.9 million tonnes of cargo.

to/from Hong Kong) into an international hub airport (serving air traffic to/from Hong Kong as well as traffic routing via Hong Kong). The international hub airport status of HKIA brings additional air traffic demand as well as a change in aircraft mix. The latest traffic demand at HKIA is forecast to reach approximately 607,000[3] ATMs per year by 2030.

2.2.1.3 Given that future air traffic demand is also dependent on a number of external factors, a review of other key factors that may influence future air traffic demand in Hong Kong has been carried out, including aircraft mix, high-speed rail service and the effect of optimisation of Pearl River Delta (PRD) airspace on PRD airports and so forth. However, the analysis suggests that these external factors will not significantly affect or reduce the projected air traffic demand in Hong Kong.

2.3 Alternatives to Expanding HKIA into a Three-Runway System

2.3.1.1 Alternatives to meet the projected air traffic demand apart from expanding HKIA into a 3RS were considered. These include optimising the remaining two-runway capacity and cooperating with neighbouring airports. After careful consideration, these two alternatives were found to be unfeasible for the following reasons:

- Optimising the remaining two-runway capacity would be a short-term measure, as the two-runway system will soon reach its practical maximum capacity. Runway saturation will occur sometime between 2019 and 2022 according to MP2030, or one to three years earlier than the MP2030 projection based on the latest review by IATA. Beyond this point, further expansion would still be required. The delay in expanding HKIA into a 3RS would mean that the maximum runway capacity of HKIA would be reached before further expansion is completed. Optimising the two-runway capacity before developing into a 3RS would also lead to resource wastage, as the added infrastructure for upgrading the two-runway capacity would be for only a few years before redevelopment under a 3RS.
- Cooperation with neighbouring airports in PRD region would be difficult due to the differences in air jurisdictions and air services agreements. Furthermore, the need to transit between cities would bring inconvenience to passengers and cargo operators, and incur additional time and resource depletion affecting both the scheduling and affordability of the journey. Relying on other airports to meet Hong Kong's air traffic demand also reduces the benefits that HKIA brings to Hong Kong's economy and would ultimately diminish the overall competitiveness of HKIA and, by extension, Hong Kong.

2.4 Benefits of the Project

2.4.1.1 Expansion into a 3RS has been identified as the best way forward to secure the continual growth of HKIA operation. With a 3RS, additional benefits can be realised, including:

- Airport services and facilities would be further improved with the provision of new and modified passenger and airfreight facilities as well as increased operational flexibility, which would permit runway operations to better take into account the needs and concerns of nearby residents.

[3] Latest forecasts from IATA by 2030 is 102.3 million passengers, 8.9 million tonnes of cargo and 607,000 ATMs.

- Air connectivity would increase with the larger number of destinations served and frequency of flights to destinations, providing more choices for airport users and contributing to increased business and trade to/from Hong Kong.
- New jobs and direct employment at HKIA would be increased, as would indirect employment resulting from the supply of goods and services to the aviation sector and non-aviation activities at HKIA, as well as jobs that are induced from the spending of income by direct and indirect employees associated with HKIA.
- The contribution of HKIA to economic growth would increase by boosting gross domestic product (GDP) as a result of increased imports, exports and re-exports passing through HKIA. Hong Kong's share of the international business and trade markets would also increase as a result of the increased international connections enabled by the expansion of HKIA.

2.4.1.2 While some environmental impacts associated with airport expansion would be unavoidable, there are also opportunities, at the project's design, construction and operation stages, for incorporating positive environmental elements into the project. These include minimisation of night-time operations at the South Runway wherever practical; increased flexibility on preferential use of flight tracks to minimise aircraft noise impact to populated areas; decreased aircraft taxiing and holding times to reduce aircraft emissions; beneficial use of fill materials generated by other projects; and incorporation of best practice for environmental and efficiency improvements, such as energy efficiency, water conservation and waste recycling at airport buildings and facilities.

2.5 Consequences of Not Proceeding with the Project

2.5.1.1 Under the current two-runway system, the MP2030 study identified that the maximum practical runway capacity was expected to be reached between 2019 and 2022. The latest forecast suggests that this maximum capacity may be reached one to three years earlier than previously projected. In the absence of the project, HKIA will have to operate under a constrained mode[4]. When this happens, the following consequences will arise:

- For airport operations, service quality will deteriorate due to increased congestion and reduced flexibility to cope with, and recover from, service disruptions.
- For airline operations, the limited availability of landing / take-off slots would result in a reduction in available routes / destinations, which would instigate a need to seek alternative airports for expanding their flight network.
- For the aviation industry, growth would effectively be capped as no new routes nor increased frequency of existing routes can be made without the substitution of existing flights.

2.5.1.2 These changes would then impact passengers, cargo businesses and environmental performance as follows:

- Passengers would face reduced choice of destinations and flights, longer waiting / connecting times, increased travelling costs as a result of shortage in supply, and increased risk of delays.
- Cargo business would experience similar impacts due to loss of business associated with the reduction in destinations, increased risk of delays to delivery of goods, increased costs,

[4] Constrained mode refers to a mode of operation where demand (for aircraft landing and take-off (LTO) slots) exceeds supply (availability of LTO slots)

reduced scheduling flexibility and the need to seek alternative airports for expanding their service.

- The environmental performance of the airport would worsen due to increased air traffic congestion (and associated emissions) and increased aircraft noise impacts to nearby populated areas.

2.5.1.3 Inevitably, the impacts would be far-reaching and would lead to a reduction in the city's status as an international aviation hub and the overall competitiveness of Hong Kong. To avoid these consequences, expansion of HKIA into a 3RS is considered to be the best option.

3. Consideration of Alternatives

3.1 Background

3.1.1.1 The expansion of the airport requires the consideration of a multitude of external and intrinsic factors that are inherently complex. These factors were carefully considered as part of a number of feasibility studies undertaken during the master planning process[5].

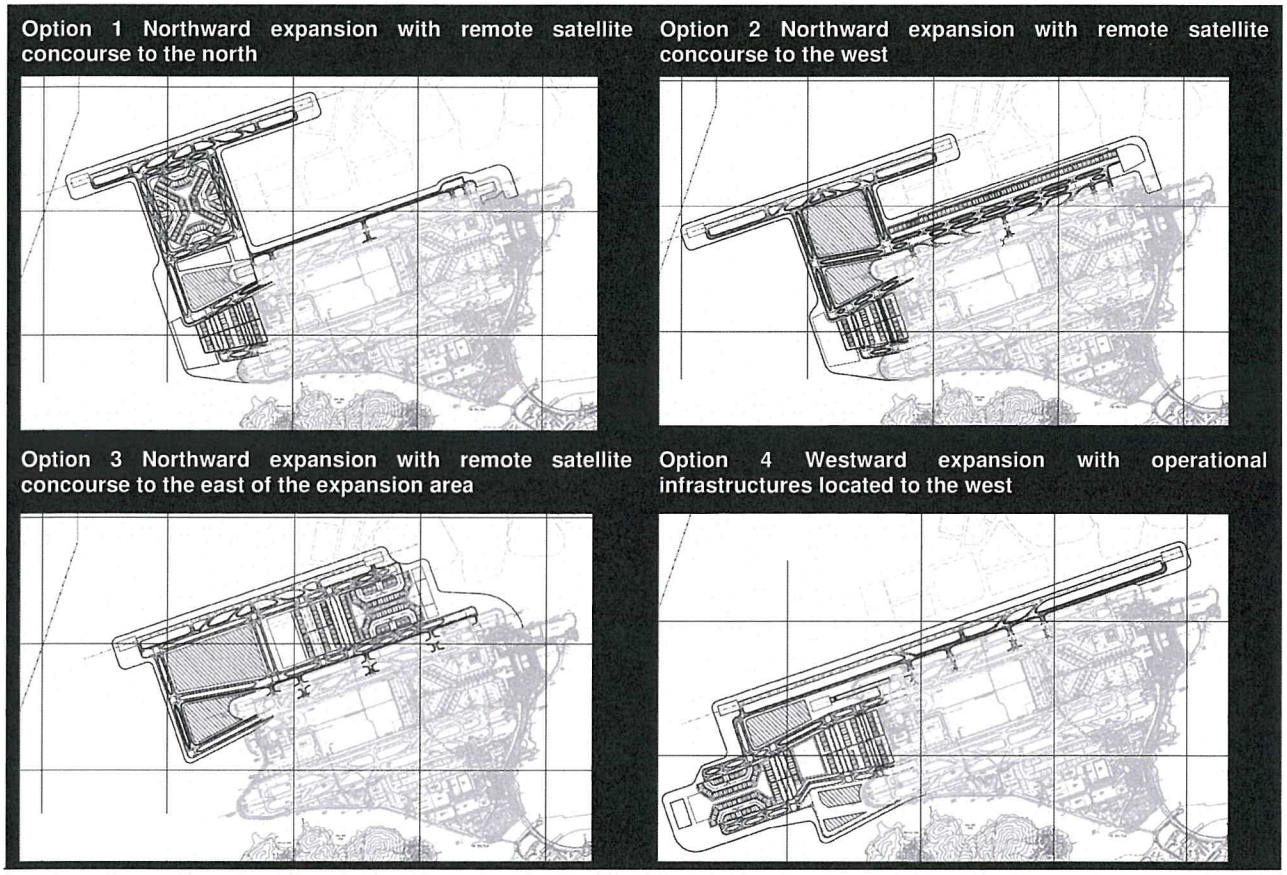
3.1.1.2 For MP2030, AAHK commissioned relevant consultants to conduct feasibility studies covering airspace and runway capacity analysis, initial land formation engineering evaluation, preliminary engineering feasibility and environmental assessment, preliminary aircraft noise impact analysis, preliminary air quality impact analysis, economic impact analysis and financial feasibility assessment. These evaluations and assessments provided essential input into the master planning process, enabling identification of the various constraints and issues as well as identifying the opportunities for optimising different components of the airport, such as the configuration of the third runway, passenger processing terminal and passenger concourse areas. One of the purposes of the feasibility studies was to assess the environmental acceptability of different expansion / construction options, which led to a number of improvements in the environmental performance of the project, including reduced extent of land formation, use of non-dredge methods during land formation to minimise impacts on water quality, waste and marine ecology, and use of the deep cement mixing (DCM) approach for ground improvement at the contaminated mud pit (CMP) area to prevent leakage of contaminants.

3.2 Airport Layout

3.2.1.1 Considerations for the runway alignment formed the first major foundation to the airport layout options assessment. Sixteen initial alignment options (comprising 15 original options plus one additional option) were identified and evaluated against a set of mandatory criteria that are crucial to the safe and effective operation of the third runway. This screening process narrowed the list of viable options to four alignments. Further evaluation against operational requirements resulted in a shortlist of three viable alignment options for further analysis. These three alignment options were combined with airport layout options to create a total of 18 airport layout options, covering possible permutations of passenger terminal, concourse and aircraft apron locations. These 18 options were then evaluated against a number of operational criteria, which resulted in a final shortlist of four airport layout options. These final shortlisted options were subsequently taken forward for detailed engineering and environmental evaluation.

3.2.1.2 The four shortlisted airport layout options are shown below:

[5] These feasibility studies are published as part of the MP2030 consultation and are available via the website http://www.threerunwaysystem.com/en/Information/Consultancy_reports.aspx



3.2.1.3 The four shortlisted options were assessed against both the non-environmental criteria and environmental criteria. The non-environmental evaluation comprised the following criteria:

- Airfield efficiency
- Passenger convenience
- Surface access
- Cargo operations efficiency
- Constructability / cost

3.2.1.4 In general, the non-environmental criteria evaluation found that northward expansion (Options 1, 2 and 3) would provide better performance than the westward expansion option (Option 4).

3.2.1.5 Similarly, evaluations were undertaken against the environmental criteria. The evaluation was based on a number of key criteria, with different rankings assigned according to the degree of potential environmental impact associated with each airport layout option. The findings are summarised in **Table 3.1**.

Table 3.1: Summary of Environmental Evaluation of Shortlisted Airport Layout Options

Criteria	Preferred Option	Reason
Air Quality	All options would result in similar level of impact.	All options would result in similar level of impact.
CWD	Option 3	Generally affects a smaller area of CWD feeding habitat and has less impact on other CWD-important areas compared to the other options.
Fisheries	Option 3	Generally considered to have less impact on fishery activities compared to other options.
Marine Ecology	Option 3	Impacts to marine ecological areas are generally less compared to other options.
Noise	Option 3	Generally associated with less potential aircraft noise impact compared to other options.
Visual	Option 3	Generally associated with less potential visual impact compared to other options.
Water Quality and Hydrodynamics	Option 3	Generally associated with less potential water quality and hydrodynamic impacts compared to other options.

Note:
1. Cultural heritage – not a key environmental differentiator as all options would have similar potential marine archaeological impact, and no direct impacts on terrestrial cultural heritage.
2. Hazard to Human Life – not a key environmental differentiator as all options would have similar potential hazard to human life impacts associated with diversion of submarine aviation fuel pipeline, extension of fuel hydrant system, and dangerous goods (DG) storage (diesel, gasoline and liquid petroleum gas)
3. Terrestrial ecology – not a key environmental differentiator as all options would have similar impacts (mainly indirect impacts) to terrestrial ecology.
4. Waste – the waste differentiator was based on previous assumptions of using dredged land formation. As the project is now confirmed to use non-dredge methods, this differentiator is no longer applicable.
5. Land Contamination – not a key environmental differentiator as all options would have similar potential impacts associated with works required at the existing airport island.

3.2.1.6 Based on the comparison between the different airport layout options in terms of potential environmental impacts, it was concluded that Option 3 is associated with less overall environmental impacts. Thus Option 3 was identified as the best-performing option. While taking forward this preferred option for further evaluation, additional environmental enhancements were identified and subsequently made to the preferred option. These included a substantial reduction of the land formation area (from approximately 827 ha to approximately 650 ha). Other major components of the airport, including T2 expansion and the new third runway concourse (TRC) layout, were also evaluated against various criteria to determine the best-performing option. The outcome of these evaluations was the preferred airport layout (shown in **Drawing No. MCL/P132/ES/3-001**), which has been adopted in this EIA study.

3.3 Construction Methods

3.3.1 Land Formation

3.3.1.1 From an early stage, it was identified that only the non-dredge method, which involves 'filled' land formation, would meet the long-term operational requirements of the project while minimising the environmental impact associated with land formation. As the project will be partly formed over the historical capped CMPs, the evaluation of ground improvement options was one of the key requirements to ensure minimal disturbance to the capped CMPs. A total of 11 ground

improvement options were initially compared and evaluated on technical feasibility and environmental acceptability. The results of the evaluation produced a shortlist of six options (cylindrical steel cells, DCM, prefabricated vertical drains, sand compaction piles, stone columns and vertical sand drains) that were considered to be technically and environmentally acceptable. However, only one option, namely, DCM, was found to be environmentally acceptable for application within the CMP area. This non-dredge method differs from the other methods in that it provides in-situ treatment and stabilisation of the marine sediment, which reduces the potential for release of contaminated pore water. Based on research findings on overseas application of this method, the results of a previous trial[6] in Hong Kong and consultation with EPD, it was concluded that only the DCM method would be applied within the CMP area for land formation works. Recognising the benefits of this approach, DCM is also proposed for other marine infrastructure works within the CMP area, such as the piles for the new runway approach lights.

3.3.1.2 Consideration was also given to various seawall design options, taking into account engineering requirements, environmental benefits and other considerations. The findings of the evaluation identified rockfill sloping seawalls as presenting an environmental advantage from the perspectives of waste minimisation and marine ecological habitat. Taking into account all other applicable factors, rockfill sloping seawalls, comprising either mound core or circular steel cell cofferdam, were identified as the preferred options to be implemented as the dominant seawall types for the project. However, the adoption of vertical seawall design would be required at local areas with specific operational requirements, such as sea rescue berths.

3.3.1.3 After completion of land formation, various facilities would be constructed on the existing and expanded airport area, including (but not limited to) the third runway, taxiways, aprons, TRC, T2 expansion, tunnels, road networks, drainage, sewerage, utilities, fuel hydrant system and various ancillary buildings of the project. These will generally comprise standard construction methodologies that, with the implementation of recommended mitigation measures, are not anticipated to result in significant variations to the environmental performance of the project.

3.3.2 Marine Infrastructure Diversion

3.3.2.1 Key existing marine infrastructure elements will require diversion as part of the project, including the existing submarine aviation fuel pipelines and the submarine 11 kV cables.

3.3.2.2 The existing airport island is currently supplied with aviation fuel via submarine aviation fuel pipelines that originate from the permanent aviation fuel facility at Tuen Mun. These pipelines route via the aviation fuel receiving facility at Sha Chau before connecting to the existing aviation fuel tank farm on the airport island. As the land formation for the airport expansion will cover part of the existing alignment of the submarine pipelines, these pipelines will need to be diverted prior to commencement of land formation. Three alignment / construction options were evaluated as part of the scheme design for this project for diverting the submarine aviation fuel pipelines. Two of these options involve open trench excavation from the airport island to Sha Chau, while the

[6] A DCM trial was carried out at the CMP area in February 2012, during which extensive water quality and underwater noise monitoring was performed to check for any potential environmental impacts. The monitoring results indicated that the DCM work would not cause any appreciable deterioration of water quality, and no leakage of contaminants or cement slurry was detected throughout the trial process. It was also found that the DCM work was relatively quiet compared to other marine construction techniques, and the underwater noise generated was typically below 200 Hz, which is a frequency of low sensitivity for CWD. Therefore, the field trial has demonstrated that DCM is an environmentally acceptable ground improvement method at the CMP area.

remaining option involves drilling through bedrock using the horizontal directional drilling (HDD) method. All three options were evaluated from the perspectives of design, construction, environment and inspection and maintenance. The results of the evaluation identified the HDD method to be the option with the least potential for environmental impacts. This method was subsequently adopted as the preferred option for diverting the submarine aviation fuel pipelines.

3.3.2.3 Similarly, an evaluation was undertaken for the existing submarine 11 kV power cables. These cables provide power supply from the northwest of the airport island to various facilities located on Sha Chau and Lung Kwu Chau islands. As the land formation for the airport expansion will cover part of the existing alignment of the submarine cables, these cables will need to be diverted prior to commencement of land formation. A total of five alignment / construction options were evaluated from both technical and environmental perspectives. Three of the options involve direct bury methods from the airport island to Sha Chau. One involves direct bury method from the airport island to a 'mid-point' outside the Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), whereby the diverted cable would subsequently be connected to the existing cable via a field joint. The remaining option involves drilling through bedrock using the HDD method. Of the five options, the HDD method was identified to be technically infeasible due to the high risk of damage to the power cables; thus this option was not considered further. Of the remaining four options, the option with the least environmental impact was identified to be the direct bury method with field joint, as this method avoids encroachment into the ecologically sensitive Marine Park. This method was subsequently adopted as the preferred option for diversion of the submarine 11 kV power cables.

4. Project Description

4.1 Key Project Components

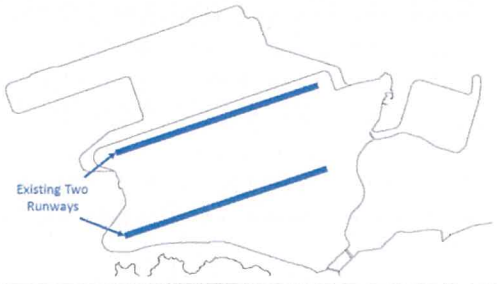
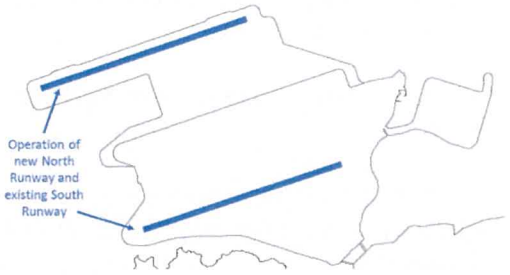
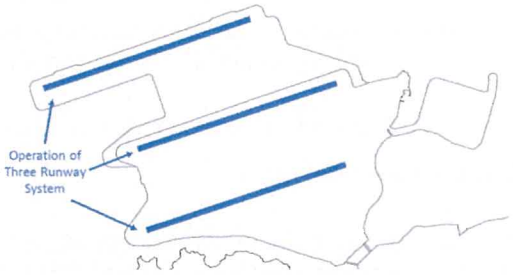
4.1.1.1 Based on the preferred airport layout (shown in **Drawing No. MCL/P132/ES/3-001**), the key project components include:

- Land formation comprising ground improvement, seawall construction and modification (including sea rescue boat points), filling and surcharge activities;
- Construction of new airfield facilities including the third runway, taxiways, aprons, aviation fuel supply network and other airfield infrastructure, aircraft navigational aids, approach lighting system and new Hong Kong International Airport Approach Area (HKIAAA) marker beacons;
- Modification of existing airfield facilities, including the existing North Runway, taxiways and aprons in the Midfield area;
- Construction of new passenger facilities including the TRC and expansion of T2, the automated people mover (APM) system and associated depot and maintenance / stabling areas, and the baggage handling system (BHS);
- Construction of new ancillary facilities to support the operational needs of the expanded airport, including utility buildings, airport support developments, air cargo staging, catering, aircraft maintenance, aircraft engine run-up (engine testing) facilities, ground service equipment (GSE) area, early bag storage facility, fire station, fire training facility, petrol fuelling station, new air traffic control towers (ATCT), Hong Kong Observatory (HKO) facility, mobile phone system antenna towers, stores, security gate houses, etc.;
- Construction of new and expanded infrastructure and utilities, including road networks, seawater cooling and flushing system, stormwater drainage system, greywater system, sewerage network and potable water supply, Towngas supply, 132 kV / 11 kV and other power supply networks, communication networks, etc.;
- Diversion of existing submarine infrastructure, including the submarine aviation fuel pipelines and submarine 11 kV cables.

4.2 Construction Programme

4.2.1.1 The tentative programme for the project is for the 3RS to be operational in 2023. Given the scale and complexity of the project, the construction and concurrent runway operational configuration will be implemented in phases as shown in **Table 4.1** below. Some components, such as the TRC, may be constructed in phases based on the level of demand. Due to such phasing arrangement, the three-runway airfield system will be in operation before the full completion of all infrastructure associated with the project.

Table 4.1: Summary of Construction and Runway Operational Configuration Phasing

Phase	Description	Runway Operational Configuration	Timeframe
Advanced Works	Diversion of the submarine pipelines and power cables		2015 to 2016
Phase 1	Land formation works will commence before subsequent construction of third runway, new taxiways and the new TRC. Expansion of T2 will also commence. The existing two-runway system remains operational throughout the construction phase.		2016 to 2021
Phase 2	Upon completion of the third runway and associated taxiways, the existing North Runway will be closed for modification works, while construction activities for the TRC and aprons, vehicle tunnels and reconfiguration of T2 are on-going. During this interim period, the South Runway and the new third runway will be operational.		2021 to 2023
Phase 3	Upon completion of all essential infrastructure and facilities, including part of the TRC and aprons and expanded T2, the airport will operate under the 3RS. Construction of the remaining facilities will continue until completion.		2023 and after

4.3 Summary of Designated Projects

4.3.1.1 The project components that constitute a Designated Project under the EIAO are listed as follows:

- Reclamation works (including associated dredging works) more than 5 ha in size (Item C.1, Part I, Schedule 2).
- An airport (including its runway and the development and activities related to aircraft maintenance, repair, fueling and fuel storage, engine testing or air cargo handling) (Item B.1, Part I, Schedule 2).
- A railway and its associated stations (Item A.2, Part I, Schedule 2).
- A road or railway tunnel more than 800 m in length between portals (Item A.7, Part I, Schedule 2).
- An activity for the reuse of treated sewage effluent from a treatment plant (Item F.4, Part I, Schedule 2).

- A submarine gas pipeline or submarine oil pipeline (Item H.2, Part I, Schedule 2).
- All projects including new access roads, railways, sewers, sewage treatment facilities, earthworks, dredging works and other building works partly or wholly in an existing or gazetted proposed country park or special area, a conservation area, an existing or gazetted proposed marine park or marine reserve, a site of cultural heritage, and a site of special scientific interest (Item Q.1, Part I, Schedule 2).
- A road which is an expressway, trunk road, primary distributor road or district distributor road including new roads, and major extensions or improvements to existing road (Item A.1, Part I, Schedule 2).
- A railway siding, depot, maintenance workshop, marshalling yard or goods yard (Item A.4, Part I, Schedule 2).
- A road or railway bridge more than 100 m in length between abutments (Item A.8, Part I, Schedule 2).
- Reclamation works (including associated dredging works) more than 1 ha in size and a boundary of which is less than 100 m from a seawater intake point (Item C.2(b), Part I, Schedule 2).
- A cement works or concrete batching plant with a total silo capacity of more than 10,000 tonnes in which cement is handled and manufactured (Item K.5, Part I, Schedule 2).
- A sand depot with a site area of more than 1 ha in size (Item K.11, Part I, Schedule 2).

4.4 Concurrent Projects

4.4.1.1 A review of available information during preparation of the EIA identified a number of other planned / committed projects that may be implemented around the same time as this project, and which may contribute to cumulative environmental impacts. Where applicable, these concurrent projects have been considered and incorporated into relevant technical assessments as part of this EIA report.

5. Summary of Environmental Impact Assessment

5.1 Approach to Environmental Impact Assessment

5.1.1.1 The EIA process provides a means of identifying, assessing and reporting the environmental impacts and benefits of the project. It is an iterative process that has been followed in parallel with the design process to identify the potential environmental effects of various design options, and develop alternatives as well as mitigation measures to be incorporated into the design, construction and operation of the airport expansion. AAHK has considered and incorporated the feedback and advice obtained from the various stakeholder engagement activities into the EIA process where appropriate. AAHK has also come up with measures that can avoid some potential environmental impacts, while others are minimised or mitigated to acceptable levels.

5.2 Overview of Impact Avoidance, Minimisation and Mitigation Measures

5.2.1.1 On the basis of the preliminary engineering and environmental assessments undertaken during the preparation of MP2030, and the subsequent EIA study, a number of environmental considerations have been identified and integrated into the project. AAHK is committed to implementing the following key design and planning initiatives to improve environmental performance:

Minimising Land Formation Footprint

5.2.1.2 After detailed evaluation of a range of airport layout options, a preferred option has been selected to achieve the best balance among various key environmental factors, operational efficiency and engineering constraints. Nevertheless, further enhancements have been made to the preferred option, which include, among others, substantial reduction of the land formation area from approximately 827 ha to approximately 650 ha. A key driver for the reduction was to minimise associated impacts on marine habitat and its marine life, including CWD.

Avoiding / Minimising Construction Phase Impacts

5.2.1.3 Non-dredge ground improvement methods (e.g., DCM) will be used for land formation in order to avoid bulk removal and disposal of any dredged materials, as well as to minimise suspended solids (SS) and contaminants release. The use of this method will substantially reduce the potential impacts to surrounding marine water quality and marine ecology, including CWD.

5.2.1.4 The HDD method will be deployed through the deep rock stratum below the seabed for diversion of the submarine aviation fuel pipelines from the airport island to Sha Chau to avoid dredging of any seabed, thereby eliminating any impacts on marine water quality and marine ecology, including impacts on the SCLKCMP. In addition, the daylighting location of the fuel pipelines (i.e., the point where the pipelines surface at ground level) on Sheung Sha Chau Island has been carefully selected to minimise disturbance to the egretry on the island.

5.2.1.5 The water jetting method will be adopted to lay new submarine 11 kV cables for connection to the existing cables at over 500 m from the boundary of the SCLKCMP. The use of this method will minimise the generation and disposal of marine sediment and avoid disturbance to the seabed inside the Marine Park.

5.2.1.6 During the design and construction planning process, priority was given to maximise, as far as practicable, the reuse of inert construction and demolition (C&D) materials generated by the project, including rock armour from the removal of the existing northern seawall for the land formation works. This will minimise off-site delivery of the surplus inert C&D materials and the associated environmental impacts. Optimising the use of C&D materials on site will be balanced with maximising, as far as practicable, the use of public fill materials from the Government's public fill reception facilities (PFRF), i.e., unwanted fill materials from other projects in Hong Kong, for the project's land formation works.

5.2.1.7 All marine sediment that will be excavated as a result of the various construction works on the expanded airport island will be treated and reused on-site as backfilling materials for the project, in accordance with the relevant requirements. This approach avoids the need for off-site disposal which could result in impacts on the marine environment.

Minimising Aircraft and Related Emissions and its Potential Health Impact

5.2.1.8 AAHK is committed to reducing, where practicable, the potential air quality and health impacts associated with airport and its associated operations. As such, a number of initiatives have already been put in place to minimise emissions of air pollutants. These initiatives include enforcing the use of fuel-efficient airside vehicles through mandatory requirement in the licensing process; promoting increased use of electric vehicles and electric GSE at HKIA by providing charging infrastructure and progressively replacing the entire vehicle fleet with electric or fuel-efficient / hybrid vehicles, with the aim of replacing all saloon vehicles on the airside by electric vehicles by 2017; banning all idling vehicle engines on the airside since June 2008, with the exemption of certain vehicles and equipment due to safety and operational considerations; provision of the cleanest diesel and gasoline at the airfield; requiring all of AAHK's diesel vehicles to use biodiesel (B5); and providing liquefied petroleum gas (LPG) fuelling points for airside vehicles and GSE.

5.2.1.9 Furthermore, AAHK is increasing the use of fixed ground power and pre-conditioned air systems, which currently has an approximately 80% usage rate for aircraft parking at frontal stands. AAHK will also ban aircraft from using auxiliary power units (APU) at frontal aircraft parking stands by end of 2014.

Minimising Aircraft Noise and Potential Health Impact

5.2.1.10 In order to minimise aircraft noise and the associated health impact, a number of planned operational procedures will be incorporated into the future operation of the proposed 3RS, which include:

(i) Putting the South Runway on standby where possible at night between 2300 and 0659;

(ii) Requiring departures to take the southbound route via West Lamma Channel during east flow at night from 2300 to 0659, subject to acceptable operational and safety consideration. This is an arrangement that is consistent with the existing requirement in the operation of the two-runway system at night;

(iii) A new arrival Required Navigation Performance (RNP[7]) Track 6 has been designed for preferential use in the west flow direction (i.e., runway 25 direction) between 2300 and 0659 and it is assumed that up to 95% of flights may preferentially use this new Track 6 instead of the existing straight-in tracks by year 2030; and

(iv) Implementing a preferential runway use programme when wind conditions allow such that west flow is used when departures dominate while east flow is used when arrivals dominate during night-time.

Mitigation of Unavoidable Impacts

5.2.1.11 While environmental impacts associated with the construction and operation of the project will be avoided/ minimised by implementing the aforementioned key design and planning strategies, the project will inevitably give rise to some impacts on the environment. Therefore, detailed and comprehensive assessment of the environmental impacts has been carried out and, where necessary, appropriate mitigation measures have been established to further alleviate the potential impacts. A summary of the major assessment findings is presented in the following sections. Details of specific mitigation measures are included in the relevant sections of the main EIA report.

[7] RNP is a method of navigation which permits aircraft operations on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these, with the addition of an on-board performance monitoring and alerting capability.

5.3 Air Quality

5.3.1 Introduction

5.3.1.1 Potential air quality impacts associated with the construction and operation phases of the project have been assessed in accordance with the criteria and guidelines as stated in the requirements given in Section 3.4.3 and Section I of Appendix A of the EIA study brief, as well as Section 1 of Annex 4 and Annex 12 of the Technical Memorandum on EIA Process issued under the EIAO (EIAO-TM).

5.3.1.2 Quantitative assessment using the relevant air models approved by EPD was performed for both the construction and operation phase impact assessments.

5.3.2 Construction Phase

5.3.2.1 The key activities that could potentially result in dust emissions during construction phase of the project have been identified. These activities include land formation works; construction of the third runway, a passenger concourse, the apron and relevant airfield infrastructure facilities; expansion of the existing T2 and part of the midfield freighter apron; extension of the APM and BHS; improvement of relevant road networks; rock crushing plants; diversion of the submarine aviation fuel pipelines and submarine 11 kV cables; modification of existing outfalls; and the concrete batching plants, asphalt batching plants and barging points. In addition, construction dust emissions from concurrent projects within the 500 m assessment area have also been identified and included in the cumulative air quality impact assessment where appropriate.

5.3.2.2 According to Clause 3 (ii) under Section I of Appendix A of the EIA Study Brief, representative air sensitive receivers (ASRs) within 500 m from the project boundary were identified for air quality impact assessment during the construction phase. The air pollutants of interest in the assessment include Total Suspended Particulates (TSP), Respirable Suspended Particulates (RSP or PM_{10}) and Fine Suspended Particulates (FSP or $PM_{2.5}$).

5.3.2.3 With the implementation of the recommended mitigation measures and relevant control requirements[8] as part of the construction works, it has been assessed by the use of quantitative modelling that the hourly TSP criterion would be complied with at all ASRs, and compliance with the corresponding Air Quality Objectives (AQO) for RSP and FSP would be achieved at all ASRs throughout the whole construction period. Therefore, no adverse residual TSP, RSP or FSP impacts are anticipated at any ASRs during the construction phase of the project.

5.3.2.4 During the proposed DCM process that would be carried out as part of the ground improvement works for land formation, cement powder will be transferred from supporting vessels to DCM barges through piping in closed loop, or in a totally enclosed manner. There will be no open storage of cement on the DCM barges or supporting vessels. Therefore, no adverse residual dust impacts due to cement transfer or storage are anticipated.

[8] Air Pollution Control (Construction Dust) Regulation, EPD's *Guidance Note on the Best Practicable Means for Cement Works (Concrete Batching Plant) BPM 3/2(93), Guidance Note on the Best Practicable Means for Tar and Bitumen Works (Asphaltic Concrete Plant) BPM 15 (94)* and *Guidance Note on the Best Practicable Means for Mineral Works (Stone Crushing Plants) BPM 11/1 (95)*

5.3.2.5 There is potential for emissions associated with bitumen fumes from the proposed asphalt batching plants at the airport expansion area. However, given their large separation distances from ASRs (at least 3.1 km from the nearest ASR) and with the implementation of various emission control measures as given in the EPD's Guidance Note on the Best Practicable Means for Tar and Bitumen Works (Asphaltic Concrete Plant) BPM 15 (94), adverse residual air quality impacts due to bitumen fume emissions are not anticipated.

5.3.2.6 In view of the above assessment findings, construction of the project will not result in adverse residual air quality impacts.

5.3.3 Operation Phase

5.3.3.1 There are various key air emission sources due to airport operation, which include emissions from the aircraft landing and take-off (LTO) cycle; use of APUs during aircraft ground operation; the aircraft maintenance centre; engine testing facilities; operation of Government flying service (GFS), including fixed wing aircraft and helicopters; ferry operation at SkyPier; operation of airside vehicles, including GSE and non-GSE; aviation fuel tank farm operation; operation of the Hong Kong Business Aviation Centre; car park operation; catering facilities; fire training activities; and use of motor vehicles on the airport island.

5.3.3.2 Based on the trends of future aircraft emissions forecast by the International Civil Aviation Organization (ICAO), as well as the air traffic forecast prepared by IATA for the 3RS project, the highest aircraft emissions scenario would occur in Year 2031, which is therefore selected as the year of assessment.

5.3.3.3 Existing and planned air emission sources within 5 km of the project boundary (i.e., the boundary of the expanded airport island) have been identified and included in the operation phase air quality assessment. Other far-field air emission sources (i.e., those outside the 5 km assessment area from the airport boundary) are collectively considered as background emissions that contribute to the ambient air pollutant concentrations in the study area. The background contributions comprise various sources covering the Guangdong Province, Pearl River Delta Economic Zone and HKSAR.

5.3.3.4 In determining the emission inventories for airport operation, nearby infrastructure and ambient emissions, both committed policies and practical technology advancement have been considered. AAHK has been implementing a number of measures and initiatives aimed at further reducing air emissions from airport activities and operations, and air quality will remain a key focus of AAHK's environmental plan, including:

- Banned all idling vehicle engines on the airside since 2008, except for certain vehicles that are exempted ;
- Banning the use of APU for all aircraft at frontal stands by end-2014;
- Requiring all airside saloon vehicles to be electric by end-2017;
- Increasing charging stations for electrical vehicles (EVs) and electric GSE to a total of 290 by end-2018;
- Conducting a review on existing GSE emissions performance and exploring measures to further control air emissions;

- Exploring with franchisees the feasibility of expediting replacement of old airside vehicles and GSE with cleaner ones during tender or renewal of contracts;
- Requiring all new airside vehicles to be fuel-efficient, and making it a prerequisite for the licensing process;
- Providing the cleanest diesel and gasoline at the airfield;
- Requiring all of the AAHK's diesel vehicles to use biodiesel (B5); and
- Providing an LPG fuelling point for airside vehicles and GSE.

5.3.3.5 It is anticipated that with implementation of the above measures, air emissions associated with operation of the 3RS will be further reduced.

5.3.3.6 According to Clause 4 (i) under Section I of Appendix A of the EIA Study Brief, the operational air quality impact within 5 km of the project boundary shall be quantified. As such, the 5 km boundary from the project site was taken as the study area, which generally covers the entire area of Tung Chung, San Tau, Sha Lo Wan, San Shek Wan, Siu Ho Wan and Sham Wat Wan in North Lantau, and Tap Shek Kok in Tuen Mun.

5.3.3.7 Representative ASRs within 5 km of the project boundary have been identified. Existing ASRs, which mainly include residential buildings, educational institutions and hotels, have been identified by reviewing topographic maps, aerial photos and land status plans, supplemented by site inspections. Planned / committed ASRs have been identified by making reference to the relevant Outline Zoning Plans (OZP), Outline Development Plans, Layout Plans and other published plans in the study area. They include:

- Chek Lap Kok OZP (No. S/I-CLK/12);
- Tung Chung Town Centre Area Layout Plan – Lantau Island (L/I-TCTC/1F);
- North Lantau New Town Phase IIB Area (Part) Layout Plan (L/I-TCIIB/1C);
- Sha Lo Wan Village Layout Plan (L/I-SLW/1);
- Tung Chung Town Centre Area OZP (S/I-TCTC/18);
- Siu Ho Wan Layout Plan (No. L/I-SHW/1); and
- Tuen Mun OZP (No. S/TM/31).

5.3.3.8 A Planning and Engineering Study on the remaining development in Tung Chung is being undertaken by the Civil Engineering and Development Department (CEDD). The objective of the study is to assess the feasibility of the remaining development located in the east and west of Tung Chung. Representative ASRs have been selected at the site boundary of the proposed Tung Chung New Town Development Extension in the air quality study of this EIA.

5.3.3.9 Near-field models accepted by EPD (i.e., AERMOD, CALINE4) and the regional model developed by EPD (i.e., PATH) were adopted to predict the pollutant concentrations at the ASRs. Both the two-runway system (2RS) scenario (i.e., "without project" scenario) and 3RS scenario (i.e., "with project" scenario) have been modelled.

5.3.3.10 The model results for the Year 2031 3RS scenario indicate that cumulative nitrogen dioxide (NO_2), RSP, FSP, sulphur dioxide (SO_2) and carbon monoxide (CO) levels comply with the relevant AQOs at all ASRs. The annual average NO_2 and FSP concentration contours at 1.5 m above ground are shown in **Drawing No. MCL/P132/ES/5-3-001** and **MCL/P132/ES/5-3-002**, respectively, which show compliance of the relevant AQOs in the air sensitive areas outside the airport. For the airport island, in addition to continuous outdoor air quality monitoring, AAHK also monitors indoor air quality to maintain a quality environment for passengers and staff. Terminal 1, Terminal 2, SkyPier and the North Satellite Concourse have achieved and maintained a "Good Class" indoor air quality under EPD's "IAQ Certification Scheme for Offices and Public Places".

5.3.3.11 On comparing the annual pollutant levels of the 3RS scenario with those of the 2RS scenario (i.e., "without project" case), the increase in annual NO_2, RSP and FSP are less than 1μg/m^3, 0.2 μg/m^3 and 0.1 μg/m^3 respectively, indicating relatively insignificant changes.

5.3.3.12 With respect to the incremental changes in the annual concentration of NO_2 in Sha Lo Wan (i.e., 3RS – 2RS), which is downwind of the airport (the prevailing wind at the airport is easterly), a decrease in concentration is predicted. This suggests that the 3RS will bring environmental benefit to the receivers at Sha Lo Wan and the contributing factors include:

- Shifting of dominant aircraft departure from the South Runway (2RS scenario) to the centre runway (3RS scenario); and
- Assigning the South Runway as standby mode wherever practicable during the night-time period between 2300 and 0659.

5.3.3.13 NO_2 is the key air pollutant associated with airport operations. The source contribution breakdown for the cumulative annual average NO_2 impact at the key sensitive areas under the 3RS scenario is shown in **Table 5.1**. The dominant emission sources are from ambient emissions, which contribute in most cases more than 60% of the total NO_2 concentrations. Except for Sha Lo Wan, this is followed by proximity infrastructure emissions (10 – 30%) and airport-related emissions (< 10%).

Table 5.1: Annual Average NO_2 Source Contribution Breakdown for 2031 (3RS) Scenario

Area	Cumulative Impact (μg/m^3)	Ambient Emissions (μg/m^3)	Proximity Infrastructure Emissions (μg/m^3)	Airport Related Emissions (μg/m^3)
Tung Chung	33	22	9	2
Tung Chung West	30	22	6	2
Tung Chung East	28	22	4	2
Sha Lo Wan	36	20	4	12
Tuen Mun[1]	38	27	9	2 [1]

Note:

[1] Airport-related emissions are included in ambient emissions in PATH model for Tuen Mun area.

5.3.3.14 In view of the above assessment findings, it can be concluded that operation of the project will not result in adverse residual air quality impacts.

5.4 Hazard to Human Life

5.4.1 Introduction

5.4.1.1 Development of the 3RS will require the existing aviation fuel hydrant system to be extended and extra hydrant pumps to be installed at the existing aviation fuel tank farm (AFTF). Due to the land formation for the 3RS, the existing submarine aviation fuel pipeline lying underneath the proposed land formation will also need to be diverted.

5.4.1.2 In accordance with the EIA study brief, a hazard assessment has been conducted to evaluate the risk due to:

- Construction works near the existing aviation fuel pipelines and storage facilities;
- Operation of new aviation fuel pipelines (submarine and underground) and new fuel hydrant systems for aircraft refuelling operations at the new aircraft stands in the airport expansion area; and
- New facilities for the storage of dangerous goods (DG), i.e., fuel for airside vehicles / GSE.

5.4.1.3 In the assessment, the hazardous scenarios associated with these activities were identified and a quantitative risk assessment (QRA) was conducted to determine both the individual and societal risk levels based on a set of identified hazardous scenarios. The major tasks involved in the QRA included hazard identification, frequency assessment, consequence modelling, risk summation and identification of mitigation measures. The evaluated risk levels were compared with the criteria for evaluating hazard to human life as stipulated in Annex 4 of the EIAO-TM.

5.4.1.4 Hazard identification involved conducting a review of the historical incidents that have occurred at HKIA and airports worldwide, as well as conducting a hazard identification workshop using 'Structured What If' technique. The identified hazardous scenario(s) were then further assessed as part of the frequency assessment, using fault tree analysis and event tree analysis techniques to analyse the hazard frequencies. The updated hazard rates have been inputted into the RiskTool model to evaluate the overall individual and societal risk.

5.4.1.5 Consequence analysis was undertaken to determine the amount of leakage of jet fuel and airside vehicle fuel (gasoline and diesel) under each of the identified scenarios, and the corresponding safety risk to working staff and travellers was assessed. The software PHAST was used for the consequence modelling for vehicle fuel, while the software PoolFire6 thermal radiation model was used for the consequence modelling for jet fuel pool fire.

5.4.1.6 The risk summation was carried out using the RiskTool program to generate both the individual and societal risk levels. Safety measures were identified during the hazard identification workshop, and cost benefit analysis was undertaken for risk levels falling into the As Low As Reasonably Practicable (ALARP) region.

5.4.2 Potential Hazard and Risk

5.4.2.1 Offsite individual risk during both the construction phase and operation phase was below the criterion of 1×10^{-5} per year (i.e., less than 1 in 100,000 chance of death per year); therefore, they comply with the Hong Kong Risk Guidelines as stipulated in Annex 4 of the EIAO-TM.

5.4.2.2 For societal risk, construction phase risk is dominated by potential impact due to the construction of the new submarine pipeline adjacent to the existing submarine pipelines, and construction of the airside tunnels adjacent to the existing underground pipeline serving Terminal 1 and the Midfield. Total societal risk was assessed to be within the acceptable region.

5.4.2.3 Total societal risk during the operation phase is dominated by the risk associated with operating the aviation fuel hydrant pit valves, and this was assessed to be within ALARP region. Uncertainty analysis was conducted, which concluded that the uncertainty had been minimised by adopting conservative assumptions / parameters. This provides confidence that the risk level assessed during the operation phase would not exceed the Hong Kong Risk Guidelines.

5.4.2.4 A range of further mitigation measures has been recommended to be implemented for the 3RS project in order to further reduce risk level. Construction phase mitigation measures to reduce the risk level identified in the study include, for example, implementing precautionary measures for marine traffic management, clear instructions to construction workers on avoidance of existing hydrant networks / pipeline locations, and conducting tests and inspecting pipeline integrity prior to commissioning. Operation phase mitigation measure includes improvement audits to reinforce existing refuelling practices and achieve better compliance.

5.4.2.5 With the implementation of the mitigation measures, the risk is considered to be within the ALARP region and complies with the Hong Kong Risk Guidelines.

5.5 Noise Impact

5.5.1 Introduction

5.5.1.1 Potential noise impacts associated with the construction and operation phases of the project have been assessed in accordance with the technical requirements stipulated in Section 3.4.5 and Section I of Appendix C of the EIA study brief, as well as Annexes 5 and 13 of the EIAO-TM.

5.5.2 Aircraft Noise

5.5.2.1 An aircraft noise assessment (ANA) was prepared in accordance with the requirements stipulated in the EIA study brief. Noise criteria, in terms of noise exposure forecast (NEF) 25 and 30 as stipulated in the EIAO-TM, were adopted in the ANA. The assessment covers the entire Hong Kong with particular emphasis on those areas under and near the flight tracks, and in the vicinity of HKIA.

5.5.2.2 The ANA was carried out in accordance with the guidelines set out by the ICAO and Federal Aviation Administration (FAA). The FAA's integrated noise model (INM) Version 7.0dsu1 (released in late May 2013, with a service update released in September 2013) was adopted for quantitative assessment, and the results were presented in the form of aircraft noise contours in NEF metrics. Data derived from the air traffic forecast developed by IATA[9], and Total Airspace and Airport Modeler (TAAM) simulations undertaken by National Air Traffic Services (NATS) based on the IATA's air traffic forecast, were employed as key data inputs for noise modelling. The assumptions, input data, operational modes, noise sources inventory and mitigation measures adopted for assessments have been confirmed with the Civil Aviation Department (CAD).

5.5.2.3 In addition, a NEF contour map based on the aviation operation data for HKIA in 2011[10], utilising operational records and radar data provided by CAD, was prepared as part of the study to describe the prevailing aircraft noise environment.

5.5.2.4 In addition to the existing measures, CAD has been exploring other measures and new initiatives that could be implemented in the near term with a view to further reducing the aircraft noise impact arising from the existing operation of HKIA. Since February 2012, CAD has implemented a set of flight procedures whereby aircraft which are capable to use satellite-based navigation technology, when departing to the northeast of HKIA, can adhere closely to the nominal flight track when making the turn to the West Lamma Channel, thereby keeping the aircraft at a distance away from the areas in the vicinity of the flight paths and reducing the noise impact on these areas.

5.5.2.5 Furthermore, all subsonic jet aircraft landing or taking off in Hong Kong have already been required to meet the noise standards stipulated in Chapter 3 of Annex 16 Volume I, Part II to the

[9] Includes number of aircraft arriving and departing from HKIA, origin and destination of each flight, type of aircraft, and cargo or passenger aircraft, projected up to 2038.

[10] Year 2011 is employed to represent the prevailing noise environment because the full-year data set in 2011 is the latest information available at the commencement of the assessment and is considered representative of the prevailing aircraft noise environment.

Convention on International Civil Aviation ("Chapter 3 standards") since July 2002. To further improve the local noise environment and alleviate the impact of aircraft noise on local communities, with effect from end of March 2014, CAD would not allow airlines to schedule the noisier marginally compliant Chapter 3 (MCC3) aircraft, which are defined as per CAD's Aeronautical Information Circular 32/13 dated 26 November 2013, to operate between 2300 and 0659 (MCC3-Prohibited Period). Besides, upon review of this measure, CAD would consider extending the MCC3-Prohibited Period to cover the whole day for the existing two-runway operation.

5.5.2.6 Moreover, AAHK is conducting a detailed study to develop an environmental charges / incentives scheme as a means of encouraging airlines to use quieter aircraft types, and the introduction of any such scheme must follow thorough consultation with the aviation community. Demand for night flights will also be managed at HKIA to ensure that the noise contour in the remaining years of two-runway operations will not expand to any new noise sensitive receivers (NSR).

5.5.2.7 When the airport is operating under the existing 2RS, certain villages along North Lantau shoreline would be impacted by the aircraft noise. Therefore AAHK will offer the provision of window insulation and air-conditioning for all houses situated within the newly affected villages before the operation of the third runway in order to alleviate the potential aircraft noise impact on the residents.

5.5.2.8 According to the EIA study brief, the operational assessment scenarios for the 3RS project include (1) worst operation mode, representing the maximum aircraft noise emission scenario (which was identified as year 2030 for the EIA); (2) the interim phase operation mode, representing the phase during which the existing North Runway is closed and the proposed third runway is operational with the South Runway (identified as year 2021 for the EIA); and (3) full operation of the 3RS at design capacity (defined as Year 2032 for the EIA).

5.5.2.9 A number of aircraft noise mitigation measures have been identified, and these will be implemented as standard HKIA operating procedures in the operation of the 3RS under the primary operating mode. These measures include the following and are illustrated in **Drawing No. MCL/P132/ES/5-5-001**:

- Putting the South Runway on standby where possible at night between 2300 and 0659;
- Requiring departures to take the southbound route via the West Lamma Channel during east flow at night from 2300 to 0659, subject to acceptable operational and safety consideration. This is an arrangement that is consistent with the existing requirement in the operation of the two-runway system at night;
- A new arrival RNP Track 6 has been designed for preferential use in the west flow direction (i.e., runway 25 direction) between 2300 and 0659 and it is assumed that up to 95% of flights may preferentially use this new Track 6 instead of the existing straight-in tracks by year 2030; and
- Implementing a preferential runway use programme when wind conditions allow, such that west flow is used when departures dominate while east flow is used when arrivals dominate during night-time.

5.5.2.10 The INM modelling has taken into account the above mitigation measures in predicting the potential aircraft noise impact under 3RS operation.

5.5.2.11 During the interim phase period in 2021, the NEF25 contour will still be causing impact to Sha Lo Wan and certain village houses along North Lantau shoreline due to the close proximity of these areas to the airport. The affected village houses/ licensed structures will be offered the provision of indirect noise mitigation measures in the form of window insulation and air-conditioning before the operation of the third runway, as described in **Section 5.5.2.7** above. As there are only two operating runways, it would be impossible to introduce some of the above measures such as putting the South Runway on standby mode. However, the 2021 NEF25 contour would not encroach onto any existing or planned NSRs in the Tung Chung area.

5.5.2.12 For the 2030 and 2032 scenarios, a slight encroachment of the NEF25 contour remains at Sha Lo Wan and certain villages along North Lantau shoreline, in view of their close proximity to the airport island. However, the impact will be largely reduced with the full commissioning of the 3RS and placing the South Runway on standby mode during night-time. The NEF contours of 2030 are presented in **Drawing No. MCL/P132/ES/5-5-002**.

5.5.2.13 Apart from the measures as stated in **Section 5.5.2.9**, as an additional direct mitigation measure, it is recommended that in developing the Master Layout Plan (MLP) for the Comprehensive Development Area (CDA) site at Lok On Pai, the alignment of the NEF25 contour line should be taken into account to ensure that no noise sensitive uses are situated within the NEF25 contour in the planned development. On the other hand, as mentioned above, some village houses in Sha Lo Wan and other villages along North Lantau shoreline will still be situated within the NEF25 contours after the operation of the third runway (including the 2021, 2030 and 2032 scenarios), however these village houses would have been offered the provision of window insulation and air-conditioning as stated in **Section 5.5.2.7** above. Hence, no adverse residual aircraft noise impact is identified to be associated with the operation of the project. For future village houses, they should be planned in accordance with the prevailing government policy and guidelines.

5.5.3 Fixed Noise Sources

5.5.3.1 The potential fixed noise sources during the operation phase include the operation of aircraft on ground level (i.e., taxiing, operation and maintenance testing of APUs and engines); APM; BHS; and ventilation systems / shafts. Fixed noise sources have been assessed individually and cumulatively. Concurrent projects have also been identified and incorporated into the assessment for cumulative impact where appropriate. Representative NSRs have also been identified for the fixed noise impact assessment.

5.5.3.2 The proposed APM has a horizontal separation distance of at least 200 m from the nearest NSRs. Other underground facilities such as the BHS and the proposed greywater recycling plant are fully enclosed. Therefore, no significant adverse ground-borne noise impacts are anticipated from the proposed APM or other underground facilities.

5.5.3.3 In accordance with the EIA study brief, the airport operation modes assessed include the worst operation mode, with maximum aircraft noise emission from the operation of the project; the interim phase; and full operation mode at design capacity.

5.5.3.4 The predicted noise levels associated with aircraft taxiing under the worst operation mode, interim phase operation mode and full operation mode scenarios indicated compliance with the relevant

daytime/evening and night-time noise criteria at all representative NSRs. The operation of APUs was also predicted to comply with the relevant daytime/evening and night-time noise criteria at all representative NSRs under all three scenarios.

5.5.3.5 Noise mitigation measure in the form of a noise enclosure has been proposed to alleviate the noise impacts from aircraft engine run-up facilities. With this proposed mitigation measure, the overall noise levels at all NSRs are expected to comply with relevant noise criteria for the daytime/evening and night-time periods. Therefore, adverse residual noise impacts from fixed noise sources on the existing and planned NSRs are not anticipated.

5.5.4 Construction Noise

5.5.4.1 Quantitative assessment of the potential construction noise impact has been carried out in accordance with the EIA study brief requirements. The potential key sources of noise impact during the construction phase include land formation works; construction works on the newly formed land and existing airport island; concrete batching plants, asphalt batching plants, haul roads, barging points and crushing plants and diversion of the submarine aviation fuel pipelines and submarine 11 kV cables. Concurrent projects have also been identified and incorporated into the assessment for cumulative impact.

5.5.4.2 The assessments were based on standard acoustic principles and the guidelines in the EPD Technical Memorandum on Noise from Construction Work other than Percussive Piling. Based on the tentative construction programme and powered mechanical equipment (PMEs) anticipated to be used, the potential construction noise impact on representative NSRs was assessed.

5.5.4.3 The construction of the APM, BHS and submarine aviation fuel pipelines may potentially generate ground-borne noise impacts. The APM and BHS will be constructed by cut and cover method (instead of drill and blast or bored tunnelling method), and no rock breaking or tunnel mining works will be involved in the underground construction. Therefore, no ground-borne noise impact is anticipated. The works involved in the diversion of the submarine aviation fuel pipelines are expected to be at least 1.8 km from the nearest NSR, where the vibration from HDD will be screened out. Therefore, no ground-borne noise impact is anticipated during the construction phase.

5.5.4.4 With the implementation of mitigation in the form of quiet plant and the use of movable noise barriers and enclosures, the construction noise levels at all NSRs are predicted to comply with the noise standards stipulated in the EIAO-TM. Adverse residual construction noise impacts are therefore not anticipated in this project.

5.5.5 Road Traffic Noise

5.5.5.1 As stipulated in the EIA study brief, the assessment area for impact from road traffic noise includes areas within 300 m from the boundary of the project. The nearest identified NSRs are located beyond the 300 m assessment area for the proposed road alignments of 3RS project; therefore, adverse road traffic noise impact on the NSRs is not anticipated.

5.5.6 Marine Traffic Noise

5.5.6.1 Based on the guideline in *British Standard 4142:1997 Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas* and information from the *Engineering Feasibility and Environmental Study for Airport Master Plan 2030 – Marine Traffic Impact Assessment*, the marine traffic impact assessment area was determined to be 1,350 m from the manoeuvring of vessels. No NSRs were identified within the 1,350 m assessment area; representative NSRs were found to be over 1,700 m from the manoeuvring route of marine vessels associated with airport activities. Therefore, adverse marine traffic noise impacts from vessels associated with airport activities during operation are not anticipated.

5.6 Water Quality

5.6.1 Introduction

5.6.1.1 In accordance with the EIA study brief, the study area for the water quality impact assessment covers the North Western, North Western Supplementary, Deep Bay and Western Buffer Water Control Zones (WCZ). Water sensitive receivers (WSRs) such as cooling seawater intakes, Water Supplies Department (WSD) flushing water intakes, typhoon shelters, bathing beaches, coral communities, fishery sensitive areas, and ecologically sensitive areas that might be affected by the project were identified.

5.6.1.2 The criteria used for evaluating water quality impacts follow the EIAO-TM and Water Quality Objectives (WQO) for the North Western, North Western Supplementary, Deep Bay and Western Buffer WCZs. Other local and international criteria were also adopted where applicable[11].

5.6.1.3 Quantitative analysis using the validated 3-dimensional hydrodynamic model – Western Harbour Model (WHM), derived from the Update Model by Deltares in 2000-2001, was performed for the construction and operation phases. This model covers the study area for the project and includes the Pearl River Estuary (PRE) and the Dangan (Lema) Channel with some project-specific refinements. Concurrent projects for the construction and operation phases were identified and incorporated into the assessment for cumulative impact where appropriate.

5.6.2 Construction Phase

5.6.2.1 Potential key sources of water quality impact during the construction phase include land formation works; modification of existing northern seawall; diversion of submarine aviation fuel pipelines and 11 kV submarine cable; construction of new stormwater outfalls and modifications of existing outfalls; piling activities for construction of the new runway approach lights and the HKIAAA marker beacons; construction site runoff and drainage; sewage effluent from construction workforce and general construction activities. It should be noted that potential construction phase water quality impacts associated with the proposed works have already been substantially reduced by the adoption of non-dredge methods for land formation and the HDD method for submarine aviation fuel pipeline construction, which avoids disturbance to the seabed. The adoption of the DCM method for ground improvement at the CMPs also avoids the removal of contaminated sediment during land formation and provides an environmentally friendly way of ground improvements at the CMP area.

5.6.2.2 A quantitative assessment of potential water quality impacts associated with marine construction works was conducted, taking into account the period of planned highest productivities and worst case periods of SS release. Other activities that could affect water quality during construction are primarily land-based and were assessed qualitatively.

[11] Other criteria adopted includes WSD's Water Quality Criteria (for flushing water); sediment deposition and SS criteria for corals; No Observable Effect Concentration from an EPD's ecotoxicology study; UK Shellfish Waters Directive; EU's Environmental Quality Standards Directive; as well as the USEPA National Recommended Water Quality Criteria: Criteria Maximum Concentration (CMC) and Criteria Continuous Concentration (CCC).

5.6.2.3 The assessment has shown that with the application of a construction design approach that ensures a minimum 200 m leading edge of partially completed seawall prior to marine filling activities and the implementation of mitigation measures (in the form of double silt curtains and silt screens where applicable), there will be no exceedance of the depth-averaged SS criteria at any WSR due to project activities. However, when combined with the assumptions of SS release from concurrent projects, cumulative exceedance is predicted at a few WSRs. Nevertheless, the findings show that the cumulative exceedances are primarily due to the conservative assumptions for the concurrent project rather than due to the contributions from the 3RS project. Those conservative assumptions are based on the maximum allowable SS release rates of the relevant concurrent project. However, based on the available information, the actual SS release rates are much lower than the maximum allowable release rates. Therefore, adverse residual water quality impacts due to the project are not anticipated.

5.6.2.4 In addition, based on the findings of the quantitative assessments, no unacceptable water quality impacts associated with the submarine 11 kV cable diversion, ground improvement via DCM and surcharge activities of the land formation are anticipated.

5.6.2.5 Other construction activities include diversion of the submarine aviation fuel pipelines, construction of stormwater outfalls, and piling for the new runway approach lights and the HKIAAA marker beacons. With the implementation of good site practices and the recommended mitigation measures to minimise potential water quality impacts, these construction activities, as well as general construction site drainage and sewage effluent from the construction workforce, are not anticipated to result in significant water quality impacts.

5.6.2.6 In view of the above assessment findings, it is concluded that no adverse residual water quality impacts are anticipated during the construction phase of the project.

5.6.3 Operation Phase

5.6.3.1 The potential key sources of water quality impact during the operation phase include changes in hydrodynamics as a result of the permanent new landform; embayment of water at the western end of HKIA; sewage discharge; reuse of treated greywater; spent cooling water discharge; stormwater discharge; accidental fuel spillage; and potential maintenance dredging of the navigable waters north of HKIA. It should be noted that as part of the earlier studies on the airport layout, the potential hydrodynamic impacts associated with the physical landmass of the project were considered. These early studies led to the current land formation footprint, which minimises changes to hydrodynamics and water quality associated with the project.

5.6.3.2 Quantitative assessments of potential impacts for 'with project' and 'without project' scenarios were undertaken. Year 2026 was adopted as the assessment year to represent the worst case pollution loading, taking into account other planned and committed concurrent projects in the study area.

5.6.3.3 The findings show that despite minor exceedances in SS, total inorganic nitrogen (TIN) and unionised ammonia (NH_3) were predicted at some WSRs, these were all identified as not attributed to the project. Therefore, implementation of the project would not result in adverse hydrodynamic and water quality changes in the study area.

5.6.3.4 For other operation phase activities, appropriate design / precautionary measures have been proposed to ensure that sewage discharge, the reuse of treated greywater and accidental fuel spillage would not result in adverse water quality impacts. The findings from the assessment also show that the project would not result in significant sedimentation of the navigable waters north of HKIA; therefore, maintenance dredging is not required due to the implementation of the project.

5.7 Sewerage and Sewage Treatment

5.7.1 Introduction

5.7.1.1 Impacts on the public sewerage system, sewage treatment and disposal facilities associated with the project have been assessed according to the requirements as specified in Section 3.4.7 and Appendix D2 of the EIA study brief.

5.7.1.2 Based on the forecast of ATM, passengers and cargo throughput in 15 years after commencement of operation of 3RS (i.e., 2038), the project would generate a total sewage flow of 43,500 m^3/day. On this basis, the impacts arising from the project on the existing / planned sewerage system in North Lantau, including the sewerage catchments of Tung Chung Sewage Pumping Station (TCSPS) and Siu Ho Wan Sewage Treatment Works (SHWSTW), have been assessed.

5.7.2 Potential Impact

5.7.2.1 The sewerage system for 3RS will be designed, operated and maintained by AAHK in accordance with all the relevant standards and guidelines published by Drainage Services Department (DSD). In addition to continuing the odour control arrangements, AAHK will monitor the hydrogen sulphide (H_2S) level and adopt active septicity management measures that can effectively contain any future septicity problems in the design for the 3RS sewerage system. With the implementation of the said measures, no adverse impacts in respect of septicity and odour from the new sewerage system are anticipated.

5.7.2.2 According to the hydraulic assessment results, the existing gravity sewers from the airport discharge manhole to TCSPS will reach full capacity by 2027. AAHK has therefore proposed to construct a new gravity sewer with a diameter of 1,200 mm adjacent to the existing gravity sewer (1,050 mm in diameter), and then divert the sewage flow generated from the airport and other sub-catchments in Tung Chung to the new gravity sewer. AAHK will consider to study the feasibility to keep the proposed abandoned sewer (i.e., the existing gravity sewer of 1,050 mm in diameter) in place as a spare sewer with an overflow system for the emergency discharge subject to future design of the new gravity sewer. This sewer upgrading work will be able to provide sufficient design capacity in the sewer in order to deliver the sewage arising from the project to the TCSPS. The sewer upgrading work shall be completed by 2026 (allowing a buffer period of about one year before full capacity is reached), with planning work to commence in 2022 (assuming one year for planning plus three years for design and construction).

5.7.2.3 While AAHK undertakes to implement and complete the mitigation works for the affected gravity sewers by 2026, the discharge of additional sewage will start upon commissioning of the project, and the sewage build-up may occur at a more rapid rate than that predicted. Therefore, it is recommended that AAHK should monitor the sewage flow build-up as part of the environmental monitoring and audit (EM&A) for the project, and start planning construction of the upgrading works in 2022 or when the sewage flow in the affected gravity sewer exceeds 80% of the design capacity of the sewer, whichever is earlier. This will ensure timely completion of the mitigation works before flow exceeds the design capacity of the sewer.

5.7.2.4 Based on the assessment findings, the total peak sewage flow from the airport and the relevant Planning Data Zones (PDZ) will exceed the existing design peak flow of TCSPS in 2023, subject to future development of the Tung Chung New Town Extension (TCNTE). A Government project under Agreement No.CE6/2012 is currently underway to investigate, design and construct an additional sewage rising main between TCSPS and SHWSTW to enhance the operational reliability of the sewerage system. That project is planned to commence construction in 2015 and complete the works by end 2022. According to the latest sewerage impact assessment report from the DSD under Agreement No.CE6/2012, twin 1,200 mm diameter sewage rising main will be adopted for conveying the planned sewage flow from Tung Chung and the airport to SHWSTW, which is sufficient for the estimated ultimate design sewage flow of 3,648 L/s[12].

5.7.2.5 In view of the assessment findings, it is considered that the design capacity of the existing SHWSTW is sufficient to handle the estimated total Average Dry Weather Flow (ADWF) from the project and the relevant PDZ during year of 2038. However, it is estimated that the design peak flow of SHWSTW will be exceeded after 2026. It is understood that SHWSTW will be upgraded by the relevant Government departments to cater for the sewage treatment demand arising from future developments within the relevant sewerage catchment areas, including the expanded airport and TCNTE. It is understood that the EPD will monitor the sewage flow build-up and coordinate the necessary upgrading works for the SHWSTW when needed in due course.

5.7.2.6 With implementation of upgrading works for the gravity sewer, TCSPS and SHWSTW, there is no need to establish any central pre-treatment facilities or separate sewage treatment plant for the project. Provided that the upgrading of the gravity sewer, TCSPS and SHWSTW will be completed by 2026, end 2022 and 2026 respectively, no interim sewage treatment facilities will be required for the project.

[12] EPD has agreed to reserve 43,500 m^3/day (ADWF) at the TCSPS for the total sewage discharge from the expanded airport, and AAHK will closely liaise with EPD and DSD to ascertain a smooth interface with the upgrading works for TCSPS.

5.8 Waste Management

5.8.1 Introduction

5.8.1.1 The types of waste that would be generated during the construction and operation phases of the project have been identified. The potential environmental impacts that may result from these waste materials have been assessed in accordance with Section 3.4.8 of the EIA study brief as well as the criteria and guidelines outlined in Annex 7 and Annex 15 respectively of the EIAO-TM.

5.8.2 Construction Phase

5.8.2.1 The approach for development of the project is to avoid or to reduce the volume of waste generated through the application of alternative design options and / or construction methods. Non-dredge methods are proposed for ground improvement to completely avoid bulk removal and disposal of any dredged materials. The proposed sloping seawall option would allow for the reuse of rock armour from the existing northern seawall. The HDD method proposed for the diversion of submarine aviation fuel pipelines would avoid dredging of the seabed, thereby eliminating the need for removal and disposal of any dredged materials and the associated impacts on marine environment. Similarly, the water jetting method proposed for the diversion of submarine 11 kV cables would avoid the generation and disposal of marine sediment.

5.8.2.2 The major waste types that would be generated by construction activities would include inert C&D materials from excavation works, demolition works, seawall modification, piling works and superstructure construction works on the existing airport island / proposed land formation area, as well as from HDD during diversion of the existing submarine pipelines; non-inert C&D materials from site clearance at the golf course area, works for the T2 expansion and various superstructure construction works; marine sediments dredged from the cable field joint area; CMP and marine sediments excavated from the foundation / piling / basement / excavation works for constructing the various tunnels, facilities and buildings; chemical waste from the maintenance and servicing of construction plant and equipment; general refuse from the workforce; and floating refuse trapped / accumulated on the newly constructed seawall.

5.8.2.3 In order to minimise the extent of excavation and maximise on-site reuse of the inert C&D materials generated, the excavation works for various facilities, buildings and tunnel works as well as the construction programme have been carefully planned and developed. Based on the scheme design estimates, it is anticipated that a total of approximately 9,543,500 m^3 of inert C&D materials will be generated from 2015 to 2022, the majority of which will be generated from excavation works for the APM and BHS tunnels, the new APM depot and airside tunnels, and the piling works for the TRC and other facilities. Of this total amount of inert C&D materials, it is estimated that approximately 3,639,230 m^3 (or about 38%) could be reused on-site as fill materials for the proposed land formation works. The remaining 5,904,270 m^3 (or about 62%) of inert C&D materials would be generated after completion of majority of the filling activities. Therefore, these materials will need to be transferred off-site to any identified projects that require fill materials and/or the government's PFRF for beneficial use by any other projects in Hong Kong. Despite maximising the on-site reuse of inert C&D materials, it is estimated that the project would require importing approximately 10,911,770 m^3 of public fill material for land filling activities during the period from 2016 to 2018.

5.8.2.4 Based on scheme design information, it is estimated that approximately 96,200 m^3 of non-inert C&D materials would be generated during the period from 2016 to 2021. The contractor would separate the non-inert C&D materials from the inert C&D materials on site. Any recyclable materials (e.g. metal) will be segregated from the non-inert C&D materials for collection by reputable licensed recyclers. The remaining non-recyclable waste materials will be disposed of at designated landfill sites by a reputable licensed waste collector.

5.8.2.5 It is estimated that in total, approximately 777,860 m^3 of marine sediments will be generated by the various construction activities from 2015 to 2022. The majority of this total amount of marine sediments, i.e., about 767,660 m^3 (or about 98.7%), would be generated from the foundation / piling works for the tunnels, buildings, approach lights and new HKIAAA marker beacons as well as excavation works for the new APM depot. These marine sediments will be treated and reused on-site as backfilling materials, thus avoiding the need for disposal of the sediments off-site. The remaining minority, i.e. about 10,200 m^3 (or about 1.3%), is estimated to be generated from excavation of the cable field joint area during the advance works in 2015/16. This material would require open sea disposal (for Category L sediments) or open sea disposal at dedicated sites (for Category M_p sediments), as such sediments cannot be treated and reused as backfilling materials on-site due to a mismatch with the overall construction programme (i.e., the estimated time to generate such sediments would be over one year before the majority of the filling works for the proposed land formation work is scheduled to begin).

5.8.2.6 The maximum daily arising of general refuse from the construction workforce is estimated to be approximately 9,100 kg. A Construction Waste Management Plan will be developed, which will prioritise the provision and arrangement of recycling facilities to maximise the diversion of construction waste from being sent to landfill. Non-recyclable waste will be disposed of at designated landfill sites. With the appropriate design of the artificial seawall to avoid or minimise any trapped or accumulated refuse, it is estimated that about 65 m^3 of floating refuse will be collected during each year of construction from the newly constructed seawall. The floating refuse will be sorted and recycled or disposed of at designated landfill sites, as appropriate. It is expected that small quantity of chemical waste will be generated during construction, which would be properly handled, stored, labelled and disposed of in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

5.8.2.7 Provided that all the identified waste materials are handled, transported and reused / disposed of in strict accordance with the relevant legislative and recommended requirements, and that the recommended good site practices and mitigation measures are properly implemented, no unacceptable environmental impacts are expected during the construction phase.

Table 5.2: Summary of Waste Arising during Construction Phase

Waste Type	Estimated Total Quantity of Waste Generation
Inert C&D Material	About 3,639,230 m^3 would be reused on-site as fill materials About 5,904,270 m^3 would be delivered off-site
Non-inert C&D Material	About 96,200 m^3 would be disposal of at landfills after on-site sorting and segregation of recyclable materials
Excavated Marine Sediments	About 10,200 m^3 would require open sea disposal (for Category L sediments) or open sea disposal at dedicated sites (for Category Mp sediments) About 767,660 m^3 would be treated and reused on-site as backfilling materials
Chemical Waste	Anticipated as small quantity
General Refuse	Maximum daily arising of approximately 9,100 kg

Waste Type	Estimated Total Quantity of Waste Generation
Floating Refuse	About 65 m^3/year to be collected from the newly constructed seawall

5.8.3 Operation Phase

5.8.3.1 During the operation phase, the key waste types generated would include general refuse from the operation of passenger concourses, aircraft cabin, terminal buildings, offices, commercial establishments (e.g. restaurants, retail outlets) and various airport infrastructure facilities as well as chemical waste from the maintenance, servicing and repairing of various electrical and mechanical (E&M) equipment. As mentioned previously, it is expected that there will also be accumulation of floating refuse on the artificial seawall. With the proposed installation of a new greywater treatment plant, sludge from the proposed treatment plant will also be generated and disposed of in accordance with the relevant guidance and regulations.

5.8.3.2 Based on the forecast of passengers in 2038 (commencement of operation of 3RS in 2023 plus 15 years), it is estimated that approximately 46,190 tons of general refuse will be generated by the project. The initiatives currently implemented at HKIA in segregating recyclable waste materials (such as cardboard, paper, metals, plastics, glass bottles, food waste, etc.) from general refuse for recycling will be extended to cover the expanded airport. The non-recyclable waste will be disposed of at designated landfill sites.

5.8.3.3 The new artificial seawall has been properly designed to achieve a shoreline that does not have any sharp turns or abrupt indentation in order to avoid or minimise any trapped or accumulated refuse. With appropriate seawall design, it is estimated that about 65 m^3 of floating refuse would be collected from the new artificial seawall every year. The floating refuse will be sorted and recycled or disposed of at designated landfill sites, as appropriate.

5.8.3.4 It is difficult to quantify the amount of chemical waste that could arise during the operation phase of the project at this stage, as it would be dependent on the equipment maintenance requirements and the amount of equipment utilised. As per current requirements at the airport, all chemical waste would be properly handled, stored, labelled and disposed of in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

5.8.3.5 Based on the operation records of the existing greywater treatment facility, it is estimated that the quantity of dewatered sludge from the proposed new greywater treatment plant would be approximately 0.23 tons/day. The dewatered sludge will be stored in tight containers or skips and delivered to the designated landfill sites for final disposal by a reputable licensed waste collector. The sludge generated will be handled and managed to minimise the adverse impact of odour and potential health risks to the operators by attracting pests and other disease vectors.

5.8.3.6 Provided that all the identified waste materials are handled, transported and disposed of in strict accordance with the relevant legislative requirements, and the recommended mitigation measures are properly implemented, no unacceptable environmental impacts are expected during the operation phase.

5.9 Land Contamination

5.9.1 Introduction

5.9.1.1 The potential land contamination issues associated with the project have been assessed by following the guidelines in Sections 3.1 and 3.2 of Annex 19 of the EIAO-TM as specified in Section 3.4.9 of the EIA study brief. In accordance with the requirement set out in Appendix E2 of the EIA study brief, a Contamination Assessment Plan (CAP) was prepared for the project and endorsed by EPD in February 2014.

5.9.1.2 Desktop study and site reconnaissance surveys were conducted to determine the past and present land uses, including potentially contaminative uses, within or in the vicinity of the project area. Other relevant information was also collected from various Government departments.

5.9.2 Potential Impact

5.9.2.1 Based on the findings of the site appraisal on the present and past land uses in the land contamination assessment areas, none of the assessment areas are identified as potential contaminative land use types listed in Table 2.3 of the EPD Practice Guide for Investigation and Remediation of Contaminated Land (2011), except the golf course area, the underground and above-ground fuel storage tank areas, emergency power generation units, fuel tank rooms and airside petrol filling station.

5.9.2.2 There was no record of chemical waste spillage or leakage in any of the assessment areas, according to information obtained from the EPD. Based on information provided by the Fire Services Department (FSD), no DG spillage or leakage incidents were recorded within the assessment areas. The reconnaissance site surveys also did not identify any potential source or sign of land contamination within the assessment areas, except the golf course area, the underground and above-ground fuel storage tank areas, emergency power generation units, fuel tank rooms and airside petrol filling station.

5.9.2.3 According to the EP of the golf course, artificial chemical fertilisers and pesticides are not allowed to be used on the golf course and turf area. While no sign of land contamination was observed at the golf course maintenance facility, maintenance activities are still on-going, which may potentially cause land contamination when the site is returned to AAHK. The EP requires that Airport Management Services Limited (AMSL) should carry out post-operation soil sampling and testing works in order to identify any land contamination issues and, if necessary, to decontaminate the site. AMSL will then undertake all the necessary testing and remediation works, if required, after the expiry of operation of the golf course. Therefore, it is anticipated that upon the return of the golf course area to AAHK, there would be no land contamination issues, or any land contamination would have been satisfactorily cleaned up. Therefore, no unacceptable impact due to land contamination is anticipated.

5.9.2.4 For the T2 building expansion area, two underground fuel storage tanks, two above-ground fuel storage tanks and two emergency power generation units to the north and south of T2 were identified. Besides, two more above-ground fuel storage tanks within the T2 building will be demolished as part of the expansion works. For the existing airside facilities, a petrol filling station and a fuel tank room will also require relocation. The preparation and implementation of a

sampling and testing plan, including the number of sampling locations and sampling depths, is recommended prior to the commencement of any construction works at these areas.

5.9.2.5 Since some of the assessment areas were currently not accessible for site reconnaissance, future site investigation (SI) locations are proposed for the potential contaminated areas based on the relevant drawings. Further site reconnaissance will be conducted once these areas are accessible in order to identify any land contamination concern. Subject to the further site reconnaissance findings, a supplementary CAP for additional SI (if necessary) may be prepared and submitted to the EPD for endorsement prior to the commencement of SI and any construction works at these areas. Nevertheless, it is anticipated that any potential land contamination concern related to possible leakage / spillage of fuel from such areas will not cause any insurmountable impact.

5.9.2.6 After completion of the SI, a Contamination Assessment Report (CAR) will be prepared and submitted to the EPD for approval prior to the start of the proposed construction works at the golf course, the underground and above-ground fuel storage tank areas, emergency power generation units, airside petrol filling station and fuel tank room. Should remediation be required, a Remediation Action Plan (RAP) and Remediation Report (RR) will be prepared for the EPD's approval prior to the commencement of the proposed remediation and any construction works, respectively. As a result, no unacceptable impact due to land contamination is anticipated.

5.9.2.7 Mitigation measures for handling, transporting and disposing contaminated materials (if any) and regular site audits are recommended in the EIA to minimise the potential adverse impacts on workers' health and safety.

5.10 Terrestrial Ecology

5.10.1 Introduction

5.10.1.1 Potential impacts on terrestrial ecology that may arise from construction and operation of the project have been assessed in accordance with the relevant requirements as specified in Section 3.4.10 and Appendix F of the EIA study brief, as well as the relevant criteria and guidelines identified in Annexes 8 and 16 of the EIAO-TM. The study area for terrestrial ecology covers the area between the airport island, north of Lantau and Sha Chau.

5.10.1.2 Literature reviews were conducted to identify ecologically sensitive terrestrial habitats in the study area. The literature review was then updated following terrestrial field surveys to fill any data gaps and provide updated information. Key terrestrial ecological sensitive receivers within the study area, or the areas that may potentially be affected by the project, include Tai Ho Stream SSSI, San Tau Beach SSSI, and Lung Kwu Chau, Tree Island and Sha Chau SSSI.

5.10.1.3 The terrestrial field surveys carried out for this EIA study between September 2012 and September 2013 include habitat mapping, flora surveys, and other relevant terrestrial and aquatic fauna surveys (i.e., macroinvertebrate, herpetofauna and aquatic fauna surveys) at off-site habitats located within the study area. In relation to the lack of available information on the flight activities of birds in the land formation area and adjacent sea, tailored avifauna field surveys, including boat transect and land-based surveys, were conducted for a total of 12 months to study the birds' activities. The boat transect survey was conducted at North Lantau waters to investigate the birds' utilisation of that area. Land-based surveys were conducted at three survey stations on the airport island and one station at Sha Chau. Furthermore, an additional egretry survey was conducted for the Sha Chau egretry.

5.10.2 Field Survey Findings

5.10.2.1 The field survey results, supplemented with the literature review, suggest that ardeid is the major bird group recorded in the open waters of North Lantau. The ardeid community includes the Little Egret, Great Egret, Pacific Reef Heron and Black-crowned Night Heron. These species are widely recorded in the study area and associated mostly with coastal habitats in North Lantau, SCLKCMP and along Urmston Road. An egretry (breeding ground for ardeid) was identified at Sha Chau. The artificial coastline of North Lantau, including the HKIA site and marine construction sites, are also commonly used by the species. Although widespread sightings were recorded, the area proposed for land formation was not found to be particularly important because of the relatively low abundance that was recorded compared to the context of the whole of North Lantau waters for this bird group.

5.10.2.2 Seabirds are mainly recorded in open areas and are seldom found in coastal areas. The abundance of seabirds in Hong Kong is highly seasonal. The analysis for seabirds in four seasons showed a relatively high abundance in the winter season, which is attributed to wintering gulls such as Black-headed Gull and Heuglin's Gull, with lower abundance in other seasons. The aggregation of wintering gulls is found mostly along Urmston Road and SCLKCMP. These species are seldom recorded in coastal water areas and are generally not present in the proposed land formation area. The results of the surveys indicate that the proposed land formation area is not an important habitat for waterbirds and landbirds. The marine-associated

Black Kite was widely recorded in the waters of North Lantau owing to its ubiquitous habit, although the proposed land formation area does not appear to be particularly important to this species.

5.10.2.3 Based on the information collected, it was found that the flight movement adjacent to the airport island is not prominent for all identified bird species. The major flight activities in the study area were found to be associated with the ardeid species, as they move between foraging places.

5.10.3 Potential Impact

5.10.3.1 The assessment of potential terrestrial ecological impacts has been made based on literature reviews and field survey findings. Based on the assessment findings, it can be concluded that the loss of 650 ha of open sea area to the north of existing airport island due to the proposed land formation works will not cause any direct loss of terrestrial habitat. The loss of 5.9 km of artificial seawall along north coast of the existing airport due to land formation works will be reinstated after the construction of the new 13-km artificial seawall.

5.10.3.2 The proposed land formation area displayed low abundance and frequency in terms of bird feeding grounds. Therefore, the impact of loss of the area as a foraging ground is considered to be low, during both the construction and operation phases. Potential interruption to bird flight movements is anticipated to be negligible, owing to the absence of important avifauna habitats or migration passages near the proposed land formation area. Given the large separation distances between ecologically sensitive areas in North Lantau and the project area, the construction and operation of the proposed project is not predicted to significantly affect the ecological resources of North Lantau.

5.10.3.3 It is concluded that the identified impacts to the terrestrial habitats, flora and fauna species in North Lantau, including the airport island, would be low or negligible in general during both the construction and operation phases of the project, except for potential construction phase impacts to the Sha Chau egretry. As part of the submarine aviation fuel pipelines diversion work, the pipeline daylighting location / works area on Sheung Sha Chau Island would potentially affect the Sha Chau egretry with moderate degree of impact. Therefore, mitigation measures for protection of the egretry are required.

5.10.3.4 The recommended mitigation measures include locating the HDD daylighting and flat top barge (if required) away from the Sha Chau egretry, preserving the nesting vegetation used by breeding ardeids; and avoiding construction activities of Sheung Sha Chau Island during night-time and the ardeids' breeding season (i.e., April to July).

5.10.3.5 A pre-construction survey prior to the commencement of HDD works at HKIA is recommended to update the latest boundaries of the egretry, as these features may change over time. With the recommended mitigation measures in place, the potential impact on terrestrial ecology would be minimised to low. As a result, no adverse residual impacts are anticipated during both the construction and operation phases.

5.11 Marine Ecology

5.11.1 Introduction

5.11.1.1 Potential impacts on marine ecology that may arise from the construction and operation of the project have been assessed in accordance with the relevant requirements as specified in Section 3.4.10 and Appendix F of the EIA study brief, as well as the relevant criteria and guidelines identified in Annexes 8 and 16 of the EIAO-TM. The study area for marine ecological impact assessment is the same as that for the water quality impact assessment, which includes the North Western WCZ, North Western Supplementary WCZ, Deep Bay WCZ and Western Buffer WCZ, which includes the key habitats for CWDs.

5.11.1.2 The CWD is resident in Hong Kong's western waters and has been shown to be declining in abundance in Hong Kong in recent years. The available survey data are largely based upon more than 20 years of data collected by the Agriculture, Fisheries and Conservation Department's (AFCD) long-term small cetacean monitoring programme, which does not cover the existing HKIAAA (i.e., Marine Exclusion Zone). In order to supplement project specific baseline details, focused CWD surveys were undertaken over a 12-14 month period, covering the proposed land formation footprint and particularly within the existing HKIAAA. The CWD surveys include vessel based line transect surveys, land-based theodolite tracking surveys and underwater noise assessment in the form of passive acoustic monitoring (PAM) surveys.

5.11.1.3 In addition to CWD surveys, a comprehensive baseline ecological literature review has also been conducted for the identification of information gaps. Marine ecological surveys specific to the proposed land formation footprint, especially within the existing HKIAAA, were conducted, covering intertidal habitats, sub-tidal soft bottom and hard bottom habitats, and marine waters. Updated verification surveys were also conducted along the North Lantau coast (from Yan O to the east and Tai O to the west), SCLKCMP and The Brothers. Where appropriate, reference sites with similar ecological attributes to the habitats within the land formation footprint were also surveyed to facilitate ecological evaluation.

5.11.2 Field Survey Findings

5.11.2.1 The field surveys yielded important data on which a full evaluation of the importance of the proposed works area to the CWDs was conducted, based on a synthesis of information from previous studies and the results of the current field work directed at assessing impacts within the land formation area and specifically within the current HKIAAA. While the abundance of CWDs within the two surveyed areas (airport north and airport west) is considered to be at the low end of moderate, the densities of dolphins in those areas, based on 12-14 months of data collected, appear similar to those in the known historically important CWD habitats, such as The Brothers area and Southwest Lantau. These densities are much lower than those in the most critical habitat areas of Northwest Lantau and West Lantau, however the Northeast Lantau (covering the proposed land formation footprint) and Southwest Lantau areas are still considered important habitats particularly in the light of the declining abundance of CWDs in Hong Kong waters. The PAM survey data collected between December 2012 and December 2013 suggests that CWDs may use the areas directly north of the airport more at night than during the day, although the significance of this compared with CWD use in other CWD habitat areas during night-time is not known.

5.11.2.2 Some CWDs use the airport north and airport west survey areas as part of their general habitat and as a portion of a much larger home range. A variety of activities occur in these areas, although they do not seem to represent prime feeding areas for the CWDs. The data collected appears to point to these areas being used as important travelling areas between feeding habitats to the east at The Brothers and Sham Shui Kok, and to the west at the SCLKCMP and West Lantau area. Although the value of these focused survey areas was not readily apparent from historical studies of CWDs in Hong Kong, recent changes in habitats (such as the opening of SkyPier and its attendant new vessel traffic just north of the airport, on-going intensive construction of the Hong Kong Boundary Crossing Facility directly northeast of the existing airport island and the construction of the Hong Kong Link Road to the west and south of the airport) have potentially resulted in variations in how the CWDs are using the available space. It is possible that these focused study areas may have been used more by CWDs during the study period than in the past because of these habitat changes.

5.11.2.3 Data from literature review and field surveys were obtained to evaluate the ecological value for the intertidal, sub-tidal soft bottom and hard bottom, and marine water habitats within the proposed land formation footprint. Along the surveyed artificial seawall of the existing airport island, species diversity and evenness were found to be moderate-low, and no intertidal species of conservation importance were recorded. Polychaetes represented the highest species richness and abundance recorded at sub-tidal soft bottom habitats within the land formation footprint. For sub-tidal hard bottom habitats, isolated colonies of Gorgonian *Guaiagorgia* sp., which is common in western Hong Kong waters, were recorded with a low coverage along the existing artificial seawall at the north of Chek Lap Kok within the proposed land formation footprint. A cup coral species of conservation importance, *Balanophyllia* sp., was recorded with low coverage at the northeast seawall along the existing airport island outside the land formation footprint. Within the open waters of the land formation footprint, six marine fish species of conservation importance were recorded, all of which were also found outside the footprint, except for the Longheaded eagle ray (recorded within the footprint only by trawl survey at a relatively low density). The ecological values of artificial seawall along the existing airport island, the sub-tidal soft bottom and hard bottom habitats, as well as marine waters within the land formation footprint were thus considered in a range from low to moderate-high.

5.11.2.4 Data from literature reviews and field surveys were also obtained to evaluate the ecological value for the intertidal, sub-tidal soft bottom and hard bottom, and marine water habitats along the North Lantau coast, and four recognised sites of marine conservation importance within the North Western WCZ and Southern WCZ. These sites included the San Tau Beach SSSI, SCLKCMP, planned Brothers Marine Park (BMP) and potential Southwest Lantau Marine Park (SWLMP), which are all outside the land formation footprint but within the study area. Such habitats may be subject to indirect impact by the project but anticipated to be insignificant.

5.11.2.5 Mangrove and intertidal mudflat habitats along the North Lantau coast at Tai Ho Wan, Tung Chung Bay, San Tau and Sham Wat Wan were identified as important intertidal habitats. The presence of seagrass beds at San Tau and Tai Ho Wan was verified with three seagrass species recorded, and a new locality of *Halophila beccarii* was found at Sham Wat Wan. A significant number of horseshoe crab juveniles and sub-adults were recorded at Sham Wat Wan, San Tau, Tung Chung Bay and Tai Ho Wan, suggesting that these areas may be part of the nursery grounds of horseshoe crabs in Hong Kong. Eight fish species and one crab species of conservation importance were recorded for intertidal streams along the North Lantau coast, including the spotted seahorse *Hippocampus kuda* and the pipefishes *Syngnathoides biaculeatus*

and *Syngnathus schlegeli*. For the sub-tidal soft bottom habitat, one individual of amphioxus, *Branchiostoma belcheri*, was found at North Lantau outside the land formation footprint, and low coverage of cup coral *Balanophyllia* sp. and ahermatypic coral *Paracyathus rotundatus* were observed within SCLKCMP. For the sub-tidal hard bottom habitat, a low abundance of benthic fauna and low coverage of cup coral *Balanophyllia* sp. were commonly recorded throughout the study area outside of the land formation footprint. For the open marine water habitats, a moderate abundance of marine fauna was recorded at North of airport island outside the land formation footprint, SCLKCMP and The Brothers, and a total of 20 species of conservation importance (including 17 fish species, one sea snail and two horseshoe crabs) were identified. In summary, the four sites of marine conservation importance within the North Western WCZ were considered overall to be of high ecological value, while the intertidal, sub-tidal and marine water habitats were evaluated to range from low to high ecological values. Nevertheless, the identified recognised sites of conservation importance are all outside the land formation footprint and would only be subject to insignificant indirect impact by the project.

5.11.3 Potential Impact

5.11.3.1 The proposed 3RS project layout and construction methods have been chosen to avoid and minimise potential ecological impacts by design. The land requirement estimates have been reduced by about 20% through systematic option assessment and refinement. In terms of construction methods, percussive piling and underwater blasting, which can present high risks of nuisance and injury to the CWDs, have been avoided and the measures such as the adoption of the method of Deep Cement Mixing (DCM) have been adopted to minimise disturbance to the marine environment. Bored piling for the new runway landing lights and beacons would also avoid the peak CWD calving season of March to June as a precautionary measure.

5.11.3.2 Nevertheless, the proposed land formation will result in the permanent loss of 672 ha[13] of seabed (about 40% of which is part of the capped CMP). Beyond the seawall toe at the seabed, varying widths of scour aprons of approximate 10 ha will be constructed (the actual width required for scour protection is subject to detailed design). The scour aprons will be in the form of stone or gravels. These habitats will provide hard substrates for the re-colonisation of benthic fauna. In addition, 650 ha of open waters for marine fishes, CWDs and associated marine benthos, as well as 5.9 km of artificial seawall with low coverage of soft corals will be lost.

5.11.3.3 With regard to CWDs, the construction and operation phase impacts associated with habitat loss, influence on travelling areas and overall disturbance to CWD behaviour have been assessed. Many impacts have been concluded to be insignificant or minor as a result of the above measures. However, the project will result in some impacts on the CWD population in Hong Kong waters, mostly related to the loss of CWD habitat, the reduction of the size of CWD travelling areas between the east and west of the airport and the associated impacts on habitat fragmentation and carrying capacity, largely as a result of the new land formation, as well as impacts from the SkyPier high-speed ferries (HSF) traffic.

[13] Proposed land formation footprint: 650 ha. The net seawall toe construction is 12 ha (22 ha proposed seawall toe minus 10 ha of the existing seawall toe). Approximate 10 ha scour apron of varying widths (subject to detailed design) will be constructed beyond the seawall toe for scour protection. Therefore, the total open water to be lost is 650 ha, but seabed habitat to be lost would be 672 ha.

5.11.3.4 The proposed land formation footprint area is a very small proportion of the overall PRE CWD population's habitat area and only 2.5 % of the Hong Kong habitat area but represents part of the home range for some of the Hong Kong sub-population. Also, the SkyPier HSF traffic will need to move through regions of moderate or even high CWD density and controls are, therefore, required to minimise nuisance and risk of collisions.

5.11.3.5 The potential disturbance to the function and quality of marine parks within the study area during the construction and operation phases has been assessed. Indirect disturbance to the SCLKCMP may include the corresponding effects of gradual habitat loss due to land formation, marine traffic and vessel noise, loss of CWD prey resources, and disturbance from HSF. It is, however, possible that the building of the 3RS project could result in increased CWD use of the SCLKCMP as they may be displaced from the area north of the airport. Potential impacts due to the change in habitat quality of the SCLKCMP, including the potential loss of prey resources of CWDs and hydrodynamic changes to the water quality regime, are considered to be of low-moderate significance. With the implementation of mitigation measures including construction vessel speed restrictions and other protection measures for CWDs (see **Section 5.11.3.10**), residual impacts are predicted to be acceptable.

5.11.3.6 Potential indirect disturbance to the planned BMP including the impact on travel areas (north of the airport island), marine traffic movements, vessel noise and the potential disturbance as a result of changing in hydrodynamic and water quality during the construction and operation of the 3RS project have been evaluated. If the new travel area (north of the expanded airport island) is not used as extensively as the existing travel area (north of the existing airport island), then CWDs may travel less to the Brothers area, and this will likely result in a negative impact on CWD abundance in that specific area. For the marine traffic movements, the increase in SkyPier HSF traffic is not expected to be significant that may affect the function and quality of the planned BMP. The potential disturbance to the planned BMP as a result of change in hydrodynamic and water quality regime from the land formation and the associated potential impact on prey resources available for CWDs has been reviewed. It has been concluded that there would not be any significant impact on the sustainability of the fisheries resources at the planned BMP, and specifically the CWD prey species, due to the high mobility of the fish and availability of prey for the CWD in northern Lantau waters. However, taking a precautionary approach, the potential impact on CWD use of the planned BMP during the construction phase is considered to be of moderate significance, and appropriate mitigation has therefore been proposed, in particular the establishment of a much larger marine park by linking the planned BMP.

5.11.3.7 The potential SWLMP is far from the 3RS construction works, hence significant impact on the quality or function of this potential marine park due to the 3RS development is not expected.

5.11.3.8 The potential impacts on marine fauna other than CWDs are considered to be insignificant to moderate. Moderate impacts on the sub-tidal soft bottom habitat and open waters are predicted in view of the permanent loss associated with land formation works and seawall construction.

5.11.3.9 A range of measures has been proposed to minimise, mitigate and compensate for the potential impacts on CWDs and marine ecology during the construction and operation phases of the project. As noted above, the proposed land formation area has been reduced to 650 ha to minimise loss of marine resource habitat, including CWD habitat and alternative construction methods have been proposed to reduce direct and indirect disturbance to seabed and marine habitats to a minimum, including the non-dredge DCM methods; the use of HDD at bedrock level

for submarine aviation fuel pipeline diversion and the use of water jetting for submarine cable diversion. To minimise water quality impacts and therefore, associated impacts to CWDs, construction of a minimum 200 m leading edge of seawall prior to marine filling works will be adopted, together with the deployment of silt curtains.

5.11.3.10 Specific mitigation measures for the protection of CWDs and marine ecology have been recommended, which include:

- Conducting a pre-construction phase coral dive survey to review the feasibility of coral translocation as a precautionary measure;
- Avoiding peak calving season for CWDs when undertaking bored piling activities as a precautionary measure;
- Establishing dolphin exclusion zones during ground improvement works (e.g. DCM), water jetting works for submarine cables diversion, excavation at the field joint locations, seawall construction and bored piling works;
- Acoustic decoupling of construction equipment mounted on barges;
- Establishing a spill response plan as precautionary measure;
- Setting speed restrictions for construction vessels at a maximum of 10 knots within areas where CWDs are likely to occur; and
- Diverting SkyPier HSFs travelling to/from Zhuhai and Macau to the north of SCLKCMP and restricting their speed to 15 knots across areas with high CWD abundance.

5.11.3.11 In addition, the establishment of a new marine park of approximate 2,400 ha by linking the planned BMP and the existing SCLKCMP (**Drawing No. MCL/P132/ES/5-11-001**) is recommended. The total area of this proposed new marine park is much greater than the seabed habitat loss of 672 ha and is expected to significantly improve the conservation prospects for the Hong Kong sub-population of CWDs by mitigating the impacts of habitat loss, habitat fragmentation, changes in patterns of habitat use, as well as minimising the noise and disturbance from marine traffic, specifically HSFs. It should also be noted that the new marine park will be contiguous with the PRE CWD national nature reserve established by the Mainland side, thereby linking the protected habitat between Hong Kong and the mainland. The Administration has made a firm commitment to seek to designate the proposed marine park of approximately 2,400 ha in the waters north of the 3RS project in accordance with the statutory process stipulated in the Marine Parks Ordinance, as a mitigation measure for the permanent habitat loss arising from the 3RS project. AAHK will seek to assist in completing the designation tentatively around 2023 to tie in with the full operation of the 3RS. In addition, environmental enhancement measures have also been recommended to contribute to strengthening marine ecology and fisheries resources in northern Lantau waters. These includes eco-enhancement designs of part of the seawall to facilitate colonisation by intertidal and sub-tidal fauna within the future extended HKIAAA, exploring the feasibility of deployment of artificial reefs, setting up a marine research programme to support conservation of marine ecology, setting up an education programme to provide a platform for local school groups and the general public to learn more about local marine ecology and CWDs, and the promotion of environmental education and eco-tourism. An Environmental Enhancement Fund will be established to support these activities.

5.11.3.12 Through the implementation of the proposed mitigation measures, the potential residual impacts due to the construction and operation of the project would be reduced to levels that are not predicted to cause significant population-level impacts on the PRE CWD population or the Hong Kong sub-population. Similarly, the potential construction and operation phase impacts on marine fauna other than CWDs would also be mitigated to acceptable levels.

5.12 Fisheries

5.12.1 Introduction

5.12.1.1 Potential impacts on fisheries associated with the construction and operation of the project have been assessed in accordance with Section 3.4.11 and Appendix G of the EIA study brief as well as Annex 9 and Annex 17 of the EIAO-TM. The study area for the fisheries impact assessment is the same as that for the water quality impact assessment, which includes the North Western WCZ, North Western Supplementary WCZ, Deep Bay WCZ and Western Buffer WCZ.

5.12.1.2 The fisheries impact assessment was conducted based on information gathered from literature review and fisheries surveys to fill identified information gaps, especially within the HKIAAA, where vessels are restricted entry for security purposes. Fisheries surveys on marine habitats that would potentially be affected by the 3RS project were carried out. Various surveys including fish trawl, purse seine, gill net, hand line, artificial reefs, ichthyoplankton and fish post-larvae surveys, as well as fisheries interview survey were carried out to update and supplement the status of fisheries resources and fishing activities within the study area for a robust fisheries impact assessment.

5.12.2 Field Survey Findings

5.12.2.1 Based on the literature review and latest fisheries survey findings, the sites of fisheries importance that were identified within the study area include spawning grounds of commercial fisheries resources in northern Lantau waters; SCLKCMP; artificial reefs at SCLKCMP and proposed artificial reefs deployment at the planned BMP; Ma Wan Marine Fish Culture Zone (FCZ); the area of high production of capture fisheries at Tai O; the area around the Brothers which has been proposed to be designated as Marine Park arising from the Hong Kong-Zhuhai-Macao Bridge – Hong Kong Boundary Crossing Facilities project; and the oyster production area at the Deep Bay mudflat.

5.12.2.2 There were no aquaculture activities or artificial reefs within the land formation footprint. The level of overall fishing operations was moderate. The fisheries productions in terms of abundance and yield were low and moderate respectively, and most dominant species were of low or no commercial value. The ichthyoplankton and fish post-larvae densities and family richness were low.

5.12.2.3 Apart from the land formation footprint, four areas adjacent to the footprint that may be affected by the project were examined. These included The Brothers, western and northern Chek Lap Kok waters, and SCLKCMP.

5.12.3 Potential Impact

5.12.3.1 Fisheries impacts are likely arising from the 3RS project due to the proposed land formation works, diversion of submarine 11kV cables, SI within the SCLKCMP and construction of a floating temporary platform for the submarine aviation fuel pipeline diversion works, the provision of approach lights at two ends of the third runway, and provision of marker beacons along the boundaries of the future HKIAAA, which will lead to both permanent and temporary loss of fishing grounds, direct loss of fisheries habitats (and resources), direct loss of spawning grounds at the

northern Chek Lap Kok waters. There will also be indirect disturbance of fisheries habitats due to the potential deterioration of water quality, indirect impact on aquaculture sites, indirect impact on artificial reefs, disturbance of fishing activities, disturbance to fisheries resources associated with underwater sound, change in hydrodynamics and tidal influence, impingement and entrainment due to seawater intakes, indirect disturbance of marine fishes due to aircraft noise and potential impact due to the extension of HKIAAA as fisheries "no-take-zone".

5.12.3.2 The waters within the proposed land formation footprint would be moderately used by fishermen for capture fisheries. The land formation works will result in a total (permanent plus temporary) fishing ground loss of approximately 1,392 ha, including a permanent loss of 410 ha[14] during the construction phase, which is considered to be of low impact significance from the commencement of construction to moderate impact significance upon completion of land formation works. During the operation phase, permanent loss of fishing ground will be 768 ha[15], which is also considered to be of moderate impact significance.

5.12.3.3 There would be a permanent loss of 672 ha[16] of fisheries habitats (and resources), which is considered to be of low impact significance from the commencement of construction to moderate impact significance upon completion of land formation works. The proposal to establish a large marine park of approximately 2,400 ha (**Drawing No. MCL/P132/ES/5-11-001**) would compensate for the loss of fisheries habitats (and resources) / fishing ground by improving the ecological connectivity between the existing SCLKCMP, the planned BMP, the Pearl River Chinese White Dolphin Nature Reserve (PRCWDNR) and the existing / future HKIAAA. In addition, a suite of controls and restrictions according to the Marine Parks Ordinance and the Marine Parks and Marine Reserves Regulation, including the control of fishing activities, speed restriction to 10 knots or below and control of other anthropogenic disturbance, would further promote the recovery of fisheries resources in the northern Lantau waters and adjacent areas. With the implementation of the proposed new marine park, conservation of fisheries resources within the proposed new marine park and adjacent waters would be promoted, and there would be a positive synergistic effect on fisheries resources conservation. Therefore, no adverse residual impact on loss of fisheries habitats (and resources) is anticipated after the establishment of the proposed new marine park.

5.12.3.4 The recovery of potential fisheries resources due to the relevant protection measures to be applied for the proposed marine park, together with the synergic effect of the connected marine protected areas, will benefit the adjacent fishing grounds. Based on successful cases of establishing marine protected area to enhance fishing efficiency, it is considered that the proposed establishment of the new marine park as a compensation measure for loss of fishing grounds will mitigate the potential impact to no adverse residual impact.

5.12.3.5 Nevertheless, a number of fisheries enhancement measures, including eco-enhancement design of part of the seawalls within the future extended HKIAAA, potential deployment of artificial reefs at appropriate locations to promote juvenile fish recruitment, and implementation of a Fisheries Enhancement Strategy (FES), are proposed in addition to the recommended mitigation

[14] 410 ha = 650 ha of proposed land formation area – 240 ha of existing HKIAAA

[15] 768 ha = 650 ha of proposed land formation area – 240 ha of existing HKIAAA + 358 ha of proposed new HKIAAA

[16] 672 ha = 650 ha of proposed land formation area + 22 ha of proposed seawall toe construction + 10 ha of scour apron – 10 ha of existing seawall toe

measures, with a view to further improving the fisheries resources in the western Hong Kong waters and supporting sustainable fisheries operation. A Fisheries Enhancement Fund will be established to support these activities.

5.13 Landscape and Visual

5.13.1 Introduction

5.13.1.1 A landscape and visual impact assessment has been carried out in accordance with Section 3.4.12 and Appendix H of the EIA study brief, and Annexes 10 and 18 of the EIAO-TM. The current relevant planning and development control framework was reviewed, it is concluded that the proposed 3RS is generally consistent with the current land uses, and there is no conflict with the relevant planning and development control framework.

5.13.1.2 The main sources of impacts on existing landscape and visually sensitive receivers were identified. These include construction and operation of the proposed land formation, T2 expansion and associated infrastructure, new passenger concourses and other airport buildings, laying of the 11 kV submarine cables and field joint connection, and the daylighting point for submarine aviation fuel pipelines. It should be noted that impacts have already been avoided or minimised as part of the project design. For example, the land formation footprint has been located to the north of the existing HKIA, which is furthest away from most of the visual sensitive receivers (VSRs), and the adoption of HDD method for construction of the submarine aviation fuel pipelines has minimised the area of landscape resources (LR) affected.

5.13.1.3 Within the landscape and visual impact assessment study area, a total of 19 LR, 11 landscape character areas (LCAs) and 79 representative VSRs were identified that may be affected by the 3RS. In addition, a broad-brush tree survey was also carried out to determine, in broad terms, the potential impacts on existing trees.

5.13.2 Construction Phase

5.13.2.1 Based on the impact assessment findings, mitigation measures covering all relevant landscape and visual aspects are proposed to be implemented during construction. These include minimising construction works areas, construction periods, construction-related marine and road traffics and construction plants; phasing construction; providing screen hoarding; controlling night-time lighting; hydroseeding exposed surfaces; protecting existing trees; transplanting affected trees.

5.13.2.2 After implementing the recommended mitigation measures, all LRs and LCAs are either anticipated to experience residual impacts of slight or insubstantial significance, or they are not anticipated to be affected by the construction of the 3RS, with the exception of the following:

Landscape Resources

- The coastal waters of North Lantau adjacent to Chek Lap Kok are anticipated to experience impacts of substantial significance due to a loss of 650 ha of coastal waters as a result of the new land formation.
- Roadside amenity planting within the assessment area is anticipated to experience impacts of moderate significance after the implementation of mitigation measures.

Landscape Character Areas

- Inshore water landscape is anticipated to experience a residual impact of substantial significance due to highly visible marine construction activity and the loss of 650 ha of this LCA.

5.13.2.3 With implementation of the mitigation measures, all VSRs are either anticipated to experience residual impacts of slight or insubstantial significance, or are not anticipated to be affected by the 3RS during construction phase, except the following VSRs:

- Passengers / drivers of recreational marine craft in North Lantau waters and Urmston Road and recreational users of Sha Chau islands are anticipated to experience a large magnitude of visual change, and this, combined with their high sensitivity, results in an impact considered to be of substantial significance.
- Residents of Tung Chung, including Tung Chung Crescent, Seaview Crescent, Caribbean Coast, Area 53 to Area 56, as well as residents along south coast of Tuen Mun, Hong Kong Gold Coast and Siu Lam; Hong Kong SkyCity Marriott Hotel, Hong Kong Airport Passenger Terminal and Regal Airport Hotel; passengers of Cable Cars of Ngong Ping 360; hikers of Nei Lak Shan, Fung Wong Shan (Lantau Peak), Tai Tung Shan (Sunset Peak), Lantau North Country Park, Lantau South Country Park and Scenic Hill are anticipated to experience an intermediate magnitude of visual change, and this, combined with their high sensitivity, results in an impact considered to be of moderate significance.
- Passengers / drivers of vehicles and Mass Transit Railway (MTR) along Cheong Wing Road; visitors to AsiaWorld-Expo; passengers of commercial aircraft; passengers / drivers of the proposed Hong Kong Link Road; and passengers of ferries in North Lantau waters and Urmston Road are anticipated to experience an intermediate magnitude of visual change, and this, combined with their medium sensitivity, results in an impact considered to be of moderate significance.

5.13.3 Operation Phase

5.13.3.1 Based on the impact assessment findings, mitigation measures covering all relevant landscape and visual aspects are proposed to be implemented during operation. These include sensitive landscape design at the land formation edges; sensitive and aesthetic design of building / structure facades to ensure good integration and compatibility; sensitive lighting / streetscape design; reinstatement of disturbed areas; implementation of greening measures; compensatory tree planting use of appropriate building materials and colours; sensitive design of footbridges; greening of noise barriers and enclosures; sensitive design of streetscapes and lighting and aesthetic improvement planting.

5.13.3.2 The residual landscape impacts on LRs and LCAs after the implementation of mitigation measures during the operation phase were assessed. All LRs and LCAs are anticipated to experience residual impacts of slight or insubstantial significance or are not anticipated to be affected by the 3RS, except that the residual impacts on coastal waters of North Lantau and inshore water landscape would remain substantial during operation phase due to the permanent loss of approx. 650 ha of coastal waters. However, this permanent loss is the absolute minimum necessary for the creation of the 3RS, and there remains a much larger area of coastal waters of North Lantau and inshore water landscape that will be unaffected by 3RS and that will be available in the operation phase as an on-going landscape resource.

5.13.3.3 With implementation of the recommended mitigation measures, all VSRs are either anticipated to experience residual impacts of slight or insubstantial significance, or are not anticipated to be affected by the 3RS, except that passengers / drivers of recreational marine craft in North Lantau waters and Urmston Road and recreational users of Sha Chau islands are anticipated to experience residual impacts of moderate significance.

5.13.3.4 In accordance with the criteria and guidelines for evaluating and assessing impacts as stated in Annex 10 and 18 of the EIAO-TM, it is considered that the overall residual landscape and visual impacts of the proposed 3RS are marginally acceptable with mitigation during the construction and operation phases.

5.14 Cultural Heritage

5.14.1 Introduction

5.14.1.1 As required under Section 3.4.13 of the EIA study brief, a cultural heritage impact assessment has been conducted. This includes a marine archaeological investigation (MAI), along with a review of terrestrial archaeology and built heritage, to evaluate the impacts on known or potential cultural heritage in the study area. The cultural heritage impact assessment follows the requirements of Annexes 10 and 19 of the EIAO-TM, while the requirements for the MAI are also set out in Appendix I of the EIA study brief.

5.14.2 Marine Archaeology

5.14.2.1 The scope of the MAI covers all marine-based activities that have the potential to impact marine archaeological resources. These include:

- Land formation of approximately 650 ha to the north of the existing airport island;
- Construction of new runway approach lights; and
- Diversion of the 11 kV submarine cables.

5.14.2.2 Activities for diversion of the submarine aviation fuel pipelines (including the associated marine SI and drilling works) have not been included in the MAI study area as the marine SI works affect a very small area of seabed only, while the pipelines would be constructed through sub-sea bedrock. With this construction method, direct impact on marine archaeological resources would be avoided and the risk of indirect impacts due to vibration would be insignificant.

5.14.2.3 The methodology for conducting the MAI was based on the Guidelines for MAI issued by the Antiquities and Monuments Office (AMO), which specifies the following tasks:

- Baseline Review;
- Geophysical Survey;
- Establishing Archaeological Potential; and
- Visual Diver Survey.

5.14.2.4 The findings of the baseline review established that the area is generally considered to have high archaeological potential based on records of historical events in the area, and due to a previous discovery (and the subsequent recovery) of a 19th century cannon in 1993 as part of the original airport construction works. However, it was also recognised that approximately 28% of the MAI study area has already been impacted due to construction and operation of the CMPs, therefore, the CMP area is considered to have zero archaeological potential.

5.14.2.5 Based on the findings of the baseline review, further investigation was warranted. In December 2012, a geophysical survey comprising side scan sonar, seismic profiler, dual frequency and multi beam echo sounder was completed. Analysis of the data showed a total of 41 sonar contacts within the MAI study area, of which 22 were deemed to have archaeological potential. Further investigation in the form of magnetometer survey for the 22 sonar contacts was completed in March 2013. The magnetometer survey located a total of 180 magnetic contacts within 25 m

radius of the 22 sonar contacts. After more detailed review of the findings, and taking into account relevant factors, a final list of 57 magnetic contacts and 11 sonar contacts were deemed to have archaeological potential, and thus required visual inspection.

5.14.2.6 An application for Licence to Excavate and Search for Antiquities under the Antiquities and Monuments Ordinance was made for conducting the visual diver survey, and the licence was issued on 28 June 2013. The diver survey was conducted in July and August 2013. All 11 sonar and 57 magnetic contacts were located during the diver survey and identified as modern debris. No marine archaeological remains were positively identified during the seabed survey.

5.14.2.7 Based on these findings, it was concluded that there are no resources of marine archaeological value located with the MAI study area. Therefore, no adverse marine archaeological impacts are expected, and no mitigation measures are required.

5.14.3 Terrestrial Cultural Heritage

5.14.3.1 For the terrestrial cultural heritage impact assessment, a study area covering a radius of 500 m from the land-based project boundary was adopted. This includes the daylighting point of the submarine aviation fuel pipelines on Sheung Sha Chau Island, where the aviation fuel receiving facility is located, and the existing airport island. A literature review and desktop study was undertaken to identify any baseline terrestrial cultural heritage resources within the study area. The literature review identified six sites of archaeological interest and two built heritage features, which wholly or partially lie within the 500 m study area boundary. Of these, the Ha Law Wan site of archaeological interest and the Sha Chau site of archaeological interest are located within the project boundary, but not within the construction works boundary. No other sites of archaeological potential or built heritage features were identified as part of the literature review. A site walkover survey at Sheung Sha Chau Island also did not identify any additional built heritage features.

5.14.3.2 Potential impacts on the sites of archaeological interest located within the project boundary were assessed, taking into account the nature and proximity of the nearest construction activities. The construction activities adjacent to the Ha Law Wan site of archaeological interest involve the construction of new elevated roads and re-alignment of existing roads. However, there will be no encroachment into the boundary of the Ha Law Wan site during the construction or operation phase; therefore, direct impacts have been avoided. Potential indirect impacts due to bored piling activities were assessed to be insignificant given the small scale of the works and a buffer distance of approximately 25 m.

5.14.3.3 For the Sha Chau site of archaeological interest, the adoption of the HDD method avoids direct impacts due to the construction of the submarine aviation fuel pipelines. Potential indirect impacts due to the drilling activities were assessed to be insignificant, given that each drillhole would be less than 1 m in diameter and the drilling depth will be largely about 50 m below the seabed. Temporary power supply to Sha Chau (during the submarine 11 kV cable diversion) will be provided via a temporary generator unit and cables located on existing paved areas; therefore, no direct impacts will arise. The terrestrial archaeological assessment concluded that there will be no impact on the identified sites of archaeological interest during the construction or operation phase, and no mitigation measures are required.

5.14.3.4 For the two built heritage features within the study area (Tung Chung Battery at Tung Chung and Tin Hau Temple at Sha Chau), no direct impacts were identified as no built heritage resources

are located within the project boundary. Indirect impacts due to vibration, noise or visual disturbance were assessed to be unlikely given the large buffer distance (approximately 400 m or more) between the construction works areas and the built heritage features. The built heritage assessment concluded that there will be no impact to the built heritage resources during the construction or operation phase, and therefore no mitigation measures are required.

5.15 Health Impact

5.15.1 Introduction

5.15.1.1 Potential health impacts in relation to air emissions and aircraft noise arising from the operation of the project, have been assessed in accordance with the requirements given in Section 3.4.14 together with Section II of Appendix A and Section II of Appendix C of the EIA study brief. This is the first transport infrastructure project in Hong Kong for which a Health Impact Assessment (HIA) has been carried out.

5.15.2 Air Pollutants

5.15.2.1 The HIA focused on toxic air pollutants (TAP) and criteria pollutants. A literature search was conducted for determining the best approach and methodology for the HIA. Inhalation was identified as the major exposure pathway.

5.15.2.2 Health risk determination based on acute, chronic non-cancer risk and cancer risk forms the basis of many of the reviewed literatures. This was adopted as the approach for the HIA of the project and consisted of the following steps: (i) hazard identification, (ii) exposure assessment, (iii) dose-response assessment, and (iv) risk characterisation.

5.15.2.3 A three-tiered approach has been adopted to short-list the key TAP. Tier 1 involves a quantitative screening that considers the emission quantities and toxicity levels of the TAP. Tiers 2 and 3 are to identify other relevant and concerned chemicals:

- Tier 1: Screening based on calculation of emission-toxicity values
- Tier 2: Reference to IARC Group 1 (Carcinogenic to humans) Chemicals
- Tier 3: Reference to TAP identified in other airport-related studies

5.15.2.4 The assessment findings revealed that the short-term (i.e., 1-hour / 24-hour) and long-term (i.e., annual) TAP concentrations due to the operation of the 3RS modelled at all potential human receptors would comply with the respective acute and chronic non-carcinogenic risk criteria. Therefore, the acute and chronic non-carcinogenic risk due to 3RS are considered acceptable. Compared with the "without project" scenario, the maximum increase in carcinogenic health risk due to TAP is predicted to be 1.14×10^{-5} which is considered acceptable.

5.15.2.5 For short-term exposure to criteria pollutants, the short-term concentrations of CO (1-hour), NO_2 (1-hour) and SO_2 (10-minute) comply with the AQO in the assessment areas. Moreover, the estimated largest yearly increases in risks of hospital admission and premature death (short-term mortality risk) associated with short-term exposure to NO_2, RSP and SO_2 due to the operation of the 3RS compared with 2RS are relatively small (i.e., maximum incremental unit risk of premature deaths per annum is predicted to be around 1.27×10^{-5}). Therefore, the short-term health risk associated with short-term exposure of the concerned criteria pollutants is considered acceptable.

5.15.2.6 The incremental change arising from the operation of 3RS against 2RS for annual concentrations of NO_2, RSP, FSP and SO_2 are less than 3% in the assessment areas. In addition, the estimated largest yearly increase in premature death (long-term mortality risk) associated with long-term exposure to FSP due to the operation of the 3RS compared with 2RS is relatively small.

Therefore, the long-term health impact associated with long-term exposure of the concerned criteria pollutants is considered acceptable.

5.15.3 Aircraft Noise

5.15.3.1 The HIA due to aircraft noise was undertaken by taking into account the requirements stipulated in the EIA study brief. Since there are no guidelines or criteria for HIA associated with aircraft noise in the EIAO-TM, the best approach and methodology for HIA were developed after a review of relevant practices in Hong Kong and overseas.

5.15.3.2 Published literature on potential health effects associated with exposure to environmental noise was reviewed. The literature review has revealed positive associations with environmental noise exposure (including aircraft noise) for both annoyance and self-reported sleep disturbance. Besides, there are some studies that focused on primary schoolchildren which indicated effects of aircraft noise on cognitive performance of children in school environment.

5.15.3.3 The HIA analysis focused on comparing the changes of health impacts between the operation of 3RS and 2RS in 2030, i.e., the year of "worst operation mode", which represented the maximum total aircraft noise emission. The locations of interest include those populated areas adjacent to the NEF25 contour line, namely Sha Lo Wan, Tung Chung, North Lantau, Ma Wan and Siu Lam, which are collectively identified as the assessment area for this HIA. The assessment involved a quantitative analysis for both annoyance and self-reported sleep disturbance as the two main aspects, but also covered cognitive effects on children for other potential health effects from aircraft noise exposure.

5.15.3.4 The HIA findings identified that under the operation of 3RS, there would be a reduction in future population that would be subject to potential annoyance and self-reported sleep disturbance (with about 10% and 50% reduction of population affected respectively) in the assessment area.

5.15.3.5 Regarding cognitive effect on children by aircraft noise, it is noted that one kindergarten is within the noise band of 55 to 60 dB in Siu Lam under the three-runway scenario. However, it is considered that cognitive effects on students in this institute would unlikely be significant, as the aircraft noise levels would be masked by the background noise levels of 60 dB measured onsite.

5.15.3.6 As compared with the "without project" scenario, implementation of the 3RS will reduce the population that would be subject to potential annoyance and self-reported sleep disturbance in the assessment area, while cognitive effect on children arising from the operation of the project is not apparent. Therefore, it is concluded that the overall health impact associated with aircraft noise from the project in the assessment area is minimal.

5.16 Impact Summary

5.16.1.1 A summary of the environmental impacts for individual aspects in the EIA report is presented in **Table 5.3**.

Table 5.3: Summary of Environmental Impacts

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
Air Quality Impact – Construction Phase						
Air Sensitive Receivers within 500 m Assessment area	▪ Compliance with the hourly TSP criterion as well as the AQOs for daily RSP and daily FSP at all ASRs under the mitigated scenario ▪ Compliance with the AQO for annual RSP and annual FSP at all ASRs under the mitigated scenario	▪ Annexes 4 and 12 of EIAO-TM ▪ Air Pollution Control Ordinance ▪ AQO	With the mitigation measures in place, the predicted cumulative TSP, RSP and FSP levels at all ASRs would comply with the relevant TSP criterion as well as the relevant AQO for RSP and FSP.	N/A	▪ Relevant measures stipulated in Air Pollution Control (Construction Dust) Regulation ▪ Water spraying for heavy construction activities at all active works areas, at a frequency of 12 times a day or once every two hours for a 24-hour working period ▪ 80% of the stockpiling area covered by impervious sheets and all dusty materials sprayed with water immediately prior to any loading transfer operation ▪ Good practices for dust control ▪ Relevant measures stipulated in EPD's Guidance Note on the Best Practicable Means for Cement Works (Concrete Batching Plant) BPM 3/2(93) ▪ Relevant measures stipulated in EPD's Guidance Note on the Best Practicable Means for Tar and Bitumen Works (Asphaltic Concrete Plant) BPM 15 (94) ▪ Relevant measures stipulated in EPD's Guidance Note on the Best Practicable Means for Mineral Works (Stone Crushing Plants) BPM 11/1 (95)	Adverse residual impact is not anticipated.
Air Quality Impact – Operation Phase						
Air sensitive receivers within 5km assessment area	NO_2, RSP, FSP SO_2, and CO levels would comply with the AQO at all ASRs	▪ Annexes 4 and 12 of EIAO-TM ▪ Air Pollution Control Ordinance ▪ AQO	No non-compliance of AQO was predicted on identified ASRs	AAHK has already been implementing a number of initiatives aimed at reducing air emissions from airport activities and operations, including: ▪ Banned all idling vehicle engines on the airside since 2008, except for certain vehicles that are exempted ; ▪ Banning the use of APU for all aircraft at frontal stands by end-2014; ▪ Requiring all airside saloon vehicles to be electric by end-2017; ▪ Increasing charging stations for EVs and electric GSE to a total of 290 by end-2018; ▪ Conducting a review on existing GSE emissions performance and exploring measures to further control air emissions; ▪ Exploring with franchisees the feasibility of expediting replacement of old airside vehicles and GSE with cleaner ones during tender or renewal of contracts; ▪ Requiring all new airside vehicles to be fuel-efficient, and making it a prerequisite for the licensing process; ▪ Providing the cleanest diesel and gasoline at the airfield;	N/A	Adverse residual impact is not anticipated.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
				▪ Requiring all of the AAHK's diesel vehicles to use biodiesel (B5); and ▪ Providing an LPG fuelling point for airside vehicles and GSE.		
Hazard to Human Life – Construction Phase						
Risk due to construction works near: ▪ Existing aviation fuel pipeline; and ▪ Storage facilities	▪ The individual risk level is below 1 x 10^{-5} per year; and ▪ Societal risk level is in the acceptable region	Annex 4 of EIAO-TM	N/A	Mitigation measure is not necessary due to the fact that the societal risk level is in the acceptable region	Although mitigation measure is not required due to the fact that the societal risk level is in the acceptable region, the following measures have been recommended for general best practice: ▪ Precaution measures should be established to request barges to move away during typhoons; ▪ An appropriate marine traffic management system should be established to minimise risk of collision, which could lead to sinking or dropped objects; and ▪ Location of all existing hydrant networks should be clearly identified prior to any construction works.	Adverse residual impact is not predicted.
Hazard to Human Life – Operation Phase						
Risk due to the operation of: ▪ New aviation fuel pipelines (submarine and underground); ▪ New fuel hydrant systems for aircraft refuelling operation at the new aircraft stands in the airport expansion area; and ▪ Airside petrol filling station	▪ The individual risk level is below 1 x 10^{-5} per year; and ▪ Societal risk level is in ALARP region	Annex 4 of EIAO-TM	N/A	▪ A similar coating standard shall be applied to the new submarine pipelines as for the existing pipelines ▪ Checks on the integrity of the new submarine pipeline should be conducted during testing and commission ▪ Before the commencement of any construction works, as-built drawings showing the alignment and level of the underground aviation fuel pipelines for the work area will be provided to the third party construction contractors ▪ Third party construction contractors are required to undertake underground pipeline detection works to ascertain the exact alignment of the underground pipeline before the commencement of works ▪ Monitoring of underground pipelines by the Leak Detection System should be provided ▪ Study should be conducted to ensure the new pipeline can withstand the planned future loading ▪ New pressure surge calculations are required for the hydrant network ▪ Appropriate pressure drop calculations should be undertaken for the new system	▪ Improvement audit to reinforce existing refuelling practices and to achieve better compliance ▪ During refuelling process, four cones are to be put in place to indicate the refuelling zone from aircraft fuelling point for the new fuel hydrant system where practicable. AAHK will communicate this recommendation to airlines and their refuelling operators as appropriate. Proper implementation of this recommendation will be checked in AAHK's future safety audits.	▪ The individual risk level is below 1 x 10^{-5} per year; and ▪ Societal risk level is in ALARP region.
Noise Impact – Aircraft Noise						
Aircraft Noise Whole Hong Kong territory	NEF 25 and NEF 30 contours	NEF25 for all domestic premises, hotels, educational institutions,	A portion of land use in Lok On Pai under planning	The following noise abatement practices currently adopted for the existing airport	▪ Putting the South Runway on standby where possible at night between 2300	N/A

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
		places of worship, courts of law and hospitals; and NEF 30 for offices (Ref. Table 1A, Annex 5 of EIAO-TM)		operation will be continued and maintained for the future airport operation: ▪ aircraft departing to the northeast are required to adopt the noise abatement take-off procedures stipulated by ICAO so long as safe flight operations permit; and ▪ all aircraft on approach to the HKIA from the northeast between 11:00 pm to 07:00 am are encouraged to adopt the Continuous Descent Approach.	and 0659; ▪ Requiring departures to take the southbound route via the West Lamma Channel during east flow at night from 2300 to 0659, subject to acceptable operational and safety consideration. This is an arrangement that is consistent with the existing requirement in the operation of the two-runway system at night; ▪ A new arrival RNP Track 6 has been designed for preferential use in the west flow direction (i.e., runway 25 direction) between 2300 and 0659 and it is assumed that up to 95% of flights may preferentially use this new Track 6 instead of the existing straight-in tracks by year 2030; ▪ Implementing a preferential runway use programme when wind conditions allow, such that west flow is used when departures dominate while east flow is used when arrivals dominate during night-time; and ▪ Direct measures – when developing the MLP for the CDA site at Lok On Pai, the alignment of the NEF25 contour line should be taken into account to ensure that no noise sensitive uses are situated within the NEF25 contour in the planned development[17].	
Noise Impact – Fixed Noise Sources						
Assessment area boundary has been established against the criteria of 70 dB(A) (for daytime/evening periods) or 60 dB(A) (for night-time period) under several worst assumptions.	With the recommended avoidance and mitigation measures in place, the cumulative mitigated noise levels due to fixed noise sources, including ground noise sources associated with the aircraft taxiing as well as the operations of aircraft engine run-up facilities and APUs, would comply with the relevant daytime/evening and night-time criteria at all representative NSRs.	▪ Noise Control Ordinance; ▪ EIAO-TM; relevant Guidance Notes under EIAO; and ▪ Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites.	With the avoidance and mitigation measures in place, no exceedance of the relevant noise criteria at any representative NSRs was predicted.	Specification of the maximum permissible SWLs of the project's fixed plants during daytime/evening and night-time should be followed.	Noise enclosure with noise reduction of at least 15 dB(A) at the ERUFs is required to comply with the relevant day & evening and night-time fixed noise criteria.	Adverse residual impact is not anticipated.
Noise Impact – Construction Noise						
The first layer of NSRs (nearest to the noise sources in various directions) has been selected as the assessment points.	With the recommended avoidance and mitigation measures in place, the cumulative mitigated noise levels would comply with the daytime construction noise criterion at all representative NSRs.	▪ Noise Control Ordinance; ▪ EIAO-TM; relevant Guidance Notes under EIAO; and ▪ Technical Memorandum on Noise from Construction Work other than Percussive Piling.	With the avoidance and mitigation measures in place, no exceedance of the daytime construction noise criterion at any representative NSRs was predicted.	Good site practice to limit noise emissions at source as follows: ▪ Only well-maintained plant to be operated on-site, and plant should be serviced regularly during the construction works ▪ Machines and plant that may be in intermittent use to be shut down between work periods, or throttled down to a minimum ▪ Plant known to emit noise strongly in one direction should, where possible, be orientated to direct	▪ Selection of quieter plant ▪ Use of movable noise barrier ▪ Use of noise enclosure / acoustic shed	Adverse residual impact is not anticipated.

[17] AAHK will offer the provision of window insulation and air-conditioning for all houses situated within the newly affected villages before the operation of the third runway in order to alleviate the potential aircraft noise impact on the residents.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
				noise away from the NSRs ▪ Mobile plant should be sited as far away from NSRs as possible ▪ Material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site construction activities		
Noise Impact – Traffic Noise						
For road traffic noise, assessment shall generally include areas within 300 m from the boundary of the project and the works of the project. For marine traffic noise, the assessment area has been established against the standard where the predicted marine traffic noise at the boundary of area is 10 dB(A) below the prevailing background noise level at the nearest NSR.	For road traffic noise, adverse noise impact from the proposed road alignments is not anticipated as the nearby NSRs are all found to be located beyond the 300m assessment area for the proposed road alignments of 3RS project For marine traffic noise, adverse noise impact is not anticipated as the nearby NSRs are all found to be located outside the assessment area.	▪ Noise Control Ordinance; and ▪ EIAO-TM; relevant Guidance Notes under EIAO	N/A	N/A	N/A	Adverse road traffic noise impact is not anticipated. Adverse marine traffic noise impact is not anticipated.
Water Quality Impact – Construction Phase						
WSRs within: ▪ North Western WCZ; ▪ North Western Supplementary WCZ; ▪ Deep Bay WCZ; and ▪ Western Buffer WCZ	▪ No exceedance of sedimentation criteria ▪ No adverse water quality impact due to depletion of dissolved oxygen at WSRs from submarine cable diversion ▪ No adverse water quality impact due to release of contaminants from submarine cable diversion ▪ No adverse water quality impact due to release of contaminated pore water from DCM activities ▪ No adverse water quality impact due to release of contaminated pore water from surcharge ▪ No exceedance of depth-averaged SS criteria due to the project under the mitigated scenario; however, exceedance of depth-averaged SS criteria at some WSRs under the mitigated cumulative scenario (primarily due to conservative assumptions of marine construction activities by other concurrent projects) ▪ For all other construction activities (e.g. drilling for submarine aviation fuel pipelines, construction / modification of stormwater outfalls, piling for new runway approach lights and HKIAAA marker beacons, construction site runoff and drainage, sewage effluent from construction	▪ EIAO-TM Annex 6 & 14 ▪ Water Pollution Control Ordinance (WPCO) ▪ North Western WCZ WQO ▪ North Western Supplementary WCZ WQO ▪ Deep Bay WCZ WQO ▪ Western Buffer WCZ WQO ▪ WSD's water quality criteria for flushing water intake ▪ Sediment Deposition and SS Criteria for Corals, *"Standards and Criteria for Pollution Control in Coral Reef Areas"* ▪ UK Council Directive on the quality required of shellfish waters (Shellfish Waters Directive) ▪ Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy ▪ The US Environmental Protection Agency (USEPA) Criteria Maximum Concentration (CMC) ▪ The USEPA Criteria Continuous Concentration (CCC)	For mitigated SS due to the project only: ▪ No exceedances of the depth-averaged SS criteria at all WSRs. For mitigated cumulative SS, no exceedance of the depth-averaged SS criteria at all WSRs except the following: ▪ C20 – WSD seawater intake at Tsing Yi – up to 2.5 mg/l above criteria (mainly due to concurrent projects) ▪ CR3 – Hard corals at The Brothers islands – up to 1.26 mg/l above criteria (primarily due to conservative assumptions for concurrent projects[18]) ▪ C7a – cooling water intake at HKIA (North) – up to 16.91 mg/l above criteria (no exceedance after further mitigation) ▪ C8 – future cooling water intake at HKBCF – up to 1.23 mg/l above criteria (no exceedance after further mitigation) ▪ E12 – Sham Shui Kok – up to 4.4 mg/l above criteria (primarily due to conservative assumptions for the concurrent Lantau Logistics Park (LLP) project. However, there is currently no implementation programme for this concurrent project, and the future project at this site will require an EIA	▪ Use of non-dredge ground improvement methods for land formation for avoidance of SS and contaminants release; ▪ Use of horizontal directional drill (HDD) method for submarine aviation fuel pipelines diversion; ▪ Only welding works will be carried out on the floating platform, and bulk storage of chemicals is not required at the daylighting point at Sha Chau; ▪ No dewatering of pipe at Sha Chau; ▪ Provision of a small concrete bund wall around the high side of the pit, and a cover to prevent rain entry at the daylighting point at Sha Chau to prevent muddy runoff; ▪ Drilling is conducted via a closed-loop system at the launching point at airport island, and drilling fluid is reconditioned and reused; ▪ Use of water jetting method and closed grabs for field joint excavation for diversion of submarine 11kV cables to minimise SS and contaminant release; and ▪ Connection works for outfalls to be undertaken during dry season.	▪ Capping of daily maximum production rates of relevant land formation works to those assumed in the water quality assessment; ▪ Restricting the fines content for sand blanket and marine filling activities; ▪ 200m advanced / partially completed seawall prior to marine filling operations; ▪ Double layer silt curtain system around selected active works areas; ▪ Double layer silt curtain and/or silt screen system around selected WSRs; ▪ Use of closed grabs and silt curtains for field joint excavation activities; ▪ Use of closed grabs, steel casing and silt curtains for piling activities; ▪ Implementation of guidelines set in Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 1/94) ; ▪ Provision of chemical toilets for construction workforce; ▪ Treatment of wastewater per WPCO requirements prior to discharge; ▪ Treatment of chemical wastes in accordance to Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes; and ▪ 'Zero discharge' policy for activities at Sha Chau.	Adverse residual impact is not predicted.

[18] Conservative assumptions are based on the maximum allowable SS release rates of the relevant concurrent project. However based on the available information, the actual SS release rates are much lower than the maximum allowable release rates.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
	workforce and general construction activities), no adverse water quality impacts are anticipated with the implementation of the proposed design / construction methods and the recommended mitigation measures where applicable.		which will minimise the potential water quality impacts associated with this concurrent project)			
Water Quality Impact – Operation Phase						
WSRs within: ▪ North Western WCZ; ▪ North Western Supplementary WCZ; ▪ Deep Bay WCZ; and ▪ Western Buffer WCZ	▪ No adverse water quality impacts anticipated due to changes in hydrodynamics , but minor exceedances in water quality criteria at some WSRs; ▪ No adverse water quality impacts anticipated due to embayment of water at western end of HKIA; ▪ No adverse water quality impacts anticipated due to sewage discharge; ▪ No adverse water quality impacts anticipated due to spent cooling water discharge; ▪ No adverse water quality impacts anticipated due to stormwater discharge; ▪ No adverse water quality impacts anticipated due to greywater reuse with the proposed design measures in place; ▪ No adverse water quality impacts anticipated due to accidental fuel spillage with the proposed design and contingency measures in place; and ▪ No need for maintenance dredging of the navigable waters north of HKIA.	▪ EIAO-TM Annex 6 & 14 ▪ WPCO ▪ North Western WCZ WQO ▪ North Western Supplementary WCZ WQO ▪ Deep Bay WCZ WQO ▪ Western Buffer WCZ WQO ▪ WSD's water quality criteria for flushing water intake ▪ Criteria for cooling water discharge (e.g. USEPA CCC and ecotoxicology study by Ma *et al.* (1998))	Minor exceedances were predicted for the below parameters and stations: *SS (monthly depth-averaged value)* C3 – up to 12.0 mg/l C5 – up to 13.2 mg/l C6 – up to 14.9 mg/l *TIN (annual depth-averaged value)* C1 – up to 0.62 mg/l C9 – up to 1.05 mg/l E1 – up to 3.61 mg/l *NH_3 (annual depth-averaged value)* C9 – up to 0.026 mg/l E1 – up to 0.134 mg/l Although exceedances were predicted, they were assessed as not attributable to the implementation of the project, but due to the high background levels.	▪ Connection of sewage of network for treatment of sewage at SHWSTW; ▪ Reuse of treated greywater to reduce sewage effluent and fresh water usage; ▪ Placement of submarine aviation fuel pipelines under seabed rocks to avoid possible damage from marine vessels and fuel leakage; ▪ Appropriate design of the land formation to avoid major changes in local and regional hydrodynamics; and ▪ Restrict operation of the fuel supply and refuelling systems to qualified and trained personnel.	▪ Treatment of wastewater per WPCO requirements prior to discharge; ▪ Treatment of chemical wastes in accordance with Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes; ▪ Install and maintain roadside gullies to trap and remove silt and grit from stormwater; ▪ Install and maintain oil/grease and oil/grease interceptors at storm drains; ▪ Intercept and discharge runoff from aircraft and vehicle washing activities to foul sewer or divert to temporary storage for treatment off-site; ▪ Fuel pipelines and hydrant systems should be designed with adequate protection and pressure / leakage detection systems; ▪ Provision of a 'spill trap containment system' at aircraft apron and stand areas; and ▪ Implement an emergency spill response plan for spillage events.	Adverse residual impact is not predicted
Sewerage and Sewage Treatment Implication – Construction Phase						
Refer to the relevant parts of the Water Quality Impact – Construction Phase						
Sewerage and Sewage Treatment Implication – Operation Phase						
▪ Gravity sewer from airport discharge manhole to Tung TCSPS ▪ TCSPS ▪ Sewage rising main from TCSPS to SHWSTW ▪ SHWSTW	▪ The existing gravity sewers from the airport discharge manhole to TCSPS would reach its full capacity by 2027 ▪ Pump capacity of TCSPS would be exceeded in 2023 ▪ No adverse impact to the sewage rising main from TCSPS to SHWSTW ▪ No adverse impact to the daily treatment capacity of SHWSTW ▪ Peak flow capacity of SHWSTW would be exceeded from year 2026	▪ Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning Version 1.0 published by EPD (GESF) ▪ Sewerage Manual – Part 1 published by DSD (SM1)	N/A	N/A	▪ The sewerage system for 3RS will be designed, operated and maintained by AAHK in accordance with all the relevant standards and guidelines published by DSD. In addition to continuing the odour control arrangements, AAHK will monitor the H_2S level and adopt active septicity management measures that can effectively contain any future septicity problems in the design for the 3RS sewerage system. ▪ AAHK undertakes to implement and complete the upgrading works for the affected gravity sewer by 2026 (allowing a buffer period of about one year before the full capacity is	No adverse residual impacts would be anticipated.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
					reached), with the planning work to commence in 2022 (assuming one year for planning plus three years for design and construction). AAHK should also monitor the sewage flow build-up as a part of the EM&A for the project and start planning construction of the upgrading works in 2022, or when the sewage flow in the affected gravity sewer exceeds 80% of the design capacity of the sewer, whichever is earlier, so as to ensure timely completion of the mitigation works before the flow would exceed the design capacity of the sewer. ▪ A government project under Agreement No.CE6/2012 is currently underway by DSD to investigate, design and construct an additional sewage rising main between TCSPS and SHWSTW, which would enhance the operational reliability of the sewerage system. Construction is planned to commence in 2015 and complete the works by end 2022. The TCSPS is sufficient to cater for the ultimate design sewage flow arising from the project after the completion of construction under Agreement No. CE6/2012[19]. ▪ EPD will monitor the sewage flow build-up and coordinate the necessary upgrading works for the SHWSTW when needed in due course.	
Waste Management Implication – Construction Phase						
Project area	▪ Inert C&D materials of about 9,543,500m^3 (in-situ volume) generated from excavation works, piling works, demolition works on the existing airport island / proposed land formation area as well as from HDD during diversion of the existing submarine pipelines; ▪ Non-inert C&D materials of about 96,200m^3 (in-situ volume) generated from site clearance of the golf course area, demolition works for the T2 expansion, and various superstructure construction works; ▪ Marine sediment of about 10,200m^3 (in-situ volume) generated from excavation at the cable field joint area; ▪ Marine sediment of about 767,660m^3 (in-situ volume) generated from the foundation / piling / excavation works for	▪ Annex 7 and 15 of EIAO-TM; ▪ Waste Disposal Ordinance (Cap. 354); ▪ Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C); ▪ Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N); ▪ Building Ordinance (Cap.123); ▪ Land (Miscellaneous Provisions) Ordinance (Cap. 28); ▪ Dumping at Sea Ordinance (Cap. 466); and ▪ Public Cleansing and Prevention of Nuisances Regulation (Cap. 132BK).	N/A	▪ The use of non-dredge methods for ground improvement will completely avoid bulk removal and disposal of any dredged materials; ▪ Most sloping seawall options can allow for the reuse of rock armour from the existing northern seawall to minimise waste generation; ▪ Priority will be given to maximise the use of suitable fill materials available from other concurrent projects and the Government's PFRF; ▪ Minimise the extent of excavation and maximise on-site reuse of the inert C&D materials generated as far as practicable. The relevant construction activities (particularly for the tunnel works) and construction programme have been carefully planned and developed; ▪ All marine sediments to be generated from the foundation / piling / excavation works for constructing various tunnels, facilities, buildings	▪ Good site practices and waste reduction measures for C&D materials ▪ Marine disposal of marine sediments from the cable field joint excavation ▪ Handling of chemical wastes in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, and disposal of chemical wastes at licensed chemical waste recycling/ treatment facilities ▪ Employ a reputable licensed waste collector for disposal of general refuse and floating refuse at designated landfill sites	No adverse residual impacts would be anticipated.

[19] EPD has agreed to reserve 43,500 m^3/day (ADWF) at the TCSPS for the total sewage discharge from the expanded airport, and AAHK will closely liaise with EPD and DSD to ascertain a smooth interface with the upgrading works for TCSPS.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
	constructing various tunnels, facilities, buildings and APM depot; ▪ Small quantity of chemical waste from maintenance and servicing of construction plant and equipment; ▪ General refuse of maximum daily arising of up to 9,100kg from construction workforce; and ▪ Floating refuse of about 65m^3 to be collected from the newly constructed seawall per year.			and APM depot will be treated and reused on-site as backfilling materials, thus avoiding the need for disposal of the sediments; ▪ Using HDD method to construct the new pipeline will avoid dredging of seabed; and ▪ Use of water jetting method to lay the new cable will avoid generation and disposal of any marine sediment.		
Waste Management Implication – Operation Phase						
Project area	▪ About 46,190 tons/year of general refuse from the operation of the passenger concourse, aircraft cabins, terminal buildings, offices, commercial establishments and various airport infrastructure facilities; ▪ Chemical waste from maintenance, servicing and repairing of various E&M equipment; ▪ Floating refuse of about 65m^3 to be collected from the new artificial seawall per year; and ▪ About 0.23 ton/day of dewatered sludge from the proposed greywater treatment plant	▪ Waste Disposal Ordinance (Cap. 354); and ▪ Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354C).	N/A	▪ The initiatives currently implemented at HKIA in segregating recyclable waste materials (such as cardboard, paper, metals, plastics, glass bottles, food waste, etc.) from general refuse for recycling should be extended to cover the expanded airport; and ▪ The artificial seawall of the expanded airport island has been properly designed to achieve a shoreline without any sharp turns or abrupt indentation where floating refuse would easily be trapped or accumulated.	▪ Employ a reputable licensed waste collector to collect general refuse on a daily basis and dispose of the general refuse at designated landfill sites ▪ Handling of chemical wastes in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, and disposal of chemical wastes at licensed chemical waste recycling/ treatment facilities ▪ Regular cleaning of floating refuse trapped or accumulated on the artificial seawall, and disposal of the floating refuse together with general refuse at designated landfill sites ▪ Employ a reputable licensed waste collector to dispose of the dewatered sludge (stored in tight containers or skips) at designated landfill sites	No adverse residual impacts would be anticipated.
Land Contamination – Construction Phase						
Potential land contaminative areas within the project	Land contamination impacts were identified by carrying out land contamination assessment of the past / present land uses of potential contaminative areas. The potential land contaminative areas include: ▪ Golf course area ▪ T2 expansion area (underground and above-ground fuel tank areas, and emergency power generation units) ▪ Existing airside facilities (petrol filling station and fuel tank room)	▪ Section 3 of Annex 19 of EIAO-TM; ▪ Guidance Note for Contaminated Land Assessment and Remediation; ▪ Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management; and ▪ Practice Guide for Investigation and Remediation of Contaminated Land.	N/A (As all potential land contaminative areas are still under operation, all sampling and testing works will be conducted prior to commencement of any construction works at these areas.)	N/A	▪ The contaminated soil identified (if any) should be excavated and treated on-site; and ▪ The recommended environmental mitigation and safety measures, progress monitoring and / or confirmation sampling / testing recommended should be implemented.	No adverse residual impacts would be anticipated.
Land Contamination – Operation Phase						
N/A	N/A	N/A	N/A	N/A	N/A	N/A
Terrestrial Ecological Impact – Construction and Operation Phases						
Tai Ho Stream SSSI, San Tau Beach SSSI, Lung Kwu Chau, Tree Island and Sha Chau SSSI; Open sea to the north of the existing airport island in relation to the investigation of birds' activities	Low or negligible impacts to the terrestrial habitats, flora and fauna species in the study area during construction and operation phases	▪ Annexes 8 and 16 of EIAO-TM.	N/A	N/A	N/A	None

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
over the land formation area and the adjacent waters; All land areas within 500 m from the coastline of North Lantau from Sham Wat Wan to Tai Ho Wan; and All land areas within the boundary of SCLKCMP.						
Sha Chau Egretry	Sha Chau egretry: moderate impact due to the fuel pipeline installation works; but no impact during operation phase	▪ EIAO-TM, particularly Annexes 8 and 16.	N/A	▪ Avoidance of direct impact to egretry – the daylighting location should be outside egretry boundary ▪ Construction activities at Sheung Sha Chau Island should avoid night-time and the ardeid's breeding season (April – July).	▪ Preservation of Nesting Vegetation – the vegetation used by ardeids for nesting should be preserved.	None
Marine Ecological Impact – Construction and Operation Phase						
San Tau Beach SSSI, SCLKCMP , planned BMP and potential SWLMP, intertidal, sub-tidal hard bottom, sub-tidal soft bottom and open marine waters habitats	Temporary/ permanent loss of habitats due to land formation and associated works: ▪ Low-moderate for intertidal and sub-tidal hard bottom habitats; ▪ Moderate for open marine waters; ▪ Low for rocky shore at SCLKCMP; ▪ Insignificant to moderate for sub-tidal soft bottom habitats; ▪ Insignificant for open marine waters around Sha Chau, and two ends and northwestern waters of the 3RS Loss of carrying capacity and habitat fragmentation, changes in species distribution, abundance and patterns of habitat use: ▪ Low impacts Release of SS and associated changes in water quality: ▪ Low-moderate for corals ▪ Insignificant to low for other habitats Release of contaminants from pore water, oil/chemical spillage, change in hydrodynamics, changes in water quality associated with change in hydrodynamics, indirect disturbance of habitats due to deterioration of water quality: ▪ Insignificant to low impacts Importation and transportation of marine fill and filling activities, piling activities and associated underwater noise: ▪ Low impacts Impingement and entrainment due	▪ Annexes 8 and 16 of EIAO-TM ▪ WPCO ▪ North Western WCZ WQO ▪ North Western Supplementary WCZ WQO ▪ Deep Bay WCZ WQO ▪ Western Buffer WCZ WQO ▪ Sediment Deposition and SS Criteria for Corals, *"Standards and Criteria for Pollution Control in Coral Reef Areas"*	No exceedances are predicted	Relevant avoidance measures as detailed above for the water quality aspect	▪ Minimisation of land formation area ▪ Use of construction methods with minimal risk / disturbance ▪ Consideration of alternative alignment for pipeline diversion with minimal risk / disturbance ▪ Consideration of alternative treatment to existing pipelines after diversion ▪ Strict enforcement of no-dumping policy ▪ Good construction site practices ▪ Relevant water quality mitigation measures during construction and operation phases as detailed above ▪ Pre-construction phase coral dive survey to review the feasibility of translocating coral species ▪ Spill response plan ▪ Proposed establishment of new marine park of approximately 2,400 ha linking the planned BMP and the existing SCLKCMP [20]	No adverse residual impact is anticipated.

[20] In addition to the proposed mitigation measures, environmental enhancement measures have also been recommended, including deployment of artificial reefs; provision of eco-enhancement designs for part of the seawall; establishment of a marine research programme to support conservation of marine ecology; promotion of environmental education and eco-tourism; and setting up of environmental enhancement fund.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
	to seawater intakes, indirect disturbance of marine fauna due to aircraft noise: ▪ Insignificant to low impacts					
CWD habitats at north of airport island, around Sha Chau, marine waters between airport and Sha Chau	Temporary and permanent loss of dolphin habitats due to land formation and associated construction: ▪ Low to high for marine waters north of airport island ▪ Insignificant at other locations Loss of carrying capacity: ▪ Moderate for marine waters and CWD habitat Habitat fragmentation: ▪ Moderate for marine waters and CWD habitat Loss of CWD travelling area and connectivity between core CWD habitat areas: ▪ Moderate for travel areas north of airport island Loss of prey resources for CWD as a result of temporary loss of benthic habitat: ▪ Low for marine waters Disturbance to the CWD use of travelling area and connectivity between core CWD habitat areas: ▪ Moderate for travel area north of existing airport island Changes to species distribution, abundance and habitat use: ▪ Moderate Changes in water quality: ▪ Insignificant to low Impacts to marine life from the importation and transportation of marine fill and filling activities: ▪ Low Increased acoustic disturbance from construction works: ▪ Insignificant for 11kV cable and fuel pipeline diversion; low for bored piling for approach lights and marker beacons; low-moderate for general construction works. Increased disturbance from night-time construction works: ▪ Moderate Increased acoustic disturbance from changes to marine vessels and ferry traffic: ▪ Low to moderate during construction phase, Moderate-high during operation phase Increased risk of injury/mortality to	• Annexes 8 and 16 of EIAO-TM • WPCO • North Western WCZ WQO • North Western Supplementary WCZ WQO • Deep Bay WCZ WQO • Western Buffer WCZ WQO • Sediment Deposition and SS Criteria for Corals, *"Standards and Criteria for Pollution Control in Coral Reef Areas"*	N/A	Relevant avoidance measures as detailed above for the water quality aspect	▪ Relevant water quality mitigation measures during construction and operation phases as detailed above ▪ Acoustic decoupling of construction equipment mounted on barges ▪ Dolphin Exclusion Zones ▪ Avoid peak calving seasons of CWD for bored piling works ▪ Spill response plan ▪ Construction vessel speed limits and skipper training ▪ Establishment of new marine park of approximately 2,400 ha linking the planned BMP and the existing SCLKCMP ▪ SkyPier HSFs' speed restrictions and route diversions	No adverse residual impact is anticipated.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
	CWDs from marine traffic ▪ Low for construction vessels; High for HSFs. Changes to CWD movement patterns as a result of marine traffic: ▪ Low to moderate during construction phase, Moderate-high during operation phase Disturbance to the function and quality of Marine Parks: ▪ Low-moderate for SCLKCMP; low for potential SWLMP; moderate for planned BMP Changes to the hydrodynamic regime and water quality as a result of the new land formation: ▪ Low Secondary impacts of the proposed new marine park and extension of HKIAAA on CWDs: ▪ Positive secondary impacts					
Fisheries Impact – Construction Phase						
North Western WCZ; North Western Supplementary WCZ; Deep Bay WCZ; and Western Buffer WCZ	▪ Direct loss of fishing ground from construction works are of low significance from commencement to moderate. ▪ Direct loss of fisheries habitats (and resources) from construction works are of low significance from commencement to moderate. ▪ Direct loss of fisheries habitats (and resources) from diversion of submarine 11 kV cables and submarine fuel pipelines is insignificant. ▪ Low impact significance for the direct loss of spawning and nursery ground. ▪ Insignificant to low impact for indirect disturbance due to deterioration of water quality. ▪ Insignificant for indirect impact on aquaculture sites. ▪ Low for the indirect impact on artificial reef. ▪ Low for the impact of fishing activities. ▪ Low impact significance for the disturbance to fisheries resources associated with underwater sound.	▪ Annexes 9 and 17 of EIAO-TM ▪ Fisheries Protection Ordinance ▪ Marine Fish Culture Ordinance ▪ Marine Parks Ordinance	N/A	Relevant avoidance measures as detailed above for the water quality aspect	▪ Relevant water quality mitigation measures during construction phase as detailed above ▪ Minimisation of land formation area ▪ Use of construction methods with minimal risk / disturbance ▪ Consideration of alternative alignment for pipeline diversion with minimal risk / disturbance ▪ Consideration of alternative treatment to existing pipelines after diversion ▪ Strict enforcement of no-dumping policy ▪ Good construction site practices	No adverse residual impact is anticipated.
Fisheries Impact – Operation Phase						
North Western WCZ; North Western Supplementary WCZ; Deep Bay WCZ; and Western Buffer WCZ	▪ Moderate impact significance for the direct loss of fishing ground. ▪ Low impact significance for the disturbance of fishing activities.	▪ Annexes 9 and 17 of EIAO-TM ▪ Fisheries Protection Ordinance ▪ Marine Fish Culture Ordinance	N/A	Relevant avoidance measures as detailed above for the water quality aspect	▪ Relevant water quality mitigation measures during operation phase as detailed above ▪ Proposed establishment of new	No adverse residual impact is anticipated.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
	▪ Moderate impact significance for the direct loss of fisheries habitats (and resources). ▪ Low for the direct loss of spawning and nursery grounds. ▪ Low impact significance for the change in hydrodynamics and tidal influence. ▪ Insignificant for the indirect disturbance of fisheries habitats due to deterioration of water quality. ▪ Low impact significance for the impingement and entrainment due to seawater intakes. ▪ Insignificant for the indirect disturbance due to aircraft noise. ▪ Positive impact on fisheries resources conservation, low impact significance on fishing activities with the implementation of the proposed new marine park together with extension of HKIAAA for the project.	▪ Marine Parks Ordinance			marine park of approximately 2,400 ha linking the existing/planned marine parks and the extended HKIAAA[21]	
Landscape and Visual Impact – Construction Phase						
Identified LRs, LCAs and VSRs that may be affected by the project	After the implementation of mitigation measures during the construction phase, all LRs and LCAs are anticipated to experience residual impacts of slight or insubstantial significance or are not anticipated to be affected by the 3RS, except the following: ▪ Coastal waters of North Lantau and inshore water landscape are anticipated to experience residual impacts of substantial significance ▪ Roadside amenity planting within the assessment area is anticipated to experience impacts of moderate significance After the implementation of mitigation measures during the construction phase, all VSRs are anticipated to experience residual impacts of slight or insubstantial significance or are not anticipated to be affected by the 3RS, except the followings: ▪ Passengers / drivers of recreational marine craft in North Lantau waters and Urmston Road and recreational users of Sha Chau Islands are anticipated to experience residual impacts of substantial	▪ Annexes 3, 10, 11, 18, 20 and 21 of EIAO-TM; ▪ Hong Kong Planning Standards and Guidelines; ▪ Hong Kong 2030 Planning Vision and Strategy Final Report; ▪ Landscape Value Mapping of Hong Kong; ▪ EIAO Guidance Note No. 8/2010; ▪ Town Planning Ordinance; ▪ Forests and Countryside Ordinance; ▪ Country Parks Ordinance; ▪ Foreshore and Sea-bed (reclamations) Ordinance; ▪ Marine Parks Ordinance; ▪ Protection of Endangered Species of Animals And Plants Ordinance; ▪ Approved Chek Lap Kok OZP No. S/I-CLK/12; ▪ Approved Tung Chung Town Centre Area OZP No. S/I-TCTC/18; ▪ SILTech Publication (1991) – Tree Planting and Maintenance in Hong Kong (Standing	N/A	▪ The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape; ▪ Reduction of construction period to practical minimum; ▪ Control of night-time lighting by hooding all lights and through minimising night working periods; and ▪ All existing trees shall be carefully protected during construction.	▪ Phasing of the construction stage to reduce visual impacts during the construction phase; ▪ Construction traffic (land and sea) including construction plants, construction vessels and barges should be kept to a practical minimum; ▪ Erection of decorative mesh screens or construction hoardings around works areas in visually unobtrusive colours; ▪ Trees unavoidably affected by the works shall be transplanted where practical; ▪ Avoidance of excessive height and bulk of site buildings and structures; and ▪ Land formation works shall be followed with advanced hydroseeding around taxiways and runways as soon as practical.	In accordance with the relevant criteria and guidelines for evaluating and assessing impacts, it is considered that the overall residual landscape and visual impacts of the project are marginally acceptable with mitigation.

[21] In addition to the proposed mitigation measures, a number of fisheries enhancement measures are proposed to further improve the fisheries resources in the western Hong Kong waters and support sustainable fisheries operation, including eco-enhancement design of part of the seawalls within the future extended HKIAAA which restricts vessel entry including fishing vessels; potential deployment of artificial reefs at appropriate locations to promote juvenile fish recruitment; implementation of a FES; and setting up of a Fisheries Enhancement Fund.

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
	significance ▪ Residents of Tung Chung, including Tung Chung Crescent, Seaview Crescent, Caribbean Coast, Area 53 to Area 56, residents along south coast of Tuen Mun, Hong Kong Gold Coast and Siu Lam; visitors to AsiaWorld Expo, Hong Kong SkyCity Marriott Hotel, Hong Kong Airport Passenger Terminal and to Regal Airport Hotel; passengers of Cable Cars of Ngong Ping 360; hikers of Nei Lak Shan, Fung Wong Shan (Lantau Peak), Tai Tung Shan (Sunset Peak), Lantau North Country Park, Lantau South Country Park and Scenic Hill are anticipated to experience residual impacts of moderate significance. ▪ Passengers / drivers of vehicles and MTR along Cheong Wing Road; passengers of commercial aircraft, passengers / drivers of the proposed Hong Kong Link Road; and passengers of ferries in North Lantau waters and Urmston Road are anticipated to experience residual impacts of moderate significance.	Interdepartmental Landscape Technical Group) [11-23]; ▪ GEO publication (1/2009) – Prescriptive Measures for Man-made Slopes and Retaining Walls; ▪ GEO 1/2011 – Technical Guidelines on Landscape Treatment for Slopes ▪ Land Administration Office Instruction (LAOI) Section D-12 – Tree Preservation; ▪ LDPN 7/2007 - Tree Preservation and Tree Removal Application for Building Development in Private Projects; ▪ DEVB TC (W) No.2/2012 Allocation of Space for Quality Greening on Roads; ▪ DEVB TC (W) No.3/2012 Site Coverage of Greenery for Government Building Projects; ▪ DEVB TC (W) No.2/2013 Greening on Footbridges and Flyovers; ▪ ETWB TCW No. 2/2004 – Maintenance of Vegetation and Hard Landscape Features; ▪ ETWB TCW No. 29/2004 – Registration of Old and Valuable Trees, and Guidelines for their Preservation; ▪ ETWB TCW No. 36/2004 The Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS); ▪ ETWB TCW No. 5/2005 – Protection of Natural Streams/Rivers from Adverse Impacts Arising from Construction Works; ▪ ETWB TCW No. 10/2013 - Tree Preservation; ▪ WBTC No. 25/93 – Control of Visual Impact of Slopes; ▪ WBTC No. 17/2000 – Improvement to the Appearance of slopes in connection with WBTC 25/93; ▪ WBTC No. 7/2002 – Tree Planting in Public Works; ▪ Latest Proper Planting Practices and other relevant guidelines issued by Development Bureau (Greening, Landscape and Tree Management Section); and ▪ Latest Hong Kong International Airport Approved Plant Species List.				
Landscape and Visual Impact – Operation Phase						

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
Identified LRs, LCAs and VSRs that may be affected by the project	After the implementation of mitigation measures during the operation phase, all LRs and LCAs are anticipated to experience residual impacts of slight or insubstantial significance or are not anticipated to be affected by the 3RS, except the following: ▪ Impacts on coastal waters of North Lantau and inshore water landscape are anticipated to remain substantial in the operation phase. After the implementation of mitigation measures during the operation phase, all VSRs are anticipated to experience residual impacts of slight or insubstantial significance, or are not anticipated to be affected by the 3RS, except the following: ▪ Passengers / drivers of recreational marine craft in north Lantau waters and Urmston Road and recreational users of Sha Chau Islands are anticipated to experience residual impacts of moderate significance.	Same as for the Construction Phase.	N/A	Lighting units to be directional and minimise unnecessary light spill and glare.	▪ Sensitive landscape design of land formation edge; ▪ All above ground structures, including Vent Shafts, Emergency and Firemen's Accesses etc. shall sensitively designed; ▪ Sensitive design of buildings and structures in terms of scale, height and bulk (visual weight); ▪ Use appropriate building materials and colours in built structures to create cohesive visual mass; ▪ Greening measures, including vertical greening, green roofs, road verge planting and peripheral screen planting, shall be implemented; ▪ Compensatory Tree Planting for all felled trees shall be provided to the satisfaction of relevant Government departments; ▪ Streetscape (e.g. paving, signage, street furniture, lighting, etc.) shall be sensitively designed; ▪ All streetscape areas and hard and soft landscape areas disturbed during construction shall be reinstated to equal or better quality (with implementation of screen planting, road verge planting etc.); ▪ Aesthetic improvement planting of viaduct structure; and ▪ Sensitive design of footbridges, noise barriers and enclosures with greening (screen planting / climbers / planters) and chromatic measures.	In accordance with the relevant criteria and guidelines for evaluating and assessing impacts, it is considered that the overall residual landscape and visual impacts of the project are marginally acceptable with mitigation.
Cultural Heritage Impact – Construction Phase						
Cultural heritage within the marine archaeological assessment area and within the 500 m assessment area for terrestrial cultural heritage	No impacts predicted	Guidelines for Cultural Heritage Impact Assessment MAI Guidelines for MAI	None	N/A	None required	N/A
Cultural Heritage Impact – Operation Phase						
Cultural heritage within the marine archaeological assessment area and within the 500 m assessment area for terrestrial cultural heritage	No impacts predicted	Guidelines for Cultural Heritage Impact Assessment MAI Guidelines for MAI	None	N/A	None required	N/A
Health Impact – Aerial Emissions						
Human receptors within 5km Assessment area	Levels of acute and chronic exposure due to TAP comply with the respective international guideline values. Maximum increase of carcinogenic risk due to TAP is around 1.14×10^{-5} which is considered acceptable. For criteria pollutants, the estimated risks of hospital admission and premature death for short-term exposure are relatively small. The estimated risk of premature death for long-term exposure is also relatively small.	▪ International guidelines values (such as WHO, IRIS, OEHHA, etc.) ▪ Health risk / impact assessment guidelines (such as WHO)	N/A	Those adopted for alleviating potential air quality impacts during operation phase	Those adopted for mitigating potential air quality impacts during operation phase	N/A
Health Impact – Aircraft Noise						
Populated areas located adjacent	Changes in populations affected	Health risk / impact assessment	N/A	Those adopted for alleviating potential	Those adopted for mitigating potential	N/A

Assessment Points	Results of Impact Predictions	Relevant Standards / Criteria	Extent of Exceedances Predicted	Impact Avoidance Measures Considered	Mitigation Measures Proposed	Residual Impacts
to the NEF 25 contour line	relative to "without project" scenario: ▪ Annoyance: approximately 10% less ▪ Sleep disturbance: approximately 50% less	guidelines (such as WHO and EEA)		aircraft noise impacts	aircraft noise impacts	

6. Environmental Monitoring and Audit

6.1.1.1 An EM&A programme to check the effectiveness of the recommended mitigation measures and compliance with relevant statutory requirements will be implemented. Details of the EM&A works are given in the separately prepared EM&A Manual for the project, with the specific EM&A requirements highlighted as follows:

6.1.1.2 Air

- Monitoring of TSP during the construction phase.
- No additional air quality monitoring is required during the operation phase, as AAHK has been carrying out routine outdoor and indoor air quality monitoring on the airport island.

6.1.1.3 Hazard to Human Life

- Regular inspections to ensure that measures to reduce the risk associated with aircraft refueling operations are carried out properly.

6.1.1.4 Noise

- Regular review of aircraft noise related operation data for aircraft noise management and continuous community engagement.
- Noise commissioning tests for major fixed plant within HKIA and noise enclosure of aircraft engine run-up facilities prior to operation of the project.
- Noise level monitoring during construction works.

6.1.1.5 Water Quality

- Water quality monitoring during marine construction works (including DCM-specific monitoring).
- Post-construction monitoring upon completion of all marine construction works.
- Water quality monitoring for the greywater treatment facility during commissioning and operation.

6.1.1.6 Sewage

- Regular monitoring of the sewage flow build-up for the project to ensure timely completion of the mitigation works for the affected gravity sewer before the flow exceeds the sewer design capacity.
- H_2S monitoring for the sewerage system of the 3RS to ensure no adverse impacts in respect of septicity and odour issues.

6.1.1.7 Waste

- Regular site inspections to ensure the proper implementation of the Waste Management Plan.
- Regular inspection along the artificial seawall to check for any accumulation of floating refuse.

6.1.1.8 Land Contamination

- Regular audit of all related procedures and facilities for the handling or storage of chemicals and chemical wastes.

6.1.1.9 Terrestrial Ecology

- Pre-construction survey for the Sha Chau egretry during ardeid breeding season.

6.1.1.10 Marine Ecology

- Baseline, construction, post-construction and operation phase monitoring, including dolphin monitoring (vessel line transect, land-based theodolite tracking and PAM).
- Pre-construction coral dive survey at the artificial seawall at the north and northeast of the airport island, and the proposed daylighting location at Sha Chau.

6.1.1.11 Fisheries

- No specific fisheries monitoring is required because the proposed water quality monitoring programme will cover the sites of fisheries importance and will provide an indication of the effectiveness of the water quality mitigation measures that would in turn reduce fisheries impact.

6.1.1.12 Landscape and Visual

- Checking implementation of the landscape and visual mitigation measures during construction and operation phases.

7. Conclusion

7.1.1.1 The development needs of the airport are reviewed every five years as part of a continuous master planning process. During MP2030 study process, a number of feasibility studies were undertaken, where it was identified that there would be a need to expand the existing airport in order to cope with the projected air traffic demand up to 2030. Since then, a series of engineering studies, environmental assessments and public engagements have been undertaken to assess the various options and derive the preferred airport layout option. The outcomes from these studies and views collected from stakeholder engagements have been incorporated into the EIA study where appropriate.

7.1.1.2 On the basis of the engineering and environmental assessments undertaken during the MP2030 study stage and the subsequent EIA study, AAHK has committed to implementing a number of key design, construction and operation initiatives that aim to eliminate or substantially reduce some of the environmental impacts of the project, including the impacts on marine ecology, water quality, air quality, noise and health issues. Nevertheless, even with the implementation of the design and planning strategies, environmental impacts due to the project are still expected. These potential impacts have been assessed in a comprehensive and scientifically robust manner under this EIA with effective and practicable mitigation measures recommended to further minimise the potential impacts.

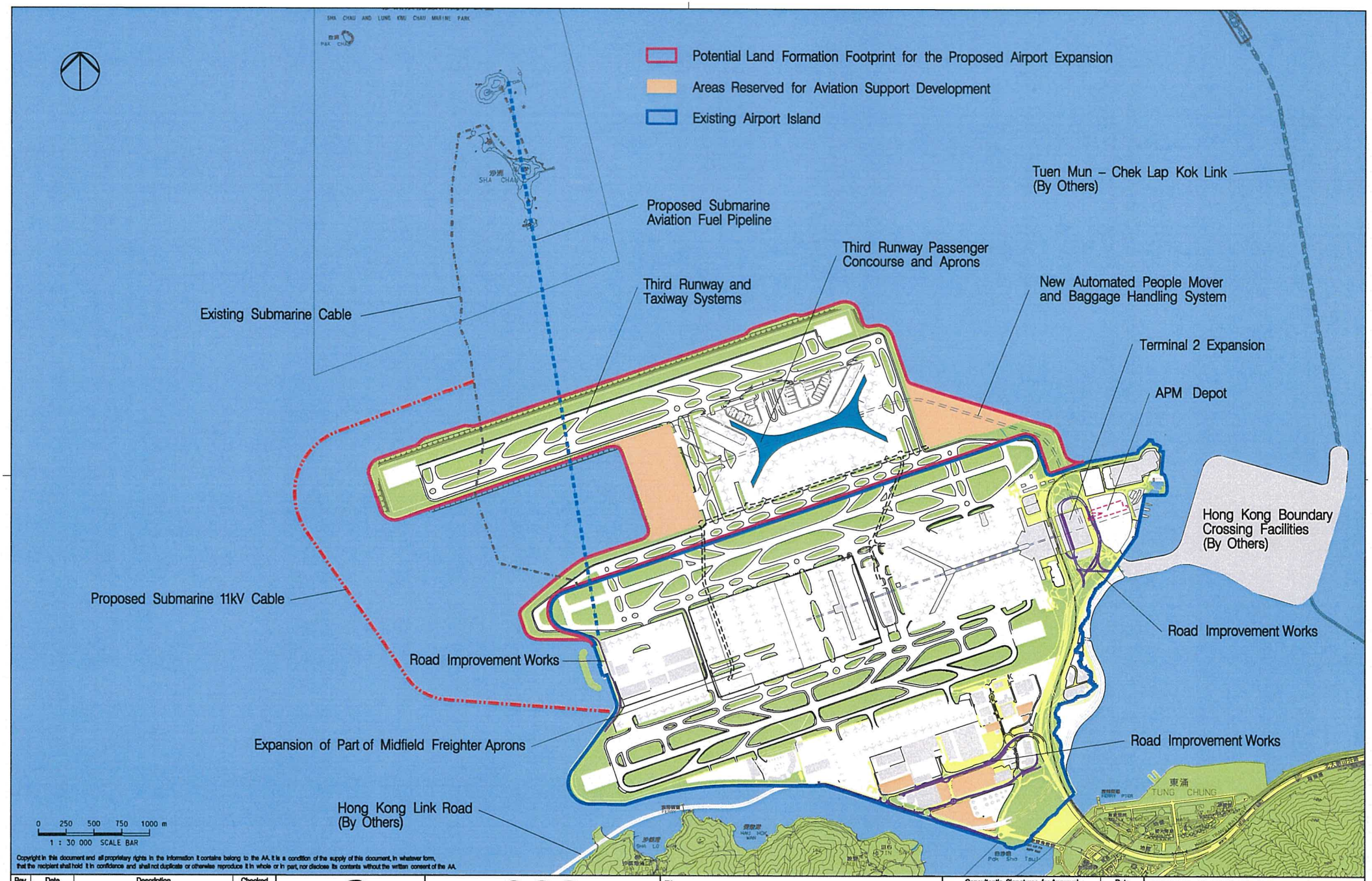
7.1.1.3 The EIA study has identified and assessed the potential environmental impacts that may arise from the construction and operation of the project, in accordance with the EIA study brief and the relevant requirements of the EIAO-TM. A summary of the outcome of the technical assessments is shown in **Table 7.1**.

Table 7.1: Summary of Outcome from the EIA Study

Environmental Aspect	Construction Phase		Operation Phase	
	Without mitigation	With mitigation	Without mitigation	With mitigation
Air Quality	Some impacts	Acceptable	Acceptable	N/A
Hazard to Human Life	Acceptable	N/A	Some impacts	As low as reasonably practicable
Noise	Some impacts	Acceptable	Some impacts	Acceptable
Water Quality	Some impacts	Acceptable	Acceptable	N/A
Sewerage and Sewage Treatment	N/A	N/A	Some impacts	Acceptable
Waste	Some impacts	Acceptable	Some impacts	Acceptable
Land Contamination	Potential impacts	Acceptable	N/A	N/A
Terrestrial Ecology	Some impacts	Acceptable	Acceptable	N/A
Marine Ecology	Some impacts	Acceptable	Some impacts	Acceptable
Fisheries	Some impacts	Acceptable	Some impacts	Acceptable
Landscape & Visual	Some impacts	Acceptable	Some impacts	Acceptable
Cultural Heritage	Acceptable	N/A	Acceptable	N/A
Health	N/A	N/A	Some impacts	Acceptable

7.1.1.4 Based on the results of the assessments, the EIA study concludes that the project would be environmentally acceptable and in compliance with the relevant environmental legislation and standards. With implementation of the recommended environmental mitigation measures, no

unacceptable adverse residual impacts from the project are anticipated. A comprehensive EM&A programme will be implemented to check the implementation of mitigation measures and environmental compliance.



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Title: PREFERRED AIRPORT LAYOUT OPTION

Consultant's Signatures for Approval		Date
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Checkers	EY	13NOV13
Design Supervisor	EC	21MAR14
Authorised Representative	AFK	21MAR14

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No. MCL / P132 / ES / 3-001

Scale at A3: 1 : 30000

Rev. B

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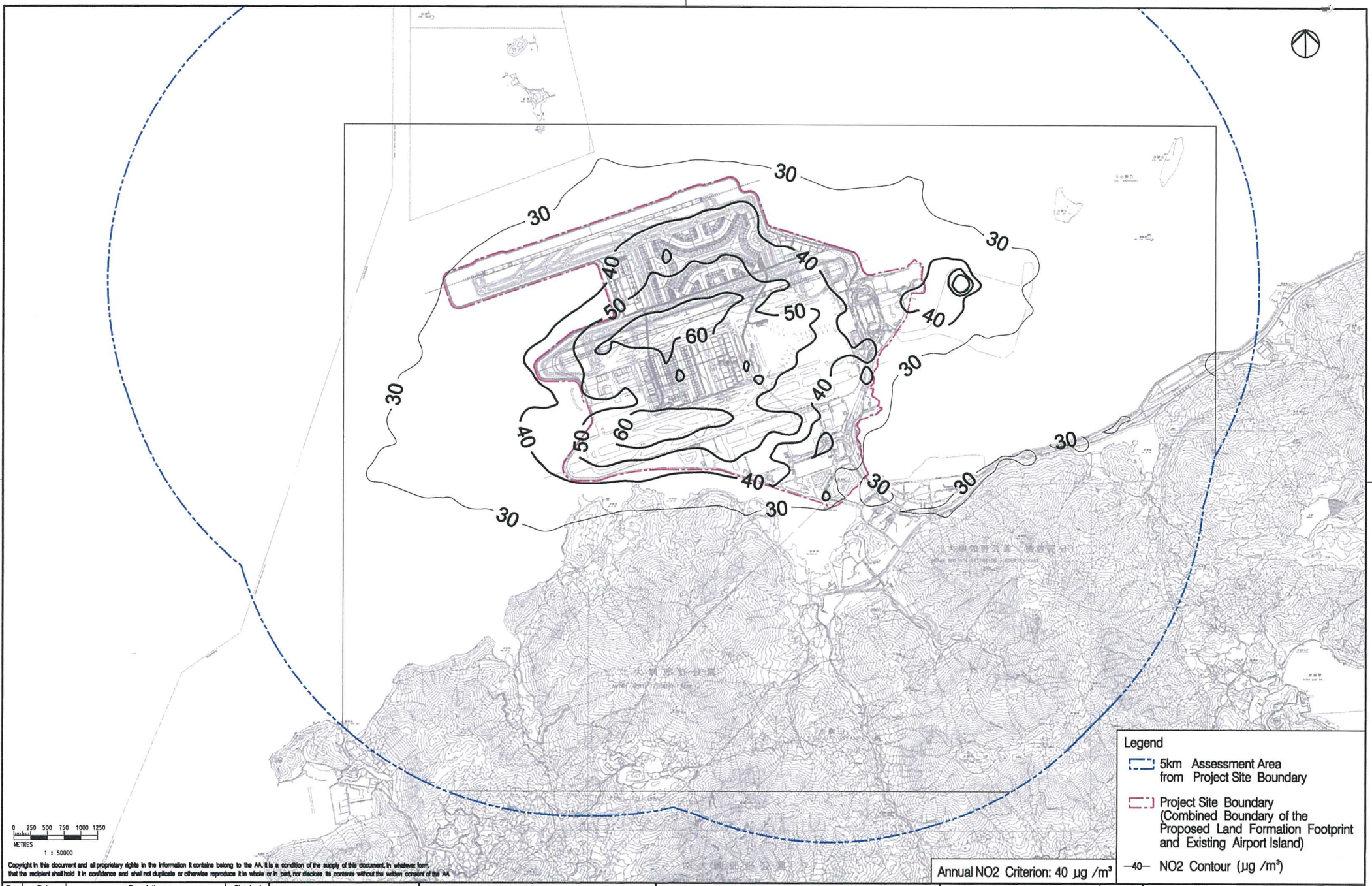

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Title: CONTOURS OF CUMULATIVE ANNUAL AVERAGE NO_2 CONCENTRATIONS AT 1.5M ABOVE GROUND FOR YEAR 2031 (AIRPORT ISLAND AND TUNG CHUNG AREA)

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Authorised Representative	AFK	24MAR14

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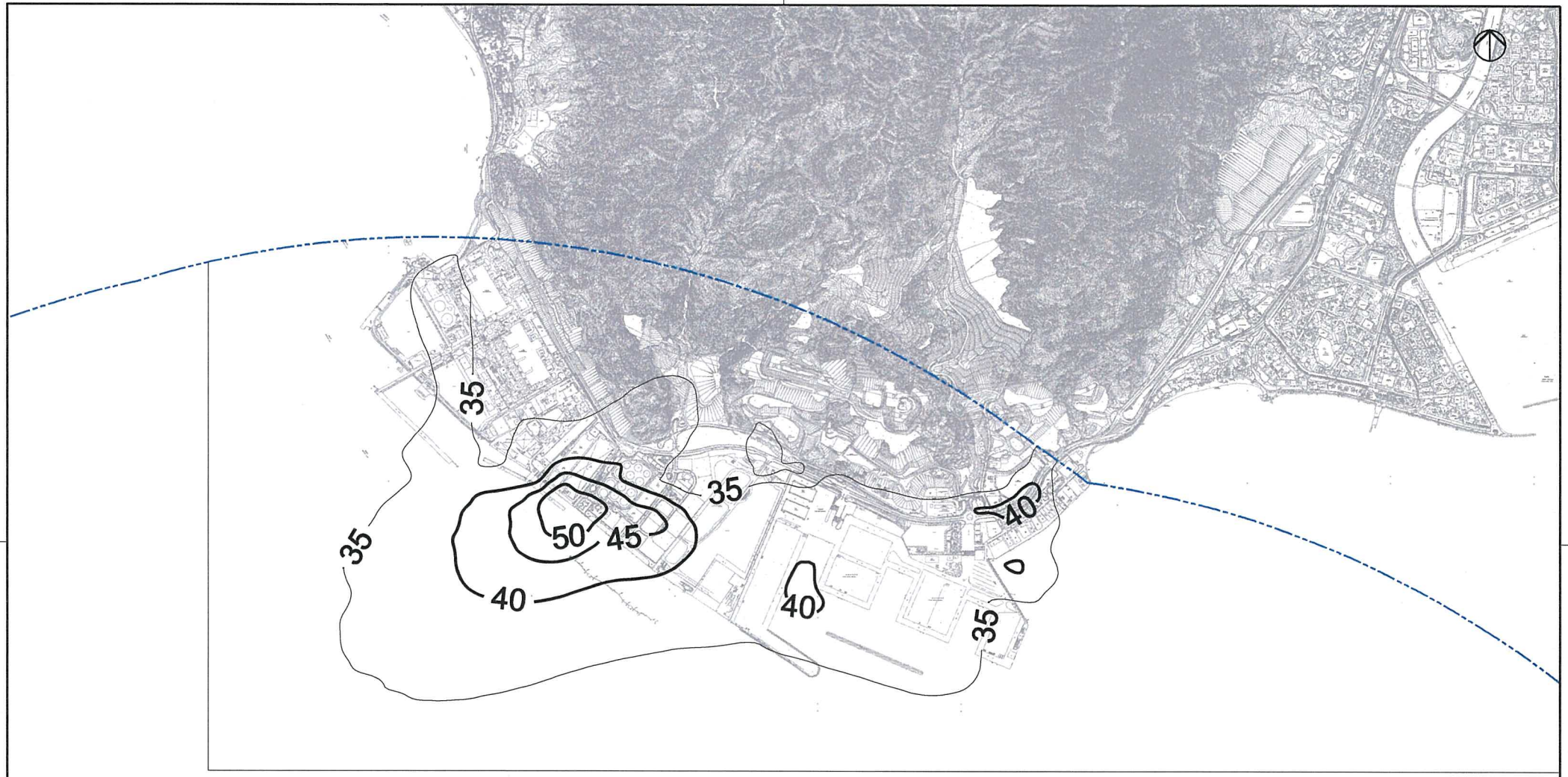

0 500 1000 m

1 : 20 000 SCALE BAR

Legend

5km Assessment Area from Project Site Boundary

–40– NO2 Contour (μg/m³)

Annual NO2 Criterion: 40 μg /m³

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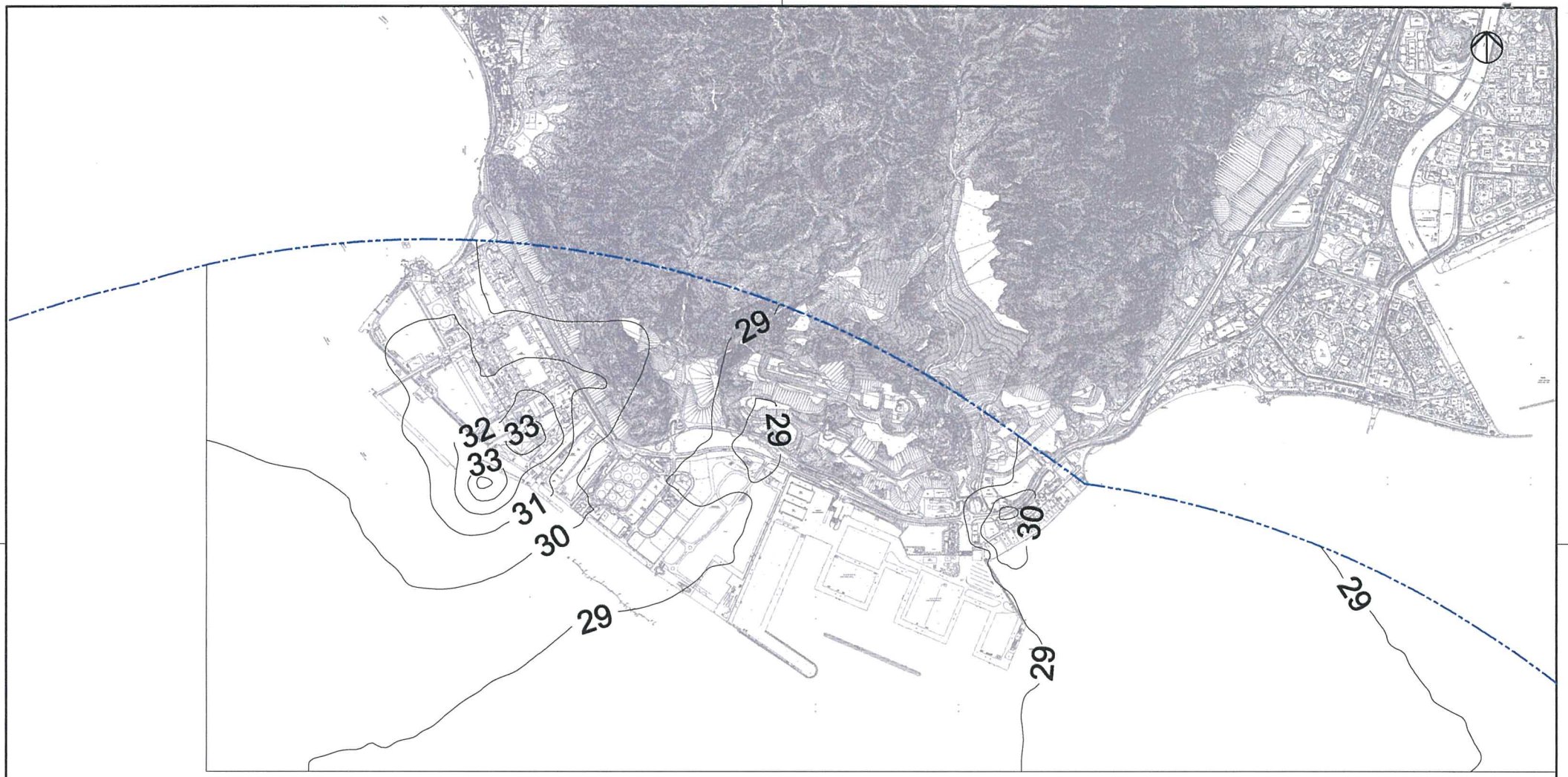

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1 : 20 000 SCALE BAR

Legend

5km Assessment Area from Project Site Boundary

–40– FSP Contour (μg/m³)

Annual FSP Criterion: 35 μg /m³

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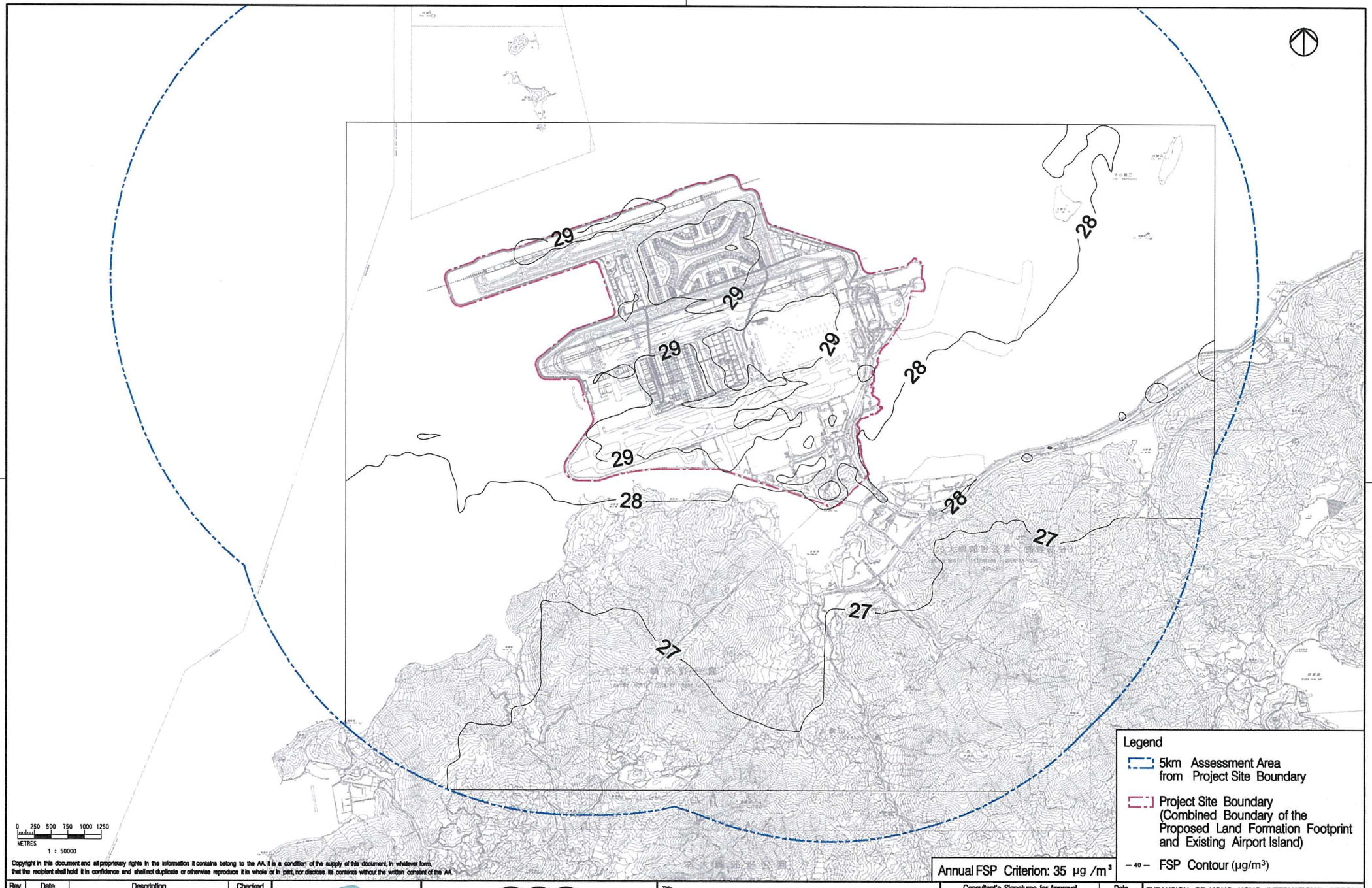

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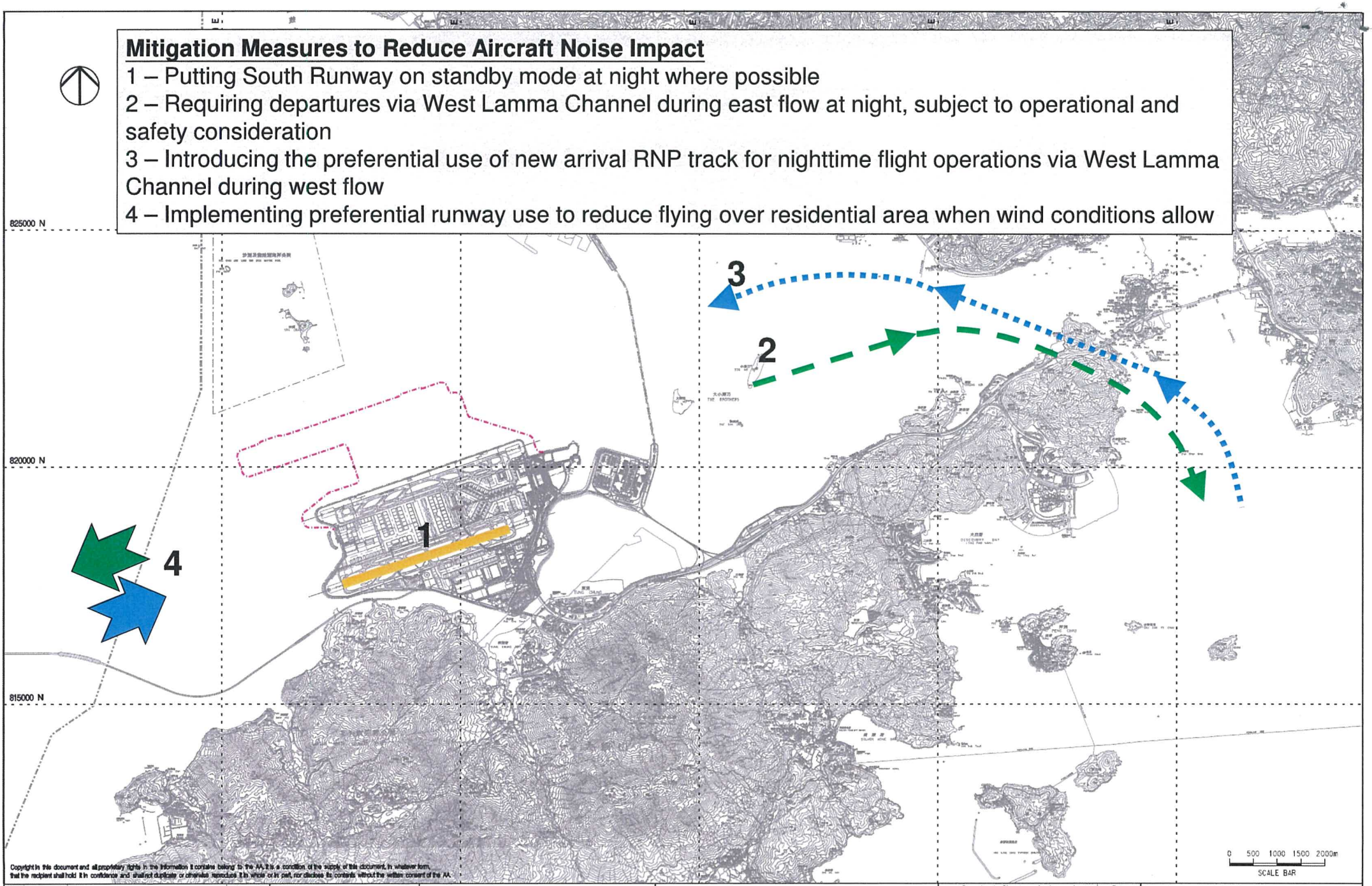
Mitigation Measures to Reduce Aircraft Noise Impact

1 – Putting South Runway on standby mode at night where possible

2 – Requiring departures via West Lamma Channel during east flow at night, subject to operational and safety consideration

3 – Introducing the preferential use of new arrival RNP track for nighttime flight operations via West Lamma Channel during west flow

4 – Implementing preferential runway use to reduce flying over residential area when wind conditions allow



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Mitigation Measures to Reduce Aircraft Noise Impact

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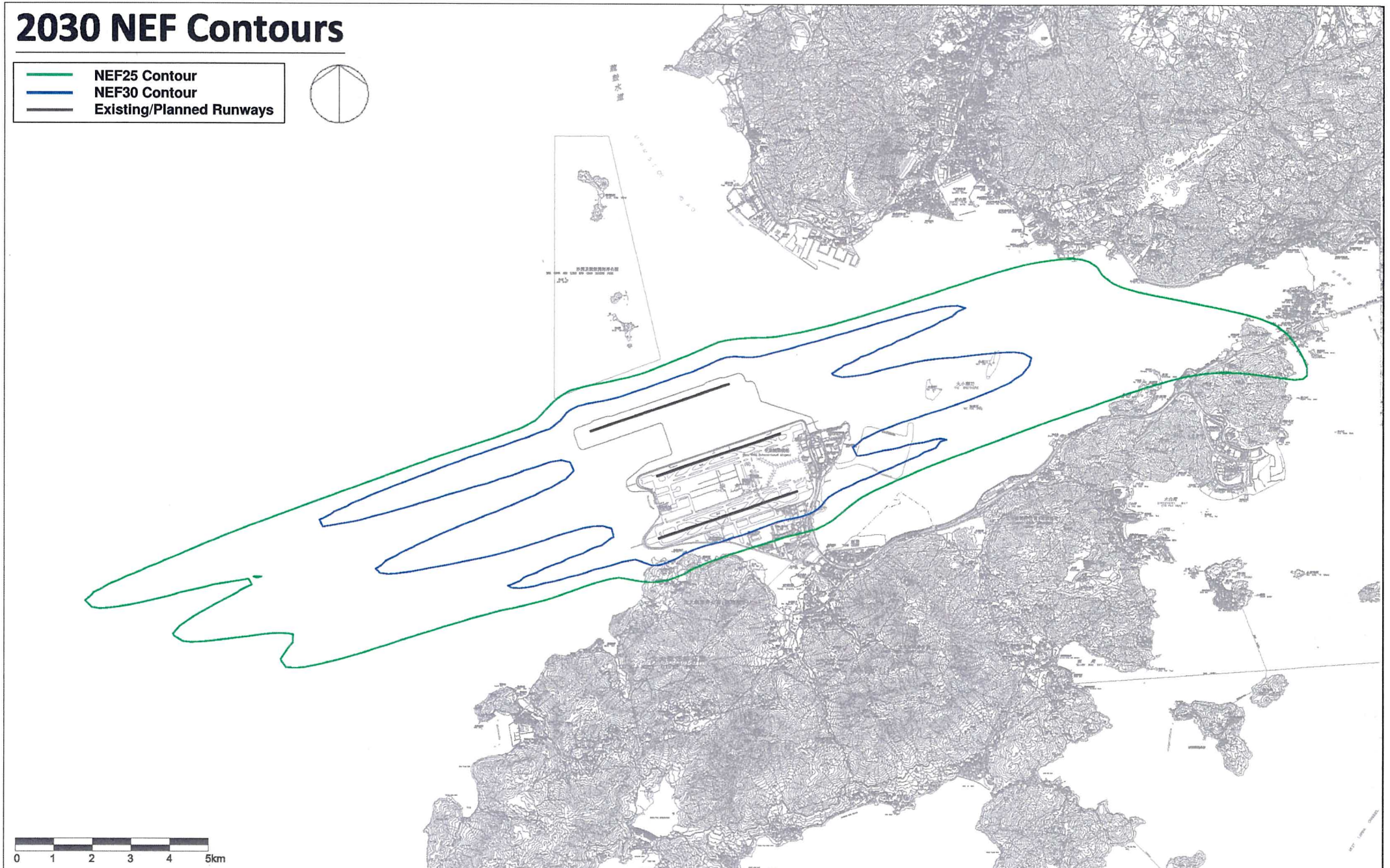
2030 NEF Contours



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NEF Contour of Year 2030

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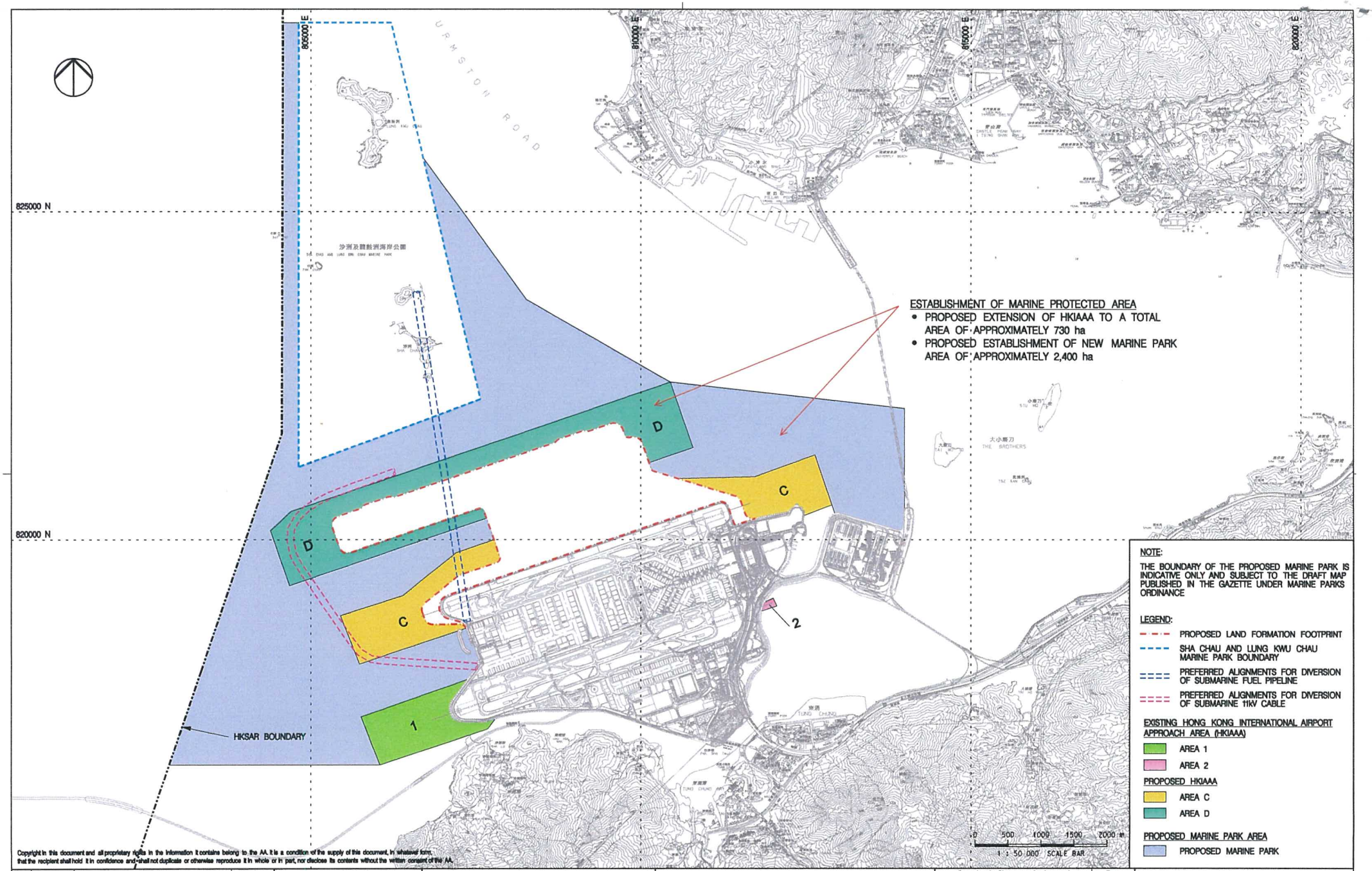

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PROPOSED MARINE PARK AND HKIAAA EXTENSION

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EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

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TPB Paper No. 9877

For Information by the

Town Planning Board on 10.4.2015

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

TPB Paper No. 9877
For Information by the
Town Planning Board
on 10.4.2015

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

PURPOSE

1. This paper is to brief Members on the planned expansion of the Hong Kong International Airport (HKIA) into a Three-runway System (3RS).

BACKGROUND

2. In addition to being an important transport infrastructure, HKIA also plays a significant role in Hong Kong's economy by enhancing the city's competitiveness through extensive air connectivity. The better Hong Kong is connected to the world, the more that trade and various sectors benefit. Financial services, insurance, professional services, trading and logistics, high-value-added manufacturing, tourism, retail, exhibitions and other sectors all stand to gain from the economic activities generated by HKIA. Therefore, it is critical to ensure that HKIA has sufficient capacity to accommodate future growth, and that Hong Kong continues to invest in airport infrastructure in a timely manner.

3. To maintain Hong Kong's position as an international and regional aviation centre, and to ensure that HKIA has sufficient capacity to handle its growing air traffic demand, the Government gave in-principle approval in March 2012 for Airport Authority Hong Kong (AAHK) to adopt a three-runway system as HKIA's future development option for planning purposes. Since then, AAHK has accomplished the relevant planning work, namely, the statutory environmental impact assessment (EIA), the associated design details, and the financial arrangements for the 3RS project. AAHK submitted its recommendations to the Government in January 2015. After considering the recommendations, the Government, on 17 March 2015, affirmed the need for the 3RS for maintaining Hong Kong's competitiveness as a global and regional aviation hub, and for catering to our long-term economic and development needs. AAHK will actively explore ways to facilitate the early implementation of the 3RS with a view to commissioning the 3RS in 2023.

THE URGENT NEED FOR 3RS SYSTEM

4. Over the past decade, Hong Kong's air traffic has climbed over 65%. In 2014, HKIA handled approximately 63.3 million passengers, 4.38 million tonnes of cargo and 391,000 air traffic movements (ATMs). On average, HKIA currently handles over 1,100 daily flight movements, which is very close to the two-runway system's (2RS) maximum practical runway capacity of 1,200 flights each day. The latest air traffic statistics show that the handling capacity of the 2RS would likely reach its maximum practical capacity in 2016 or 17, a few years earlier than the projection made in Master Plan 2030 (MP2030) published in 2011.

5. In light of the imminent saturation of the existing 2RS and rising competition from neighbouring airports (including Singapore Changi, Seoul Incheon, Guangzhou, Shenzhen and Dubai airports) which have all rolled out expansion plans, AAHK must upgrade the facilities at HKIA and plan ahead so as to accommodate the airport's growing demand.

6. In the short to medium term, AAHK has completed/ is implementing a series of plans to optimise/ expand the airport facilities to increase HKIA's handling capacity, including the west apron expansion project and the midfield development project. While the above expansion project will help incrementally and temporarily increase HKIA's terminal facilities, it is essential to expand HKIA further through the implementation of the 3RS project, in order to cater for long-term air traffic demand and maintain the competitiveness of both the airport and Hong Kong.

7. There have been comments suggesting that the capacity constraint at HKIA could be resolved through better utilization of the existing 2RS. These suggestions are not feasible. In terms of efficiency, HKIA is currently one of the world's most efficient airports[1]. Among the world's top 100 airports, HKIA has the second-highest proportion of wide-bodied aircraft (at 63.3%). In addition, the aircraft mix at the airport is driven by market demand and determined by airlines. It is not for the airport operators or governments to dictate such decision, not to mention that unnecessary interference will undermine the operational efficiencies of both airports and airlines. Having an extensive flight network is one of the

[1] *Airport efficiency is measured in terms of workload unit. One workload unit is equivalent to one passenger or 100 kg of cargo. According to Airport Council International Annual Report 2013, HKIA was named the most efficient airport with each air traffic movement carrying 264.5 workload units on average.*

core elements to help maintain HKIA's connectivity. Giving up less prominent but still commercially popular destinations would not only cause inconvenience to travelers, but also adversely impact the development of the aviation, logistics, hotel and tourism, trading, retail and catering industries – which together account for about 58% of Hong Kong's GDP and 47% of its jobs in 2012 – thereby undermining the city's overall competitiveness.

8. As mentioned above, there is a pressing need to implement the 3RS project. With the 3RS in place, HKIA's capacity would increase substantially, from 420,000 ATMs per year under the 2RS to 620,000 ATMs per year. By 2030, the 3RS at HKIA is expected to handle around 100 million passengers and 8.9 million tonnes of cargo annually. According to AAHK's latest projections, the 3RS will bring additional economic benefits of $455 billion (2012 dollars) over the 50-year period (from 2012 to 2061) as compared with 2RS. By 2030, 3RS is also expected to create around 120,000 direct and 160,000 indirect/ induced job opportunities.

THE 3RS DEVELOPMENT

Key Project Components

9. In line with MP2030 recommendations, the 3RS project will provide additional capacity for 30 million passengers per annum (mppa) upon commissioning by the planning year of 2023, with provisions for expansion to cater for further 20 mppa, as and when required. **Figure I** shows an overall layout plan for the 3RS development with the following primary components:

- Formation of approximately 650 ha of land north of the existing airport island, bounded by approximately 13.4km of seawall;
- Construction of the Third Runway, taxiways and apron;
- Construction of the Third Runway Concourse (TRC) with 57 parking positions upon 3RS commissioning;
- Modification/expansion of the existing Terminal 2 (T2) into a full service processing terminal and construction of associated road network;
- Provision of a new Automated People Mover (APM) system connecting T2 and TRC and an integrated maintenance depot that serves also the existing system;

- Provision of a new high-speed Baggage Handling System (BHS) to serve between T2 and TRC; and
- Construction of other associated airport support infrastructure, facilities and utilities for 3RS operation.

10. The scope of works and design details of the 3RS as elaborated below will be fine-tuned at the detailed design stage to ensure the final project design is well justified with due considerations for economy as well as safety and operational efficiency.

A. Land Formation

Land formation of about 650 ha is required to the north of the existing airport island by reclamation. The layout and size of the 3RS reclamation are dictated by the infrastructure works that need to be constructed on it. The works include construction of a new runway, a passenger concourse and all associated taxiways, aprons and airport infrastructure.

B. Third Runway, Taxiways and Apron

The new 3,800m long North Runway is parallel to the existing two runways and to the north of the existing airport platform. The new North Runway will become the main arrival runway. The new Centre Runway will become the main departure runway. Rapid Exit Taxiways (RET), parallel taxiways and crossfield taxiways are provided to allow aircraft to efficiently exit from the runway and access the Airport aprons.

C. Third Runway Concourse (TRC)

Building is configured in a 'Y' shape on plan and provides contact stands and gates around its entire perimeter which is similar to Terminal 1 (T1). The TRC will provide 57 parking positions and handle 30 mppa. It introduces many green features and a courtyard at the centre of the concourse, where its lush green lawn and groves of trees offer a tranquil setting for relaxation and enjoyment.

D. Terminal 2 (T2) Expansion

The role of T2 is set to change into that of a full processing terminal serving departure, arrival and transfer operations. An APM Interchange Station (AIS) will be provided

at the basement of T2 to serve as the central transfer between T1, T2, TRC and SkyPier.

E. **<u>Associated Airport Ancillary/Supporting Infrastructure, Utilities and Facilities</u>**

The majority of the proposed ancillary facilities required to support the daily operations of the future 3RS are planned to be located in the Eastern Support Area (ESA) and Western Support Area (WSA).

a. *ESA* – The ESA to the east of the TRC is mainly home to the ground service equipment (GSE), flight catering facilities, Government facilities and utilities. It also accommodates the underground APM and BHS facilities, and their associated above-ground facilities.

b. *WSA* – The WSA to the west of TRC mainly accommodates maintenance and servicing facilities to support the operational needs of the 3RS. These mainly include aircraft maintenance facilities (such as maintenance hangars and aprons, engine run-up facilities, and aircraft recovery equipment facilities), GSE and other supporting facilities, air cargo staging area, Government facilities as well as utilities.

c. *Road Network and Tunnel* – The 3RS development will require the extension and improvement of some existing landside roads on the airport island, and the provision of a new airside vehicular tunnel connecting the existing 2RS facilities to the future development areas to ensure operational continuity.

d. *Other Airport Ancillary/ Supporting Facilities* – Other ancillary facilities include power supply system, potable water and fire fighting system, seawater supply system, stormwater drainage and oil interceptor system, sewerage system, APM system and associated infrastructures, an APM depot (about 3.5 ha), Airfield Ground Lighting (AGL) vaults, Aircraft Maintenance facilities, Aviation Fuel Supply Systems, Ground Support Equipment and Vehicles Storage facilities, Aircraft Washing facilities, Antenna Farms, Communications Equipment and Masts, BHS and associated facilities, Passenger Baggage Trolley Recirculation facilities, Security Gatehouses, Security Screening facilities, associated operational ancillary Facilities, etc.

TECHNICAL ASSESSMENTS

11. EIA, Traffic Impact Assessment (TIA) and Scheme designs including various technical analyses have been carried out for the expansion of HKIA into a 3RS. The following paragraphs provide the key summaries of the relevant EIA and TIA completed in view of the planning concerns.

Summary of EIA

12. AAHK has completed the statutory EIA for the 3RS project in accordance with the provisions of the Environmental Impact Assessment Ordinance (EIAO) (Chapter 499), its Technical Memorandum (TM) and the relevant EIA Study Brief for the 3RS project issued by the Environmental Protection Department (EPD) in August 2012. A team of local and overseas consultants and experts was engaged by AAHK to conduct the EIA which assessed 12 environmental aspects including, for example, impact from aircraft noise, impact on air quality, impact on marine ecology including Chinese White Dolphins (CWDs) and fisheries, as well as the impact on human health arising from aircraft noise and emissions. AAHK has committed to undertaking a number of mitigation measures in the EIA Report to address various environmental concerns and to minimize, mitigate and compensate for all potential impacts arising from the 3RS project in full compliance with the EIAO with respect to the requirements stipulated in the TM and EIA Study Brief. The Full Report and Executive Summary are available via EPD's website[2].

13. The Director of Environmental Protection approved the EIA Report on 7 November 2014 with 18 implementation requirements and issued the Environmental Permit (EP) for the

[2] *http://www.epd.gov.hk/eia/register/report/eiareport/eia_2232014/html/index.htm*

3RS project. AAHK will start its work to fulfill the commitments made in the EIA Report and to comply with the respective requirements stipulated in the EP granted under the EIAO.

Summary of TIA

14. Under the EIA Study, a TIA was carried out in order to assess and evaluate the possible traffic impacts of the 3RS project. The transport model forecast was carried out for year 2026 and year 2031 under both 2RS and 3RS scenarios. The forecast results showed that all major roads will operate within the practical capacity in years 2026 and 2031 under both scenarios.

PUBLIC CONSULTATION

15. Since the preparation of MP2030 in 2008, AAHK has reached out to a wide spectrum of stakeholders to seek their views and explain the Airport's development plans.

16. A survey was conducted in 2011 independently by the Social Sciences Research Centre (SSRC) of the University of Hong Kong (HKU) to gauge the public's views about their preferred option for airport expansion which included two options for the long-term development of HKIA. These options were to maintain the airport's 2RS, or to develop HKIA into a 3RS. A total of 24,242 questionnaires were received online, by mail, and from collection boxes located at HKIA and the roving exhibitions that were held during the three-month public consultation. The views were then studied by the SSRC. The survey result revealed that nearly 80% of the respondents agreed or strongly agreed that AAHK should make a decision urgently on HKIA's future expansion plans, and 73% of respondents preferred the three-runway option. The relevant report can be accessed through 3RS website[3].

17. Throughout the planning process of the 3RS project, particularly during the EIA process, AAHK has reached out to promote the 3RS project and conducted regular 3RS briefings as well as airport visits for business and aviation sectors, community leaders, resident groups, professional and industry organisations, Members of the Legislative and District Councils, green groups, school and academic sector and the media. From late 2008 to March 2015, AAHK organized and took part in more than 1,200 engagement activities

[3] *http://www.threerunwaysystem.com/en/Information/Publications.aspx*

such as public forums, roundtable meetings, workshops, airport visits, briefings, exhibitions and seminars with a variety of stakeholder groups.

18. Among the various engagement initiatives, AAHK also set up four Technical Briefing Groups to collect the professional views from experts and academia with technical expertise in specific environmental aspects (i.e. air quality, noise, marine ecology and fisheries, as well as CWDs); and five Community Liaison Groups in HKIA's neighbouring districts (i.e. Islands, Kwai Tsing, Shatin, Tsuen Wan and Tuen Mun) in order to exchange views with District Councilors and the community leaders on the 3RS development.

19. During the EIA public inspection period, AAHK also organized briefings for business partners and media, roving exhibition, as well as two sessions of public forums to update the public on the findings of the EIA and the initiatives to mitigate the potential impacts of the 3RS.

20. AAHK will continue to step up its publicity and engagement efforts to generate wider and sustained community support for the 3RS project with focus on building a stronger bond between the community and the airport under the themes of HKIA being the airport for the people of Hong Kong and HKIA's striving to be one of the world's greenest airports.

ADVICE SOUGHT

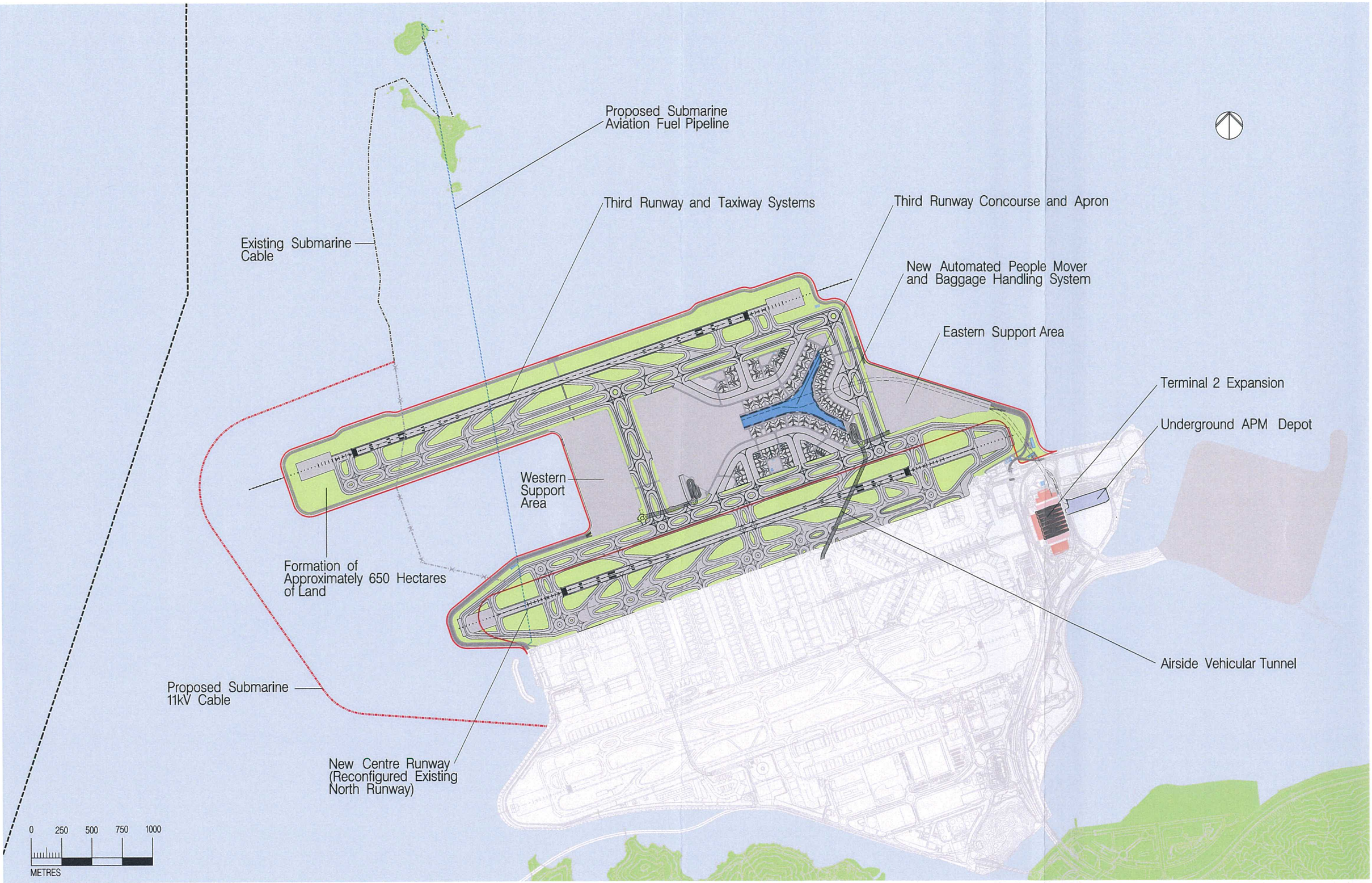
21. Members are invited to note the latest progress of 3RS project.

Airport Authority Hong Kong

April 2015

ATTACHMENTS

Figure I Overall Layout Plan for 3RS Development



香港國際機場 HONG KONG INTERNATIONAL AIRPORT	Title: Overall Layout Plan for 3RS Development	Fig.	Figure 1
		Date	Feb 2015