



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

6th Professional Liaison Group Meeting

27 July 2018

Airport Authority Hong Kong

Agenda

1. Latest Progress of the 3RS Project
2. EM&A Updates
3. Report on Coral Translocation & Transplantation
4. Marine Ecology and Fisheries Enhancement Strategy



Latest Progress of the 3RS Project



Overview of 3RS Work Activities ([video](#))

- Continue with the land formation works, including sand blanket laying, ground improvement works & seawall construction
- Commenced marine filling works in May 2018



Reclamation



Seawall construction

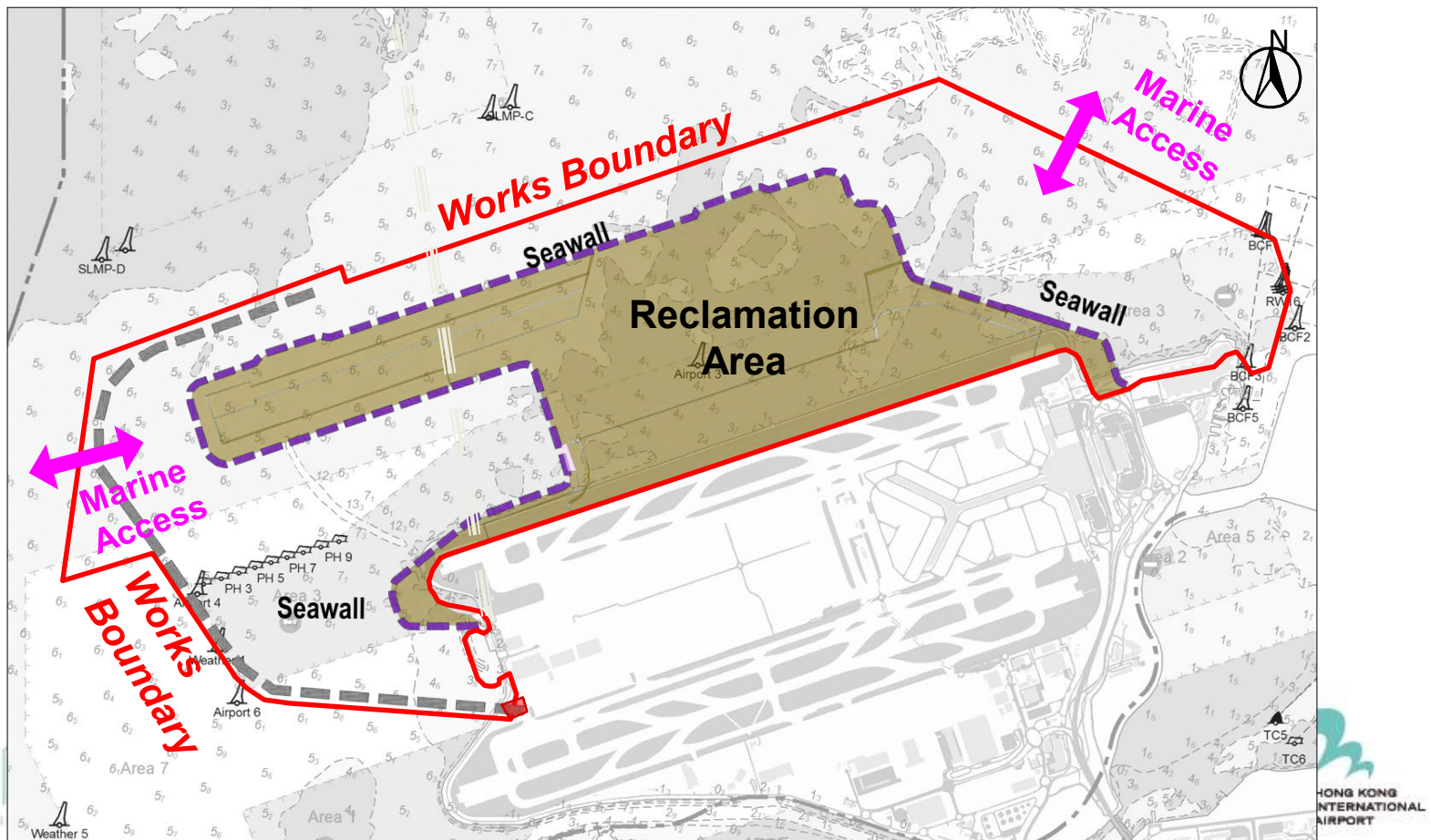


*DCM
barges*



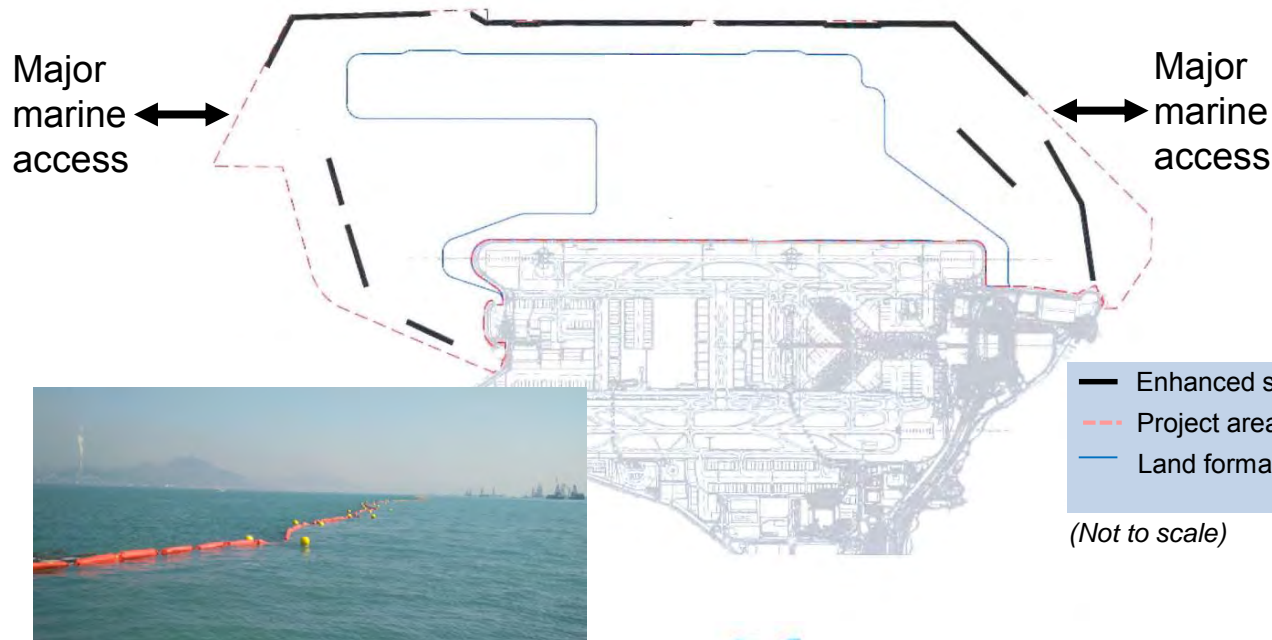
Marine Work Site Management

- More than 130 construction barges & 140 supporting vessels working on the 3RS project
- All construction and supporting vessels have to enter & exit the work site via designated entrances



Enhanced Silt Curtain System

- Deployed enhanced silt curtain system outside the works area in May 2018
- Together with the completed sections of leading edge seawalls, the entire works area is surrounded to further mitigate potential water quality impacts in view of the construction activities



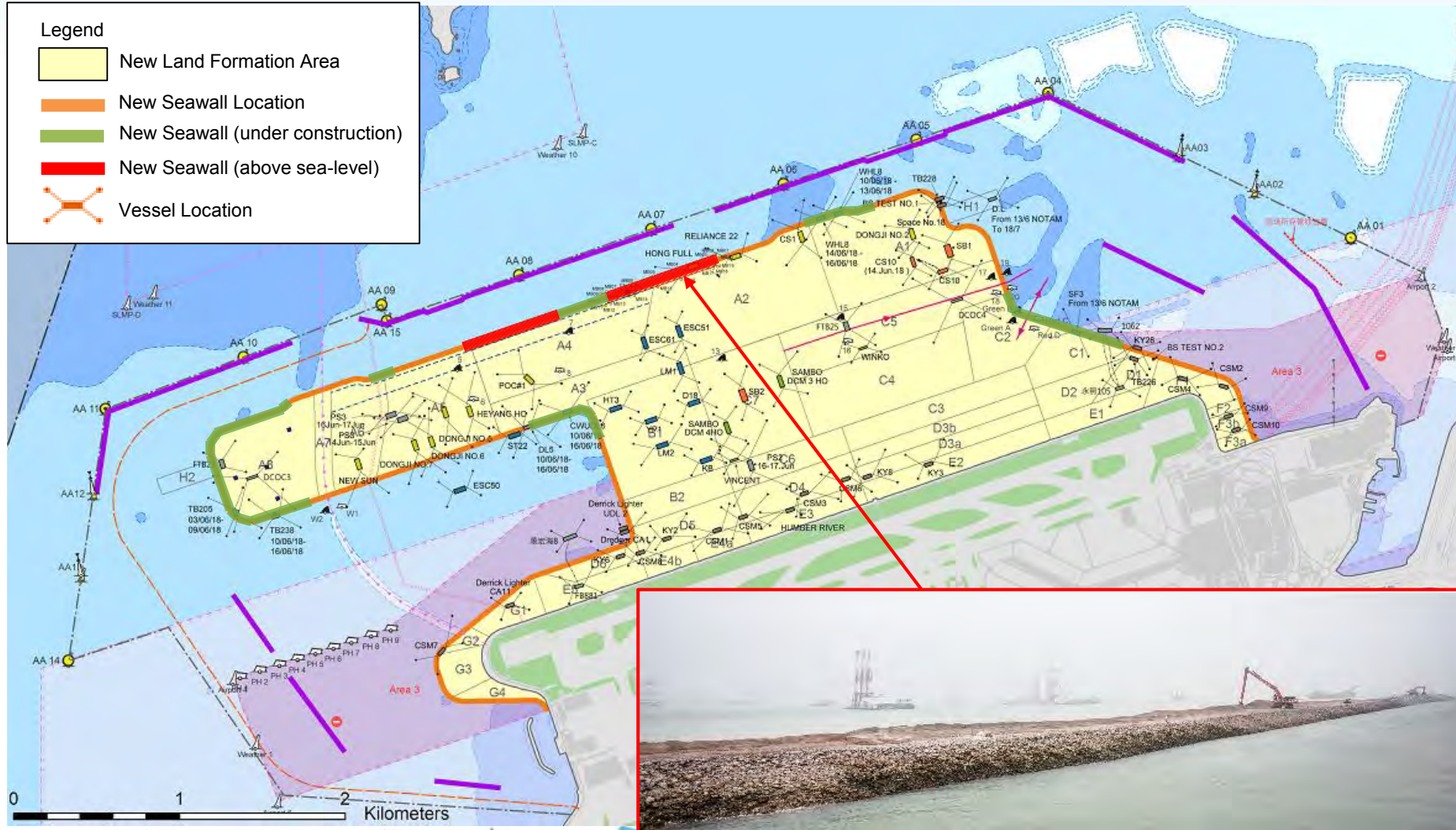
Silt curtain with GPS



Land Formation

Legend

- New Land Formation Area
- New Seawall Location
- New Seawall (under construction)
- New Seawall (above sea-level)
- Vessel Location



Installation of Aviation Fuel Pipelines by Horizontal Directional Drilling (HDD) (1)



PAFF in Tuen Mun



AFRF at Sha Chau

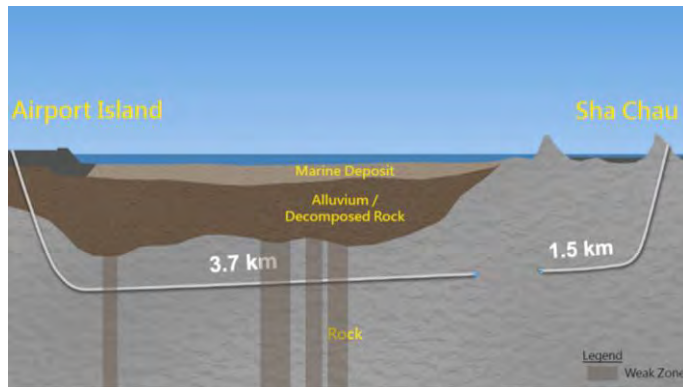


Aviation Fuel Tank Farm on Airport Island



Installation of Aviation Fuel Pipelines by Horizontal Directional Drilling (HDD) (2) ([video](#))

- Completed the installation of two about 5.2km aviation fuel pipelines connecting the Aviation Fuel Receiving Facility at Sha Chau with the airport island in Q1 2018 – at the rock stratum 100m below the seabed
- Setting a new world record of the world's longest aviation fuel pipeline installation using the environmentally-friendly HDD method
- Non-dredge HDD method has been adopted to avoid disturbing marine environment



Regular ecological monitoring



Land-based Construction Activities

Continue with land-based construction works on existing airport island

- North runway crossover taxiway works
- Terminal 2 expansion works including Automated People Mover (APM) depot and antenna farm & sewage pumping station
- Existing APM system modification works
- Baggage Handling System (BHS) & APM tunnel works



*North runway crossover
taxiway works*



*Terminal 2
expansion*



APM depot



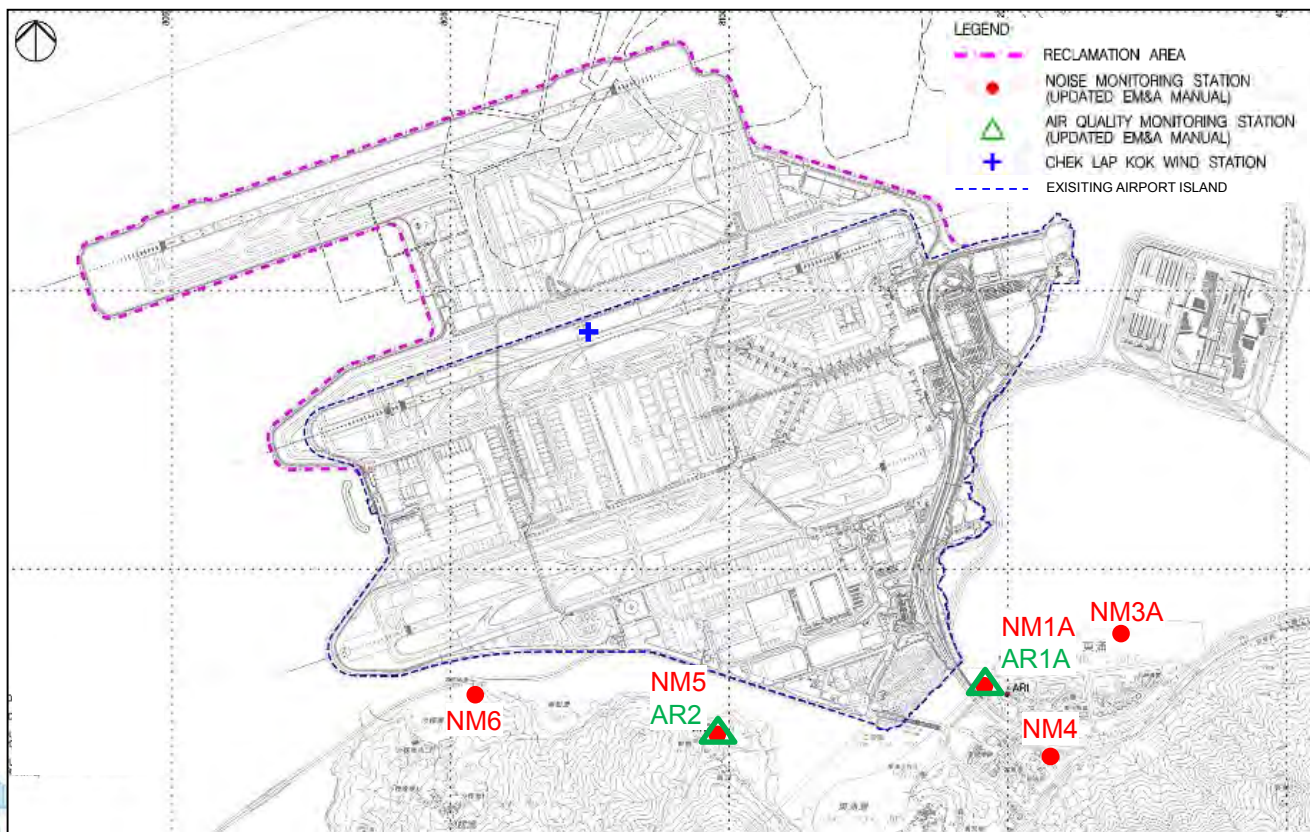
EM&A Updates



EM&A Monitoring Status (Nov 2017 – Jun 2018) (1)

Air Quality (2 stations) & Noise Monitoring (5 stations)

- 270 air quality and 174 noise monitoring events
- No exceedance of project-related Action/ Limit Levels was recorded



Air quality monitoring equipment (AR1A)

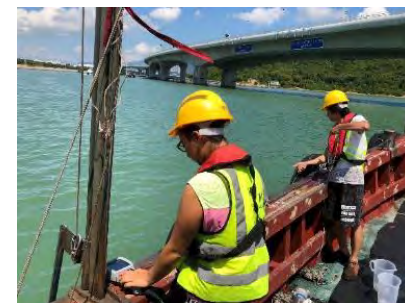
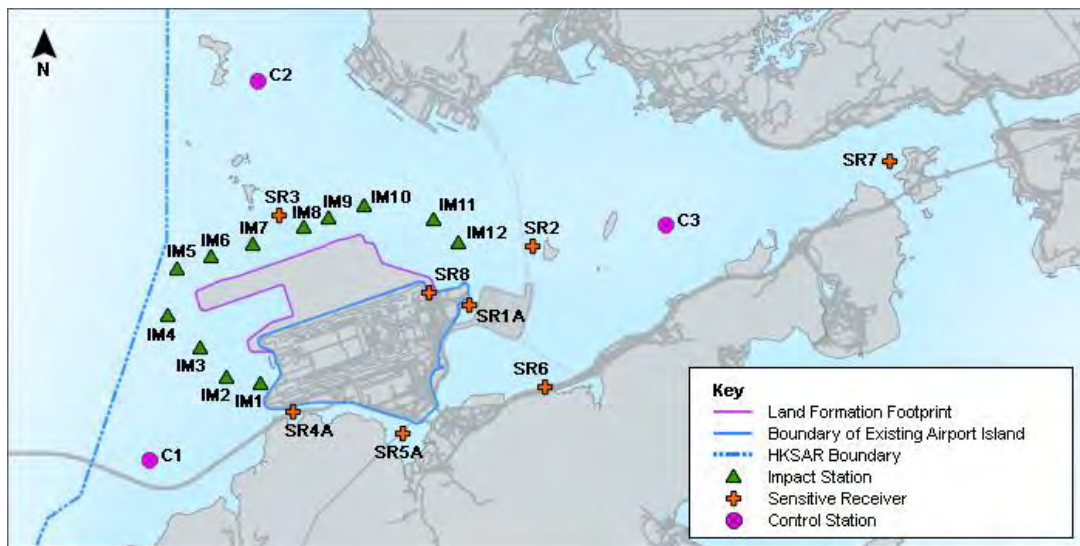


Noise monitoring equipment (NM4)

EM&A Monitoring Status (Nov 2017 – Jun 2018) (2)

General Impact & Regular DCM Water Quality Monitoring (22 stations)

- 12 impact stations, 7 sensitive receiver stations and 3 control stations
- 102 monitoring events
- No exceedance of project-related Action/ Limit Levels was recorded



Water quality monitoring & sampling

Note 1: The future permanent location for Station SR1A during impact monitoring is subject to finalisation after the HKBCF seawater intake is commissioned.

Note 2: Starting from May 2018, 9 out of 12 impact stations are temporarily shifted to stay away from the enhanced silt curtain.



EM&A Implementation (Nov 2017 – Jun 2018) (1)

Dolphin Exclusion Zone (DEZ)

- A cumulative total of 422 dolphin observers were trained
- 12 Chinese White Dolphin (CWD) sightings occurred within DEZs (6 in 2017 and 6 in Jan-Jun 2018), during which works were temporarily suspended in accordance with the DEZ Plan, and only resumed until DEZ was clear of dolphins for a continuous period of at least 30 minutes
- Conducted drills using dummy dolphin in both daytime and night-time to check the competency of dolphin observers in spotting CWD in DEZ



Dolphin observer on duty



Conduct DEZ drills with dummy dolphin

Marine Mammal Watching Plan

- A cumulative total of 236 observers were trained
- No dolphin or other marine mammal was observed during the deployment of silt curtain



EM&A Implementation (Nov 2017 – Jun 2018) (2)

Construction Noise Management

- Implemented Permit-to-work system with contractors to ensure compliance of the requirements of Construction Noise Permits (CNP)
- A cumulative total of 16 CNP trainings were provided

Chemical Spill Drill

- Conducted spill drills to strengthen workers' understanding on response procedures and handling of chemical waste
- A cumulative total of 67 chemical spill drills were conducted



Marine spill drill



Sandbags serve to protect channels from surface runoff

Precautionary Measures for Rainy & Typhoon Seasons

- All construction vessels are required to leave the works area and go to the designated typhoon shelter when typhoon signal No. 3 or above is hoisted
- Conducted regular site inspections for land-based construction activities to ensure drainage channels on the airport island are clear with no blockage



Complaints and Enquiries Handling

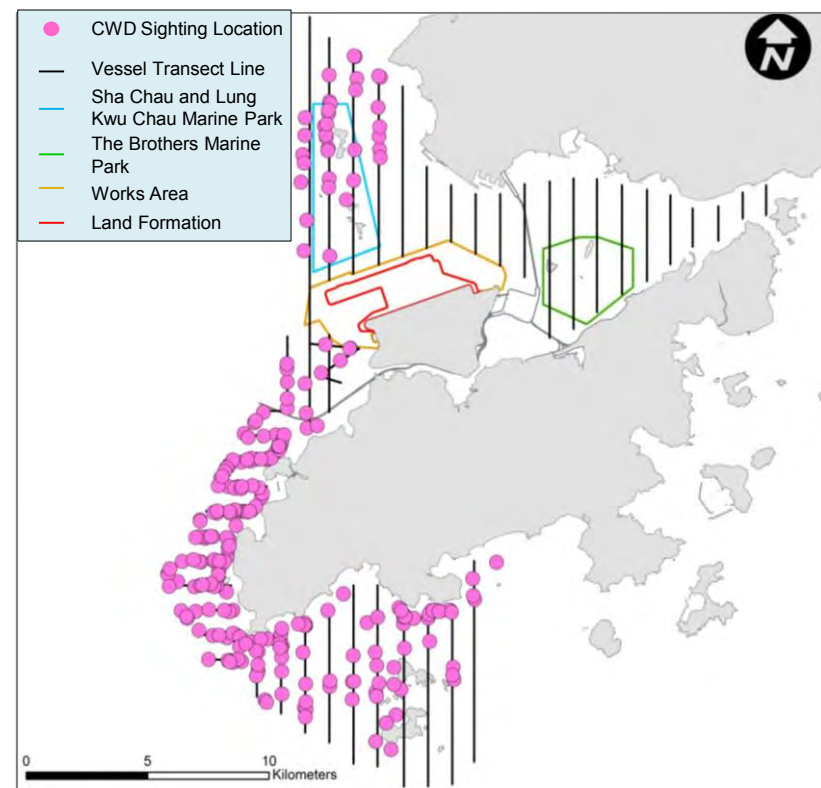
	2015 (from 28 Dec)	2016 (Full Year)	2017 (Full Year)	2018 (Jan - Jun)
Complaints	0	1	7	4
Enquiries	0	25	16	9
Total	0	26	23	13



CWD Monitoring Results

Vessel-based Line Transect Surveys in 2017 (1)

- 24 rounds of vessel-based line transect surveys covering NEL, NWL, AW, WL and SWL survey areas were completed, with a total survey effort of around 5,428km
- 252 groups of CWDs with 845 individuals were sighted
- No CWD was sighted in NEL survey area
- Most CWD sightings were recorded in WL and SWL survey areas
- The waters off Lung Kwu Chau (LKC) remain important habitats for CWDs in HK
- Average CWD group size was 3.4, ranging from 1 to 15 individuals; 42 sightings were recorded with the presence of mother and calf
- A total of 155 CWD individuals were identified by photo identification



Sighting distribution of CWDs

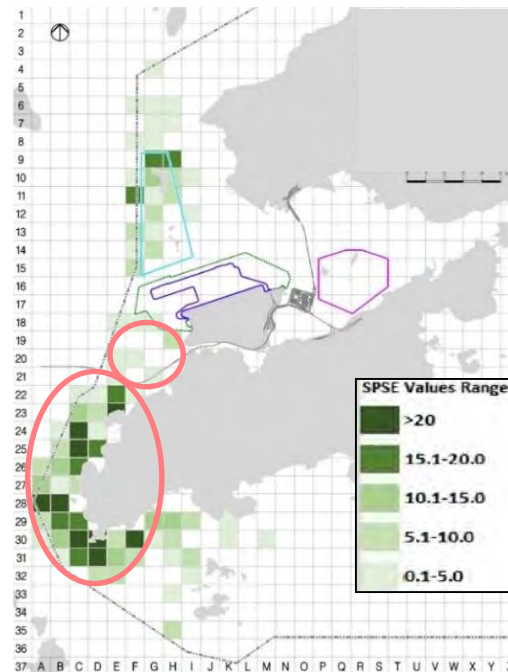


CWD Monitoring Results

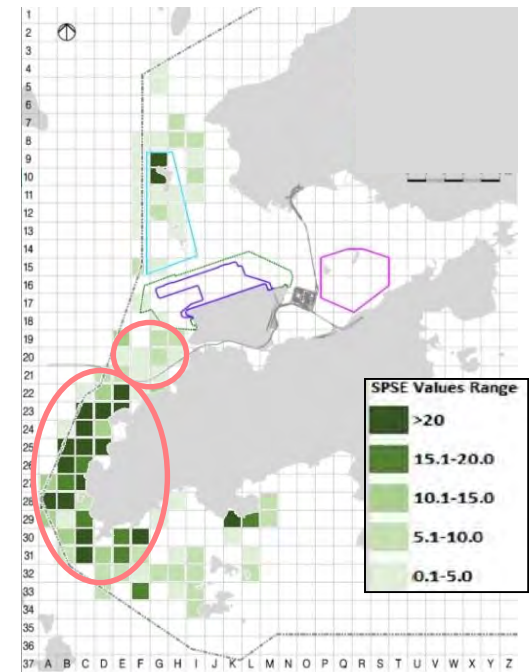
Vessel-based Line Transect Surveys in 2017 (2)

Quantitative grid analysis on habitat use, 2016 vs 2017

- Waters off LKC remain as important habitats, with high dolphin densities slightly shifted from north to northwest off LKC
- Increased usage in waters between Sham Wat and 3RS works area
- General increasing trend of dolphin usage in the West and Southwest Lantau waters



*SPSE from 3RS monitoring
in 2016*



*SPSE from 3RS monitoring
in 2017*



CWD Monitoring Results

Vessel-based Line Transect Surveys in 2017 (3)

- Estimate of overall abundance for 2017 was 71 individuals, somewhat higher than the year before (63 individuals)

Time Period	Stratum	No. of Sightings	Average Group Size	Trackline Detection Prob. - $g(0)$ #	Individual Density (no./100km ²)	Abundance	95% CI (Abund.)	%CV
2016								
Dec 2015-Dec 2016	AW	3	2.0	1.0	14.00	1	0-2	64.6
Dec 2015-Dec 2016	DB	2	7.0	1.0	8.42	3	1-12	75.1
Dec 2015-Dec 2016	NEL	0	n/a	1.0	0.00	0	n/a	n/a
Dec 2015-Dec 2016	NWL	40	3.3	1.0	17.60	15	10-25	24.3
Dec 2015-Dec 2016	SWL	44	2.7	1.0	21.80	14	8-26	30.7
Dec 2015-Dec 2016	WL	77	3.8	1.0	109.20	30	19-48	23.3
Dec 2015-Dec 2016	Pooled	166	3.3	1.0	23.40	63[^]	45-89	17.6
2017								
Jan-Dec 2017	AW	5	2.6*	1.0	40.55	2	1-4	43.9
Jan-Dec 2017	DB	1	2.6*	1.0	2.31	1	0-4	97.5
Jan-Dec 2017	NEL	0	n/a	1.0	0.00	0	n/a	n/a
Jan-Dec 2017	NWL	37	2.6*	1.0	16.59	14	9-23	23.6
Jan-Dec 2017	SWL	65	2.6*	1.0	33.57	22	14-35	23.0
Jan-Dec 2017	WL	113	2.6*	1.0	132.22	36	23-58	23.8
Jan-Dec 2017	Pooled	221	2.6*	1.0	27.33	71[^]	48-102	19.9

From Jefferson (2000)

* The Distance software gives the option for the user to either pool or stratify group size among different strata. (Thomas et al., 2010). In this case, small sample sizes for some strata (<10) could lead to very inaccurate abundance/density estimates, and thus the approach of pooling is considered more robust for this line transect analysis.

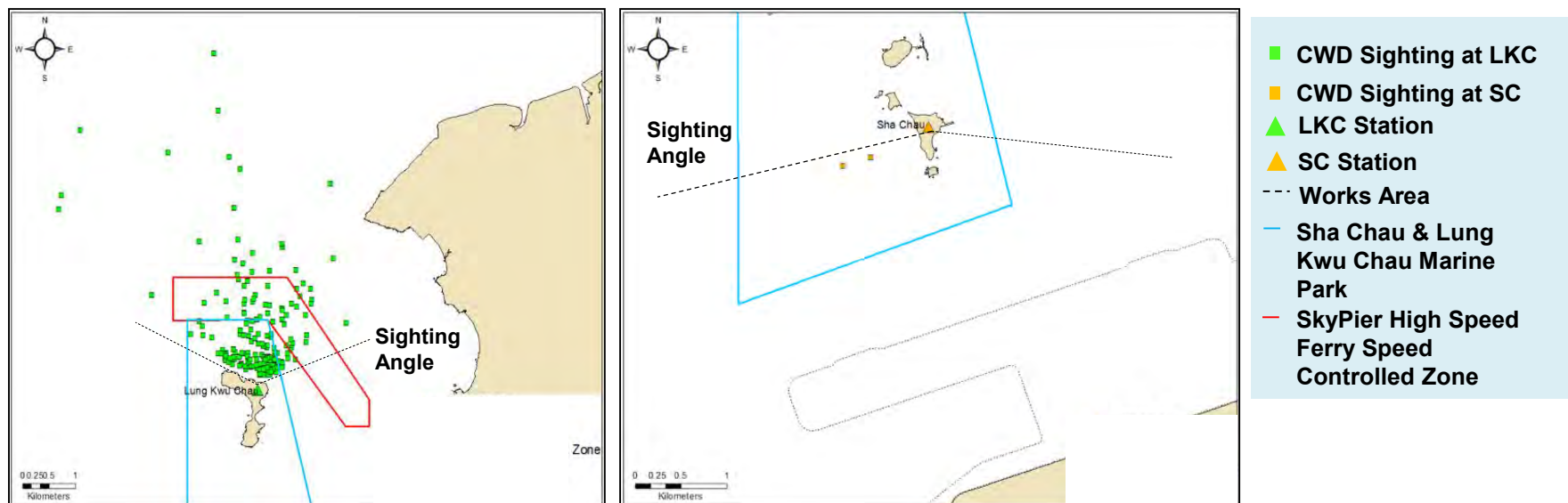
[^] Pooled abundance not including Airport West (AW). Note that the pooled estimates do not necessarily add up to the sum of the individual stratum estimates, as these are computed separately.



CWD Monitoring Results

Land-based Theodolite Tracking in 2017 (1)

- 60 rounds of land-based theodolite tracking were conducted at Lung Kwu Chau (LKC) and Sha Chau (SC), with a total survey effort of around 360 hours
- 194 CWD groups were tracked from LKC station (126 CWD groups in 2016)
- 2 CWD groups were tracked from SC station



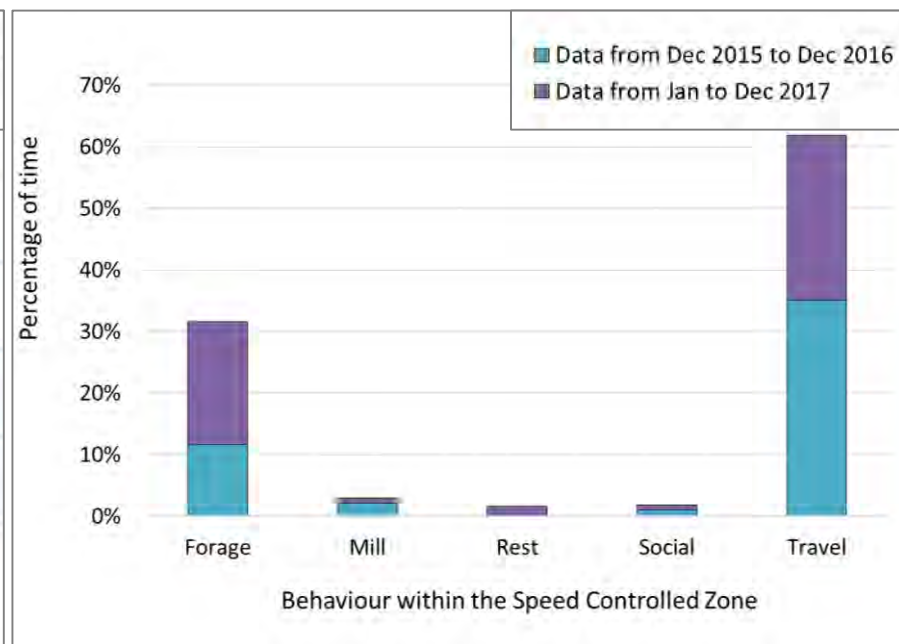
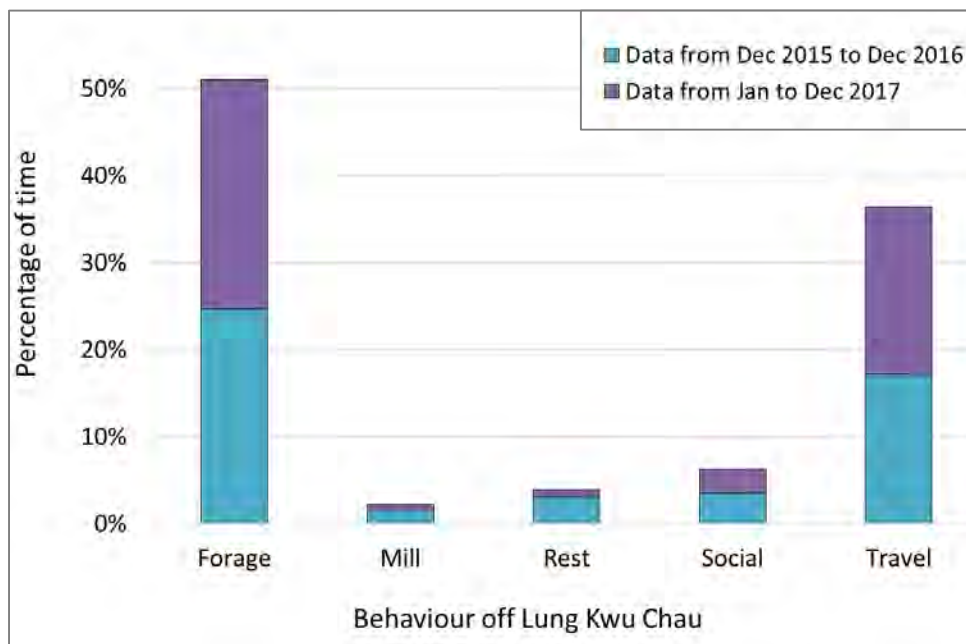
CWDs tracked by Land-based Theodolite



CWD Monitoring Results

Land-based Theodolite Tracking in 2017 (2)

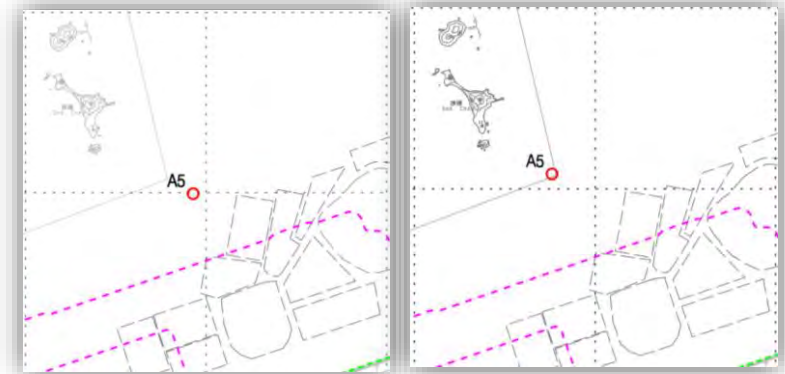
- The waters off LKC remain an important foraging area for CWDs throughout the year. Foraging and travelling were observed most frequently off LKC.
- Within the Speed Controlled Zone, travelling was the most frequently observed behaviour followed by foraging in the two years of 2016 & 2017



CWD Monitoring Results

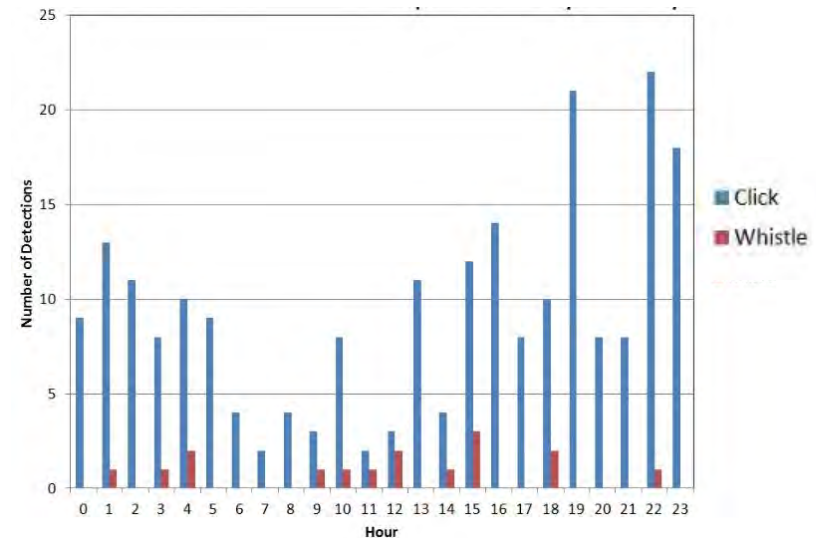
Passive Acoustic Monitoring (PAM) in 2017

- Dolphins detected on 109 of 280 days with recording effort (about 39% of the days)
- Clicks were the predominant type of dolphin signal detected
- Whistles were only occasionally detected throughout the monitoring period
- Highest dolphin detection rates during winter and spring months
- Diurnal detection of clicks showed a consistent pattern of higher levels at night compared with the daytime. Peak detection hours were 7:00pm and between 10:00 to 11:00pm.



*PAM location
(2016 to 1 Aug 2017)*

*PAM location
(2 Aug to Dec 2017)*



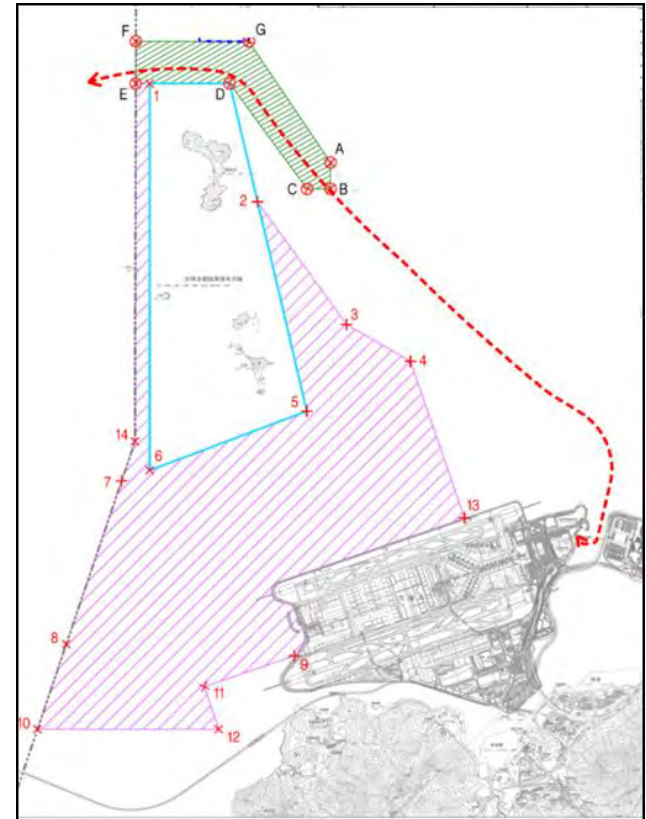
Monitoring data from PAM



Implementation of Marine Traffic Route and Management Plan for High Speed Ferries of SkyPier (SkyPier Plan) in 2017

- Total no. of diverted HSF trips*: 9,560
- Diverted SkyPier HSF trips* with average speed within 15 knots: 99.99%
- Maximum daily no. of SkyPier HSF movement: 97 (within the maximum daily cap of 125 movements)
- Annual daily average SkyPier HSF movements: 88 (within the maximum cap of 99 movements)
- No. of workshops held to refresh skippers' understanding on the requirements of SkyPier Plan: 5

* To and from Zhuhai & Macau



Report on Coral Translocation & Transplantation



Coral Translocation (1)

- 384 coral colonies were translocated from the airport's existing northern seawall to Yam Tsai Wan (YTW) in Jan 2017
- 6 post-translocation monitoring surveys were conducted within 15 months according to Coral Translocation Plan
- 2 extra surveys scheduled for Oct 2018 and Apr 2019 under the enhanced monitoring programme

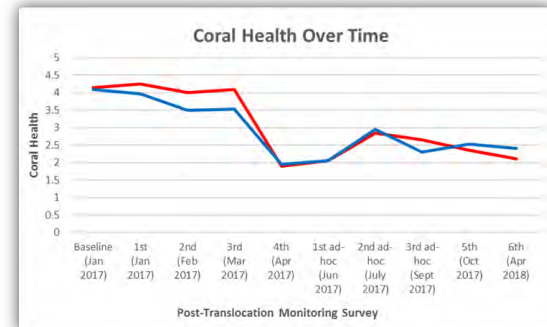
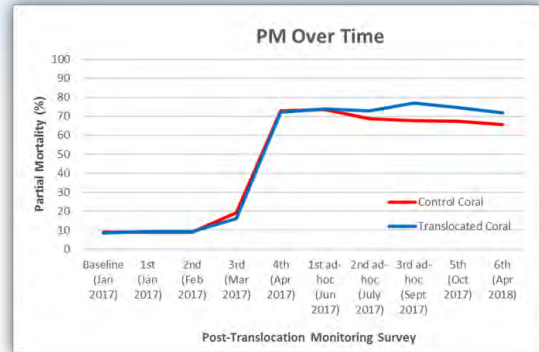
Post-translocation Monitoring	Date
1st	Jan 2017
2nd	Feb 2017
3rd	Mar 2017
4th	Apr 2017
5th	Oct 2017
6th	Apr 2018



Translocated coral colony

Coral Translocation (2)

- Increase in Partial Mortality (PM) was observed in Apr 2017 for both tagged & control corals
- *Ad-hoc* monitoring involving dive checks of natural corals at YTW, Tai Mo To (TMT) and Sham Shui Kok (SSK) indicated those at TMT & SSK (both sites closer to 3RS work site) are comparatively healthier with lower PM than the ones at YTW – high PM only occurred locally at YTW
- Since the high PM observed in Apr 2017, observations from subsequent monitoring efforts indicated PM has stabilised
- No apparent link between 3RS works and the high PM at YTW



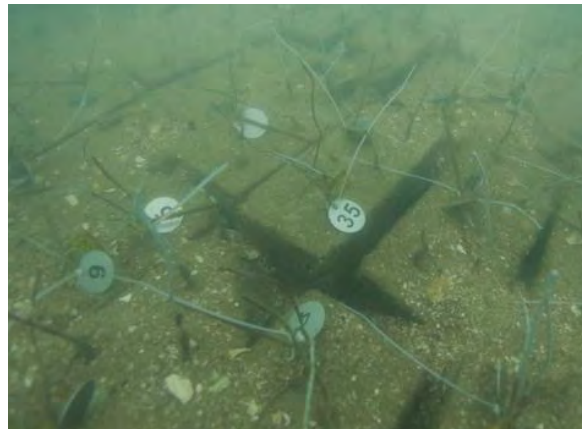
Further Initiative – Beyond EP Requirements

Coral Transplantation Trial Study (1)

- A trial study was initiated and conducted to address comments from the Advisory Council on the Environment (ACE)
- Transplantation of 56 whole colonies and 460 coral fragments from airport's existing northern seawall to YTW was completed in Feb 2017
- 7 post-transplantation surveys were conducted within 12 months, with 2 more surveys scheduled for Sep 2018 and Mar 2019



Transplanted colonies



Transplanted fragments

Post-transplantation Monitoring	Date
1st	Mar 2017
2nd	Apr 2017
3rd	May 2017
4th	Jun 2017
5th	Jul 2017
6th	Aug 2017
7th	Jan/Mar 2018



Further Initiative – Beyond EP Requirements

Coral Transplantation Trial Study (2)

- Initial post-monitoring results indicated transplantation of whole colonies more successful than fragments
- After Typhoon Hato (T10) in Aug 2017, transplanted colonies and fragments (& natural colonies) suffered higher mortality
- AA took further step & carried out another round of transplantation of about 500 whole colonies from airport's existing northern seawall to another site at YTW in May 2018 with the experience gained in the trial transplantation



Further Initiative – Beyond EP Requirements

Coral Transplantation Trial Study (3)

Methods adopted for the further transplantation

- Transplant of healthy whole colonies for better live tissue recovery
- Spread the transplant colonies along the coast with less sedimentation instead of aggregate in an area to reduce the risk of mortality
- Dead branches in the colony covered by fouling organisms that would prevent tissue re-sheeting were removed to facilitate coral growth
- Colonies attach to bricks with a combination of epoxy putty and zip ties to keep the colony in place

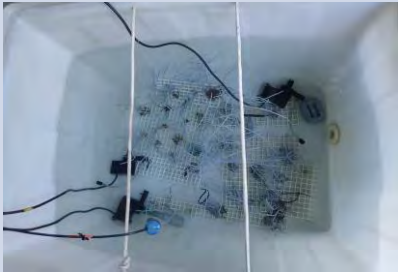


Marine Ecology and Fisheries Enhancement Strategy




Year 2017-18 MEEF Funded Projects

Project Progress (1)

Project Title	Applicant Organisation	Status	
Virtopsy for characterization and documentation of injury and death caused by human interaction, in stranded Indo-Pacific humpbacked dolphins (<i>Sousa chinensis</i>) in the Hong Kong waters	Tung Wah College	Completed	
Monitoring of population dynamics of Indo-Pacific humpback dolphins (<i>Sousa chinensis</i>) in Lingding Bay of the Pearl River Delta region	South China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences	Completed	
Reproductive Biology of the Dominant Octocoral <i>Guaigorgia</i> in Hong Kong Western Waters	The Chinese University of Hong Kong	To be completed by 31 Dec 2018	

Year 2017-18 MEEF Funded Projects

Project Progress (2)

Project Title	Applicant Organisation	Status	
Revealing cryptic faunal biodiversity in Hong Kong western waters using environmental DNA approach	The Education University of Hong Kong	To be completed by 30 Oct 2018	
Conservation Ecology of Chinese White Dolphins across the Pearl River Estuary Phase 2: Population Parameters, Socio-Demographic Structure and Habitat Requirements	Cetacea Research Institute Limited	To be completed by 31 Oct 2018	
Contributing to Marine Spatial Planning: working with fishing communities to map areas of dolphin and active fishing gear overlap	SMRU (HONG KONG) Limited	To be completed by 31 Dec 2018	

Year 2017-18 FEF Funded Projects

Project Progress

Project Title	Applicant Organisation	Status	
Pearl Farming Pilot Project	Aberdeen Fisherwomen Association	Completed	 
Study on the Current Status of Capture Fisheries Industry in Hong Kong and Strategy towards Sustainable Fisheries Development	Hong Kong Fishery Alliance	Completed	
Hong Kong Fisheries Festival – Planning and Feasibility Study	Hong Kong Fishery Alliance	Completed	
Installation of Radar Reflector for Fishing Vessels under 15m	Aberdeen Fisherwomen Association	To be completed by 30 Sep 2018	

Year 2018-19 MEEF Funded Projects

- 6 projects are funded, total \$6.55M
- Details: http://env.threerunwaysystem.com/en/meef/meef_projects.html

Project Title	Applicant Organisation
Virtopsy for characterization and documentation of injury and death caused by human interaction, in stranded Indo-Pacific humpbacked dolphins (<i>Sousa chinensis</i>) in the Hong Kong waters	Integrated Medimaging Institute Limited
Conservation Ecology of Chinese White Dolphins across the Pearl River Estuary Phase 2: Population Parameters, Demographic Structure and Habitat Requirements	Cetacea Research Institute Limited
Unravelling the strength behind the ecosystem resilience of Tung Chung mangrove: A high-resolution mapping of its food web	The University of Hong Kong
Long-term monitoring of population dynamics of Chinese White Dolphins (<i>Sousa chinensis</i>) in Lingding Bay of the Pearl River Delta region: the second stage	South China Sea Fisheries Research Institute (SCSFRI), Chinese Academy of Fishery Sciences
What Do Dolphins Do At Night? Filling knowledge gaps in night time range and behaviour activities of CWD in Hong Kong	SMRU (HONG KONG) Limited
Impact of microplastics on the Chinese horseshoe crab <i>Tachypleus tridentatus</i> in Hong Kong western waters	The Hong Kong Polytechnic University



Year 2018-19 FEF Funded Projects

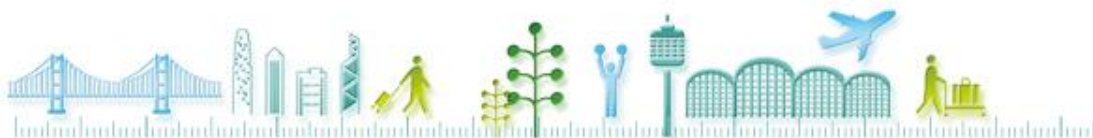
1st Round Application

- 2 projects are funded, total \$3.25M
- Details: http://env.threerunwaysystem.com/en/fef/fef_projects.html


Project Title	Applicant Organisation
Pearl Farming Pilot Project	Aberdeen Fisherwomen Association Limited
Development of Mobile Application to Support the Sales of Local Capture Fisheries	Guangdong Ocean University

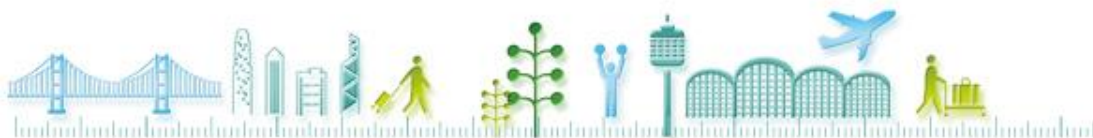
2nd Round Application

- Applications submitted on or before 31 Jul 2018 will be considered in the next assessment in the end of 2018.
- Details: http://env.threerunwaysystem.com/en/fef/fef_application.html



Potential Enhancement Measures

Potential Enhancement Measures	Status
Eco-enhancement of seawall design	Contractors will construct the seawall according to design, eco-enhanced seawall blocks are being fabricated for installation
Voluntary surveillance & potential measures that may aid or assist in the effective management of Marine Parks	<p>Pilot test within Sha Chau Lung Kwu Chau Marine Park & The Brothers Marine Park for a period of around 6 months commenced in May 2018</p> 
Artificial reef deployment	Feasibility studies have been conducted, preparation for the pilot tests in progress
Fish restocking / Fish fry release	



Stakeholder Engagement



CLG (Dec 2017)



CLG & PLG (Jan 2018)



FLG (Feb 2018)



Media
(Apr 2018)



SZHSEC* (May 2018)



* Human Settlements and Environment Commission of Shenzhen Municipality

Dedicated 3RS Project Website

<http://env.threerunwaysystem.com/en/index.html>



The screenshot displays the homepage of the Three-Runway System Main Website. The header features the Hong Kong International Airport logo on the left and navigation icons (home, Chinese, English, email) on the right. A horizontal menu lists various project-related links: Project Background, EIAO Documents, EP Submissions, Baseline Monitoring Report, EM&A Reports, EM&A Data, Professional Liaison Group, Community Liaison Groups, Marine Ecology Enhancement Fund, Fisheries Enhancement Fund, Information Centre, and What's New. The main content area is titled "EXPANSION OF HKIA INTO A THREE-RUNWAY SYSTEM" in large green letters. Below the title, a paragraph states: "This dedicated website is prepared in accordance with the requirements in the Environmental Permit (EP) (EP No. EP-489/2014) and is intended to enable user-friendly public access to project information including environmental monitoring data and finalised submissions and plans for the expansion of HKIA into a three-runway system." The page is decorated with green illustrations of trees, a bicycle, a bench, birds, and an airplane. The footer contains the text "Three-Runway System Main Website | Privacy Policy © Airport Authority Hong Kong. All Rights Reserved." and the Hong Kong International Airport logo.

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

Project Background | EIAO Documents | EP Submissions | Baseline Monitoring Report | EM&A Reports | EM&A Data | Professional Liaison Group | Community Liaison Groups | Marine Ecology Enhancement Fund | Fisheries Enhancement Fund | Information Centre | What's New

EXPANSION OF HKIA INTO A THREE-RUNWAY SYSTEM

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國際機場 | AIRPORT

Thank You

