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Hong Kong International Airport into a Three-Runway System

Wealth Mind

Wealth Mind Ltd.

1. Introduction

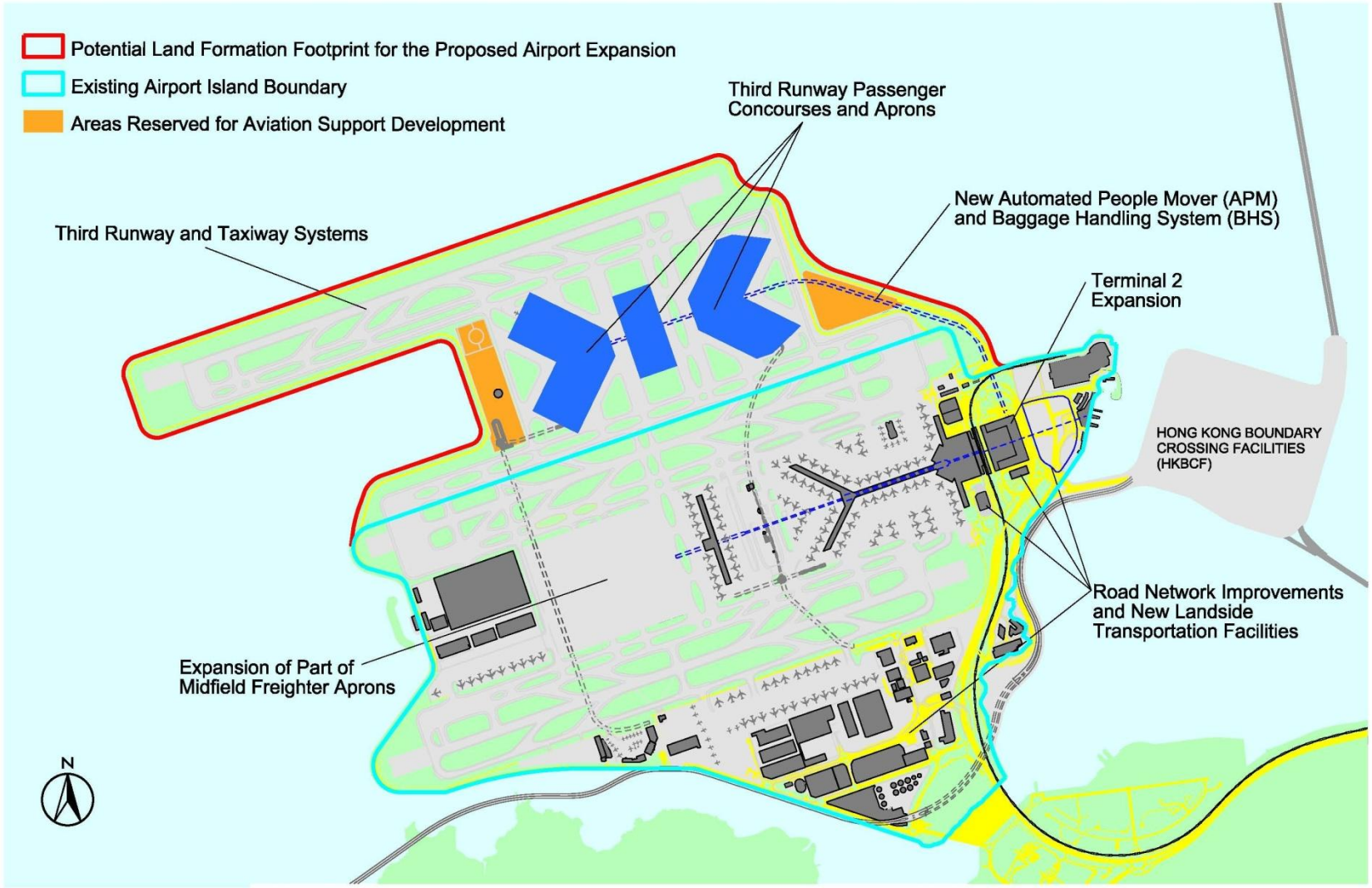
The 3RS project is proposed to be located on a new land formation immediately north of HKIA in North Lantau, covering a permanent footprint of approximately 650ha. The project primarily comprises :

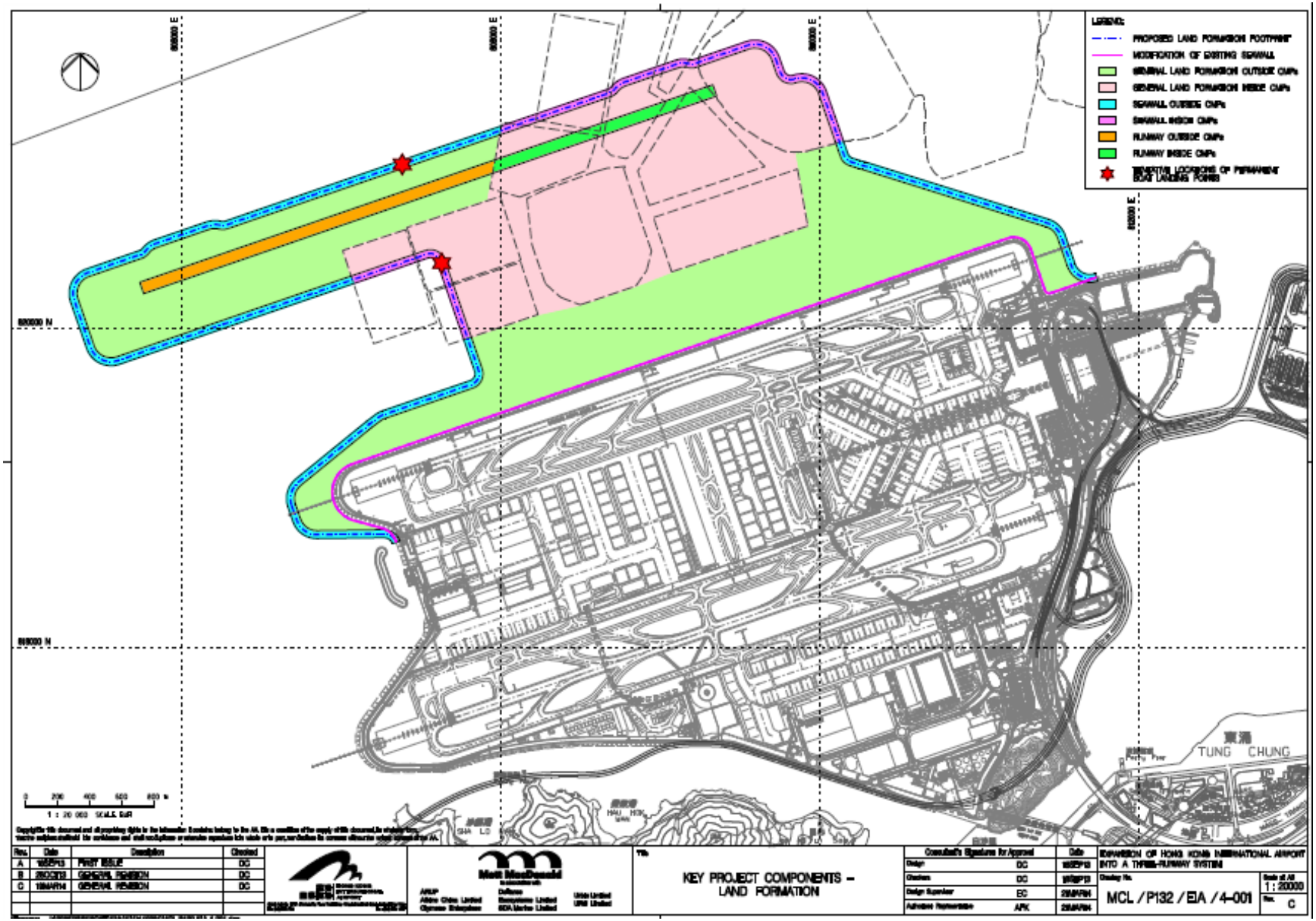
•New third runway with associated taxiways, aprons and aircraft stands

•New passenger concourse building

•Expansion of the existing Terminal 2 (T2) building

•Related airside and landside works, and associated ancillary and supporting facilities.


Potential Land Formation Footprint for the Proposed Airport Expansion
Existing Airport Island Boundary
Areas Reserved for Aviation Support Development
Third Runway Passenger Concourses and Aprons
New Automated People Mover (APM) and Baggage Handling System (BHS)
Third Runway and Taxiway Systems
Terminal 2 Expansion
HONG KONG BOUNDARY CROSSING FACILITIES (HKBCF)
Road Network Improvements and New Landside Transportation Facilities
Expansion of Part of Midfield Freighter Aprons
N


LEGEND:
PROPOSED LAND FORMATION FOOTPRINT
MODIFICATION OF EXISTING SEAWALL
GENERAL LAND FORMATION OUTSIDE CMPs
GENERAL LAND FORMATION INSIDE CMPs
SEAWALL OUTSIDE CMPs
SEAWALL INSIDE CMPs
RUNWAY OUTSIDE CMPs
RUNWAY INSIDE CMPs
INDICATIVE LOCATIONS OF PERMANENT BOAT LANDING POINTS
TUNG CHUNG
KEY PROJECT COMPONENTS – LAND FORMATION
EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM
MCL / P132 / EIA / 4-001
1 : 20000
C

2. Timeframe

It is planned that the land formation work would be undertaken from start of late 2015 / early 2016 to mid-2022, noting that the third runway and taxiway sections (which accounts for the majority of the land formation) would be completed by 2020 for closure of the existing north runway and opening of the third runway by 2021. Based on the construction planning, the land formation works have been primarily divided into three main stages. The works for each stage are described below:

Stage 1 has a T-shaped footprint and consists mainly of the land formation works for the third runway, the associated west taxiways, the western support area and other supporting facilities.

Stage 2 consists of land formation works for the new third runway concourse and aprons supported by facilities within the east support area.

Stage 3 is the land formation area at both ends of the existing north runway associated with the new wrap-around taxiways, whereby construction activities are restricted by the need to maintain operation of the existing north runway until completion of the third runway.

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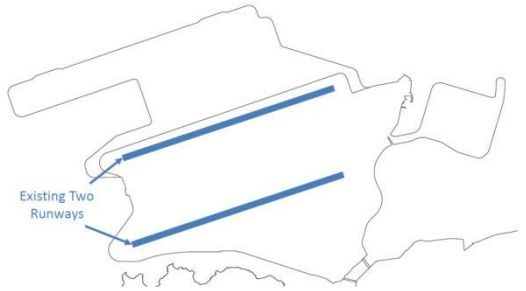
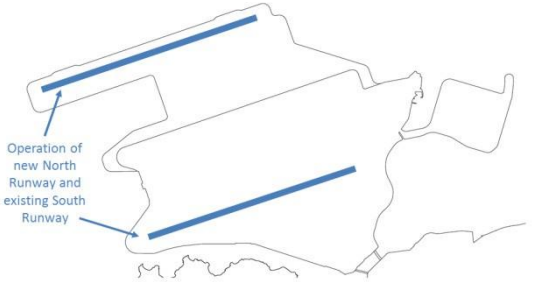
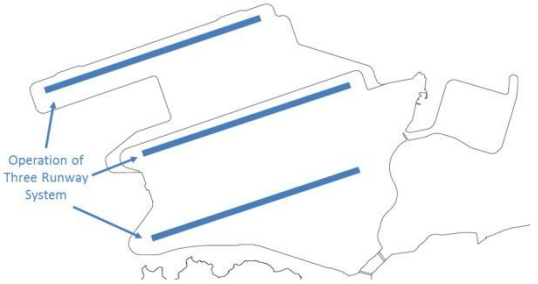
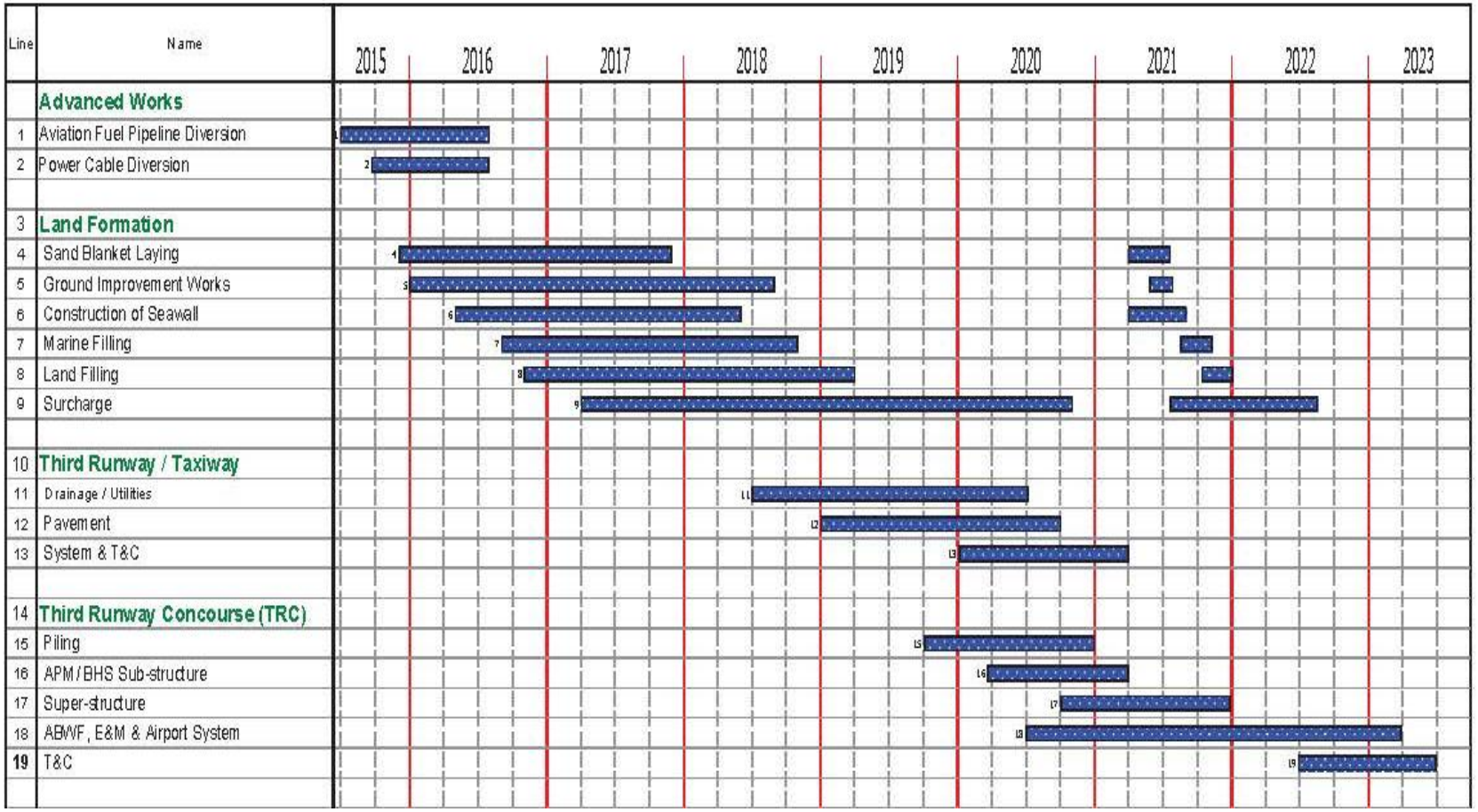
Phase	Description	Runway Operational Configuration	Timeframe
Advanced Works	Diversion of the submarine pipelines and power cables		2015 to 2016
Phase 1	Land formation works will commence before subsequent construction of third runway, new taxiways and the new TRC. Expansion of T2 will also commence. 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

Appendix 4.2 - Tentative Construction Programme



3. Environmental Impacts, Suggestion & Adventages

	Description	Competitor	Requirment	What WML done…		Requirment
Air Quality Impact	Construction dust could be generated from construction activities such as land formation, filling, material handling and hauling during land formation, movement of construction traffic over reclaimed land, and wind erosion from the site after reclamation works. If uncontrolled, the extent of consturction dust impacts resulting from wind erosion and construction vehicle movements on the unpaved reclaimed land could potentially be significant due to the large area involved in the Airport expansion works. There would also be air pollutant emissions from operation of construction plant, vehicles and barges.	**Conventional dredging** This type of conventional land formation has a proven track record for application in Hong Kong. Ground improvement works via dredging and disposal of marine sediment will generate substantial sediment plumes with its associated adverse impacts to water quality and marine ecology, as well as large volumes of waste needing off-site disposal.	Bulldozer Wheel Loader	- Coopreated with Engineering Company to submitted the Environmental Protection Construction Methods - Coopreated with Environmental Groups to provide the Key Dust Emission Report to prove that the dust Emission will be increase when using the Conventional Dredging Method for Land-based filling works.	**Non-dredged with Deep Cement Mixing Method (DCM)** DCM is proposed whereby cement is injected and mixed into columns of the soft mud below a san capping layer to increase its strength and stiffness, allowing land formation above without the realese of contaminated sediment. This method has been widely used in Japan and Asia. This non-dredge method differs fron the other methods in that it provide in-situ treatment and stabilisation of the marine sediment, which reduces the potential of release of contaminated pore water. 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 stoage of cement on the DCM barges. Therefore, it will be reduce the dust impacts due to cement transfer or storage are anticipated.	- Increase the usage of Excavator & Dump Truck due to the DCM.
Noise Impact	Airbone noise would be generated from construction activities such as land formation,infrastructure works and operation of powered mechanical equipment (PME). In addition to noise from operation of PME, noise would also be generated from traffic, especially heavy vehicles, onsite and along access roads.	NIL	- Normal Working hour from 0800 -1800	- Machine with T3A Engine - Strengthen the filter assy and add warning light - Add automatic detection technology management system which can show the emissions automatly. - provide QPME, NRMM & cetification of all Doosan machine to AAHK - Used Noise enclosure or acoustic shed to cover stationary PME	The construction may potentially generate ground-borne & vibration noise impacts. But the land formation work will be consturcted by DCM which is no rock breaking or tunnel mining works involved in the underground construction. Therefore, no ground-borne & vibration noise impact is anticipated during the construction phase.	- Extend Working Hour from 0800 - 2100

	Description	Competitor	Requirment	What WML done…		Requirment
Water Quality Impact	Marine works such as land formation and filing would possibly generate increased level of suspended solids, generation of sediment plume, re-deposition of sediment and subsequent deterioration of water quality which might indirectly cause disturbance impact on marine habitat and wildlife.	**Nil**	Nil	- Coopreated with Engineering Company to submitted the Environmental Protection Construction Methods .	Non-dredged with Deep Cement Mixing Method (DCM) DCM avoids disturbance to the seabed and also avoids the removal of contaminated sediment during land formation and provides an environmentally friendly way of ground improvements at the Contaminated Mud Pit area.	- Increase the usage of Excavator & Dump Truck due to the DCM.
Waste Management Impact	Waste management implications during the construction phase will be from generation, handling and disposal of waste. C&D materials would arise from demolition of existing seawalls and generated as excess fill materials and other construction materials.	**Sloping seawall with Circular Steel Cell Cofferdam** This type of seawall will arise the waste from demolition of existing seawalls.	-100 to 150 ton Crawler Crane & Wheel Loader	- Provided suggestion to AAHK and Environmental Groups	**Sloping seawall with 2 - 3.5m3 Marble** This type of seawall as presenting an environmental advantage from the perspectives of wase minimisation and marine ecological habitat as all of rock armour from existing northern seawall will be reuse.	- 50 - 70ton Excavator

4. Environmental Impacts Assessment Report - AAHK

During 2008 – 2014, Airport Authority Hong Kong (AAHK) & Environmental Protection Department (EPD) have organized some focused consultation with industry representatives and commissioned relevant consultants to conduct feasibility studies covering initial land formation engineering evaluation, preliminary engineering feasibility and environmental assessment, preliminary noise impact analysis, preliminary air quality impact analysis.

The Environmental Impacts Assessment Report have performance and identified that only the DCM that we submitted which involves filled land formation of the project while minimizing the environmental impact associated with land formation.

A DCM trial was carried out at the contaminated mud pit area during which extensive water quality and underwater noise monitoring was performed to check for any potential environmental impacts. The monitoring results indicated the 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.

Land Formation Work Sequence and Potential Dust Emission Sources

Work Sequence	Marine-based or Land-based Works	Potential Dust Emission Sources
1. Placement of sand blanket (2 m in thickness) on the seabed	Marine-based	No
2. Application of the appropriate non-dredged ground improvement methods to improve the engineering properties of the seabed	Marine-based	No
3. Modification of existing seawall and/or construction of new seawall on the pre-improved foundation	Partly marine-based (during marine sand filling) and partly land-based (during placement of rock fill and rock armour)	No for the marine-based part Yes for the land-based part
4. Marine sand filling up to +2.5 mPD (not including settlement), which is above high water mark	Partly marine-based (during filling below high water mark) and partly land-based (during filling above high water mark)	No for the marine-based part Yes for the land-based part
5. Land filling (using sand fill or public fill materials) with vibro compaction from + 2.5 mPD to + 6.5 mPD (not including settlement)	Land-based	Yes
6. Application of surcharge and subsequent removal	Land-based	Yes

Appendix 5.2.15 - Details of Dust Emission Sources for Annual FSP Assessment at Year 2016

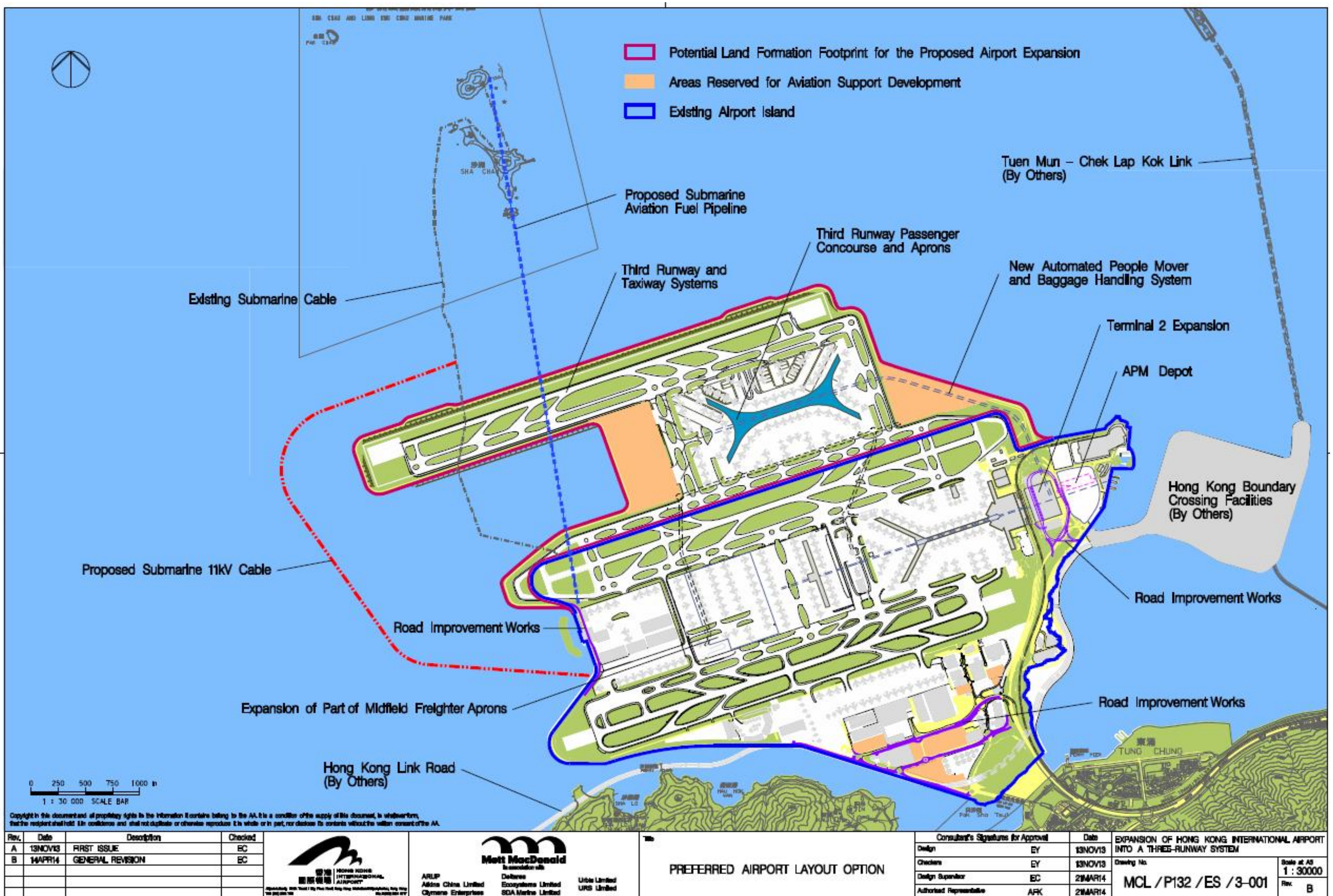
Third Runway Work Areas

Works Area	Sources	Parameter			Remarks
Third Runway Land Formation	Heavy construction Source ID: For 24hrs activities:	Percentage active area, p	0.1	%	Assume % works area for heavy construction
	Q1:	Mitigation efficiency	91.7	%	Water suppression 12 times a day Equation (3-2) in the USEPA's Control of Open Fugitive Dust Sources Final Report
	Q2:	No. of working days per month, d	30	days	
	Q3:	No. of working hours per day, h	24	hour	
	Q4: 1_03-1, 1_03-2, 1_08A-1, 1_08A-2, 1_08B-1, 1_08B-2, 2_04-1, 2_04-2, 2_06-1, 2_06-2, 2_06-3	Emission Factor (0.03)	0.0807	Mg/hectare/month of activity	AP42, Section 13.2.3.3 Thompson G. Pace, USEPA. Examination of the Multiplier Used to Estimate PM2.5 Fugitive Dust Emissions from PM10, April 2005
		Emission Rate	2.8559E-09 2.3704E-10	$g/m^2/s$ (unmitigated) $g/m^2/s$ (mitigated)	=2.69*0.03*1000000/(10000*30*h*60*60)*p/100
	Wind Erosion Source ID: (as above)	Percentage active area, p	0.1	%	
		Emission Factor (0.03)	0.0255	Mg/hectare/year	AP42, Table 11.9-4 Thompson G. Pace, USEPA. Examination of the Multiplier Used to Estimate PM2.5 Fugitive Dust Emissions from PM10, April 2005
		Emission Rate	7.41717E-11	$g/m^2/s$	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100

Appendix 5.2.15 - Details of Dust Emission Sources for Annual FSP Assessment at Year 2017

Third Runway Work Areas

Works Area	Sources	Parameter			Remarks
Third Runway Land Formation	Heavy construction Source ID: For 24hrs activities:	Percentage active area, p	1.4	%	Assume % works area for heavy construction
	Q1: 1_01, 1_03-1, 1_03-2, 1_04, 1_07-1, 1_07-2, 1_08A-1, 1_08A-2, 1_08B-1, 1_08B-2, 1_09-1, 1_09-2, 2_03B, 2_04-1, 2_04-2, 2_05B-1, 2_05B-2, 2_06-1, 2_06-2, 2_06-3, 2_07B, 2_08, 2_09-1, 2_09-2	Mitigation efficiency	91.7	%	Water suppression 12 times a day Equation (3-2) in the USEPA's Control of Open Fugitive Dust Sources Final Report
	Q2: 1_01, 1_02-1, 1_02-2, 1_03-1, 1_03-2, 1_04, 1_07-1, 1_07-2, 1_08A-1, 1_08A-2, 1_08B-1, 1_08B-2, 1_09-1, 1_09-2, 2_03B, 2_05B-1, 2_05B-2, 2_07A-1, 2_07A-2, 2_07B, 2_08, 2_09-1, 2_09-2, 3_01A-1, 3_01A-2, 3_01A-3	No. of working days per month, d	30	days	
	Q3: 1_01, 1_02-1, 1_02-2, 1_03-1, 1_03-2, 1_04, 1_05, 1_07-1, 1_07-2, 1_08A-1, 1_08A-2, 1_08B-1, 1_08B-2, 2_03B, 2_05B-1, 2_05B-2, 2_07A-1, 2_07A-2, 2_07B, 2_08, 3_01A-1, 3_01A-2, 3_01A-3	No. of working hours per day, h	24	hour	
	Q4: 1_01, 1_02-1, 1_02-2, 1_03-1, 1_03-2, 1_04, 1_05, 1_07-1, 1_07-2, 1_08A-1, 1_08A-2, 2_03B, 2_05A, 2_05B-1, 2_05B-2, 2_07A-1, 2_07A-2, 2_07B, 2_08	Emission Factor (0.03)	0.0807	Mg/hectare/month of activity	AP42, Section 13.2.3.3 Thompson G. Pace, USEPA. Examination of the Multiplier Used to Estimate PM2.5 Fugitive Dust Emissions from PM10, April 2005
		Emission Rate	4.45002E-08 3.69352E-09	g/m²/s (unmitigated) g/m²/s (mitigated)	=2.69*0.03*1000000/(10000*30*h*60*60)*p/100
	For night-time activities:	Percentage active area, p	1.4	%	
	Q1:	Mitigation efficiency	91.7	%	
	Q2: 2_04-1, 2_04-2, 2_06-1, 2_06-2, 2_06-3	No. of working days per month, d	30	days	
	Q3: 1_09-1, 1_09-2, 2_04-1, 2_04-2, 2_06-1, 2_06-2, 2_06-3, 2_09-1, 2_09-2	No. of working hours per day, h	12 (night)	hour	
	Q4: 1_09-1, 1_09-2, 2_04-1, 2_04-2, 2_06-1, 2_06-2, 2_06-3, 2_09-1, 2_09-2, 3_02A-1, 3_02A-2, 3_02A-3	Emission Factor (0.03)	0.0807	Mg/hectare/month of activity	AP42, Section 13.2.3.3 Thompson G. Pace, USEPA. Examination of the Multiplier Used to Estimate PM2.5 Fugitive Dust Emissions from PM10, April 2005
		Emission Rate	8.90004E-08 7.38703E-09	g/m²/s (unmitigated) g/m²/s (mitigated)	=2.69*0.03*1000000/(10000*30*h*60*60)*p/100
	Wind Erosion Source ID: (as above)	Percentage active area, p	1.4	%	
		Emission Factor (0.03)	0.0255	Mg/hectare/year	AP42, Table 11.9-4 Thompson G. Pace, USEPA. Examination of the Multiplier Used to Estimate PM2.5 Fugitive Dust Emissions from PM10, April 2005
		Emission Rate	1.15573E-09	g/m²/s	=0.85*0.03*1000000/(10000*365*24*60*60)*p/100


Potential Land Formation Footprint for the Proposed Airport Expansion
Areas Reserved for Aviation Support Development
Existing Airport Island
Tuen Mun – Chek Lap Kok Link (By Others)
Proposed Submarine Aviation Fuel Pipeline
Third Runway Passenger Concourse and Aprons
Third Runway and Taxiway Systems
New Automated People Mover and Baggage Handling System
Existing Submarine Cable
Terminal 2 Expansion
APM Depot
Hong Kong Boundary Crossing Facilities (By Others)
Proposed Submarine 11kV Cable
Road Improvement Works
Road Improvement Works
Expansion of Part of Midfield Freighter Aprons
Road Improvement Works
Hong Kong Link Road (By Others)
TUNG CHUNG
0 250 500 750 1000 m
1 : 30 000 SCALE BAR
Rev. Date Description Checked
A 13NOV13 FIRST ISSUE EC
B 14APR14 GENERAL REVISION EC
Mott MacDonald
ARUP
Deltares
PREFERRED AIRPORT LAYOUT OPTION
EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM
Design EY 13NOV13
Checked EY 13NOV13
Design Supervisor EC 21MAR14
Authorised Representative ARK 21MAR14
1 : 30000
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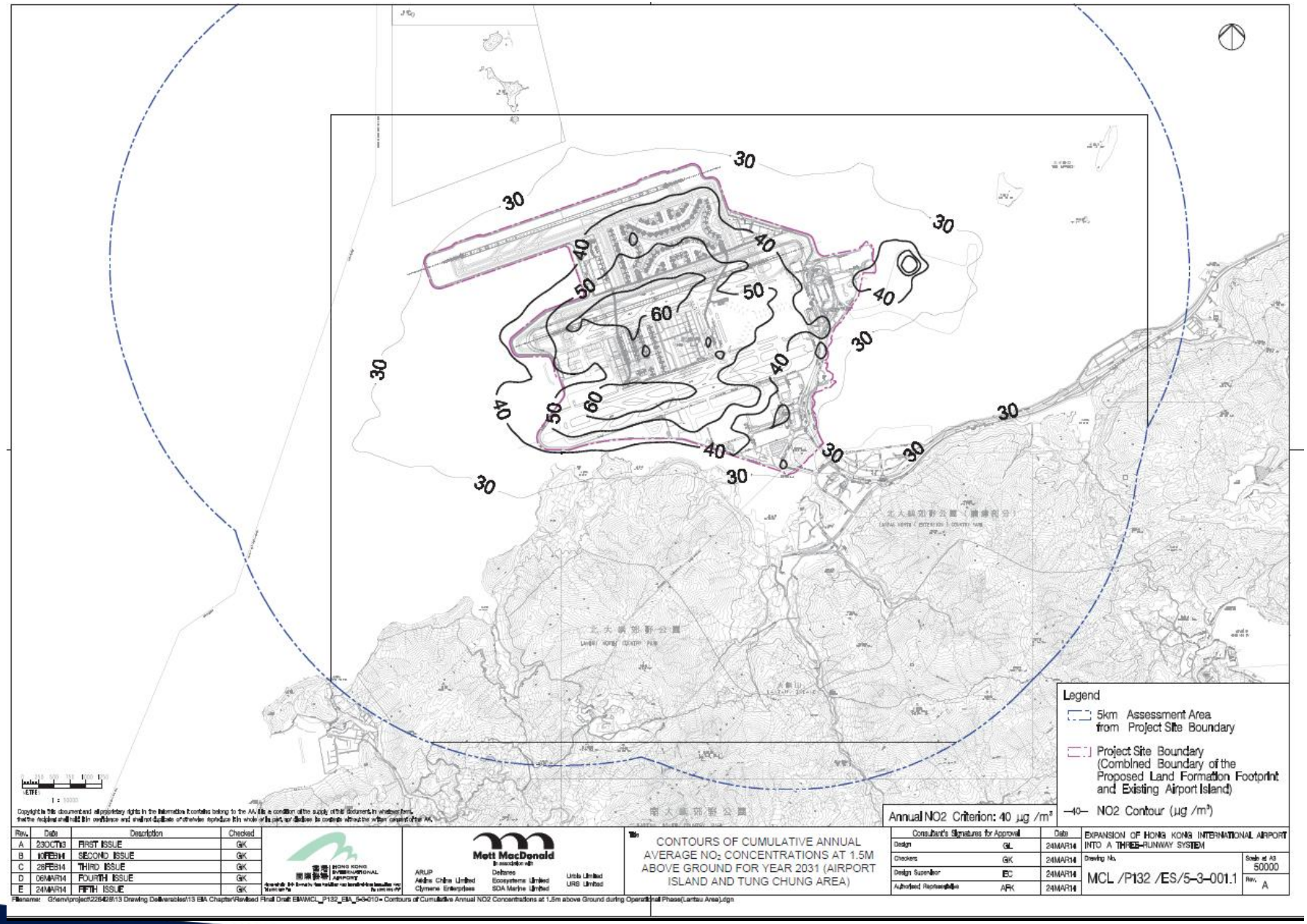


Rev.	Date	Description	Checked
A	23OCT13	FIRST ISSUE	GK
B	10FEB14	SECOND ISSUE	GK
C	28FEB14	THIRD ISSUE	GK
D	06MAR14	FOURTH ISSUE	GK
E	24MAR14	FIFTH ISSUE	GK

Mott MacDonald

ARUP, Atkins China Limited, Clymene Enterprises, Delcares, Ecosystems Limited, SDA Marine Limited, Urbis Limited, URS Limited

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

Consultant's Signatures for Approval		Date
Design	GL	24MAR14
Checkers	GK	24MAR14
Design Supervisor	EC	24MAR14
Authorised Representative	ARK	24MAR14

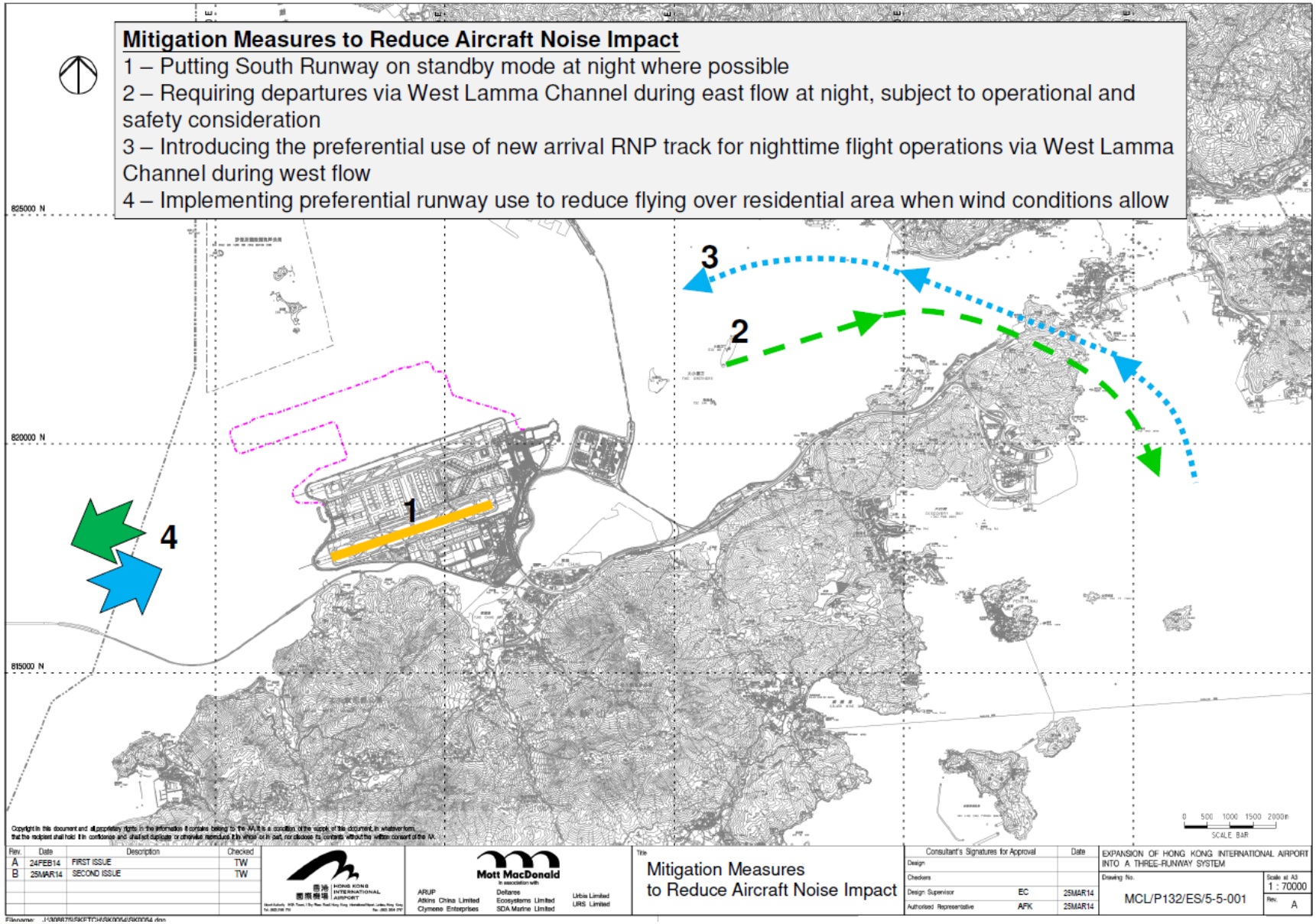
EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No. MCL /P132 /ES/5-3-001.1

Scale at A3 50000

Rev. A

Filename: G:\env\project\22640\13 Drawing Deliverables\13 EIA Chapter\Revised Final Draft EIA\MCL_P132_EIA_5-3-010 - Contours of Cumulative Annual NO2 Concentrations at 1.5m above Ground during Operational Phase(Lantau Area).dgn


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
825000 N
820000 N
815000 N
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SCALE BAR
Mitigation Measures to Reduce Aircraft Noise Impact
EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM
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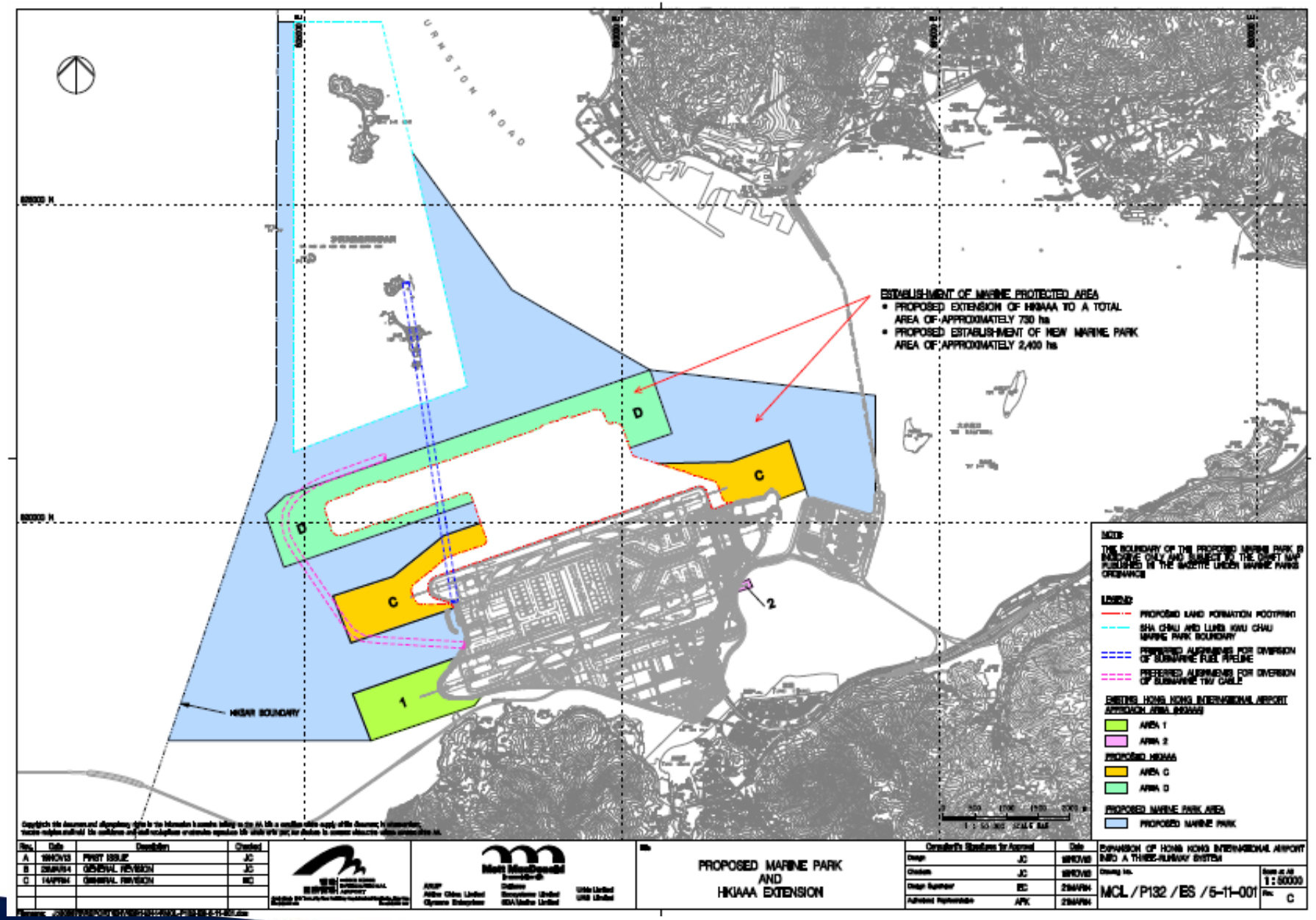
KOWLOON
ESTABLISHMENT OF MARINE PROTECTED AREA
• PROPOSED EXTENSION OF HKIAAA TO A TOTAL AREA OF APPROXIMATELY 750 ha
• PROPOSED ESTABLISHMENT OF NEW MARINE PARK AREA OF APPROXIMATELY 2,400 ha
D
C
D
C
1
2
HKIAA BOUNDARY
NOTE:
THE BOUNDARY OF THE PROPOSED MARINE PARK IS INDICATIVE ONLY AND SUBJECT TO THE DRAFT MAP PUBLISHED IN THE GAZETTE UNDER MARINE PARKS ORDINANCE
LEGEND
PROPOSED LAND FORMATION FOOTPRINT
SHA CHAU AND LUNG KWU CHAU MARINE PARK BOUNDARY
PREFERRED ALIGNMENTS FOR DIVERSION OF SUBMARINE FUEL PIPELINE
PREFERRED ALIGNMENTS FOR DIVERSION OF SUBMARINE TAV CABLE
EXISTING HONG KONG INTERNATIONAL AIRPORT APPROACH AREA (HKIAAA)
AREA 1
AREA 2
PROPOSED HKIAAA
AREA C
AREA D
PROPOSED MARINE PARK AREA
PROPOSED MARINE PARK
PROPOSED MARINE PARK AND HKIAAA EXTENSION
EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM
MCL / P132 / ES / 5-11-001
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5. Overview

Our Works :

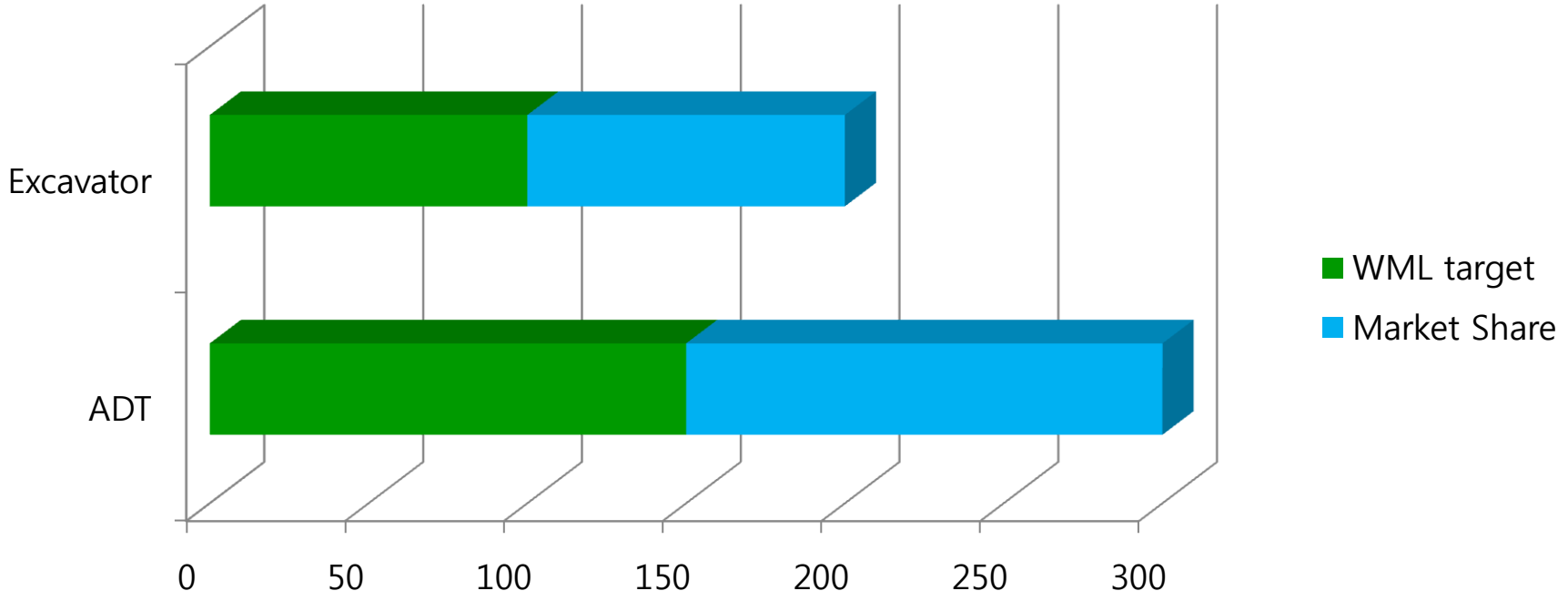
- Airport Authority Hong Kong (AAHK) & Environmental Protection Department (EPD) have organized some focused consultation with industry representatives

- WML provides a lot of environmental concept and suggestion to AAHK & EPD to increase the environmental standards, in order to reduce the demand of competitor thus increasing the supply of our company .
- We have cooperated with Engineering Company to submit the Environmental Protection Construction Methods – DCM, and have cooperated with Green Group to provide the Key Dust Emission Report to prove that the dust Emission will be increase when using the Conventional Dredging Method for Land-based filling works

- Airport Authority Hong Kong (AAHK) & Environmental Protection Department (EPD) have commissioned relevant consultants to conduct feasibility studies covering initial land formation engineering evaluation, impact analysis and perforance the Environmental Impacts Assessment and it identified that only DCM which minimize the environmental impact.

Our Target :

It is planned that the land formation project would be started from end of 2015 to early of 2016. The CHEC reclamation project that we're working, there was generate around total 60units ADT (around 15units ADT for 10000m3) therefore we evaluated that the 3RS project will be generate around 300 units ADT & 200 units Excavator. So our target would be 150 units ADT & 100 units Excavator on this 3RS project.



6. Supporting

Our Needs :

1. All machine with minimum T3A Engine
2. Strengthen the filter assy's and add warning light
3. Add automatic detection technology management system which can show the emissions automatically
4. Strengthen the noise enclosure of all machine
5. Spare Part Consignment around 10% at machine value
6. At lease 6 months preparation of machine
7. Doosan engineer on-time checking
8. Review dealer price timely
9. DC pricing
10. Strategies / Suggestion, due to the big demand of machine, all competitors will provide a very attractive pricing or program, such as buy back or rental.
11. Letter of indemnity, CAT have provide an official letter to our customer to promise that 25 units can be produce on 1 day, if fully occupy.

END