

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

## 10<sup>th</sup> Professional Liaison Group Meeting

### 2 September 2022



# Agenda

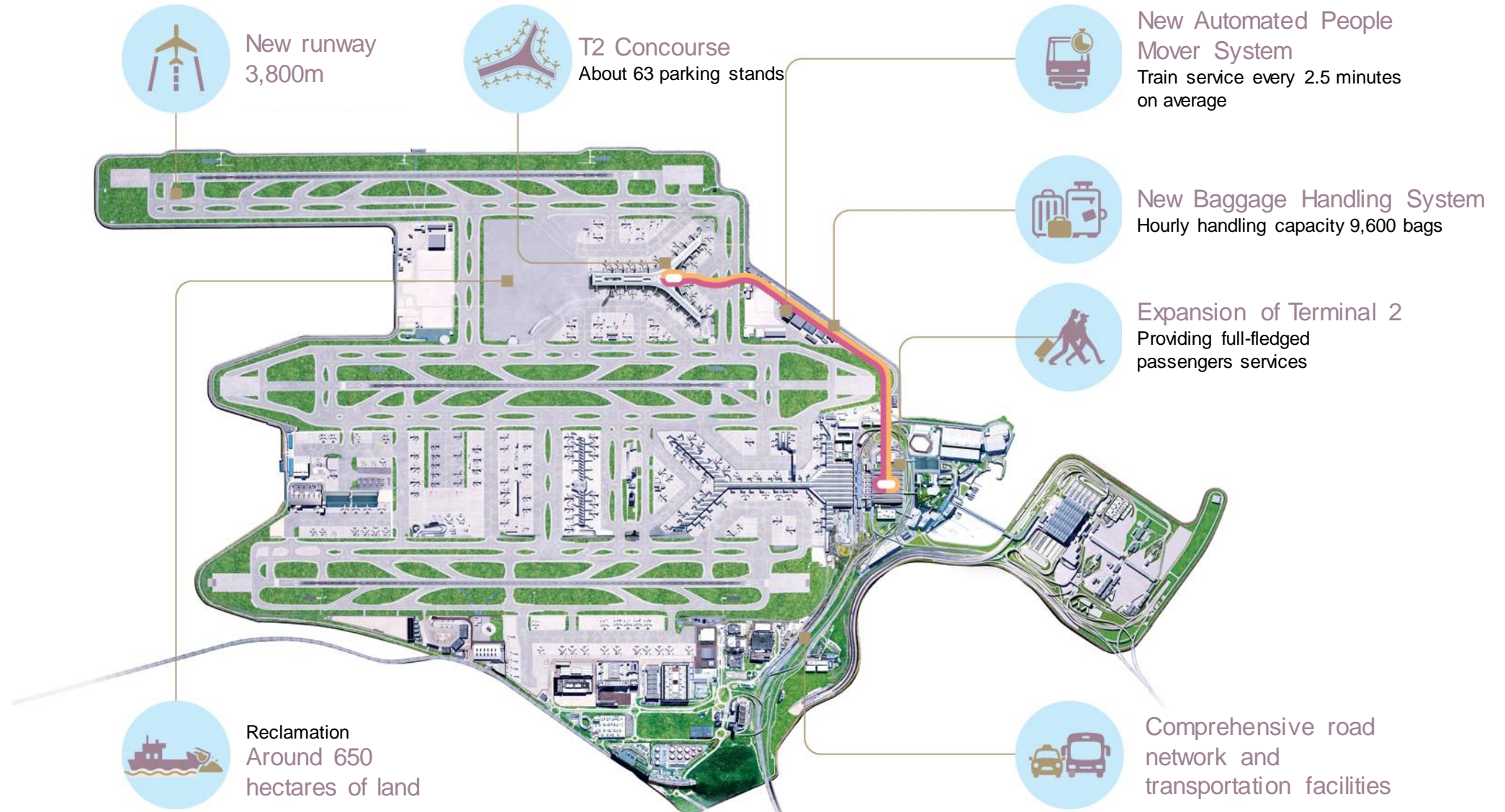
1. Update on 3RS Project & Other Airport Development
2. EM&A Updates
3. Marine Ecology and Fisheries Enhancement Strategy
4. Carbon Management and Climate Resilience
5. Green Airport Design and Sustainable Construction



# Update on 3RS Project & Other Airport Development

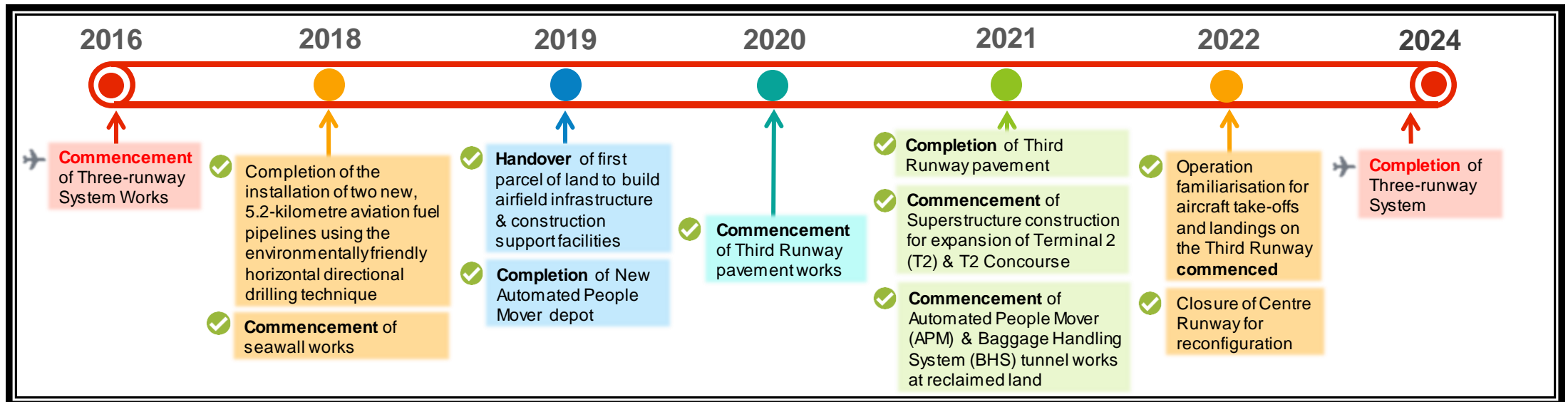


# Three-runway System





# 3RS Works Progress



# Completion on Key Milestones – New North Runway

21 April 2022

CAD informed global aviation community that the new North Runway is ready for commencing operation in 2022

22 May 2022

Completion of Security Sweeping Exercise

24 May 2022

Completion of Aircraft Crash and Rescue Exercise

31 May 2022

The new boundaries of Restricted Area came into effect and CAD issued an aerodrome licence for I-2RS operation

27 June 2022

Completion of taxiing drill

1 July 2022

CAD informed global aviation community that the new North Runway will commence operation familiarisation on 8 July 2022

Commenced operation familiarisation of New North Runway on 8 July 2022





# Completion on Third Runway

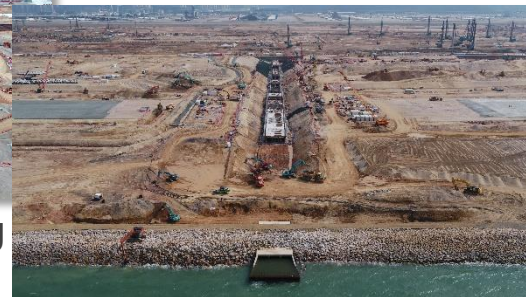


**2020**

Commencement of Third Runway Works



Underground Utilities Laying



Box Culvert Works

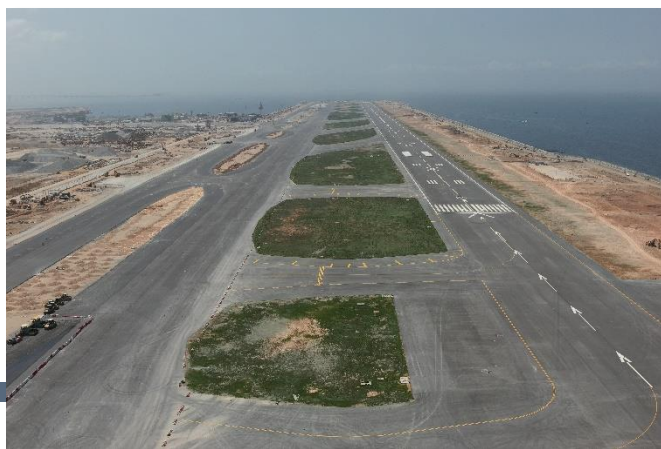


Third Runway Pavement completed in July 2021



**2022**

Third Runway Works Substantially Completed



Pavement Works for Taxiways



Line Marking



Grooving Works





# Completion on Airfield Systems

Pit Hydrant along New Third Runway (Flow Test)



Precision Approach Path Indicator

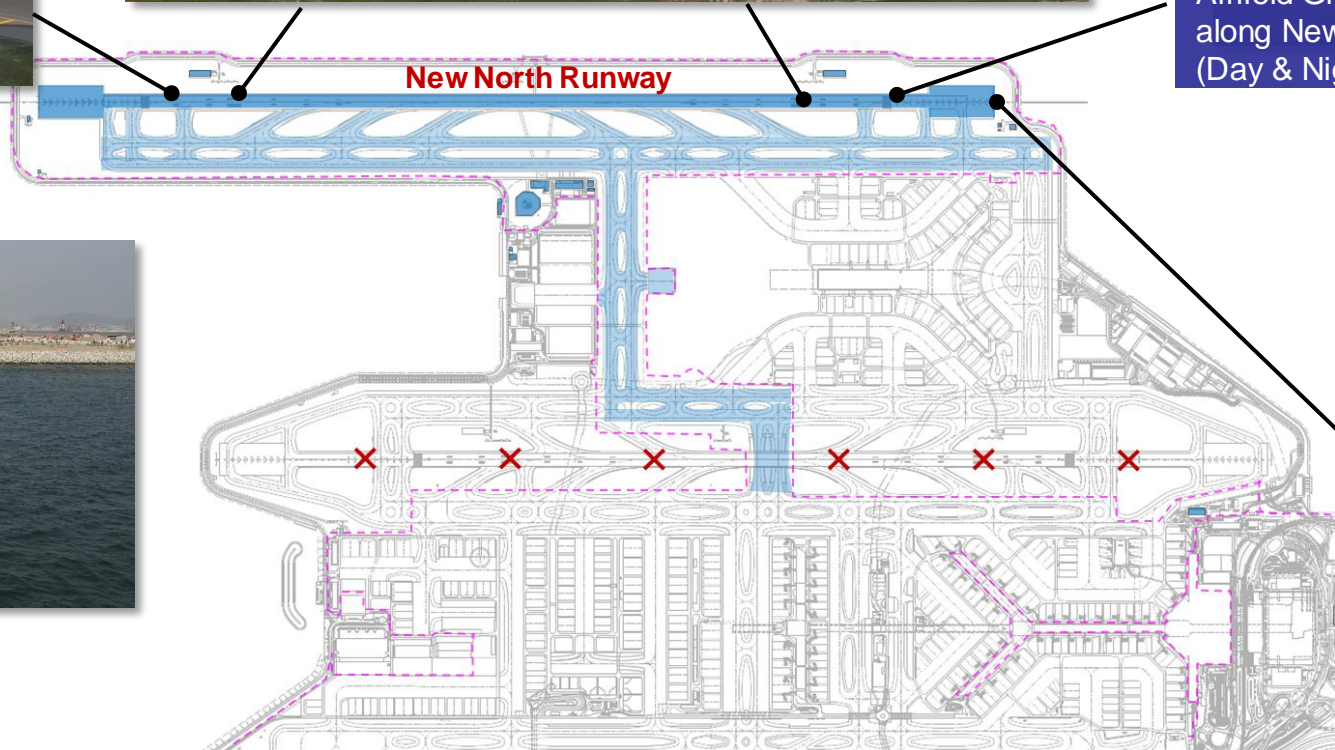


Airfield Ground Lighting along New Third Runway (Day & Night)

Runway Approach Lights



New North Runway



Localizer Antenna



 Closure of Centre Runway  
 Operational Area

Upon commissioning of Third Runway





# Completion on Facilities for I-2RS

Airport North Fire Station



ARE Store & Interim Air Traffic Control Tower (Observation Facilities)



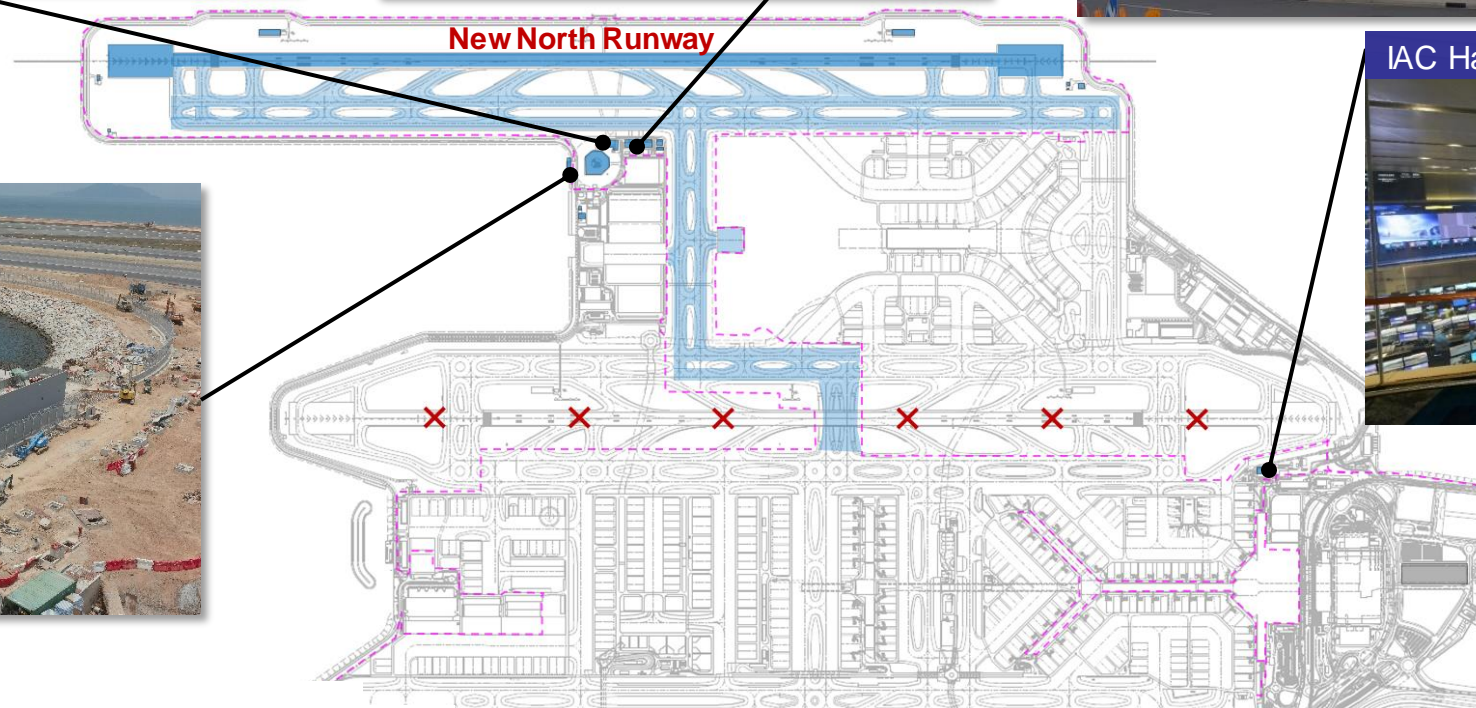
New Integrated Airport Centre (IAC)



AFC West Boat Point & Launching Facility



IAC Hall



New North Runway

X

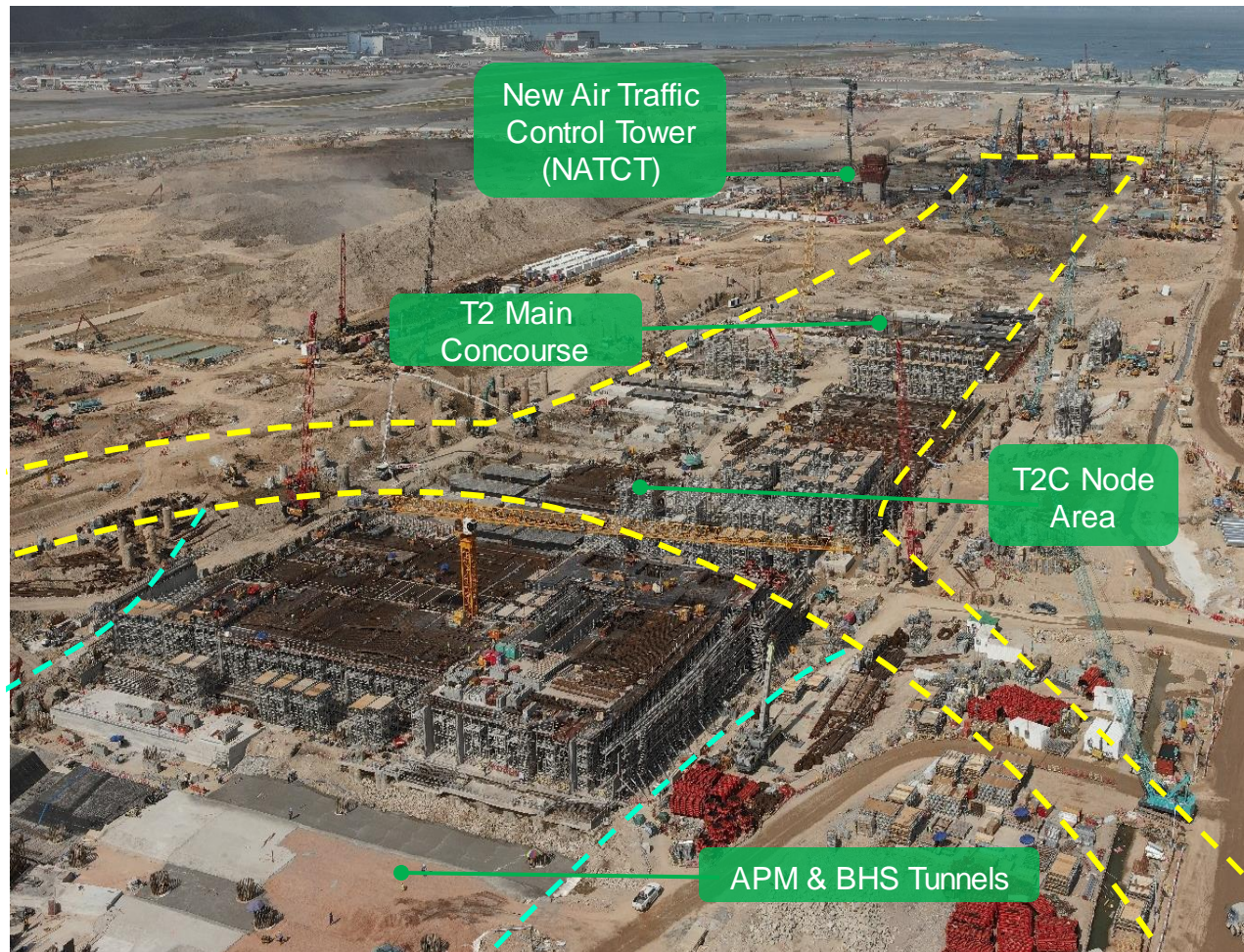
Closure of Centre Runway  
Operational Area

Upon commissioning of Third Runway



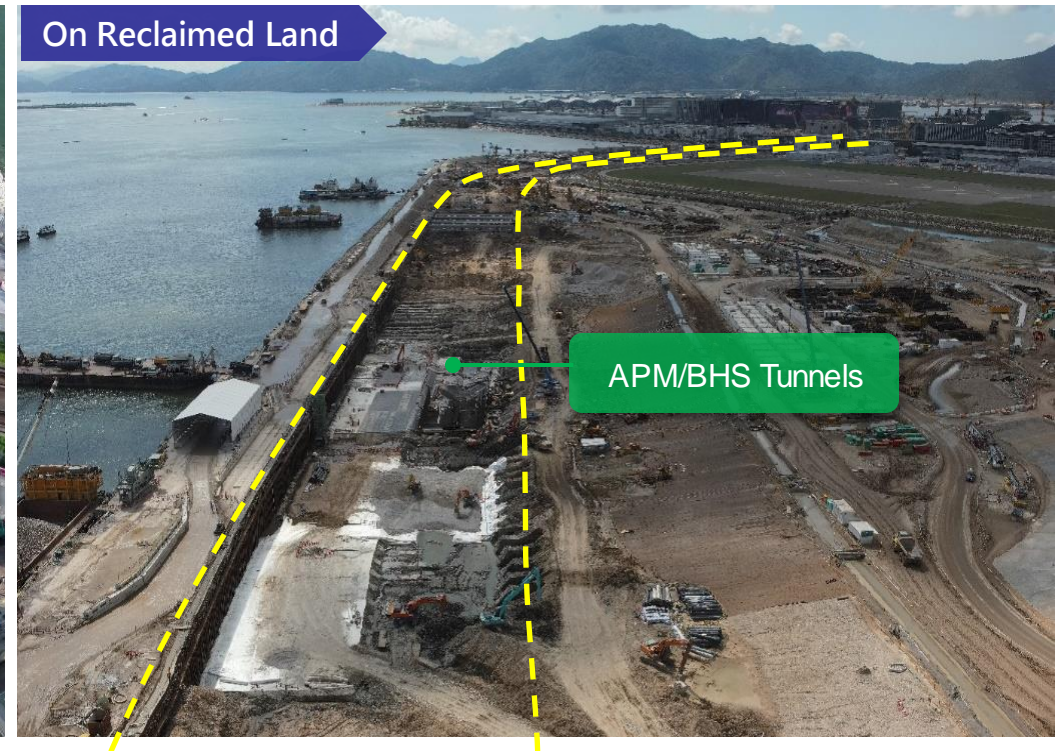
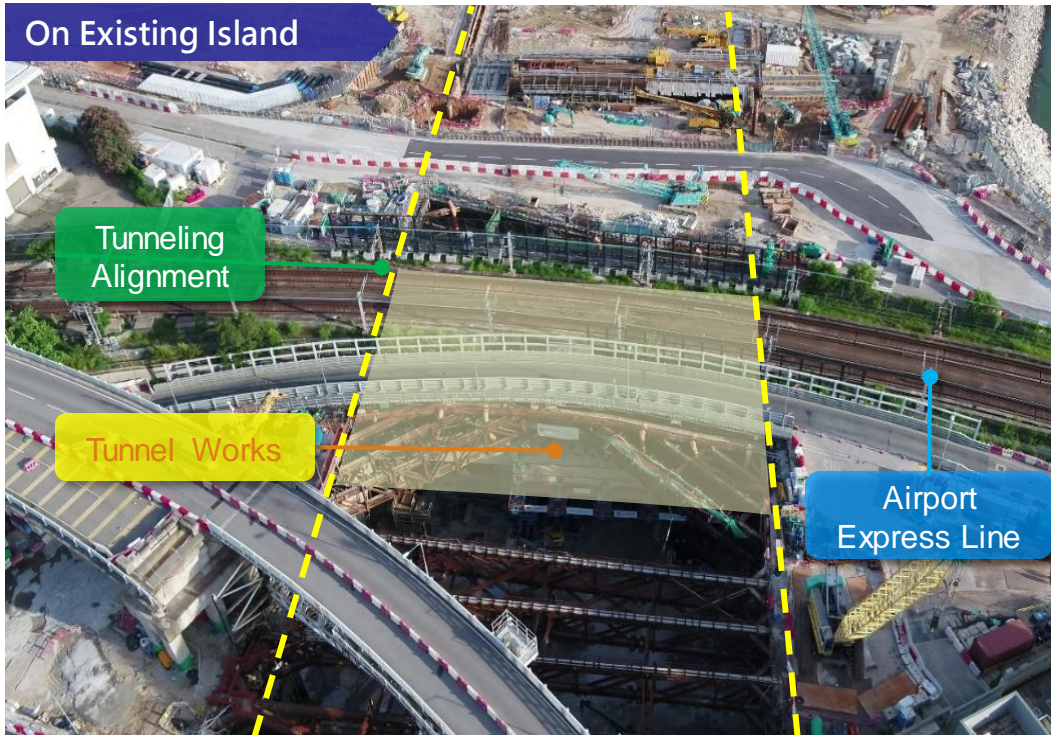


# Terminal 2 Concourse





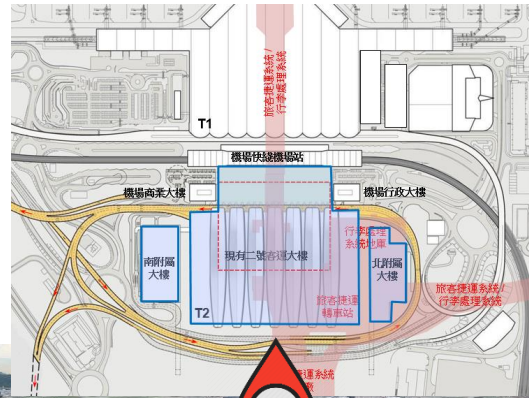
# APM and BHS Tunnels





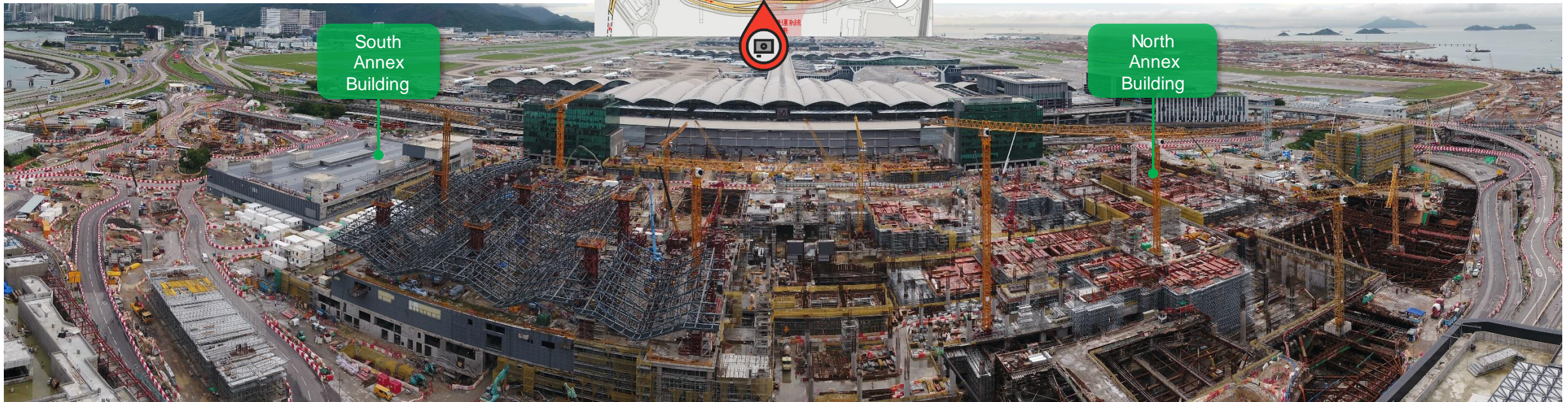
# T2 Expansion

Architectural rendering of T2



South Annex Building

North Annex Building





# Commenced operation familiarisation of New North Runway on 8 July 2022



# Commenced operation familiarisation of New North Runway (video)



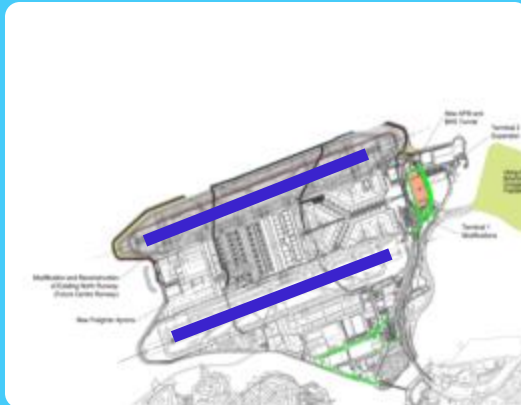


# Aircraft Noise Assessment Scenarios

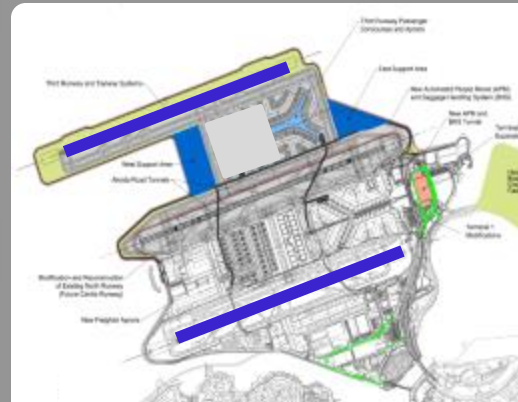
The EIA has examined the following scenarios specified in the EIA Study Brief:

## Prevailing Aircraft Noise Environment: - Year 2011

**-2011 is the full year with available data when EIA process started in year 2012**



**Interim 2RS (I-2RS) operation**  
**- Operation familiarisation**  
**commenced in July 2022**



## Worst Operation Mode - Year 2030\*

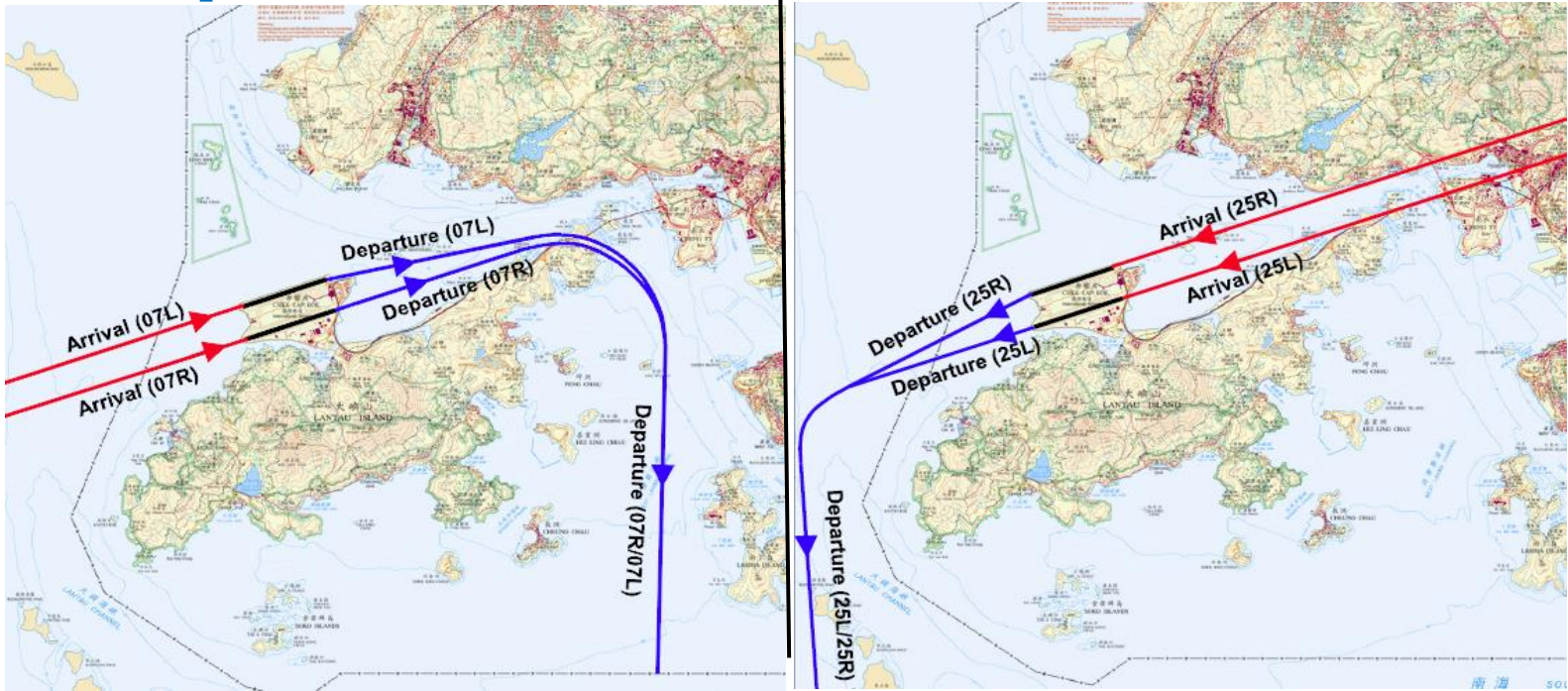
### Full Operation Mode at Design Capacity - Year 2032\*



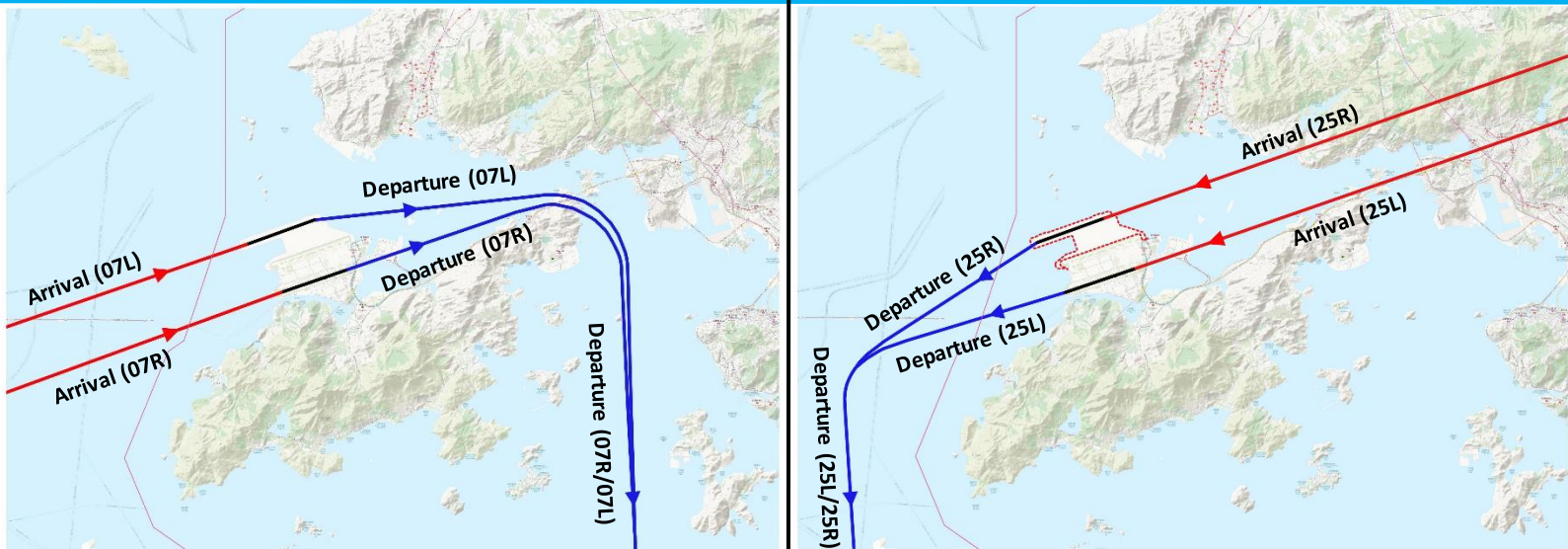
\* Assessment years assumed in the 3RS EIA Report

# Flight paths adopted in I-2RS operation are similar to those used in 2RS operation

2RS operation



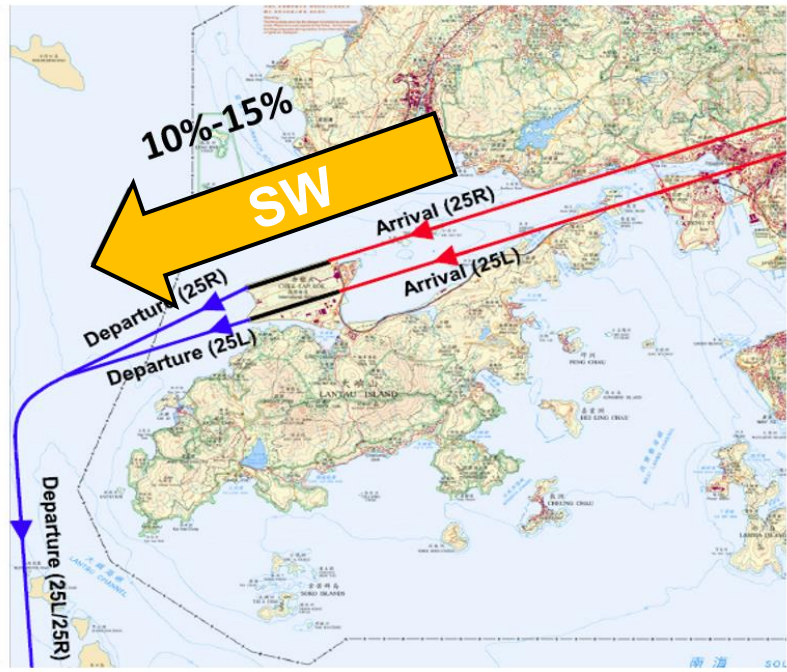
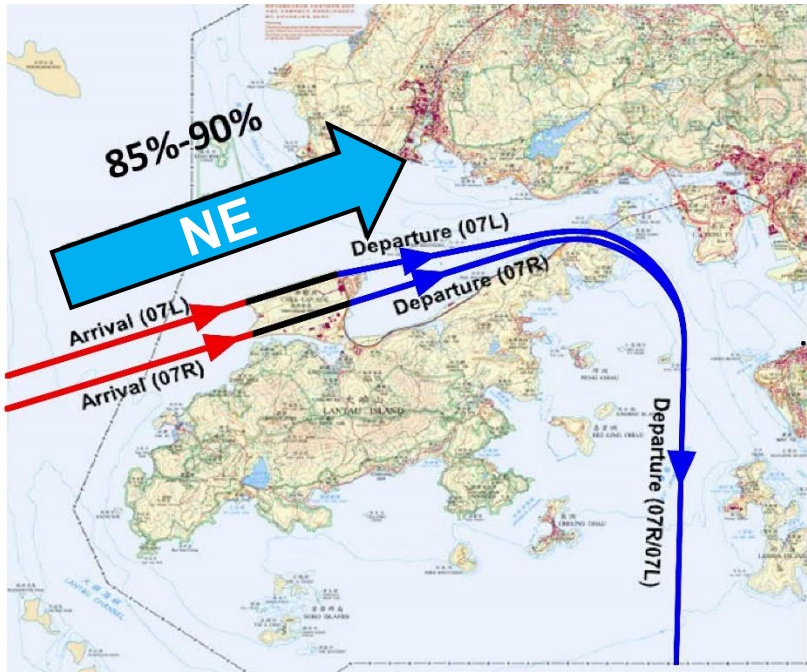
I-2RS operation



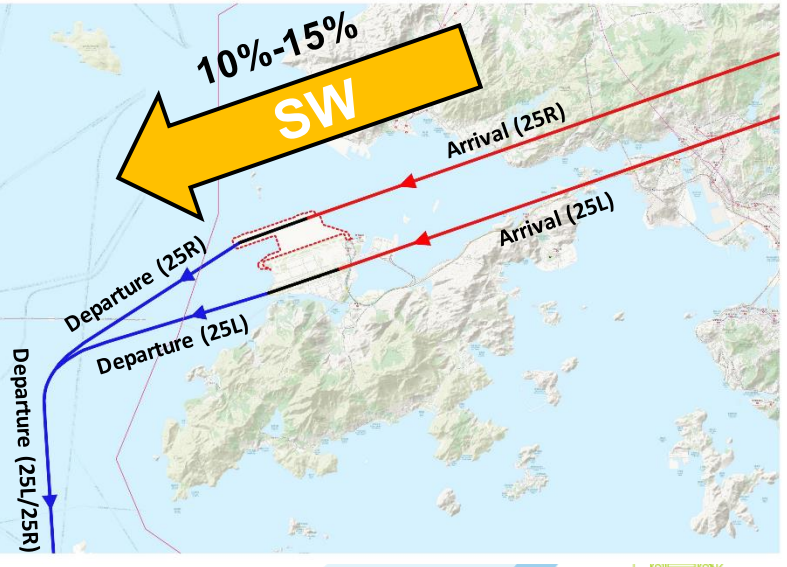
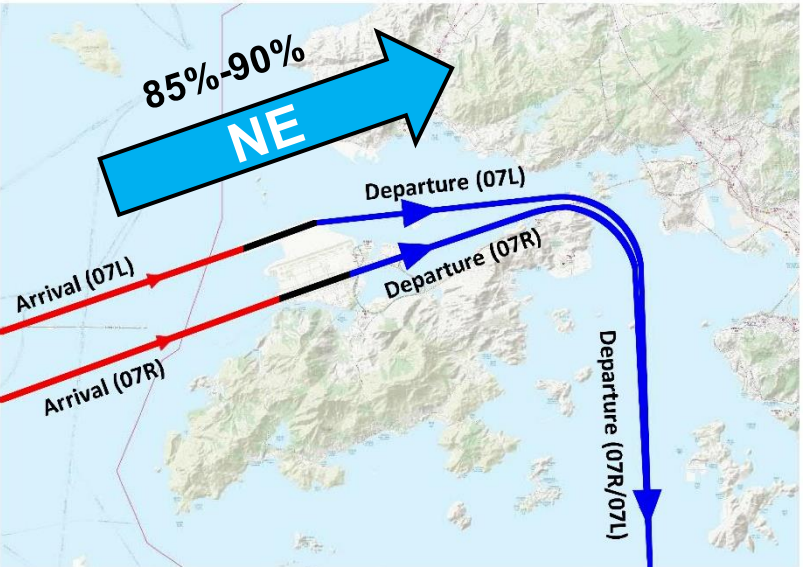


# Flight paths adopted in I-2RS operation are similar to those used in 2RS operation

2RS operation



I-2RS operation



# Key Aircraft Noise Mitigation Measures (2RS and I-2RS Operations)

Measures	Description
<b>Requiring arriving aircraft to land from southwest over water</b>	Between midnight and 7 am on the following day, subject to acceptable wind conditions and safety considerations, arrival aircraft are required to land from the southwest over the water.
<b>Continuous Descent Approach (CDA) Procedure</b>	Between 11 pm and 7 am, subject to weather and operational considerations, aircraft approaching HKIA from the northeast are expected to adopt CDA as far as practicable.
<b>Departures via West Lamma Channel</b>	Between 11 pm and 7 am, subject to acceptable operational and safety considerations, aircraft departing to the northeast of HKIA are required to use the southbound route via the West Lamma Channel.
<b>Noise Abatement Departure Procedures</b>	Aircraft departing to the northeast of HKIA are required to adopt the noise abatement take-off procedures set out by ICAO.
<b>Restrictions on Noisy Aircraft</b>	<ul style="list-style-type: none"> <li>- Aircraft that do not comply with the noise standards stipulated in Chapter 3 of Annex 16 Volume I, Part II to the Convention on International Civil Aviation ("Chapter 3 noise standards") are not allowed to land or take off at HKIA;</li> <li>- As a step further, airlines are not allowed to schedule aircraft whose noise levels only marginally meet the Chapter 3 noise standards to land and take off at HKIA;</li> <li>- In addition, airlines are forbidden from scheduling aircraft that do not comply with the more stringent noise standards stipulated in Chapter 4 of Annex 16 Volume I, Part II to the Convention on International Civil Aviation, or equivalent, to land and take off at HKIA between 10 pm and 7 am.</li> </ul>
<b>Noise Quota Count (QC) Scheme</b>	Offer an incentive for airlines to deploy quieter aircraft at HKIA via setting an annual QC limit for each airline.





# HKIA – International and Regional Aviation Hub

The **Busiest Int'l Cargo Airport** in the World

International Passenger: **3<sup>rd</sup>** In the World

**2018/19**

Passenger volume: Around **75 million**  
Air Cargo throughput: Over **5 million tonnes**

More than **120** airlines connecting  
about **200** destinations

Reaching Half of the World's Population within  
5 hours of Flying Time



# From City Airport to Airport City

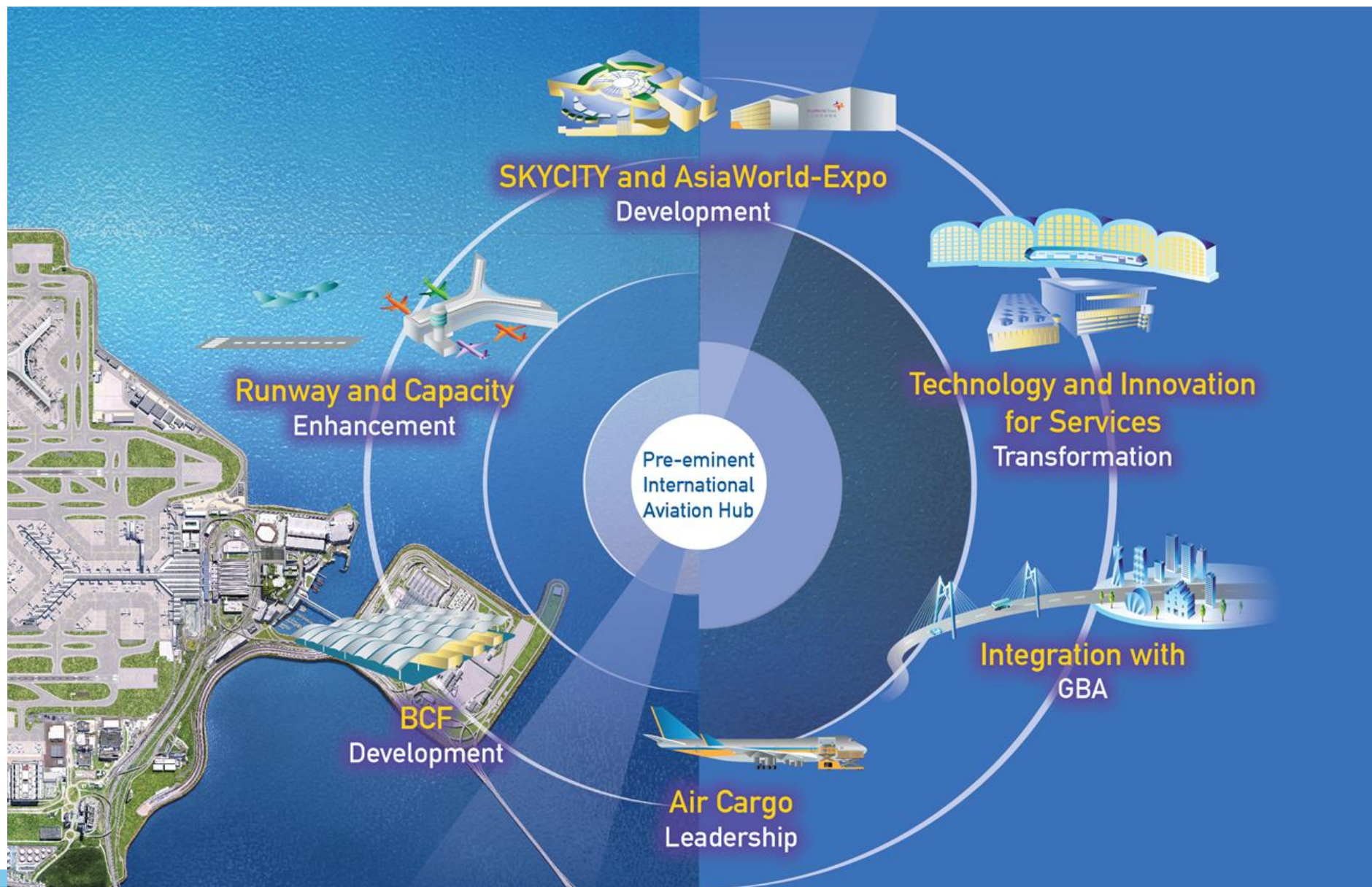


**120** million **10** million  
Passengers tonnes  
by 2035





# From City Airport to Airport City





# Brand New Airport Experience

Media walls

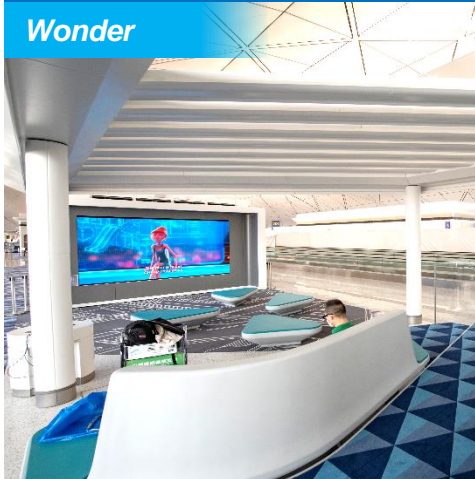


Sky Bridge

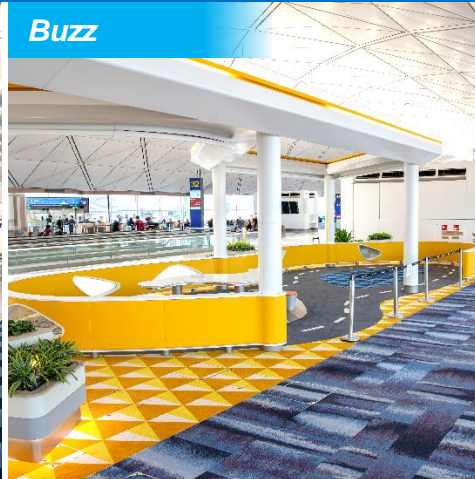


New Boarding Experience

Wonder



Buzz



Recharge



Washroom Revamp



VIP Lounge



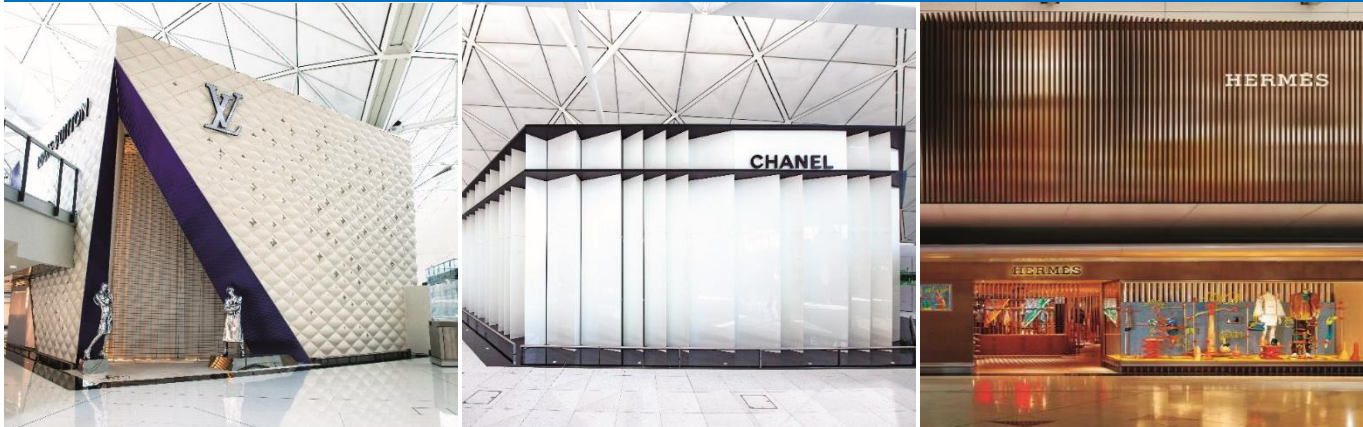


# Brand New Shopping & Dining Experience

East Hall Luxury Shopping Zone



Iconic duplex stores



Central Concourse Food Court





# GBA Connectivity

- HKIA at the centre of GBA
- The Hong Kong-Zhuhai-Macao Bridge adjacent to HKIA



# SkyPier Terminal and Automated Car Parks



## Automated Car Parks



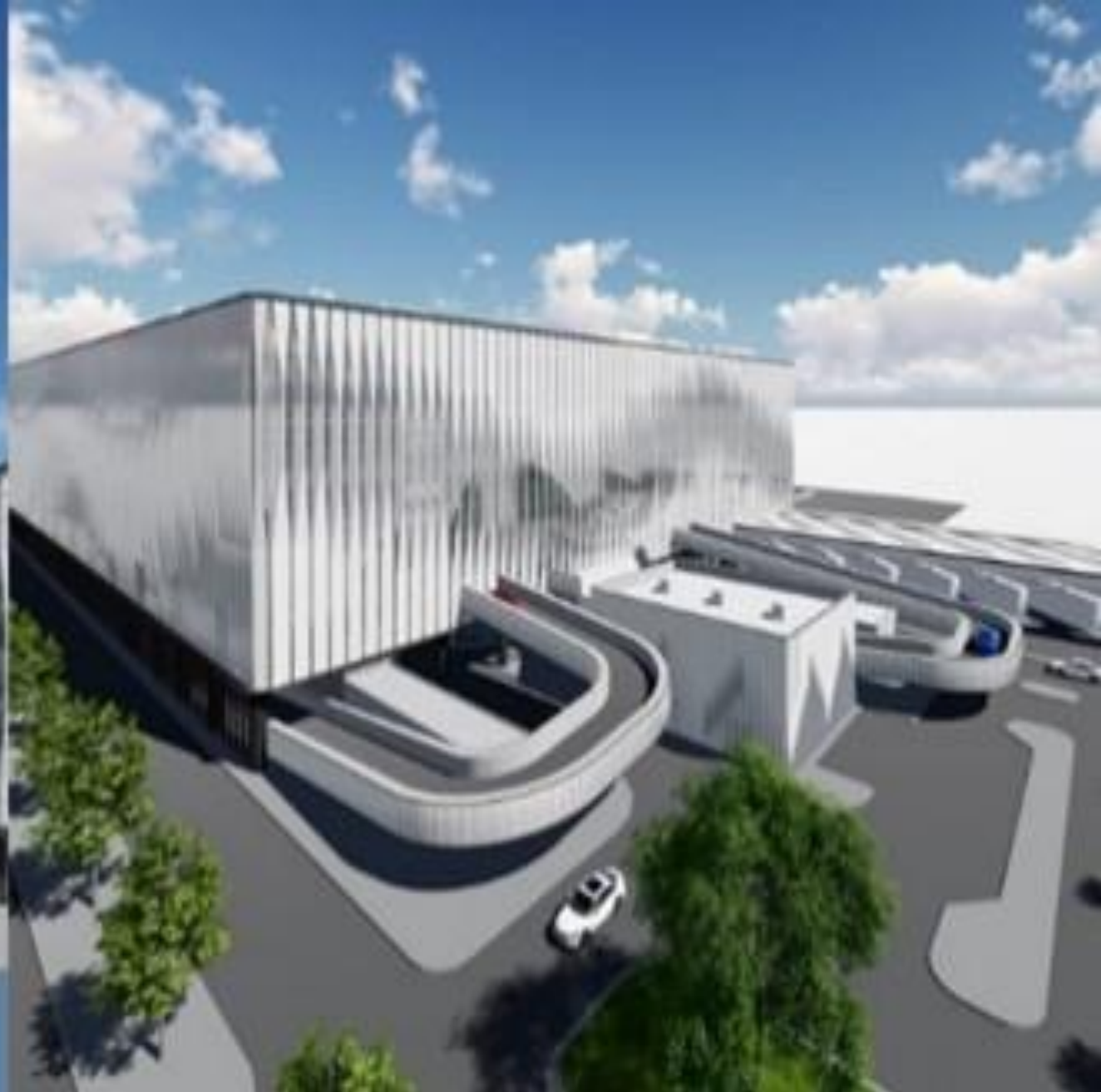
### Park and Visit



### Park and Fly









# SKYCITY – 11 SKIES



Grade A Offices- mainly wellness, medical services, wealth management services and GBA business companies

Over 800 shops including more than 120 dining outlets

Indoor Entertainment- 570,000 sq.ft



with a GFA of 3.8M sq. ft.





# SKYCITY – AsiaWorld-Expo

## AsiaWorld-Expo

**\$600 million Renovation Project**

**New Retractable Seat-Riser**



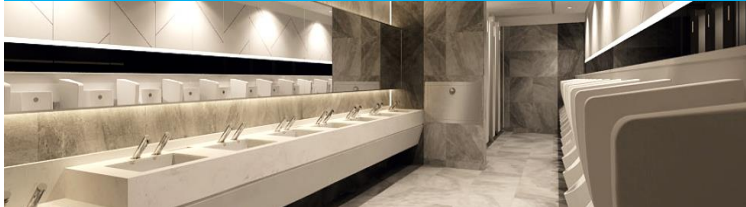
**New look of venue facilities**



**Face-lifting of venue**



**New toilets**



## AsiaWorld-Expo Phase 2

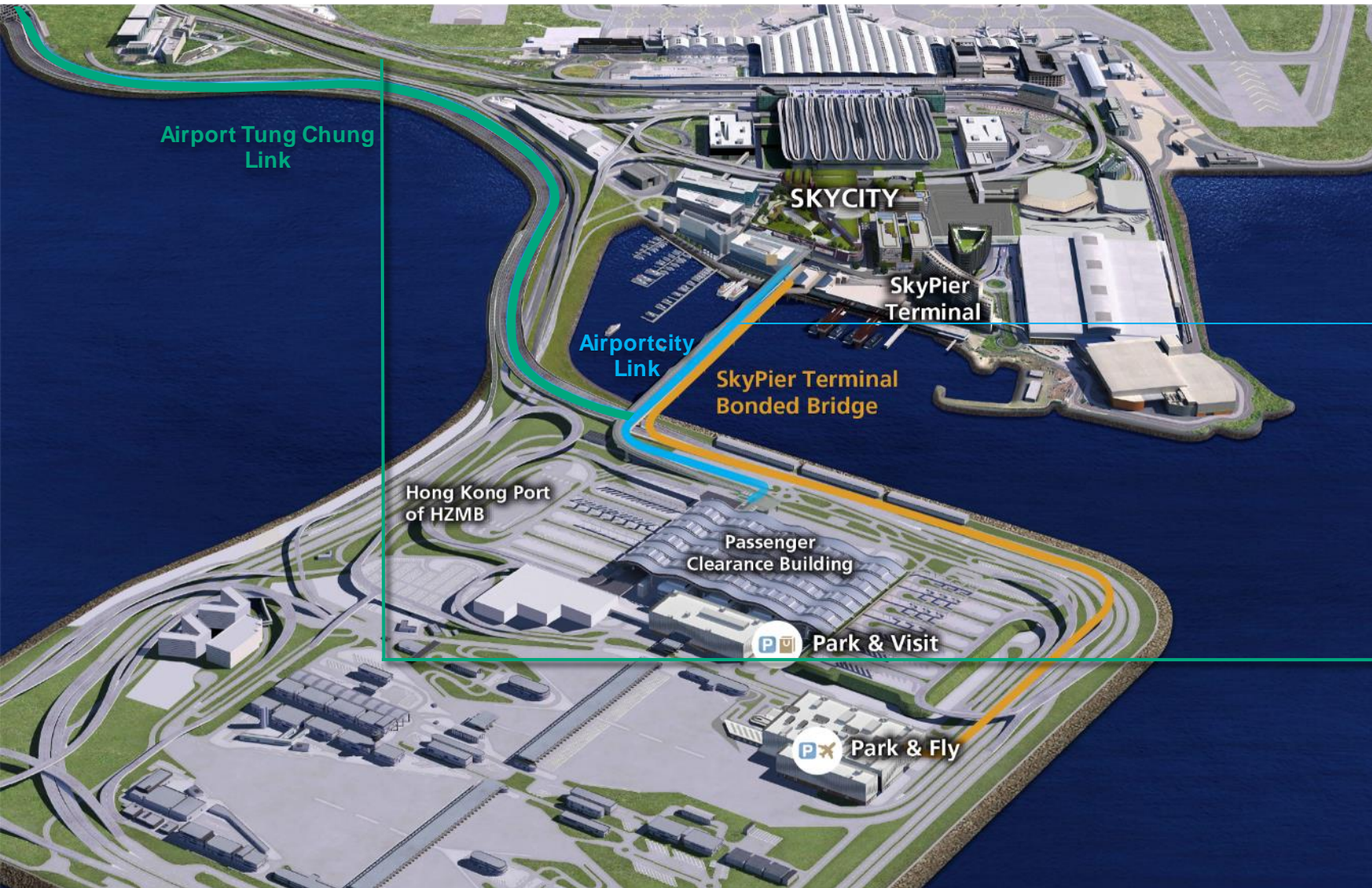
**20,000 seat capacity**

Adding another 30,000sqm, making total floor area to 100,000sqm





# Autonomous Transportation System



Airportcity Link – complete by 2024



Airport Tung Chung Link





# Autonomous Transportation System





# Smart Airport – Enhancing productivity and operational efficiency

## Autonomous Airport Operation



## AI and Data Analytics



## Wireless Communications

### 5G Mobile Network





# Smart Airport – “Flight Token” Touchless and Seamless Journey

Smart Check-in



e-Security Gates



e-Boarding Gates





# Air Cargo

## New Facilities

### Premium Logistics Centre

**380,000m<sup>2</sup>** 3<sup>rd</sup> largest  
floor area warehouse  
in Hong Kong

Target completion: 2023



### DHL Central Asia Hub

Target completion: 2022



### Transit Mail Centre

Target completion: 2025



## Taking Lead in Temperature-Controlled Cargo Handling



CEIV Pharma Partner Airport accreditation



CEIV Fresh Partner Airport accreditation



CEIV Live Animals certification





# Airside intermodal cargo pier in HKIA and HKIA Logistics Park in Dongguan





# Regional Training Centre

- Hong Kong International Aviation Academy was established in 2016. There are over 180,000 participants from Hong Kong, Mainland and “Belt and Road” regions (as of March 2022).
- A new campus located at 9/F HKIA Community Centre has come into service in September 2021.



**Air Traffic Control Centre**



**Auditorium**



**Executive Lecture Hall**



**ICAO classroom**





# EM&A Updates





# EM&A Monitoring Status (Jan 2021 to Jul 2022) (1)

## Air Quality (2 stations) & Noise Monitoring (4 stations)

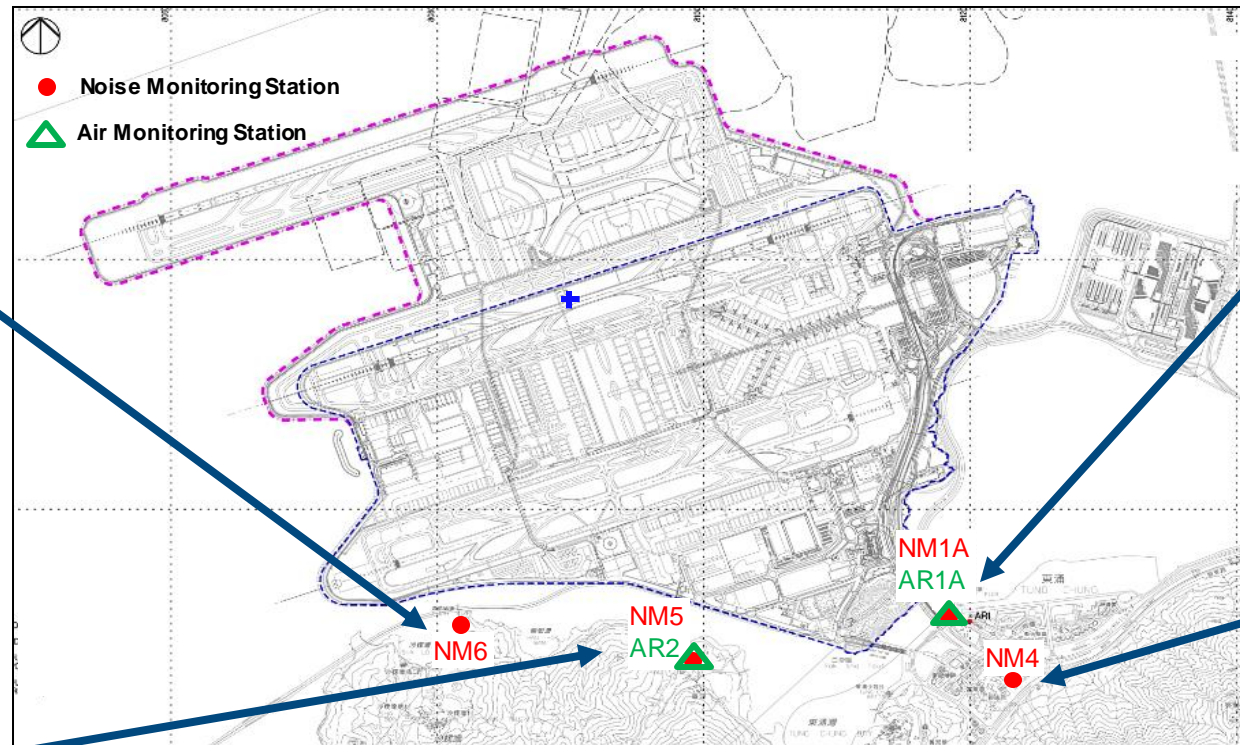
- **No** exceedance of project-related Action / Limit Level was recorded



Noise Monitoring Station (NM6)



Air Quality Monitoring Station (AR2)  
Noise Monitoring Station (NM5)



Air Quality Monitoring Station (AR1)  
Noise Monitoring Station (NM1A)



Noise Monitoring Station (NM4)

	2021	2022 (Jan – Jul)
Air Quality Monitoring Events	378	222
Noise Monitoring Events	208	120



# EM&A Monitoring Status (Jan 2021 to Jul 2022) (2)

## Water Quality Monitoring (14 stations)

	2021	2022 (Jan – Jul)
Water Quality Monitoring Events	153	90

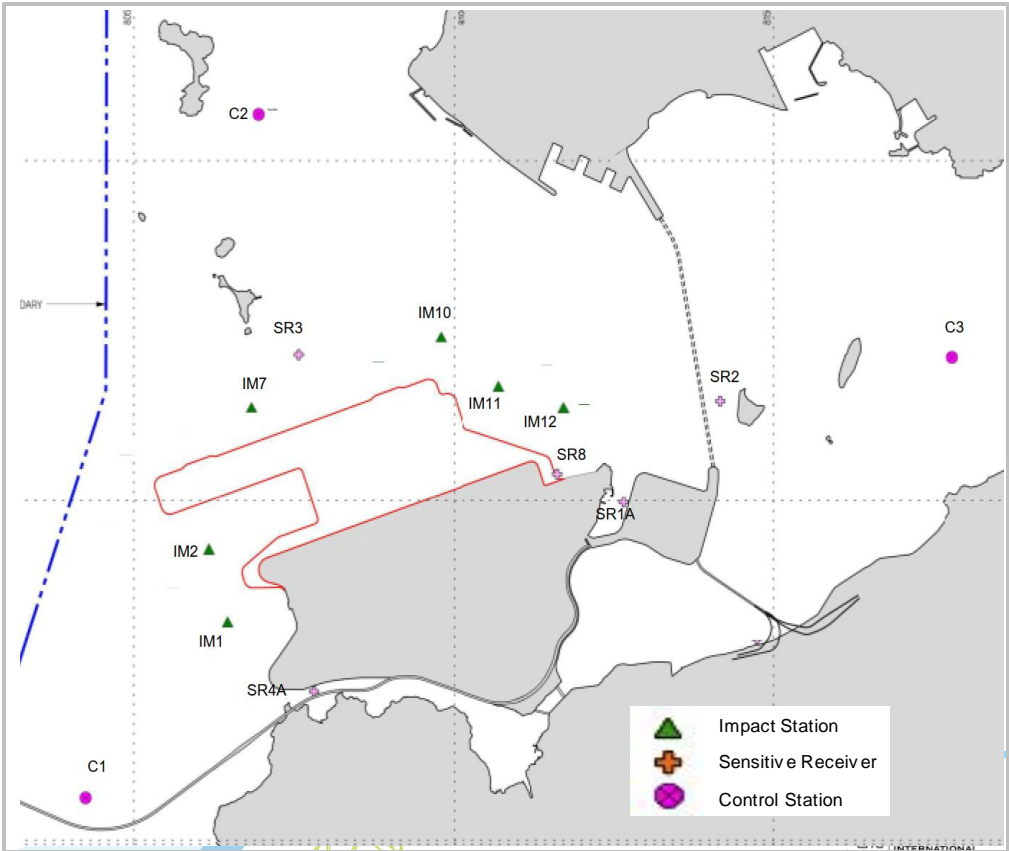
- **No** exceedance of project-related Action / Limit Level was recorded
- As most of the seawall construction has been completed, water quality monitoring stations reduced from 23 stations to 14 stations since 25 Jan 2022: 6 impact monitoring stations, 5 sensitive receiver stations and 3 control stations
- Since May 2022, regular DCM monitoring at all monitoring stations no longer required, as all marine-based DCM works completed in early April 2022



Water quality monitoring sampling



Real time water quality monitoring





# EM&A Implementation (Jan 2021 to Jul 2022) (1)

## Air Quality Mitigation Measures



Provide **regular water spraying** at the main haul road to reduce fugitive dust generation.



Provide water spraying on dusty stockpile by **360° automatic water sprinklers**



Provide regular water spraying on dusty stockpile by **mist cannon**



Provide earth bund as **speed cushion** to reduce fugitive dust generation.



Install wheel washing facilities with **high pressure water jet** at site exit to avoid carrying of dust and soil to public road by site vehicles



Covering the dusty stockpile with **impervious sheet**



Promote using **electrical vehicles** to avoid emissions in order to improve air quality



# EM&A Implementation (Jan 2021 to Jul 2022) (2)

## Water Quality Mitigation Measures



Provide **silt curtain** for marine bored pilling



Use of **wastewater treatment facilities** for treating wastewater before discharging



Use of **impervious sheet** to prevent potential seepage of contaminants from marine sediment to the surrounding



Provide **sandbags and water-filled barrier** to prevent direct discharge of muddy water into the marine environment.

## Waste Management



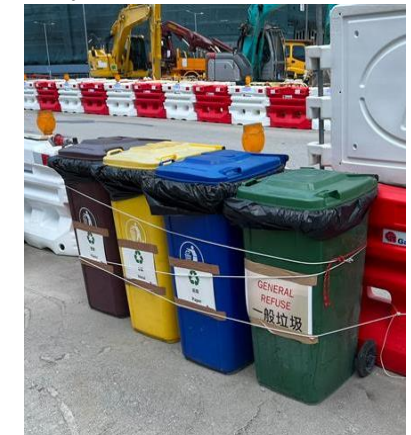
Recycle **expired safety helmets**



Recycle spent **lead acid batteries** from machinery



Recycle **metal scraps**



Segregate **recyclable material** such as glass, paper and plastic on site for recycling



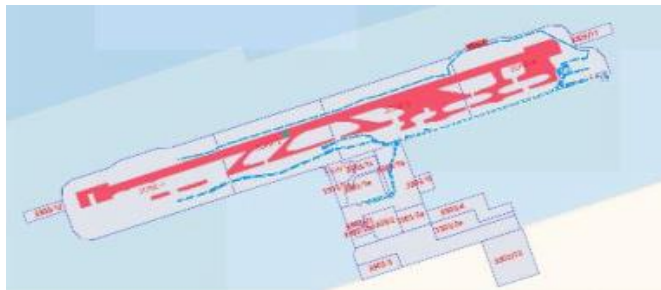
# EM&A Implementation (Jan 2021 to Jul 2022) (3)

## Environmental Recognition Scheme & Pay for Environmental Scheme

- Regular assess the contractor's environmental performance and recognize the contractors for **outstanding environmental initiatives and innovative practices**
- To enhance environmental awareness and performance on-site

### Good Examples from Contractors

**GPS** installed in the watering trucks for **tracking of water spraying** status on the haul roads to reduce dust nuisance.



Installed the **Solar Smart Dust Control System** to monitor dust level through mobile app. Water spraying will **turn on automatically** when the system detected the dust level is above the action level.



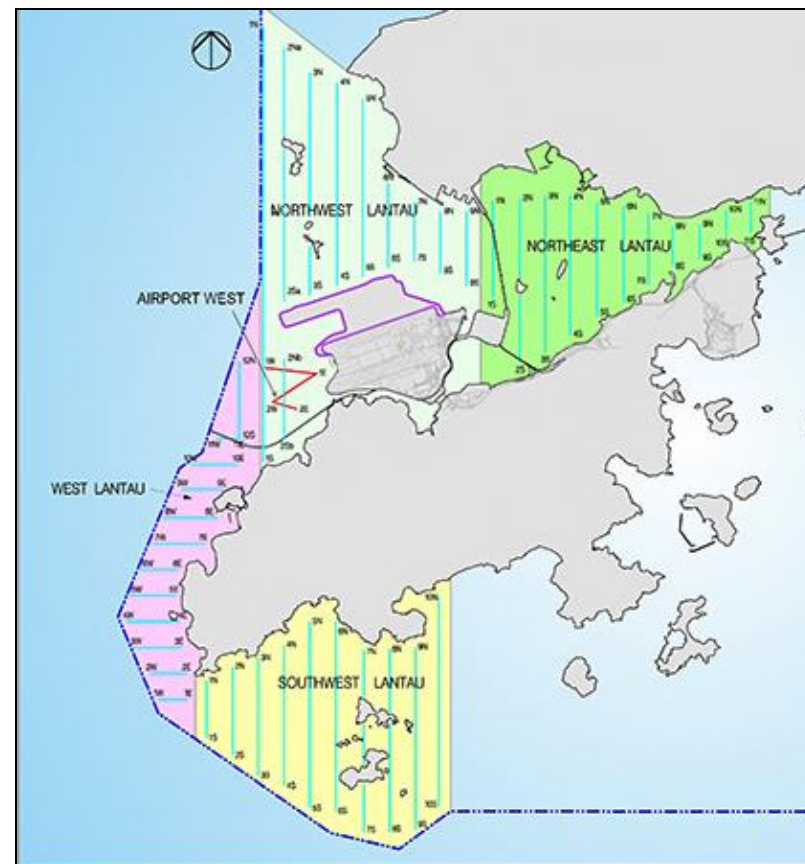
Use of **Seawater Desalination Reverse Osmosis System** to generate freshwater for hand washing, water spraying and toilet flushing to reduce the **use of freshwater**.





# CWD Monitoring Results – Vessel Line Transect Survey (Jan 2021 to Jul 2022)

- 38 rounds of vessel line transect surveys, covering a total distance of approx. 8,465 km
- 266 groups of CWDs with 900 dolphins sighted
  - 2021: 151 groups with 493 dolphins
  - Jan – Jul 2022: 115 groups with 407 dolphins
- Around 60% of CWD sightings recorded in WL survey area, followed by SWL and NWL survey areas
- The waters off Lung Kwu Chau (LKC) remains a year-round habitat for CWDs
- Average CWD group size was 3.4, ranging from 1 to 18 dolphins; 52 sightings recorded with the presence of mother-and-unspotted calf or mother-and-unspotted juvenile pairs





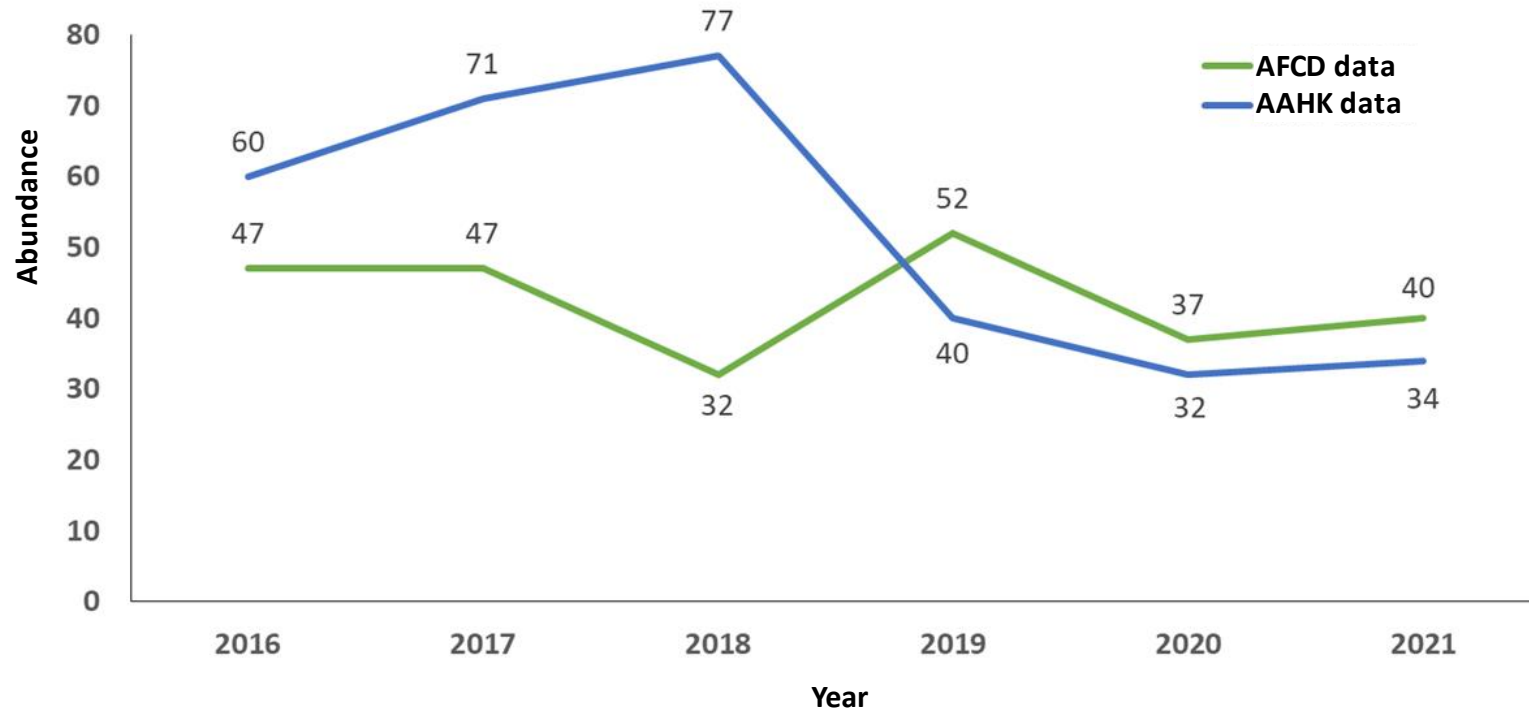
# CWD Monitoring Results – Land-based Theodolite Tracking (Jan 2021 to Jul 2022)

- 38 days (228 hours of effort) Land-based Theodolite Tracking were conducted on Lung Kwu Chau (LKC) and Sha Chau (SC)
- 16 CWD groups were tracked from LKC station, with group size ranged 1-7 dolphins
  - 2021: 15 groups
  - Jan – Jul 2022: 1 group
- No CWD groups were tracked from SC station





# CWD Estimated Abundance in the four survey areas of Lantau waters (2016 – 2021)



# CWD Rebound Study

- Additional initiative to review potential rebound of CWD to northwestern Lantau waters
- First round of 2-year study from March 2020 to February 2022 completed
- Second round of 2-year study ongoing

## Passive Acoustic Monitoring (PAM)

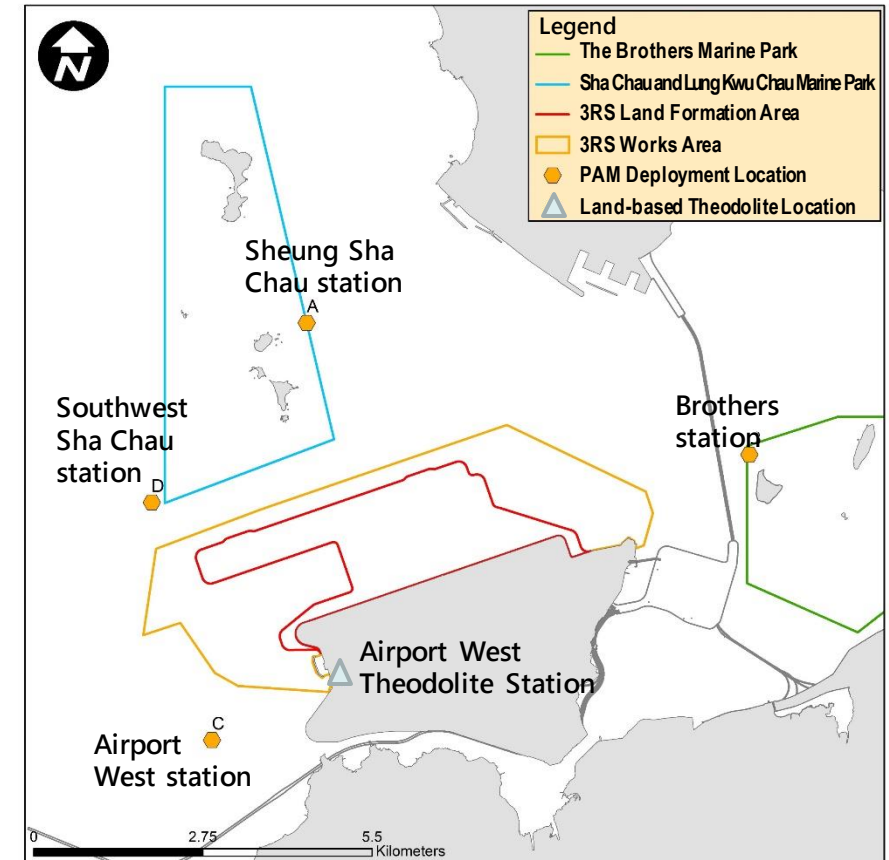
- Sheung Sha Chau station recorded the highest detection of CWD (90% Detection Positive Days), followed by the Brothers station (69%)
- CWD detections were higher during winter and lower during summer
- CWD detections were greater at night than during daytime, with higher detections between 2100 and 0300 hours
- These waters were still utilised by dolphins during night-time

## Land-based Theodolite Tracking

- The first round of study recorded 11 groups CWD, with group size ranged from 1-2 dolphins
- CWD records were mainly in winter and early spring



PAM device: F-POD



Monitoring locations of CWD Rebound Study





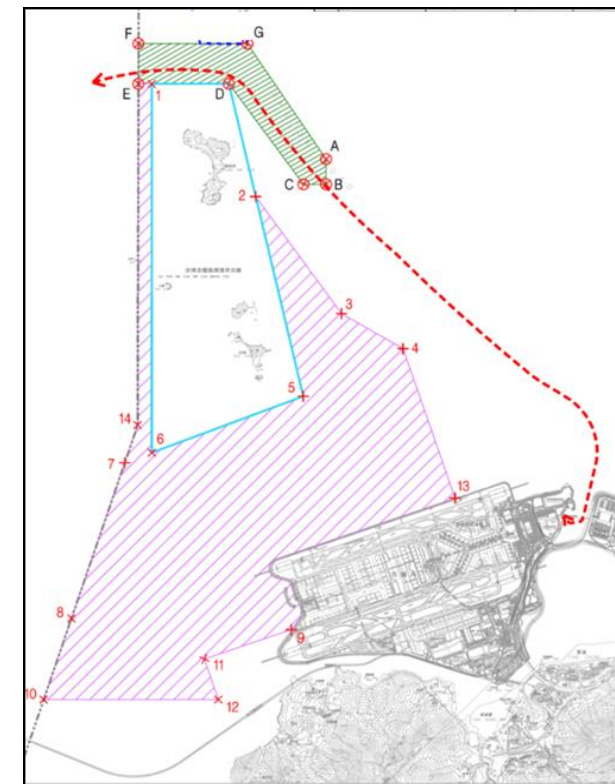
# Implementation of Marine Traffic Route & Management Plan for High Speed Ferries of SkyPier (SkyPier Plan) (Jan 2021 to Jul 2022)

	2021	2022 (Jan – Jul)
Total number of diverted HSF trips*	0 #	0 #
Diverted SkyPier HSF trips* with average speed within 15 knots	0% #	0% #
Maximum daily no. of SkyPier HSF movement (within the maximum daily cap of 125 movements)	11 #	5 #
Daily average SkyPier HSF movements (within the maximum annual daily cap of 99 movements)	4 #	3 #

- No diverted SkyPier HSF travel through the speed control zone (SCZ) over 15 knots and not travel through the SCZ was recorded.

\* Ferry service to/from between Hong Kong International Airport and Macau/Zhuhai

# Due to COVID-19 epidemic, all ferry services has been suspended from 25 March 2020 until further notice. Special ferry service have been arranged between Macau and the Hong Kong International Airport from 17 June 2020 to 16 July and late November 2020. Besides, the non-diverted SkyPier HSF provided limited service starting from 28 October 2020.



LEGEND:

 Marine Prohibited Zone for SkyPier High Speed Ferries



# Complaints and Enquiries Handling

	2015 (From 28 Dec)	2016	2017	2018	2019	2020	2021	2022 (Jan – Jul)
Complaint	0	1	7	8	1	10	21	8
Enquiry	0	25	16	19	20	9	13	1
<b>Total</b>	<b>0</b>	<b>26</b>	<b>23</b>	<b>27</b>	<b>21</b>	<b>19</b>	<b>34</b>	<b>9</b>





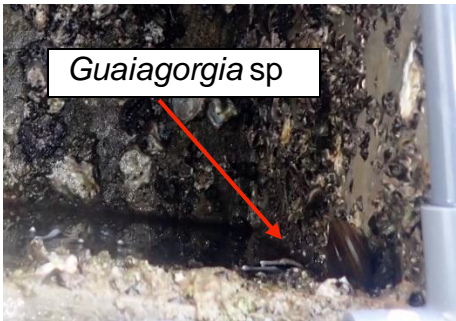
# Marine Ecology and Fisheries Enhancement Strategy



# Eco-enhancement of Seawall Design (1)



Since early 2020, 26 rock pool blocks installed (~100m)



Gorgonian coral, *Guaiaigorgia* sp. species, observed in the water retention basin in rock pool block



46 three-surfaced eco-blocks were installed at the northeast of 3RS Project area (~ 2,200m)



Since early 2020, 116 eco-enhanced concrete blocks installed (with a length of around 330m)



The deployment of rock pool blocks on sloping seawall will be completed by the end of 2022

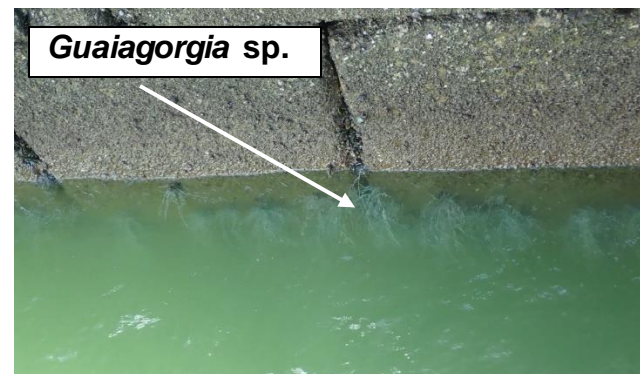
- 生態混凝土組件 (斜坡式海堤)  
Eco-enhanced concrete blocks (Sloping seawall)
- 生態混凝土組件 (垂直海堤)  
Eco-enhanced concrete blocks (Vertical seawall)
- 岩池 (斜坡式海堤)  
Rock pools (Sloping seawall)
- 岩池 (垂直海堤)  
Rock pools (Vertical seawall)



# Eco-enhancement of Seawall Design (2)

## Vertical Seawall Section

- A higher number of species were recorded on the ecological enhanced features when compared to their corresponding control blocks.
- The mean number of mobile individuals recorded on eco-enhanced units were higher than that on controls plots during wet season, especially on the rock pool seawall.



Gorgonian coral, *Guaiaigorgia sp.* species, was also observed at upper sub-tidal zone of vertical seawall during low tide



Bivalve, *Perna viridis*, observed in the water retention basin in rock pool block

### *Amphibalanus amphitrites*



Barnacle *Amphibalanus amphitrites* and herbivorous snail, *Echinolittorina sp.* recorded on vertical seawall

## Sloping Seawall Section

- At low tidal water levels, the species richness, mobile species abundance and sessile epifauna coverage were higher on three-surfaced eco-blocks than control blocks.
- At shallow subtidal depth, a trend of more individuals of mobile species and sessile epifauna on eco-blocks was observed.



Algae *Ulva sp.* recorded on of three-surfaced eco-blocks and controls



Gorgonian coral *Guaiaigorgia sp.* at low tidal of three-surfaced eco-blocks



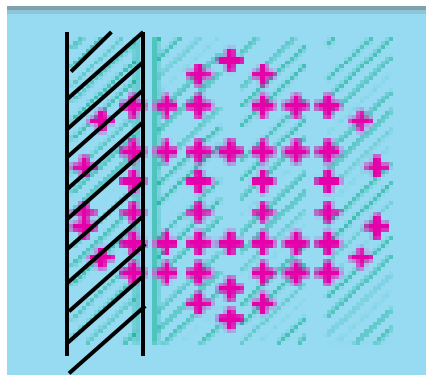
# Artificial Reef Pilot Study (1)

- 50 AR units & 50 AOR units were deployed during mid-June and early July 2021
- One year post deployment monitoring surveys were conducted on a bi-monthly basis (August 2021 – July 2022)

## Passive Monitoring



## Direct Observation





# Artificial Reef Pilot Study (2)

- In total, 51 species of marine fauna, including 13 fish preys of Indo-Pacific humpback dolphin were captured during gill-netting and hand-lining surveys



*Dendrophysa russelli*



*Nibea albiflora*

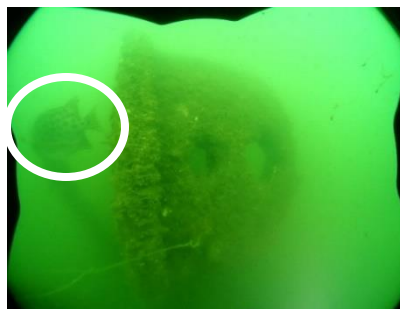


*Stolephorus indicus*



*Nematalosa japonica*

- 16 species of marine fauna, including barnacle, bivalvia, bryozoan, coral, crab, hydroid, oyster, sea squirt, sponge and eight fish species were recorded during the dive surveys



*Scatophagus argus*



*Thalamita* sp.



*Sebastiscus marmoratus*



*Balanophyllia* sp. (above)  
*Balanus amphitrite* (below)

- Significantly higher abundance/coverage of mobile and colonization species inhabited in and/or on the ARs after one year of deployment



# Shellfish Reef Pilot Study (1)

- Beyond EP requirements
- First pilot reef study on artificial seawall
- AAHK in collaboration with TNC and HKU
- Deployed shellfish reef in June and July 2021
- One-year post-deployment monitoring – completed

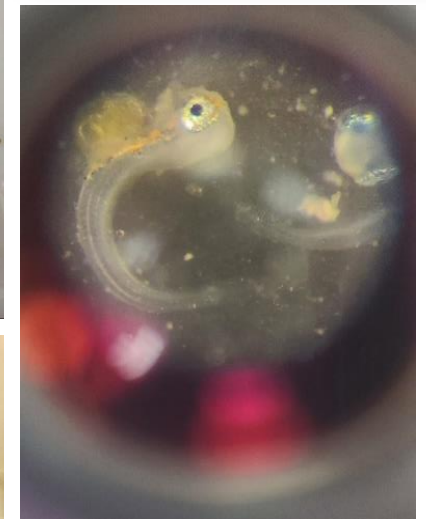
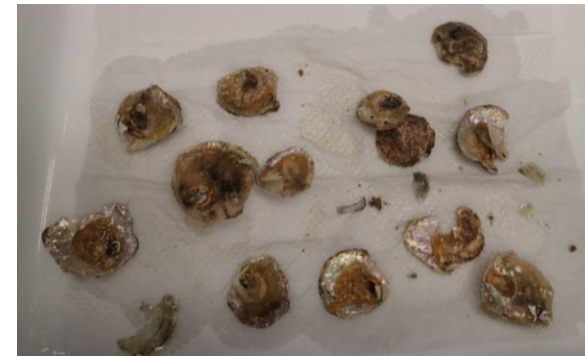




# Shellfish Reef Pilot Study (2)

## Preliminary Findings

- Recruitments higher at scour apron
- Organisms recruited well over the whole reef with colonisation observed
- Oyster recruitments consistent with seasonal variations
- Over 35 species recruited, including
  - Mussels
  - Crabs
  - Barnacles
  - Gastropods (snails)
  - Sea-stars
  - Bivalves
  - Tubeworms
  - Shrimps
- Oyster survival may be affected by sedimentation
- Collected samples are being analysed and under DNA sequencing



# Marine Ecology Enhancement Fund (MEEF) – Overview

Year	New approved projects	Funded Amount (HK\$)	Theme of funded projects	
			Dolphin-related	Others *
2017/18	6	~ \$ 5.08M	4	2
2018/19	4	~ \$ 6.55M	2	2
2019/20	3	~ \$ 6.31M	1	2
2020/21	4	~ \$ 5.46M	4	0
2021/22	8	~ \$ 6.57M	4	4
2022/23	5	~ \$ 4.79M	1	4
<b>Total</b>	<b>30</b>	<b>\$ 34.76M</b>	<b>16</b>	<b>14</b>

\* Other themes of the funded projects include mangrove, seagrass, crustaceans, horseshoe crabs etc.



Mangrove related project



Dolphin related project





# Fisheries Enhancement Fund (FEF) – Overview

Year	New approved projects *	Funded Amount (HK\$)
2017/18	4	~ \$ 2.93M
2018/19	2	~ \$ 3.69M
2019/20	4	~ \$ 6.35M
2020/21	4	~ \$ 7.84M
2021/22	2	~ \$ 5.12M
2022/23	4	~ \$ 8.53M
<b>Total</b>	<b>20</b>	<b>\$ 34.46M</b>

\* Other themes of the funded projects shellfish farming, aquaculture, fish feed development, eco-tourism, maritime safety, etc.



Sustainable Aquaculture Development Pilot Project  
Australian Redclaw Crayfish



Pilot Project for the Sustainable Aquaculture of Tropical Sea Cucumbers in Hong Kong



Pearl Farming cum Ecotourism Project



# Funds Publicity (1)

## 2<sup>nd</sup> MEEF and FEF Joint Sharing Session

- Held in November 2021, with ~70 participants from the academia, fishermen's groups, Government departments, professional bodies, NGOs and private corporations attended

## Media Interviews

- Feature stories published in major newspapers and broadcast on social media / TV – e.g. HK Economic Times, Oriental Daily, HK01, Ming Pao, Sing Tao, Wen Wei Po, TVB, i-Cable News, Facebook, YouTube and LinkedIn





# Funds Publicity (2)

## Projects videos

- MEEF projects: [https://env.threerunwaysystem.com/en/meef/meef\\_projects\\_media.html](https://env.threerunwaysystem.com/en/meef/meef_projects_media.html)
- FEF projects: [https://env.threerunwaysystem.com/en/fef/fef\\_projects\\_media.html](https://env.threerunwaysystem.com/en/fef/fef_projects_media.html)



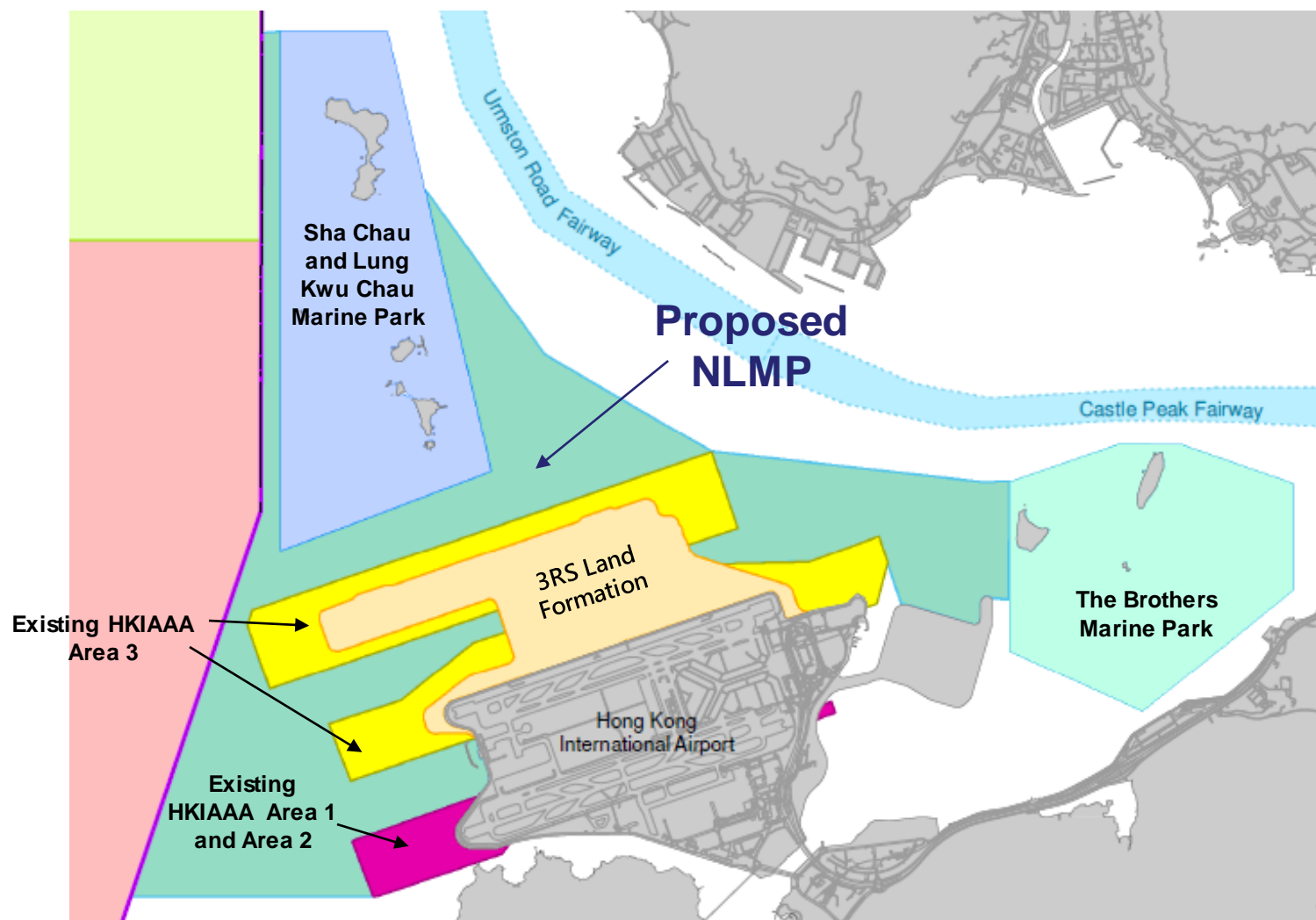
(video)



(video)



# Proposed North Lantau Marine Park (NLMP)



- In the second half of 2020, AAHK has consulted:
  - Marine Parks Committee (MPC)
  - Advisory Council on the Environment (ACE)
  - Country and Marine Parks Board (CMPB)
- AFCD will follow statutory procedures to designate the proposed marine park in 2024





# Carbon Management and Climate Resilience



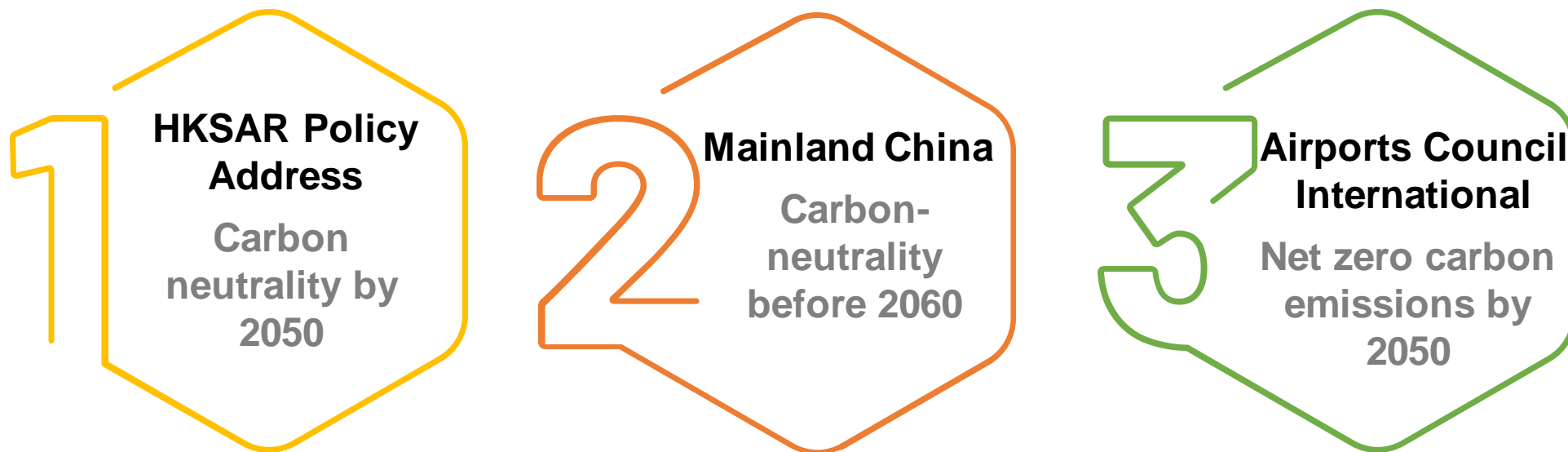
# Carbon Management – Background

- The HKIA Carbon Reduction Programme was established in 2008 and provides a platform for the airport community to collaboratively reduce carbon emissions.





# Setting a Long-term Carbon Target



- Recently, the aviation industry as well as Mainland China and HKSAR Government has committed to long term carbon targets.
- In 2019/20, AA conducted an 18-month Long Term Carbon Target Study to recommend a carbon target for HKIA, determine a roadmap to net zero emissions by 2050 and develop a corresponding carbon management action plan.



# HKIA's Carbon Reduction Target

2035

Carbon absolute  
reduction  
**55%**

2050

Net zero  
carbon  
emissions





# HKIA's Carbon Reduction Target



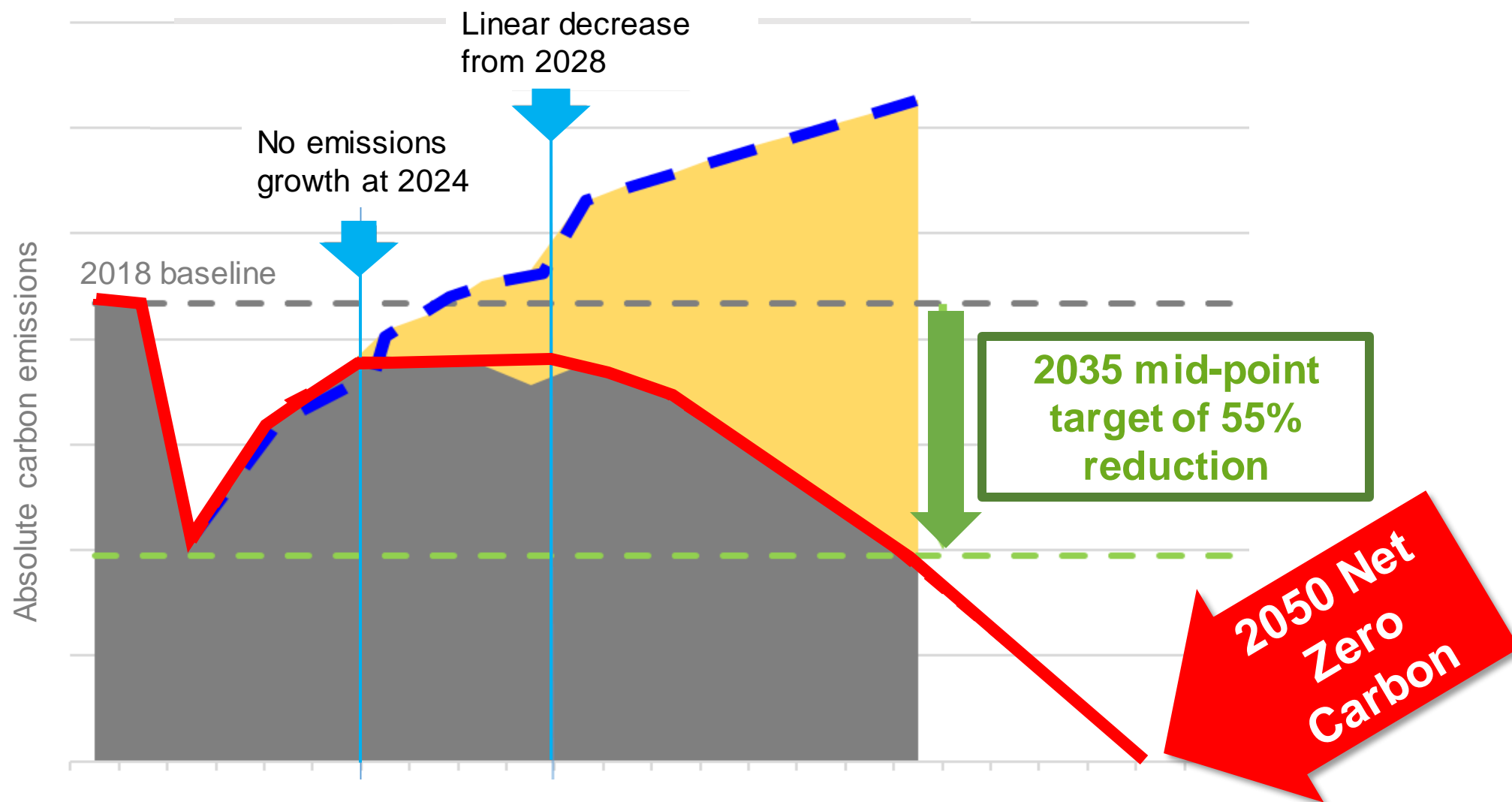
HKIA & Airport  
Business Partners  
commitment

29

Committed key aviation-  
related Business Partners



# HKIA's Carbon Reduction Target

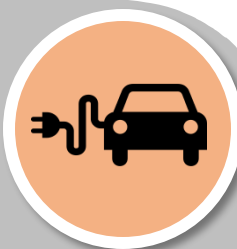




# HKIA's Carbon Reduction Midpoint Target

Reduce direct emissions

Electrification of  
vehicles and ground  
service equipment



Use of renewable  
diesel

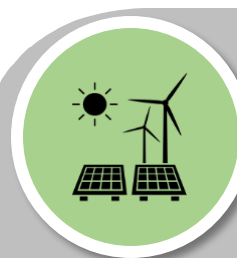


Use of low GWP  
refrigerants



**2035  
Mid-point  
Target**

Reduce indirect emissions



Zero carbon onsite  
energy generation



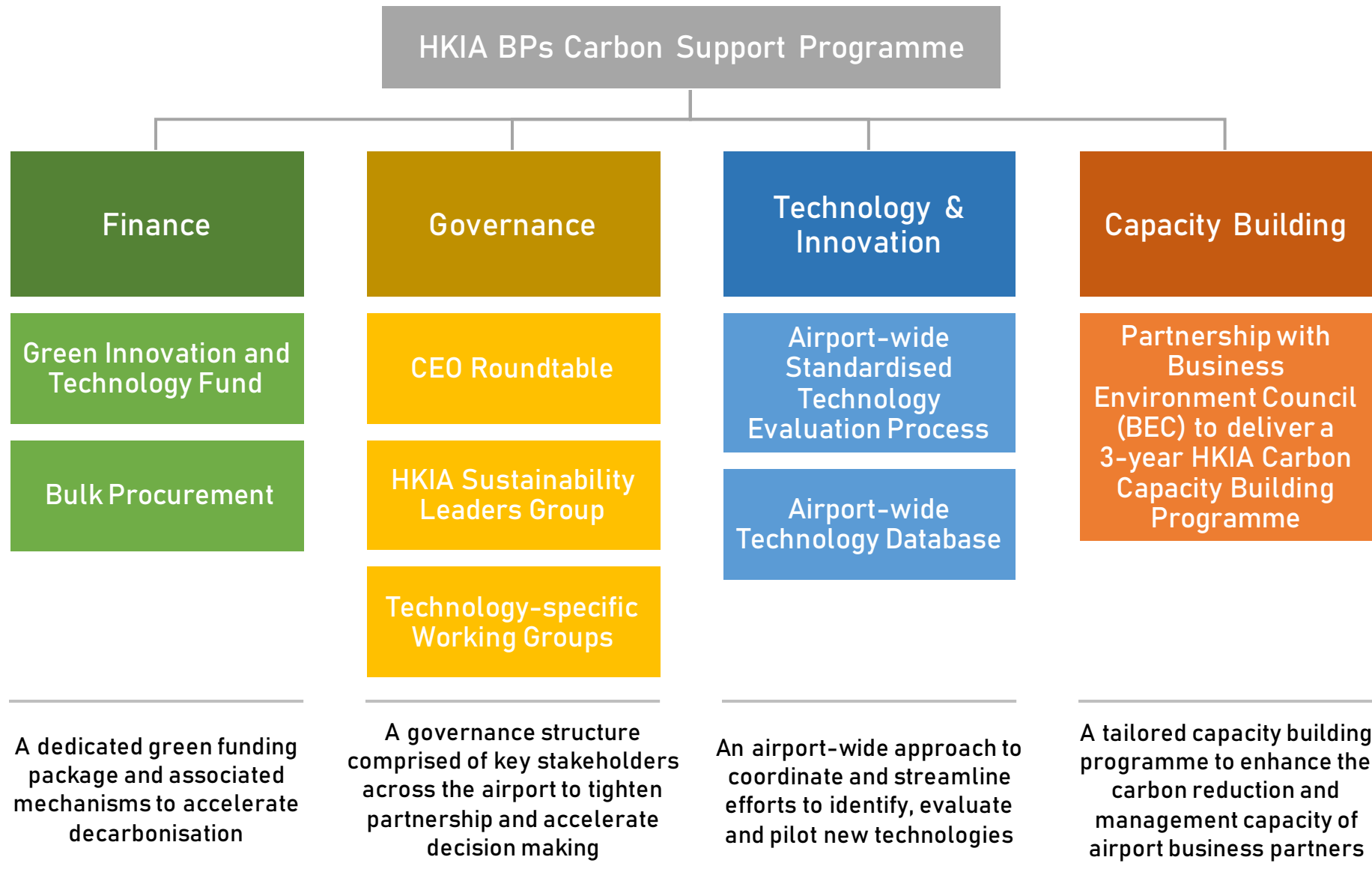
Energy efficiency  
measures



Grid  
decarbonisation



# HKIA Business Partners Carbon Support Programme





# Climate Adaptation and Resilience

- In 2020, AAHK commissioned an 18-month **Climate Resilience Study** for HKIA which aimed to:

*Strengthen the resilience of HKIA to the anticipated impacts of climate change by assessing multiple climate scenarios and the associated impacts to asset planning, financial performance and operations.*

- A **cross-departmental steering committee and working group** were established to promote collaborative input and knowledge sharing, and provide endorsement of key outputs of the study
- The study comprised of **comprehensive engagement** with 20 internal departments through about 100 meetings, workshops and online assessment feedbacks



# Climate Readiness

HKIA is already exposed to significant extreme weather events. The limited damage and ability to quickly recover operations, following events like Typhoon Mangkhut, indicate that HKIA currently has a high level of resilience and preparedness. Examples of current controls include:



## Operational procedures

- Manuals and procedures in place to deal with extreme weather e.g.
  - Business Continuity Manual
  - Typhoon and Heavy Rainstorm Preparation Guidelines
  - Plans for active media engagement during extreme weather events



## Monitoring and maintenance

- Inspection and preventive maintenance programme for critical infrastructure
- Regular review of enhancement works needed
- Power supply analyzer to monitor anomalies



## Emergency management

- Airport Emergency Centre for multi-agency coordination
- Emergency generators available
- Fault Response Team and Passenger Care Team



## Physical / system protection

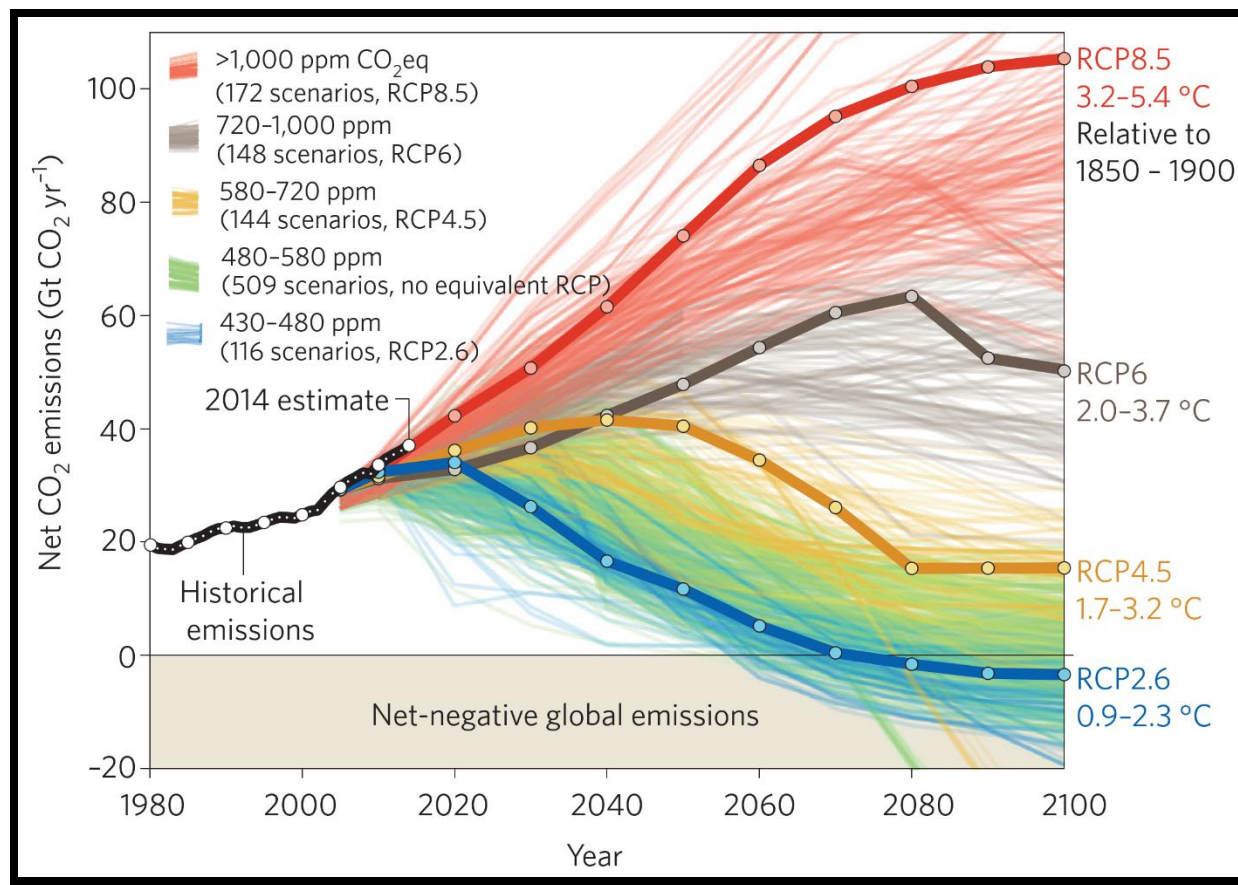
- Seawall and drainage system
- Uninterruptible power supply for essential systems
- IoT sensors for real time storm surge alert
- Some consideration of climate change in new developments (e.g. seawall)





# Climate Scenarios

Climate scenarios from the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathways (RCPs)



Source: Carbon Brief, 2019. \* RCP – representative concentration pathways

*Business as usual*

**Physical risks assessment:**  
RCP 8.5 for 2030, 2050 and 2100

*High-moderate transition*

*Low-moderate transition*

*Accelerated transition*

**Transition risks assessment:**  
RCP 2.6

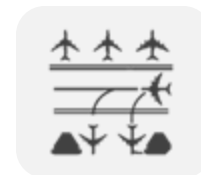


# Physical Risk Assessment

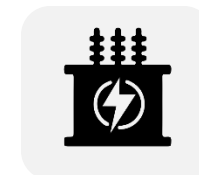
A **deep dive assessment** was conducted for the following six priority assets (shortlisted from around 40 assets)

Climate scenarios :	RCP4.5/6.0, RCP 8.5 (50 <sup>th</sup> and 95 <sup>th</sup> percentile) and H++ Sea level rise*	
Timeframes:	2030, 2050, 2100	
Hazards	Typhoons (wind, storm surge)	Sea level rise
	Rainfall (extreme)	Tidal flooding
	Lightning strikes	Average annual temperature

## Six priority assets



Airfield  
(incl. runway and drainage)



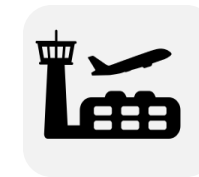
Airfield power  
distribution system



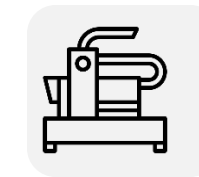
Airfield tunnel



Baggage handling  
system



Terminal and building  
structures



Chiller and  
seawater systems

**No extreme risks were identified for 2030 and 2050**

\*The H++ scenario provide a even higher possible rate of sea level rise. The scenario was developed by the United States National Oceanic and Atmospheric Administration (NOAA) in 2017 for the country's Fourth National Climate Assessment



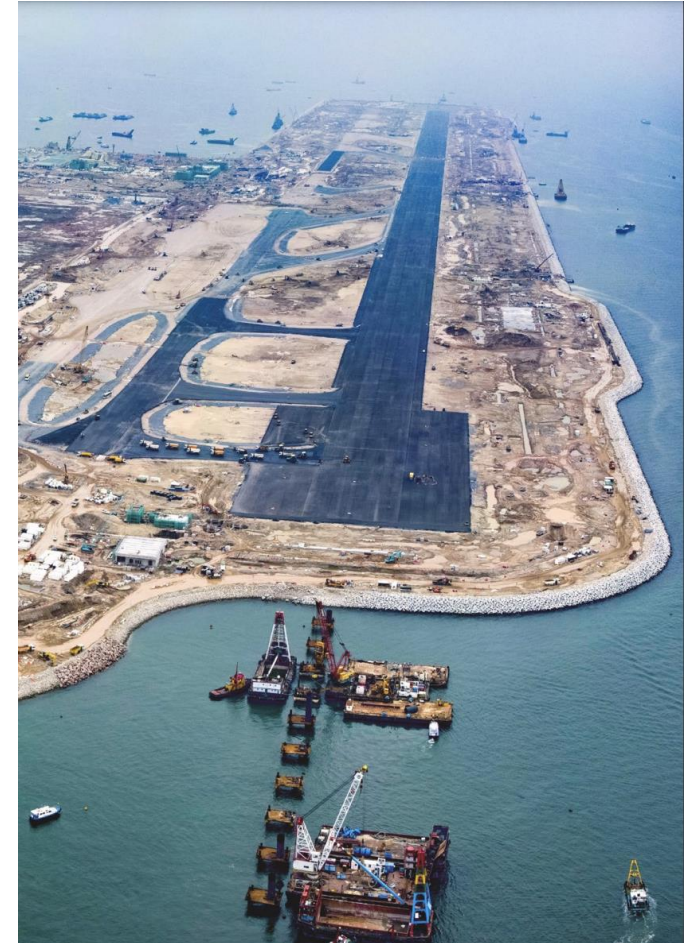
# Seawall Study and Airport-wide Drainage Study

The study identified risks relating to storm events, extreme weather, flooding and sea level rise which may affect some priority assets.

A robust simulation and scenario-based modelling approach was adopted in seawall and drainage studies to assess the **flooding risks** under multiple climate scenarios (including H++ scenario) due to:








- sea level rise
- storm surge and overtopping waves
- extreme rainfall

HKIA is well-protected from flooding with our existing sea wall (set at +6.5 m PD) and drainage system.



# Transition Risk Assessment

Below are the priority transition risks and opportunities for AAHK:

	Priority transition risk drivers	Examples
	<b>Global adoption of net zero emissions policies and action plans</b>	<p>Ability to keep pace with plans relating to:</p> <ul style="list-style-type: none"> <li>• HKSAR 2050 carbon neutrality target</li> <li>• China's carbon neutral by 2060</li> <li>• ACI 2050 Net Zero Carbon sector target</li> </ul>
	<b>Legal liabilities and regulatory approvals</b>	<ul style="list-style-type: none"> <li>• Commitments relating to climate change action and reporting will be expected, e.g. TCFD, Equator Principles</li> </ul>
	<b>Shifting consumer preferences to travel and freight</b>	<ul style="list-style-type: none"> <li>• Switch to high-speed rail / other modes for short haul flights</li> <li>• 'Flight shaming'</li> </ul>
	<b>Statutory energy and emissions performance standards and reporting requirements</b>	<ul style="list-style-type: none"> <li>• Likely to lead to more stringent energy efficiency standards, building energy codes</li> </ul>
	<b>Uptake of energy efficiency and low carbon technologies</b>	<ul style="list-style-type: none"> <li>• Shift in technology investment, development and adoption recommended in in <i>Hong Kong's Climate Action Plan</i>.</li> <li>• New airport operations for differently fuelled planes</li> </ul>
	<b>Policy enacting carbon pricing mechanisms</b>	<ul style="list-style-type: none"> <li>• Implications relating to China's nation-wide emissions trading scheme (ETS) in 2021</li> </ul>
	<b>Transformation of air transportation through fuel switching</b>	<ul style="list-style-type: none"> <li>• Transition to Sustainable Aviation Fuel (SAF); SAF was promoted in China's National Plan on Climate Change 2014-2020 and EU's 2030 Climate Target Plan</li> </ul>



# Key Actions to address Transition Risks & Opportunities



## Net zero carbon target

- Electrification and use of sustainable fuels
- Energy efficiency measures
- Grid decarbonisation



## Green Airport Design & Construction Strategy

- Increase carbon and energy reduction opportunities across the project lifecycle
- Investigate cost-effective emission reduction options



## Carbon pricing developments

- Establish a watching brief on the carbon pricing and emissions trading developments



## Promote use of sustainable aviation fuels

- AA is support of the use of SAF and will work with airlines seeking to use SAF to enable uptake at HKIA.



# Alignment with Task Force on Climate-Related Financial Disclosures (TCFD)

- AA's first TCFD statement was published in the Sustainability Report 2020/21.
  - To communicate AA's material climate-related risks and opportunities, and provide confidence to investors on AAHK's resilience to climate change.
  - To address TCFD recommendations, AA completed a climate resilience study and a long-term carbon target study in 2020.
  - HKIA was the first Asian airport to publish a TCFD statement, setting precedence for other airports.
- AA's second TCFD statement was published in the Sustainability Report 2021/22 and includes **enhanced disclosures**.



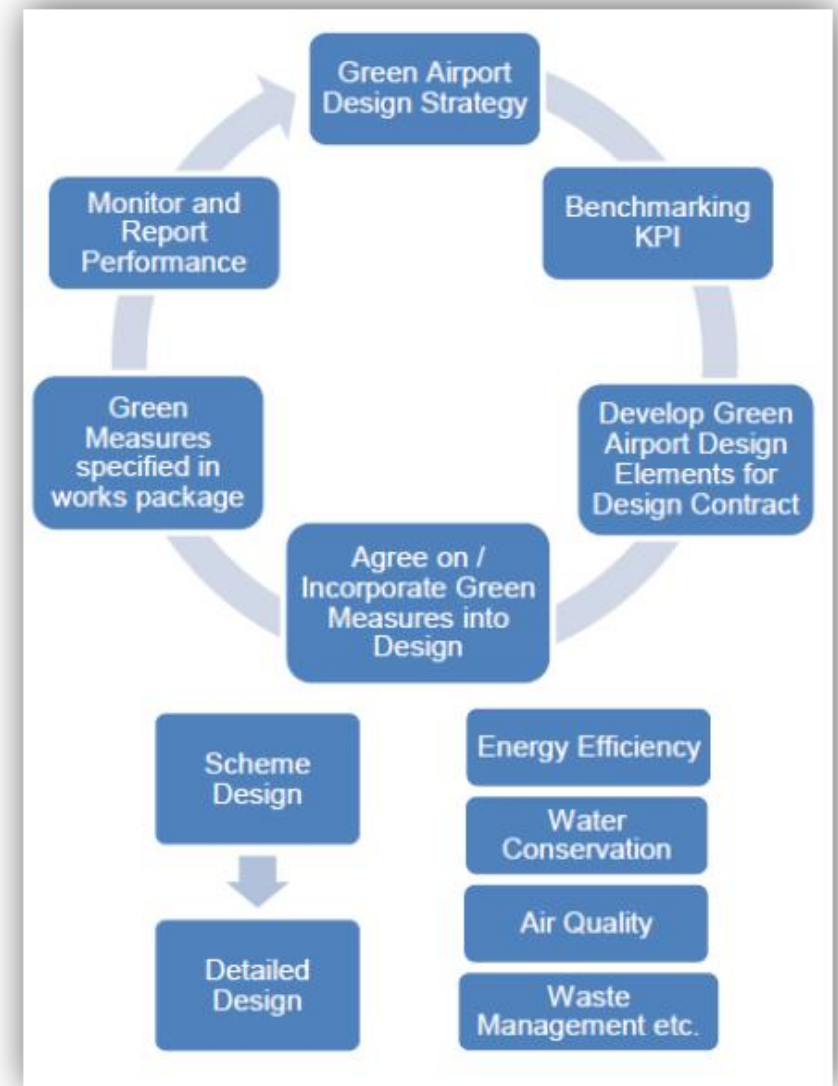


# Green Airport Design and Sustainable Construction



# AAHK's 3RS Green Airport Design Strategy

- AAHK is committed to making HKIA one of the **world's greenest airport**.
- A **Green Airport Design Strategy** has been established and implemented since the scheme design stage of the 3RS Project.
- The Strategy requires design consultants to identify **possible green design elements** and evaluate related pros and cons over the project's life cycle.
- Where considered useful, **third party certification** is pursued for demonstrating AAHK's commitments in delivering sustainable design and construction for the 3RS Project.





# 3RS Green Design and Sustainable Construction (1)

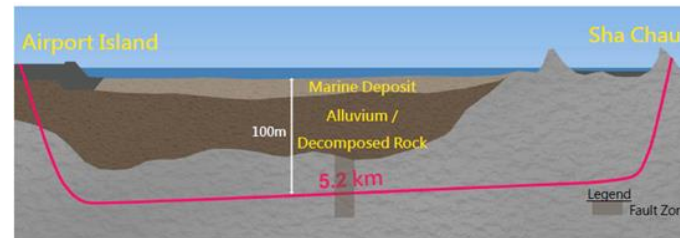
## AAHK's achievements



### Midfield Concourse

**Gold** rating under BEAM Plus Final Assessment (2017)

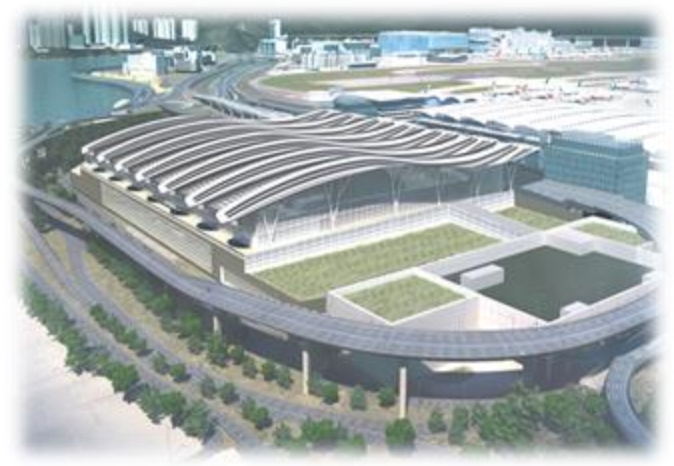
**Grand Award** in New Buildings  
Category, Completed Projects - Institutional Building, **Green Building Award 2016**



### Aviation Fuel Pipelines by HDD

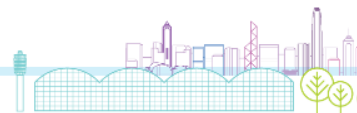
**Merit Award** under Organisation Category in CIC Sustainable Construction Award (2018)

**Excellent and Outstanding Awards** under Industry Practitioners Category in CIC Sustainable Construction Award (2018)



### T2 Expansion

**Platinum** rating under BEAM Plus Provisional Assessment (2020)



# 3RS Green Design and Sustainable Construction (2)

## AAHK's achievements



### Third Runway and Associated Works

**Excellent** rating under CEEQUAL's Sustainability Performance Assessment for Interim Client and Design Award (2020)



### 3RS Deep Cement Mixing Works

**Silver Award** under Organisation Category in CIC Sustainable Construction Award (2020)

**Excellent Award** under Industry Practitioners Category in CIC Sustainable Construction Award (2020)



### T2 Concourse (formerly known as Third Runway Concourse) and Air Traffic Control Tower

**Platinum** rating under BEAM Plus Provisional Assessment (2022)



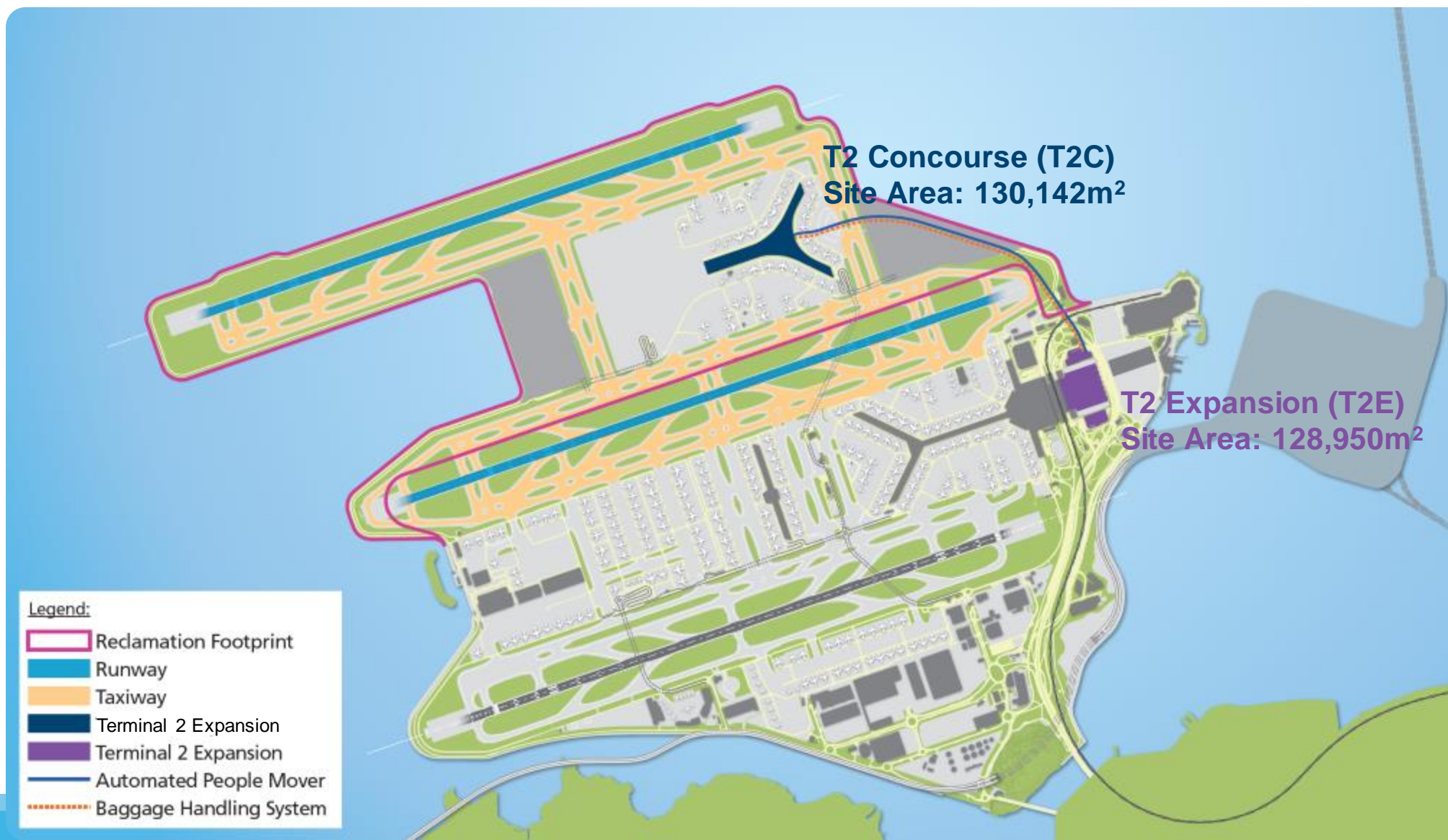


# AAHK's Airport-wide GADC Strategy

- With the achievements obtained from the 3RS Green Airport Design Strategy, AAHK has taken further step of formulating an airport-wide Green Airport Design & Construction (GADC) Strategy.
- The new airport-wide GADC Strategy provides a consistent approach for embedding green design and sustainable construction considerations in both its building and non-building infrastructure projects, as well as developments that are implemented by its franchisees and other business partners at HKIA.
- This strategy helps ensure a high importance on environmental and green design elements will be put at the project design and development stages. These elements will then be implemented in the subsequent works to minimise the environmental impact over the whole project life cycle.
- The implementation of the new GADC Strategy commenced in July 2021, with an initial two-year trial period.

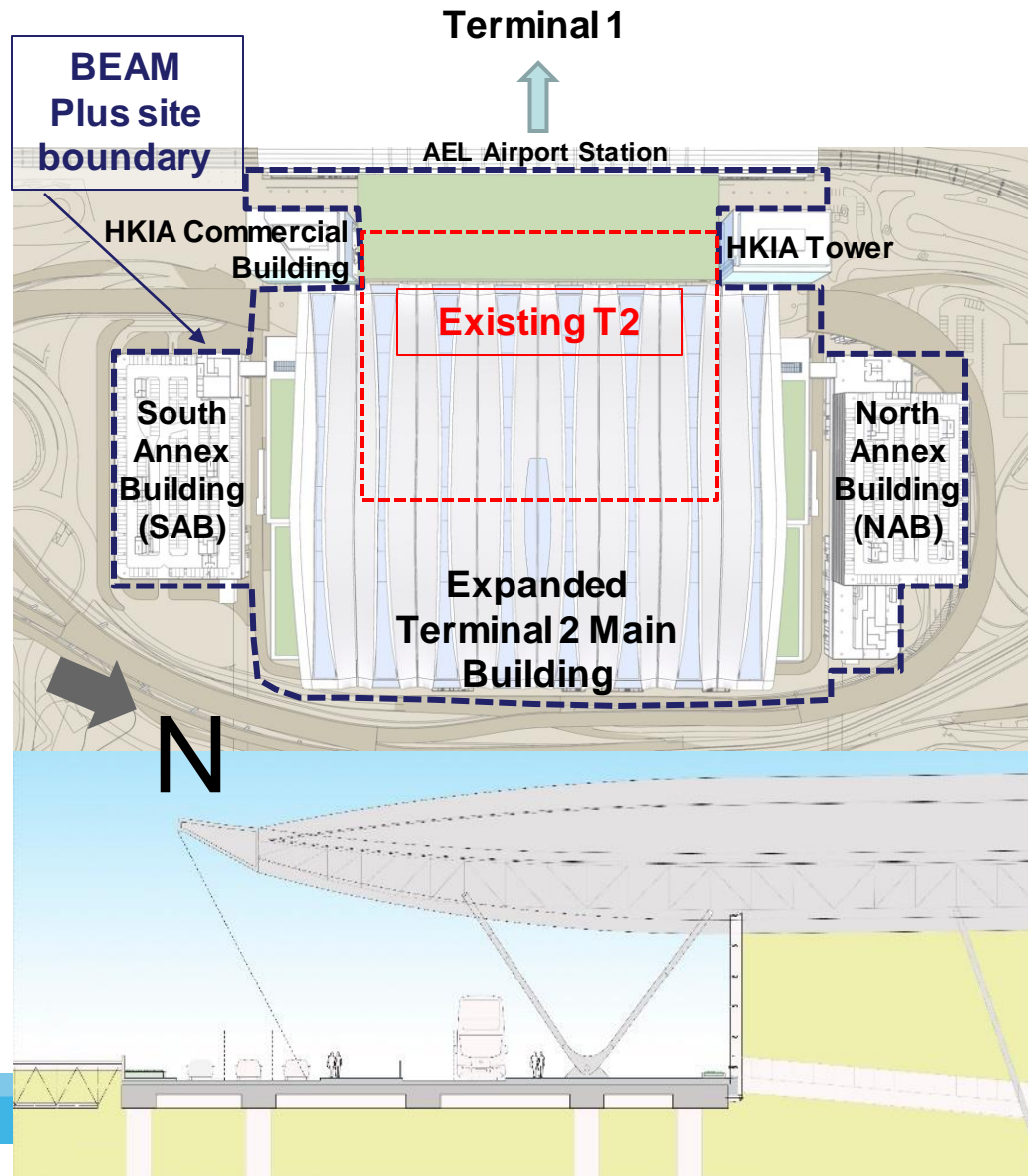


# T2 Expansion (T2E) and T2 Concourse (T2C) of 3RS



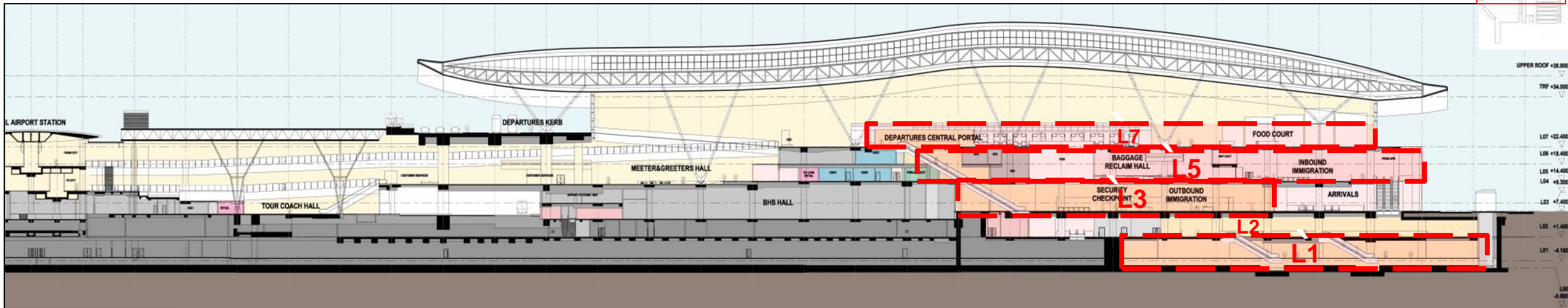


# T2 Expansion (T2E) (1)

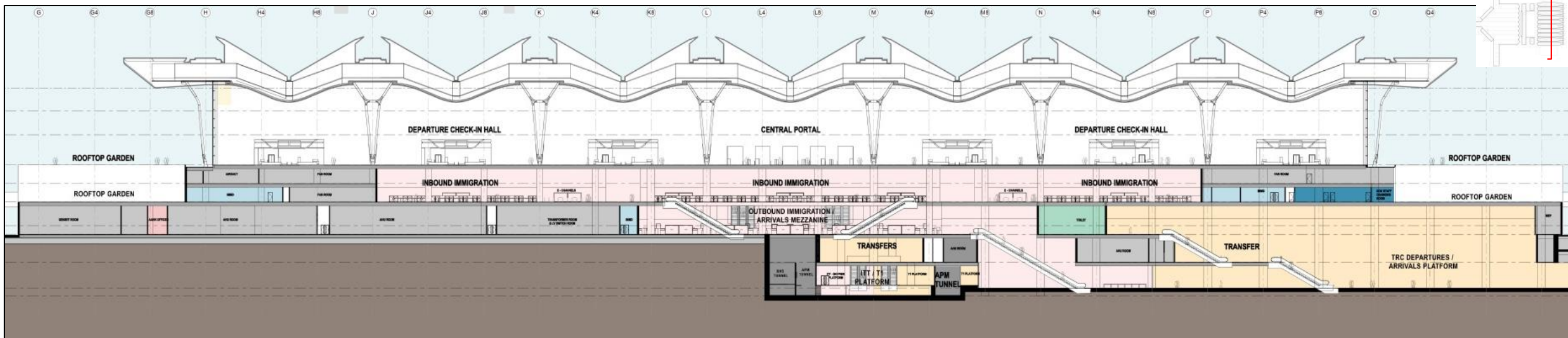




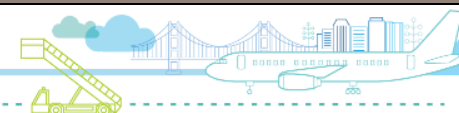
# T2 Expansion (T2E) (2)



Long Section

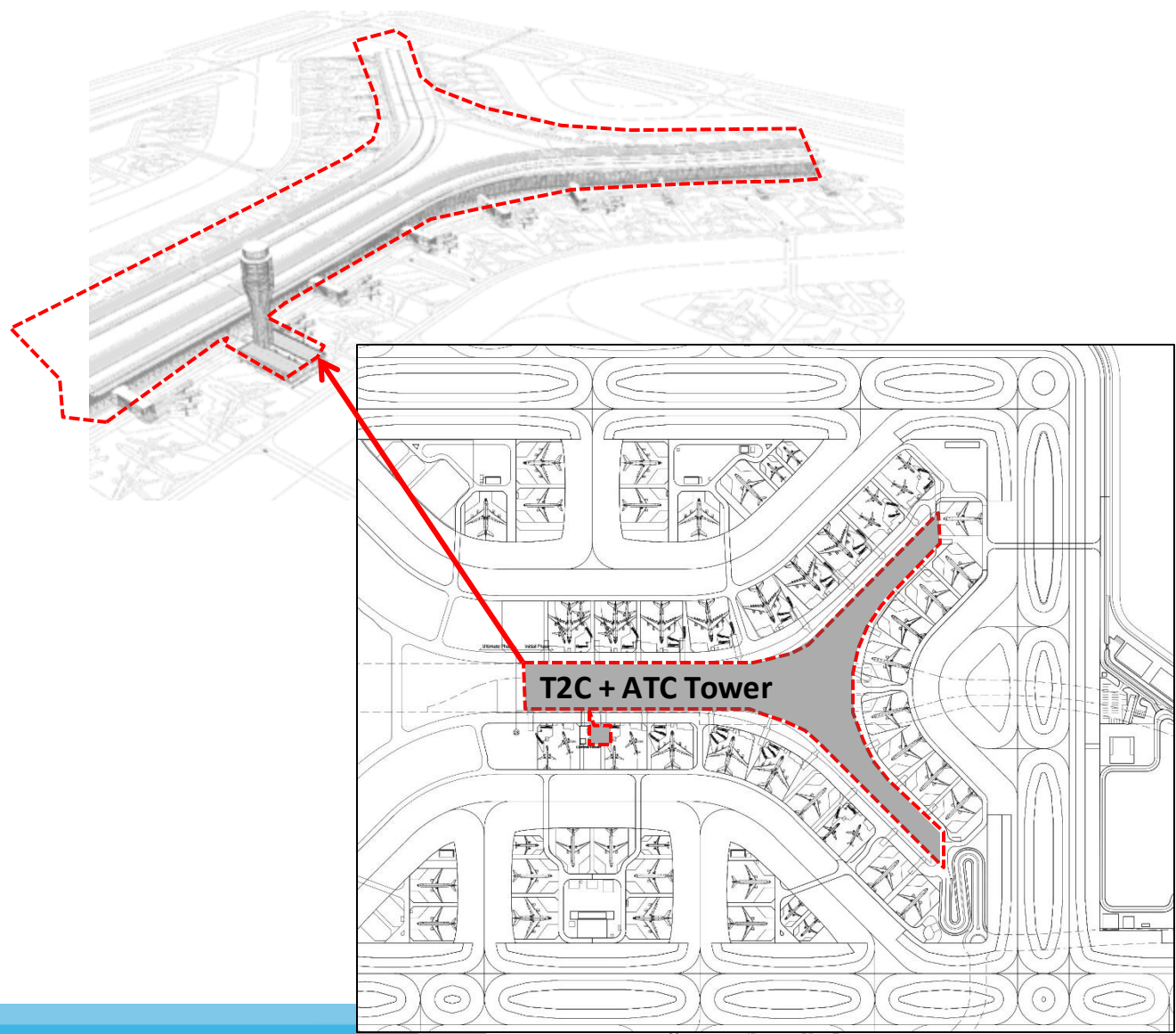


Cross Section





# T2 Concourse (T2C)



# Green Measures – Overview



## Energy efficient measures

- VSD chilled water pumps
- Binnacle air delivery system
- Seawater cooling
- DC fan coil unit
- Heat pipe for PAUs
- Application of LED lightings

## Energy saving measures

- Passive Energy Design
- Energy efficient lighting design
- Chiller optimization
- Free cooling air
- Lifts with regenerative power
- Service-on-demand escalator / passenger walkways

## Renewable technology

- PV System size ~ 2,000m<sup>2</sup> at T2E and 4,000 m<sup>2</sup> at T2C



Wind Environment

Daylight Resource

Greenery at high public exposure area



Green construction practice

Recycled content for hard standing

Green Tenant Guidelines

Material specification and modular/  
prefabrication construction



Indoor air quality (IAQ) at least “Good Class”  
or above

Additional fresh air provision

Comfort of occupants

- Lighting control
- Noise isolation & indoor vibration



Potable water usage reduction

Sewage reduction

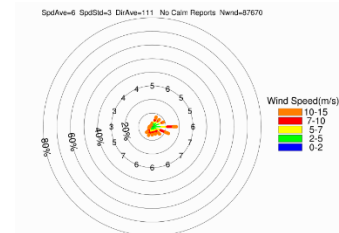
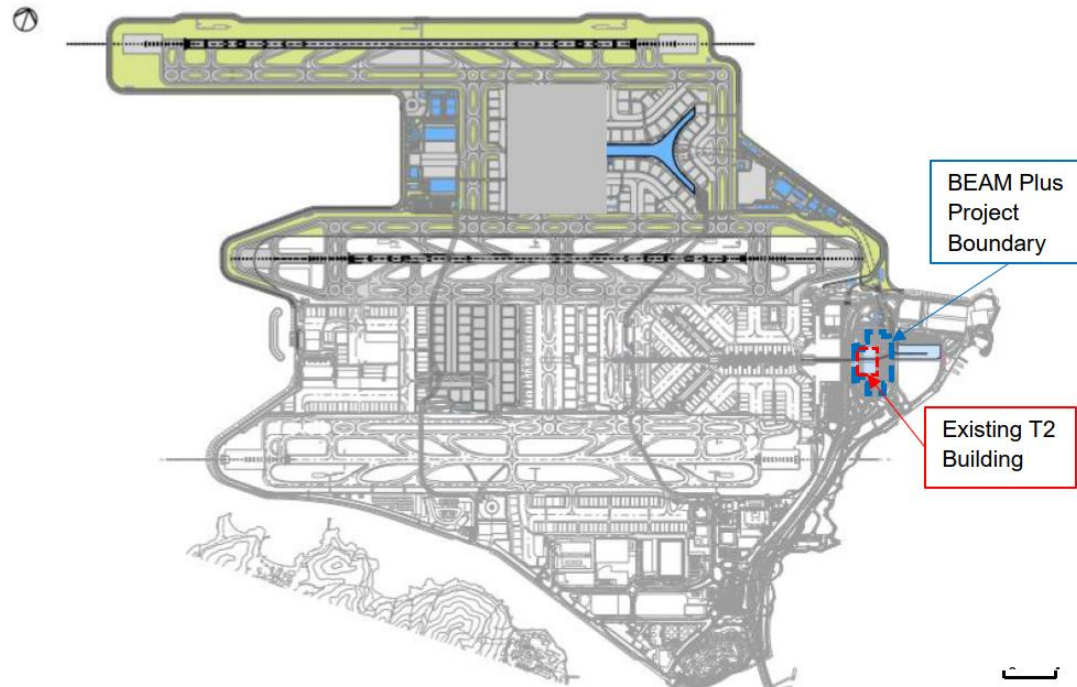




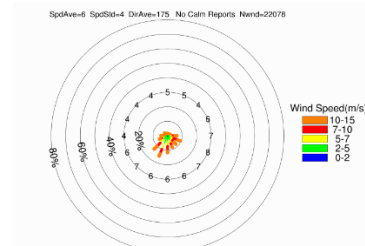
# Green Airport Design – Wind (1)

## Wind Environment

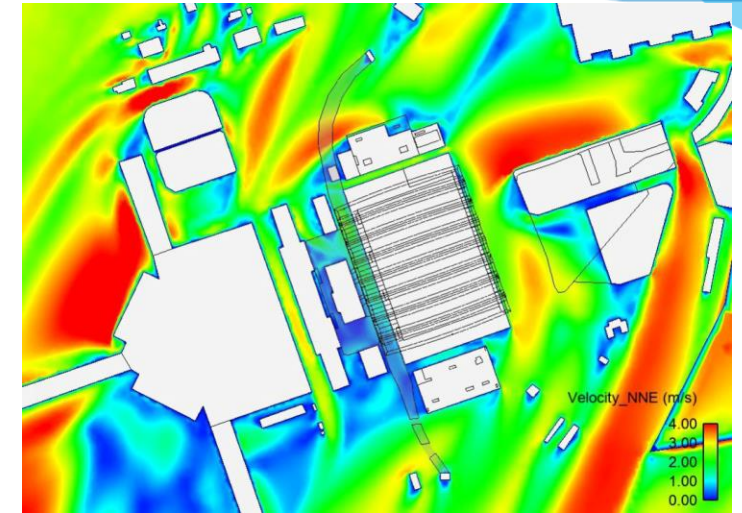
- Annual/ Winter Prevailing wind is in E direction and Summer prevailing wind is in SSE direction
- Facilitate the dilution of the air fleet pollutants along E, N and S facades



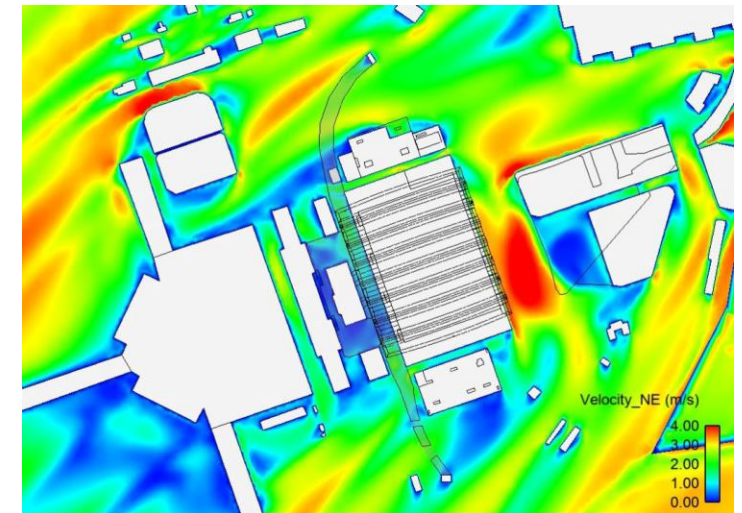
Wind rose showing annual / Winter prevailing wind direction (E)



Wind rose showing Summer prevailing wind direction (SSE)



NNE Wind at Pedestrian Level of Garden Landscape



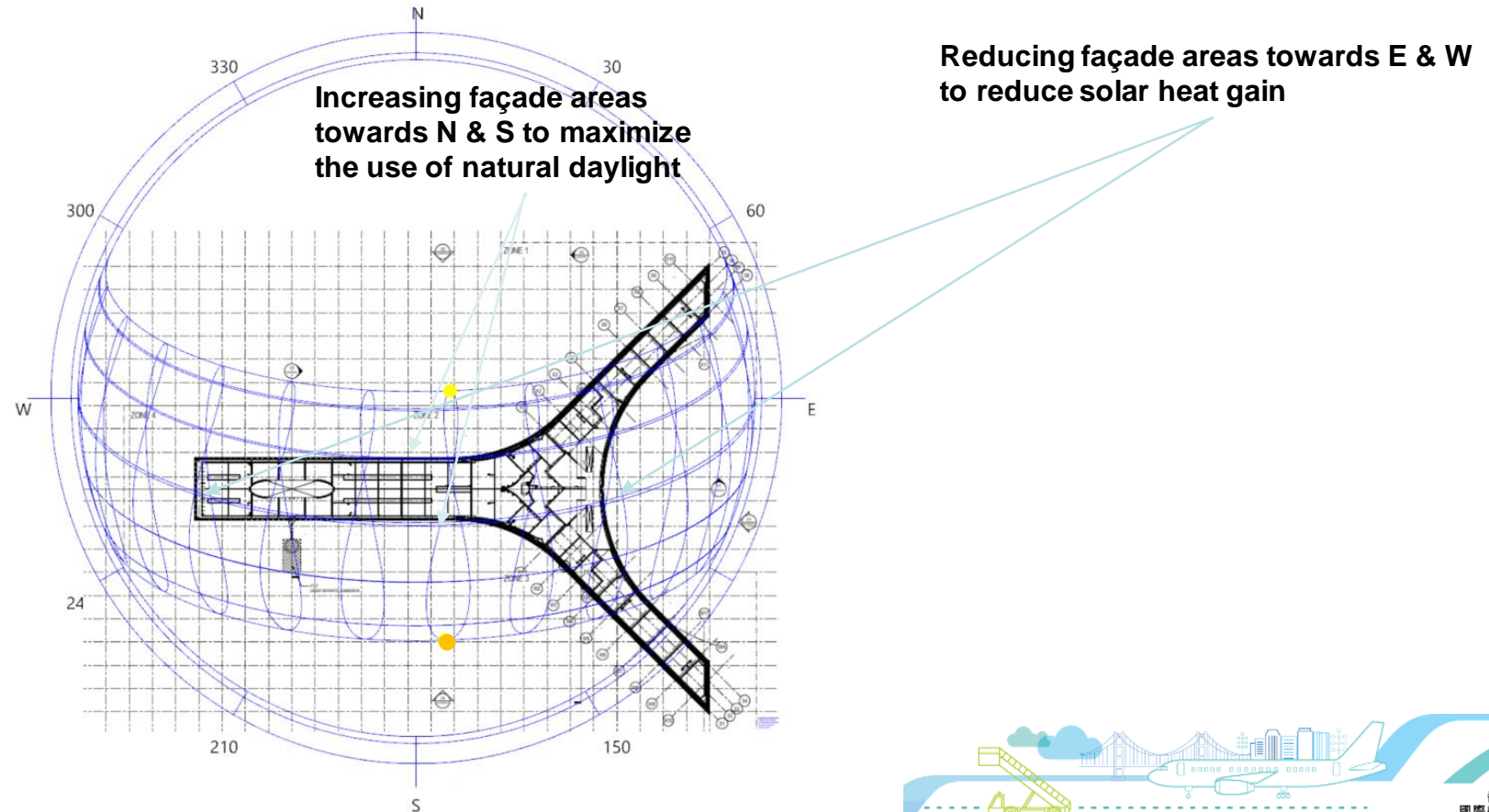
NE Wind at Pedestrian Level of Garden Landscape



# Green Airport Design – Wind (2)

## Daylight Resources

- Daylight resources are sufficient due to open site area
- Window facing south have good access to daylight and should be encouraged while window facing E & W generally have excessive solar heat gain
- Reducing the building façade areas facing E & W but increase those facing N & S

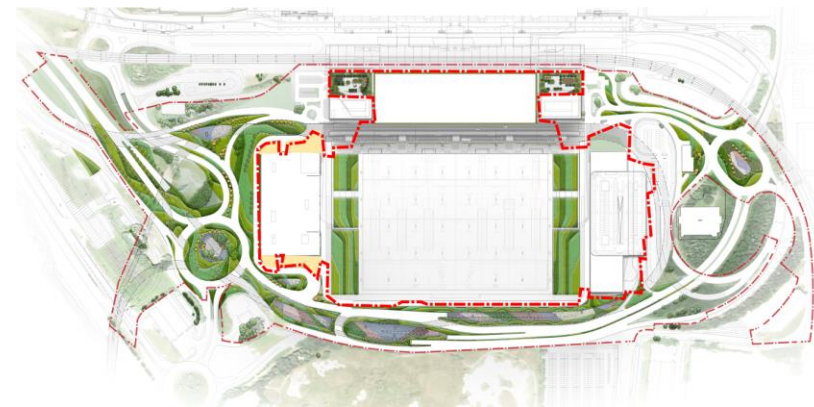




# Green Airport Design – Greenery

## Greenery

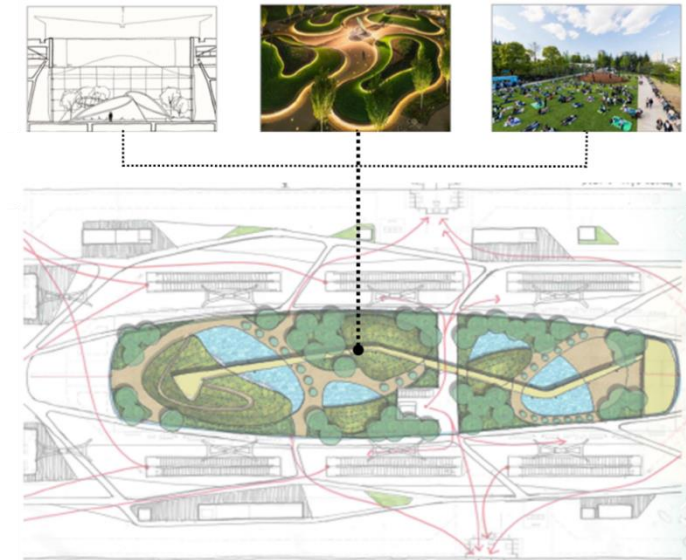
- Maximize greenery areas to reduce solar heat gain
- Introduce indoor planters improve indoor air quality and visual benefits to building occupants



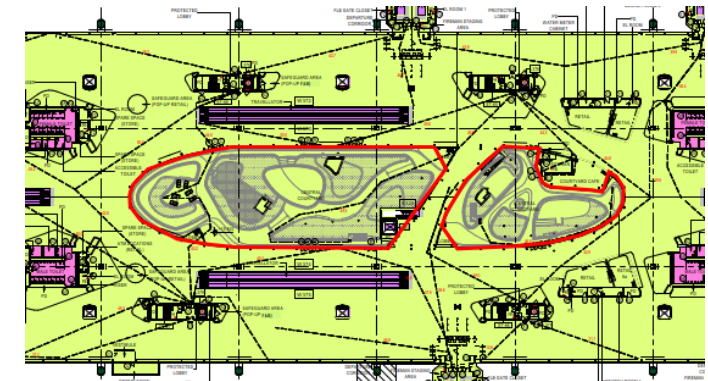
Planters at T2E



T2E



T2C



Central courtyard at T2C



# Green Airport Design – Energy Reduction

## Passive & Active Design + Solar PV System

### PLANNING & DESIGN

#### HEATING/COOLING

- + High performance envelope design
- + Low infiltration
- + heat recovery
- + Demand controlled ventilation
- + Free cooling

T2E & T2C

#### LIGHTING

- + Maximize daylighting
- + Daylight dimming
- + Occupancy sensors
- Lighting power

#### CONTROLS/LOADS

- + Seasonal controls
- + Step up/down controls

#### LIFTS & ESCALATORS

- + VVVF with regenerative power
- + On-demand passenger conveyor

#### RENEWABLE ENERGY

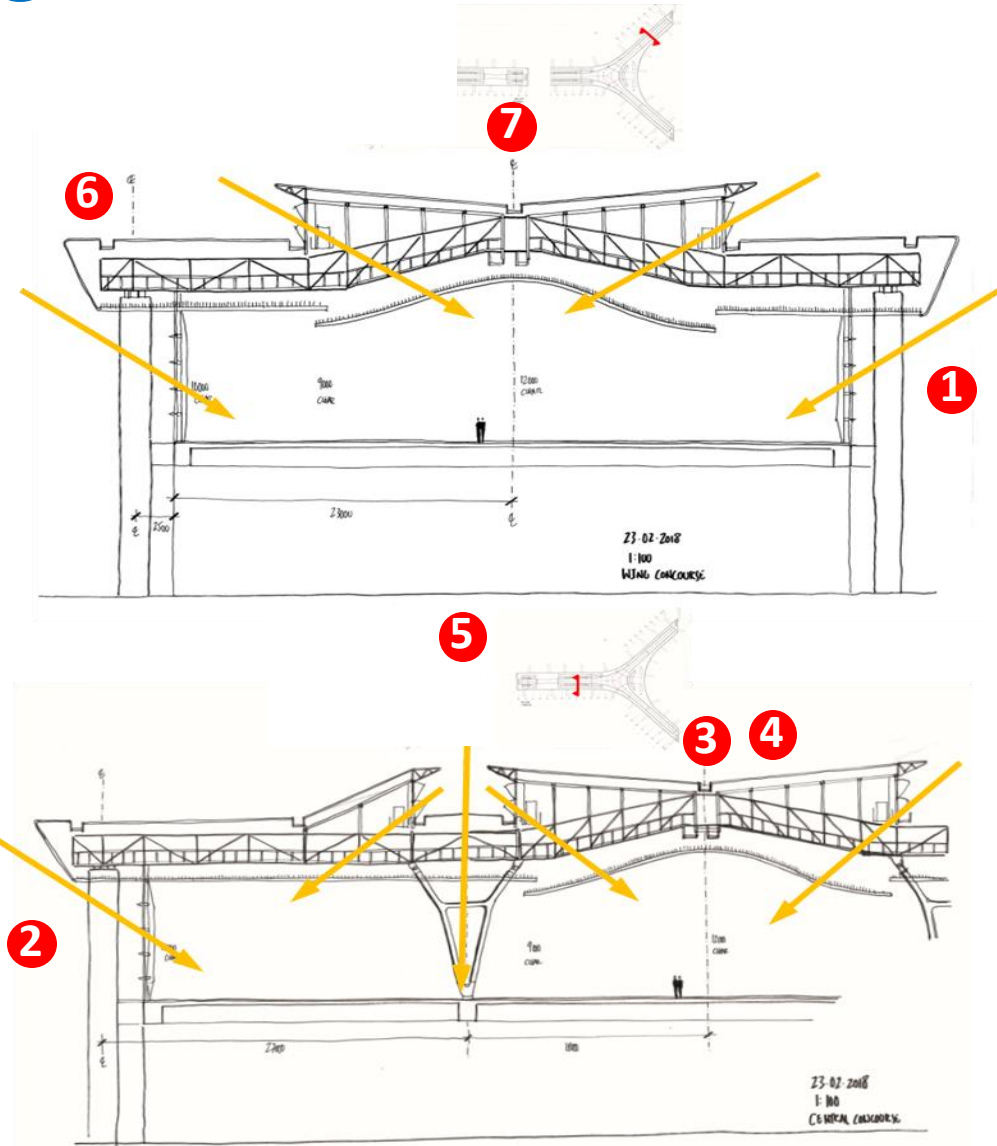
- + PV panels at T2E: ~2,000m<sup>2</sup>
- + PV panels at T2C: ~4,000m<sup>2</sup>



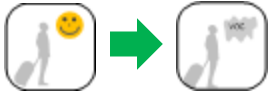
# Green Airport Design – Facade

## Optimized Roof and Façade for T2C

- ① Optimized window to wall area
- ② High performance glazing
- ③ High reflectance roof material
- ④ Photovoltaic panels integrated into roof facing S  
- to achieve minimum 0.5% total energy consumption
- ⑤ Natural day lighting
- ⑥ Shading of external glazed areas
- ⑦ Roof insulation to prevent heat transfer



# Green Airport Design – Indoor Environmental Quality (1)



## IAQ Excellent Class

- 30% additional fresh air provision over ASHRAE 62.1
- Low VOC materials
- Tenant exhaust system during fit-out works



## Construction IAQ management



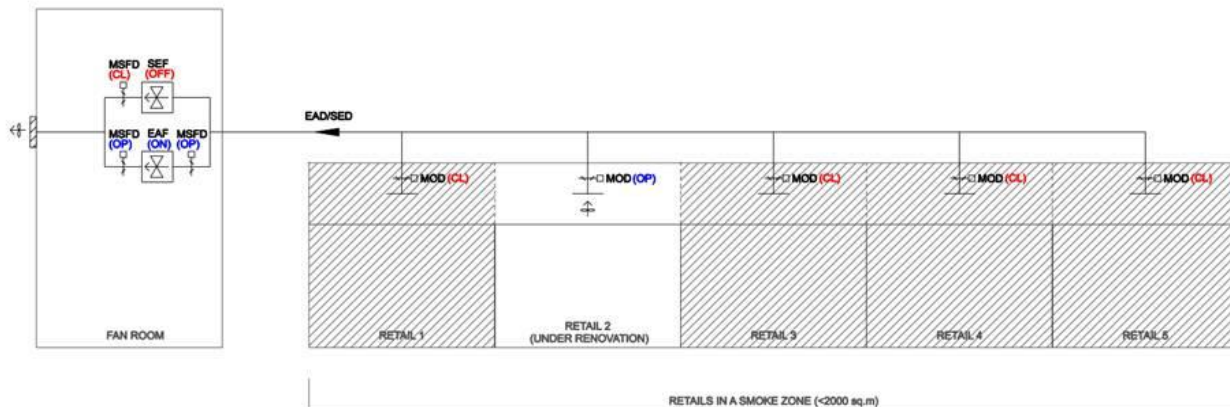
## Lighting design



## Acoustics design



## Tenants' exhaust system

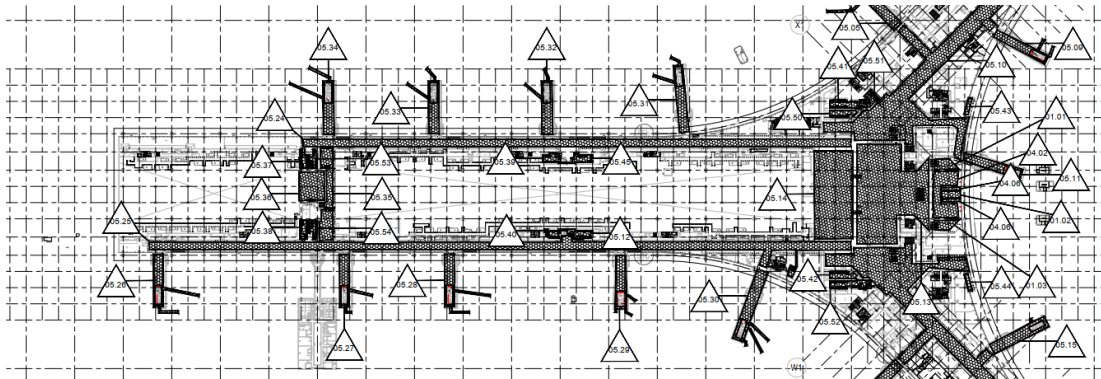




## Green Airport Design – Indoor Environmental Quality (2)

## Lighting Design

- Sensors are provided at office space, retail, F&B and circulation area
- Careful selection of lighting colour (CRI Ra > 80)
- Occupancy and daylight sensor



## T2C

# Acoustics Design

Designed to comply with the relevant international standards:

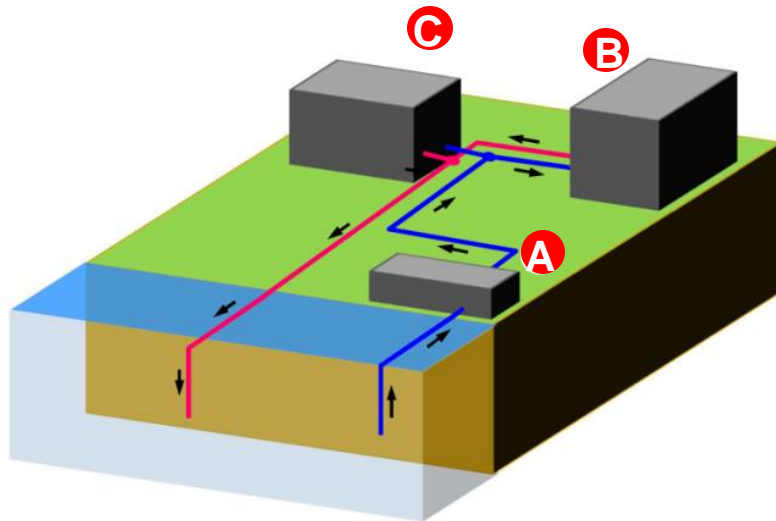
- AS2021:2015 – Acoustics-Aircraft noise intrusion – Building siting and construction
- AS/NZ2107:2000 – Recommended design sound levels and reverberation times for building interiors
- BS8233:1999 – Sound Insulation And Noise Reduction For Buildings



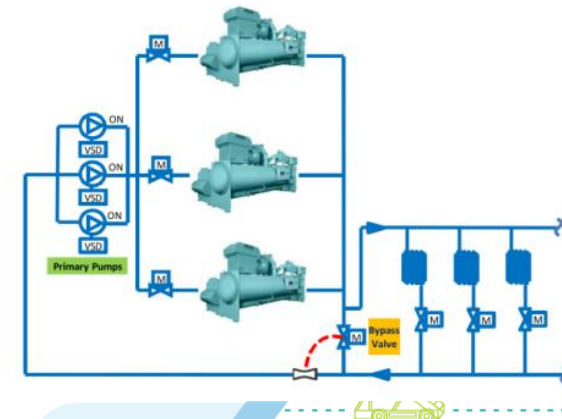
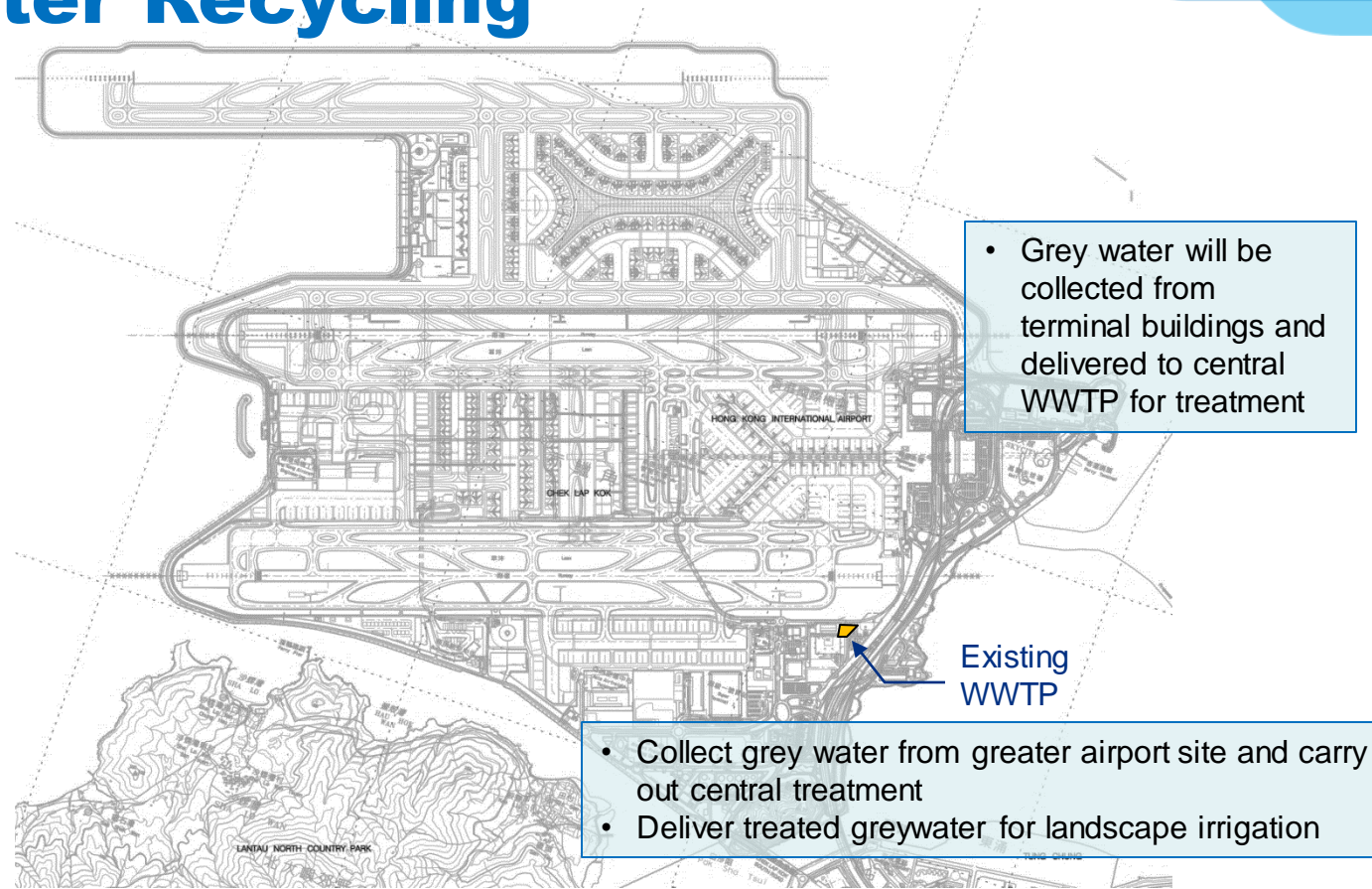
# Green Airport Design – Water Recycling

## Green Features for Water Management

- Seawater cooling
- Seawater flushing
- Low flush fitting
- Water leakage detection system
- Low irrigation or zero irrigation plant
- Water efficient irrigation



- A** Seawater Pump Room / Pump Cells
- B** T2E
- C** T2C





# Thank you

