Contract No. YL/2020/01

Development of Lok Ma Chau Loop: Main Works Package 1 – Contract 1 Site Formation and Infrastructure Works inside Lok Ma Chau Loop and Western Connection Road Phase 1

Monthly Monitoring and Management Report for OWCAs

(1st December to 31st December 2022)

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1. Introduction

1.1 Background

1.1.1 Section 12.10 of the approved Environmental Impact Assessment (EIA) Report requires ecological monitoring for Offsite Wetland Compensation Areas (OWCAs) to ensure that Habitat Creation and Management Plan (HCMP) requirements are met, particularly relating to target species. Duration of the monitoring will cover till the end of establishment period. The main aspects of monitoring are:

- Target species monitoring;
- Monitoring general conditions in the OWCAs to maximize the habitat value for target wildlife species.

1.1.2 Ecosystems Limited was appointed by the Contractor under Service Contract No. YL/2020/01 Development of Lok Ma Chau Loop: Main Works Package 1 – Contract 1 Site Formation and Infrastructure Works inside Lok Ma Chau Loop and Western Connection Road Phase 1, comply with the requirements specified in the Environmental Permit (EP), Environmental Monitoring and Audit (EM&A) Manual, EIA Report of the Project and other relevant statutory requirements.

1.2 Purpose of the Report

1.2.1 This is the 2nd Monthly Monitoring and Management Report for OWCAs, which summarizes the monitoring results in December 2022.

1.3 Structure of the Report

1.3.1 The structure of the report is as follows:

Section 1: Introduction
Section 2: Monitoring Methodology
Section 3: Monitoring Findings
Section 4: Management Works and Recommendations
Section 5: Conclusion

2. Monitoring Methodology

2.1 Target Species Monitoring

2.1.1 Specific mammal, bird, herpetofauna and dragonfly are the target species for the monitoring. Target species are selected for monitoring as specified in the HCMP (**Table 2.1**) that fulfill the two criteria below:

- Any species of conservation importance based upon criteria provided by BirdLife International (2019) and Fellowes et al. (2002), which was recorded in the impacted areas/ habitats in numbers considered to be of significance during the baseline ecological surveys; or
- Any species that, although not of conservation concern, was recorded in the impacted areas/ habitats in numbers sufficiently high to indicate that their distribution and abundance in Deep Bay or Hong Kong as a whole would be significantly impacted by the proposed development.

Table 2.1 Target Species for OWCAs Specified in HCMP

Species	Scientific Name	Preferred Habitat*			Primary/Secondary Species for Offsite Mitigation (P/S)
		Fish pond	Reed Marsh	Marsh	
Great Cormorant	*Phalacrocorax carbo*	✓			P
Little Egret	*Egretta garzetta*	✓	(✓)	(✓)	P
Chinese Penduline Tit	*Remiz consobrinus*		✓		S
Dusky Warbler	*Phylloscopus fuscatus*	(✓)	✓	✓	P
Oriental Reed Warbler	*Acrocephalus orientalis*	(✓)	✓	(✓)	S
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	(✓)	✓	✓	P
Pallas's Grasshopper Warbler	*Locustella certhiola*	(✓)	✓	✓	P
Bluethroat	*Luscinia svecica*	(✓)	✓	✓	P
Eurasian Otter	*Lutra lutra*	✓	✓	✓	P
Leopard Cat	*Prionailurus bengalensis*	✓	✓	(✓)	P
Two-striped Grass Frog	*Rana taipehensis*			✓	P
Chinese Bullfrog	*Hoplobatrachus chinensis*			✓	P
Common Rat Snake	*Ptyas mucosus*	✓	✓	✓	P
Scarlet Basker	*Urothemis signata*			✓	P
Ruby Darter	*Rhodothemis rufa*			✓	P
Common Evening Hawker	*Anaciaeschna jaspidea*			✓	P
Sapphire Flutterer	*Rhyothemis triangularis*			✓	P
Coastal Glider	*Macrodiplax cora*			✓	P

Note: *Reference to Table 12.81 of the EIA Report
Parentheses indicate that the habitat can support the species indicated, but is not the preferred habitat, and abundance are likely to be lower

2.1.2 In general, the monitoring followed a fixed transect (**Figure 2.1, 2.2** and **2.3**) in each OWCA to record the target species. The transects generally followed the transects adopted during the baseline survey with minor adjustments. For example, the transect in Area 2 is revised due to the inaccessible path after pond reprofiling, while the transect in Pond 7E is now extended but transect outside Area 7 is removed as the monitoring will be recorded by ponds or marshes where enhancement measures applied. The monitoring

methodology for each target taxa is described below, while the monitoring schedule is shown in **Table 2.2**.

2.1.3 *Mammal* – All sightings, tracks, and signs of mammals (including droppings) along the transects (**Figure 2.1, 2.2** and **2.3**) within the OWCAs were recorded. Although the mammal monitoring by transect only be conducted once a month, attention was also paid on tracks and signs of mammals during the days of other monitoring (e.g. weekly water level monitoring) and management (e.g. vegetation management) by the field staff. The location(s) of any target mammal species and species of conservation importance encountered will be recorded and reported, along with notable behaviour. Nomenclature for mammals will follow Shek (2006).

2.1.4 As Eurasian Otter is one of the key target species of OWCAs, measures for Eurasian Otter including otter holts, floating platform, jetty, and rock platform were installed. In addition to transect survey, infrared cameras were set up in the locations making reference to the baseline survey, as well as locations that can monitor the entrance of the otter holts. While the utilization of floating platform, jetty and rock platform were observed along the transects or other monitoring and management works during day time (i.e. both sightings and signs), infrared cameras will be installed near these measures. The cameras will be checked monthly to record the target species and usage of the otter holts. The location of infrared camera trap in the OWCAs are shown in (**Figure 2.1, 2.2** and **2.3**).

2.1.5 *Bird* – The bird communities in each OWCA were monitored. Transect count and/or point count survey were conducted at each pond twice in December 2022. Surveyors followed a fixed transect (**Figure 2.1, 2.2** and **2.3**) in each OWCA to record bird species and abundance, point count was conducted at each pond or marsh, the vantage points were along the transects, while the time was within 10 minutes in each vantage point along the transects. Point count served as a supplementary purpose for transect count.

2.1.6 Utilization of OWCAs as breeding habitat by birds was also recorded, if any. During the surveys, observed target species were classified into 4 categories according to their behavior including 1) present 2) possible breeding, 3) probable breeding and 4) confirmed breeding, if any.

2.2 Water Depths

2.2.1 Weekly checks of water depths were conducted. If levels are more than 25% more or less than desired levels, potential ecological impacts were reviewed and remedial measures were undertaken, if necessary.

2.3 Water and Sediment Quality

2.3.1 Water quality in each pond/marsh across the OWCAs was monitored monthly during establishment period (the combined pond/marsh i.e. 53/54, 7A/7B, 7D/7E are considered as one pond/marsh). The indicative water sampling locations are shown in **Figures 2.1 – 2.3**. For water sampling in marsh, surface water might be absent in occasion (only submerged water), hence, no water sampling and testing will be required for this scenario. The following water parameters will be measured:

- Temperature (in-situ measurement);
- pH (in-situ measurement);
- Salinity (in-situ measurement);
- Dissolved oxygen (in-situ measurement);
- BOD5 (measure in laboratory);
- Nitrate and nitrite (measure in laboratory);
- Ammonia nitrogen (measure in laboratory); and
- Orthophosphate (measure in laboratory).

2.3.2 Sediment in each OWCAs will be monitored in early wet season yearly (tentatively in April 2023). Three sediment samples will be collected from each OWCA and sent to a HOKLAS accredited laboratory for analysis during establishment period. The tentative sediment sampling locations are shown in **Figures 2.1 – 2.3**, actual sampling locations will be adjusted subject to accessibility. The following parameters will be measures:

- pH (measure in laboratory);
- Redox potential (in-situ measurement);
- Total organic carbon (measure in laboratory);
- Total nitrogen (measure in laboratory);
- Total phosphorus (measure in laboratory).

2.3.3 **Table 2.2** shows the tentative schedule of the monitoring programme.

Table 2.2: Monitoring schedule

Monitoring	2022			2023									
	Wet Season	Dry Season					Wet Season						
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Target species													
Bird	D	2D	2D	2D	2D	2D	D	D	D	D	D	2D	D

Monitoring	2022	2023											
	Wet Season	Dry Season					Wet Season						
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Mammal	D	D	D	D	D	D	D	D	D	D	D	D	-
Dragonfly	D	-	-	-	-	-	D	D	D	D	D	D	-
Herpetofauna	D+N	-	-	-	-	-	D+N	D+N	D+N	D+N	D+N	D+N	-
Habitat conditions													
Vegetation	-	-	-	D (quarterly)	-	-	D (quarterly and half-yearly)	-	-	D (quarterly)	-	-	D (quarterly and half-yearly)
Water depth	Weekly												
Water quality	-	Monthly											
Sediment quality	-	-	-	-	-	-	Once	-	-	-	-	-	-

- D: Day time; N: Night time

  As the commencement of the establishment period is in the middle of the October 2022, bird monitoring only conducted once in October 2022, another one will be conducted in October 2023

3. Monitoring Findings

3.1 General

3.1.1 The target species monitoring was conducted in 16th December 2022, 19th December 2022. Eight infrared cameras were installed in OWCAs at the beginning of the establishment period. While water depth was measured weekly in all the pond/marsh of each OWCA, and water quality measurement was conducted in 9th December 2022. A summary of the monitoring activities in the reporting period is listed in **Table 3.1**. The general site photos were shown in **Appendix A**.

3.1.2 One installed infrared camera (Cam 10) in Area 2 was found missing on 16th December 2022, which was re-installed in 19th December 2022.

Table 3.1 Summary Table for Monitoring Activities in the Reporting Period

Aspect	Monitoring Parameter	Date
Target Species		
Bird	Species and abundance	16/12 and 19/12
Mammal*		16/12 and 19/12

Aspect	Monitoring Parameter	Date
Dragonfly		-
Herpetofauna		-
Habitat Condition		
Vegetation	• Species composition, coverage and plant health of marsh • Vegetation coverage and height within OWCAs • Presence and coverage of exotic plant species	Not required for the reporting period, the first vegetation monitoring will be in January 2023
Water depth	Water depth of each pond/marsh	-Weekly between 1/12 and 31/12(2/12, 9/12, 16/12, 23/12, 30/12)
Water quality	• Temperature • pH • Salinity • Dissolved oxygen • BOD5 • Nitrate and nitrite • Ammonia nitrogen • Orthophosphate	9/12
Sediment quality	• pH • Redox potential • Total organic carbon • Total nitrogen • Total phosphorus	Not required for the reporting period, the first sediment quality monitoring will be in April 2023

*Sign of mammal was also observed during other monitoring and management works

3.2 Target Species Monitoring

Mammal

3.2.1 Only domestic dog was recorded during the survey in December 2022 by transect count method. The total operation days of infrared cameras within the present monitoring period was **153 days**. No mammal species was recorded by infrared camera method in the reporting period (**Table 3.2**).

Table 3.2 Animal encounter rate through infrared camera

Camera No.	Location	Operation Day of infrared camera*	Animal encounter rate
Cam 1	Area 2	15	No mammal records.
Cam 2	Area 2	15	No mammal records.
Cam 4	Area 9	31	No mammal records.
Cam 5	Area 2	15	No mammal records.
Cam 6	Area 2	15	No mammal records.
Cam 7	Area 7	31	No mammal records.
Cam 9	Area 9	31	No mammal records.
Cam 10#	Area 2	-	-

Camera trap was stolen

Avifauna

3.2.2 Most of the recorded bird species are common and widespread in Hong Kong. A total of 55 bird species were recorded within the OWCAs (**Appendix B**). Among all the 55 species, 3 target species and 27 species of conservation importance were recorded (**Table 2.1**). The list of the target bird species and species of conservation importance is presented in **Table 3.3** below. Most of these species are wetland dependent species. Red-billed Starling *Tarsiger cyanurus* was the highest recorded species in OWCAs. No breeding birds were found during the monitoring period.

3.2.3 Some selected target species photos are shown in **Appendix C**.

Table 3.3 Target Species and Species of Conservation Importance Recorded in the Reporting Period

Common Names	Scientific Names	Target species	Conservation status
Avifauna (All birds are protected by Cap. 170 Wild Animals Protection Ordinance)			
Eurasian Wigeon	*Anas penelope*		Fellowes et al. (2002): RC
Northern Shoveler	*Anas clypeata*		Fellowes et al. (2002): RC
Northern Pintail	*Anas acuta*		Fellowes et al. (2002): RC
Eurasian Teal	*Anas crecca*		Fellowes et al. (2002): RC
Ferruginous Duck	*Aythya nyroca*		IUCN Red List Status: NT
Tufted Duck	*Aythya fuligula*		Fellowes et al. (2002): LC
Little Grebe	*Tachybaptus ruficollis*		Fellowes et al. (2002): LC
Black-crowned Night Heron	*Nycticorax nycticorax*		Fellowes et al. (2002): (LC)
Chinese Pond Heron	*Ardeola bacchus*		Fellowes et al. (2002): PRC,(RC)

Common Names	Scientific Names	Target species	Conservation status
Grey Heron	*Ardea cinerea*		Fellowes et al. (2002): PRC
Great Egret	*Ardea alba*		Fellowes et al. (2002): PRC,(RC)
Little Egret	*Egretta garzetta*	✓	Fellowes et al. (2002): PRC,(RC)
Great Cormorant	*Phalacrocorax carbo*	✓	Fellowes et al. (2002): PRC
Black Kite	*Milvus migrans*		Fellowes et al. (2002): (RC); Appendix 2 of CITES; Cap. 586
Eastern Buzzard	*Buteo japonicus*		Appendix 2 of CITES; Cap. 586
Eurasian Coot	*Fulica atra*		Fellowes et al. (2002): RC
Black-winged Stilt	*Himantopus himantopus*		Fellowes et al. (2002): RC
Marsh Sandpiper	*Tringa stagnatilis*		Fellowes et al. (2002): RC
Black-headed Gull	*Chroicocephalus ridibundus*		Fellowes et al. (2002): PRC
White-throated Kingfisher	*Halcyon smyrnensis*		Fellowes et al. (2002): (LC)
Pied Kingfisher	*Ceryle rudis*		Fellowes et al. (2002): (LC)
Common Kestrel	*Falco tinnunculus*		Class 2 Protected Animal of China; Appendix 2 of CITES; Cap. 586
Dusky Warbler	*Phylloscopus fuscatus*	✓	-
Zitting Cisticola	*Cisticola juncidis*		Fellowes et al. (2002): LC
Red-billed Starling	*Spodiopsar sericeus*		Fellowes et al. (2002): GC
Red-throated Pipit	*Anthus cervinus*		Fellowes et al. (2002): LC
Buff-bellied Pipit	*Anthus rubescens*		Fellowes et al. (2002): LC

Notes:

1. AFCD. (2022). Hong Kong Biodiversity Information Hub.
2. Fellowes *et al.* (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong.
    - For conservation status listed by Fellowes *et al.* (2002), letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence
3. International Union of Conservation for Nature. (2022). The IUCN Red List of Threatened Species. Version 2021-3.
4. Convention on International Trade in Endangered Species of Wild Flora and Fauna (2022). Appendices I, II and III.

Abbreviations:

- Conservation Status in Fellowes et al. (2002): LC = Local Concern, RC = Regional Concern, PGC = Potential Global Concern, PRC = Potential Regional Concern, GG = Global Concern
- Conservation Status in IUCN: NT= Near Threatened
- Caption 170: Wild Animals Protection Ordinance
- Caption 586: Protection of Endangered Species of Animals and Plant Ordinance

3.3 Monitoring of Habitat Conditions

Vegetation

3.3.1 No vegetation monitoring was required in the present reporting month(s). However, it was observed that the soil in the planted areas in Area 2 and 9

for the terrestrial species was relatively dry, while aggressive invasive species including *Ipomoea aquatica, Typha angustifolia, Leucaena leucocephala, Mikania micrantha* and *Eichhornia crassipes* were found in all OWCAs. *Typha angustifolia* was occasionally found in the three areas. The distribution of the other four aggressive invasive species were restricted. Besides, *Lemna minor* was found overgrown in Pond 9E and Marsh 9D in Area 9. The first monitoring of vegetation will be conducted in January 2023.

Water Depth

3.3.2 Weekly measurement of water level was conducted in each pond/marsh. The weekly results of the water level are shown in **Table 3.4**. Although the water level in some of the ponds were below the design water level which is normal due to dry season effect, no observable impacts to wildlife (i.e. targe species and species of conservation importance were recorded in the reporting month and the last reporting month), and hence no specific management actions are required. Besides, the water level in Pond 9E was higher than the design water throughout the monitoring period, drawing out of water is not necessary as the water level will be decreased due to the evaporation effect. If the water level is consistently below or above the design water level for more than 25%, redistribution of water might be required for short-term management action. Desilting works and review the need for supplementary water supply (e.g. Lok Ma Chau meander for Area 2, and nearby drainage channels for Area 7 and 9) will be considered for medium-term and long-term management actions, respectively. In addition, the design water level will be reviewed, and will be specified in the future operation manual.

Table 3.4 Weekly Measurement of Water Level (m) in OWCA

Area	Pond	Design water level	2/12	9/12	16/12	23/12	30/12
2	53/54	1.5/1.9	1.5	1.6	1.5	1.5	1.5
	57	1.6	1.3	**1.1**	**1**	**0.8**	**0.8**
	58	1.7	**1.1**	**1.1**	**1.2**	**1.2**	**1.2**
	96	1.4	**0.9**	**1**	**0.9**	**0.9**	**0.9**
	55	1	0.8	0.8	0.9	0.9	0.9
	56A	1	**0.7**	**0.7**	**0.6**	**0.6**	**0.6**
	56B	1	**1.3**	1.1	1	0.8	0.8
7	7A/7B	1.72/1.67	**0.8**	**0.9**	**0.9**	**1**	**1**
	7C	1.49	1.4	1.3	1.3	1.2	1.2
	7D/E	1	**1.3**	1.2	1.2	1.1	1.1
9	9A	1.63	1.3	**1.2**	**1.2**	1.3	1.3
	9B/C	1.87	1.8	1.7	1.5	1.4	1.4

Area	Pond	Design water level	2/12	9/12	16/12	23/12	30/12
	9D	1.85	1.7	1.6	1.5	1.4	1.4
	9E	1	**1.6**	**1.5**	**1.5**	**1.4**	**1.4**

Remark: The water level 25% more or less than design water level is bold

Water Quality

3.3.3 Water samples were collected and measured in each OWCA. The results for the in-situ measurement and laboratory of December 2022 are shown in **Appendix E**. The results of water quality monitoring during the reporting period are summarized in **Table 3.5**.

Area 2

3.3.4 The pH value of Pond 55, 56A, 56B, 58 and 96 ranged between the normal level 6.0 to 8.5. While the pH value of other pond in Area 2 is over pH 8.5 which triggered the action level. After investigation, the high pH records may be driven by the local environment, such as lack of rainfall. Most of the salinity values in Area 2 were below 3‰, except for Pond 55 which is 4.75‰ and action level is triggered. No action level for salinity in Pond 55 was triggered in November 2022. It is investigated that the exceedance of salinity is probably due to the influx of brackish water from the Lok Ma Chau Meander through the discharge pipe in Pond 55. As other water parameters were within the normal levels, influx of brackish water might provide brackish habitat for wildlife in Area 2, no specific actions, are recommended, given other water parameters are within the normal levels. If other water quality parameters also triggered the action level, the discharge pipe should be re-designed to avoid water influx into Pond 7A. For dissolved oxygen, only Pond 56B triggered the action level. However, the pH value in Area 2 was normal in November 2022, only the dissolved oxygen level in 56B was consistently lower than 4 mg/L which triggered the action level. It is investigated that as 56B is a marsh overgrown with wetland plant, dissolved oxygen level is normally lower than other ponds, no action is considered necessary.

3.3.5 For BOD5, nitrate and nitrite, ammonia nitrogen, orthophosphate were in the normal level in all pond/marsh of Area 2. No management actions such as increasing the monitoring frequency, and developing a contingency plan according to the HCMP, for Area 2 are considered necessary due to the monitoring results and abovementioned investigation for the exceedance parameters.

Area 7

3.3.6 pH value ranged between the normal level 6.0 to 8.5 in Area 7 while salinity in most of the pond/marsh ranged below 3‰ except 7A and 7B which is 9.64‰ which triggered the action level. Salinity in 7A and 7B was also triggered the action level in November 2022, which is due to the influx of brackish water from the outside water channel through the discharge pipe in 7A after investigation. As other water parameters were within the normal levels, influx of brackish water might provide brackish habitat for wildlife in Area 7, no specific actions are recommended, given other water parameters are within the normal levels. If other water quality parameters also triggered the action level, the discharge pipe should be re-designed to avoid water influx into Pond 7A. For dissolved oxygen, all pond/marsh in Area 7 ranged within the normal level.

3.3.7 For BOD5, nitrate and nitrite, ammonia nitrogen, orthophosphate were in the normal level in all pond/marsh of Area 7. No management actions such as increasing the monitoring frequency, and developing a contingency plan according to the HCMP, for Area 7 are considered necessary due to the monitoring results and abovementioned investigation for the exceedance parameters.

Area 9

3.3.8 pH value ranged between the normal level 6.0 to 8.5 in all pond/marsh of Area 9 except Pond 9B/9C which triggered the action level, while salinity in all pond/marsh ranged below 3‰ except 9A which was 14.8‰ and action level is triggered. It is investigated that the high pH recorded may be driven by the local environment, such as lack of rainfall. However, the pH value in Pond 9B/9C was normal in November 2022. Salinity in 9A was also triggered the action level in November 2022, which is due to the influx of brackish water from the outside water channel through the discharge pipe in 9A after investigation. As other water parameters were within the normal levels, influx of brackish water might provide brackish habitat for wildlife in Area 9, no specific actions are recommended, given other water parameters are within the normal levels. If other water quality parameters also triggered the action level, the discharge pipe should be re-designed to avoid water influx into Pond 7A. For dissolved oxygen, all pond/marsh in Area 9 ranged within the action level.

3.3.9 For BOD5, nitrate and nitrite, ammonia nitrogen, orthophosphate were below the action level in all pond/marsh of Area 9. No management actions such as increasing the monitoring frequency, and developing a contingency plan according to the HCMP, for Area 9 are considered necessary due to the monitoring results and abovementioned investigation for the exceedance parameters.

Table 3.5 Results of water quality monitoring in OWCAs

Monitoring Item	Action level	Dec 2022		
		Area 2	Area 7	Area 9
Temperature (ºC)	-	53: 21.94 54: 21.94 55: 22.14 56A: 24.69 56B: 20.18 57: 21.18 58: 21.92 96: 22.45	7A: 23.71 7B: 23.71 7C: 22.24 7D: 20.70 7E: 20.70	9A: 20.41 9B: 20.42 9C: 20.42 9D: 21.28 9E: 21.80
pH	Outside 6.0-8.5	**53: 9.14** **54: 9.14** 55: 8.45 56A: 7.51 56B: 6.35 **57: 8.84** 58: 7.74 96: 7.53	7A: 8.23 7B: 8.23 7C: 7.43 7D: 7.37 7E: 7.37	9A: 7.71 **9B: 8.65** **9C:8.65** 9D: 7.60 9E: 7.68
Salinity(ppt)	>3	53: 1.45 54: 1.45 **55: 4.75** 56A: 0.98 56B: 0.46 57: 1.26	**7A: 9.64** **7B: 9.64** 7C: 0.25 7D: 0.48 7E: 0.48	**9A: 14.8** 9B: 1.52 9C: 1.52 9D: 0.52 9E: 2.25

Monitoring Item	Action level	Dec 2022		
		Area 2	Area 7	Area 9
		58: 2.27 96: 1.74		
Dissolved oxygen(mg/L)	<4	53: 9.62 54: 9.62 55: 11.16 56A: 9.42 **56B: 3.54** 57: 9.43 58: 8.45 96: 9.05	7A: 11.00 7B: 11.00 7C: 8.35 7D: 5.45 7E: 5.45	9A: 7.86 9B: 9.65 9C: 9.65 9D: 6.80 9E: 8.02
BOD5 (mg/L)	>20	53: 5.5 54: 5.5 55: 9.5 56A: 4.5 56B: 3.0 57: 3.0 58: 4.0 96: 3.5	7A: 8.0 7B: 8.0 7C: 7.5 7D: 6.0 7E: 6.0	9A: 3.0 9B: 5.5 9C: 5.5 9D: 8.0 9E: 4.0
Nitrate and Nitrite (mg/L)	>5	53: 0.009 54: 0.009 55: 0.20 56A: 0.01 56B: <0.005 57: <0.005 58: 0.05 96: 0.35	7A: 1.2 7B: 1.2 7C: <0.005 7D: 0.08 7E: 0.08	9A: 0.95 9B: <0.005 9C: <0.005 9D: 0.02 9E: <0.005
Ammonia nitrogen (mg/L)	>3	53: 0.10 54: 0.10 55: 0.10 56A: 0.10 56B: 0.11 57: 0.10 58: 0.10 96: 0.10	7A: 0.11 7B: 0.10 7C: 0.10 7D: 0.10 7E: 0.10	9A: 0.52 9B: 0.10 9C: 0.10 9D: 0.10 9E: 0.11
Orthophosphate (mg/L)	>0.3	53: <0.01 54: <0.01 55: 0.01 56A: <0.01 56B: 0.02 57: <0.01 58: <0.01 96: <0.01	7A: 0.01 7B: 0.01 7C: <0.01 7D: 0.02 7E: 0.02	9A: 0.03 9B: 0.01 9C: 0.01 9D: <0.01 9E: 0.02

4. Management Works and Recommendation

Fish Stocking and Water Management

4.1.1 In accordance with the Section 6.2.1 of the HCMP and the Section 4.1.2 of Wetland Creation Proposal, trash fish species i.e. Tilapia is recommended for restocking in the Intensively Managed Fishponds (53/54, 57, 58 in Area 2 and 9A in Area 9) where regular drain-down occurs. Besides Tilapia, WWF also mentioned Mud Carp for waterbirds during the site visit on 10th November 2021. Hence, Tilapia is the major stocking fish for the Intensively Managed Fishponds, while small amount of Mud Carp should also be added.

4.1.2 For other ponds in OWCA specified in the HCMP, stocking can be undertaken less frequently. As both AFCD and the team recognized that some aquatic plants such as Lemma and algae might be overgrown the ponds, stocking with herbivorous fish i.e. Grass Carp and filter feeding fish i.e. Bighead / Silver Carp are recommended to control the Lemma and algae in other ponds. Fish stocking was carried out in December 2022.

4.1.3 After fish stocking in the Intensively Managed Ponds, the water level was drained down sequentially during dry season. One of the Intensively Managed Ponds will be drained down first, the pond water pumped to other ponds by submersible pump. The drain down operation will be conducted progressively. When the water level has dropped 0.5m, the drain down operation will be suspended to allow the shallow water areas to be exposed to the sun for 7-10 days; and then, the drain down operation was resumed until another 0.5m deep water is dropped. Eventually, the water depth in the pond was drained down to below 0.5m deep. Upon the completion of drain down operation of one Intensively Managed Pond for about 7-10 days, the drained pond will be filled with water again and another Intensively Managed Pond will start the drain down process. The exact exposure time will depend on the actual utilization of waterbirds.

4.1.4 When the Intensively Managed Ponds have been sequentially drained down, the whole operation will be repeated, if possible, until the end of dry season. While the intensively managed Pond 9A in Area 9, the drain down operation will be similar to Area 2, except there will be only one intensively managed pond.

4.1.5 Since otter holt was deployed in Pond 58 and 96, water level should be monitored to allow the water level reaching the base of the otter holt entrance in particular Pond 96 which is a managed pond.

Vegetation Management

4.1.6 It was observed that the soil in the planted areas for the terrestrial species was relatively dry. Watering frequency has been increased to three times a week during dry season.

4.1.7 Five of the aggressive invasive species (*Ipomoea aquatica*, *Typha angustifolia*, *Leucaena leucocephala*, *Mikania micrantha* and *Eichhornia crassipes*) were found in different regions of OWCAs, removal of these invasive species was conducted in the reporting month. However, resprout of these invasive species was occurred. Removal of these species is recommended.

4.1.8 *Lemna minor* was not proposed to plant in Area 9, but overgrown of *Lemna minor* was observed in Pond 9E and Marsh 9D in Area 9. Removal of *Lemna minor* until the *Lemna minor* pond surface coverage reached 50% is

recommended when *Lemna minor* pond surface coverage reached 70%. Besides, stocking of Grass carp is recommended to reduce the *Lemna minor*.

Target Species Monitoring

4.1.9 Domestic dogs were recorded by transect count, while the dogs are considered belonged to one of the aquaculturist nearby. It is recommended to communicate with the aquaculturist to leash their dogs, in order to avoid the domestic dogs disturbing the wildlife within OWCAs.

5. Conclusion

5.1.1 According to Section 1.2, 3 recorded species are the target species including Little Egret *Egretta garzetta*, Great Cormorant *Phalacrocorax carbo* and Dusky Warbler *Phylloscopus fuscatus* and 27 bird species of conservation importance. Among the three OWCAs, the species richness was the highest in Area 2. As both target species and species of conservation importance of different groups were recorded within the OWCA, the ecological performance is considered satisfactory.

5.1.2 Although the water level and water quality in some of the ponds were below the design water level, and the action level was triggered, no observable impacts to wildlife (i.e. targe species, and species of conservation importance were recorded in the reporting month and last reporting month), and hence no specific management actions are required.

6. Reference

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Convention on International Trade in Endangered Species of Wild Fauna and Flora. (2021). Appendices I, II and III. Retrieved from: https://www.cites.org/eng/app/appendices.php.

Fellowes, J.R., Lau, M.W.N., Dudgeon, D., Reels, G.T., Ades, G.W.J., Carey, G.J., Chan, B.P.L., Kendrick, R.C., Lee, K.S., Leven, M.R., Wilson, K.D.P. and Yu, Y.T. (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong. Memoirs of the Hong Kong Natural History Society No. 25, 123-160.

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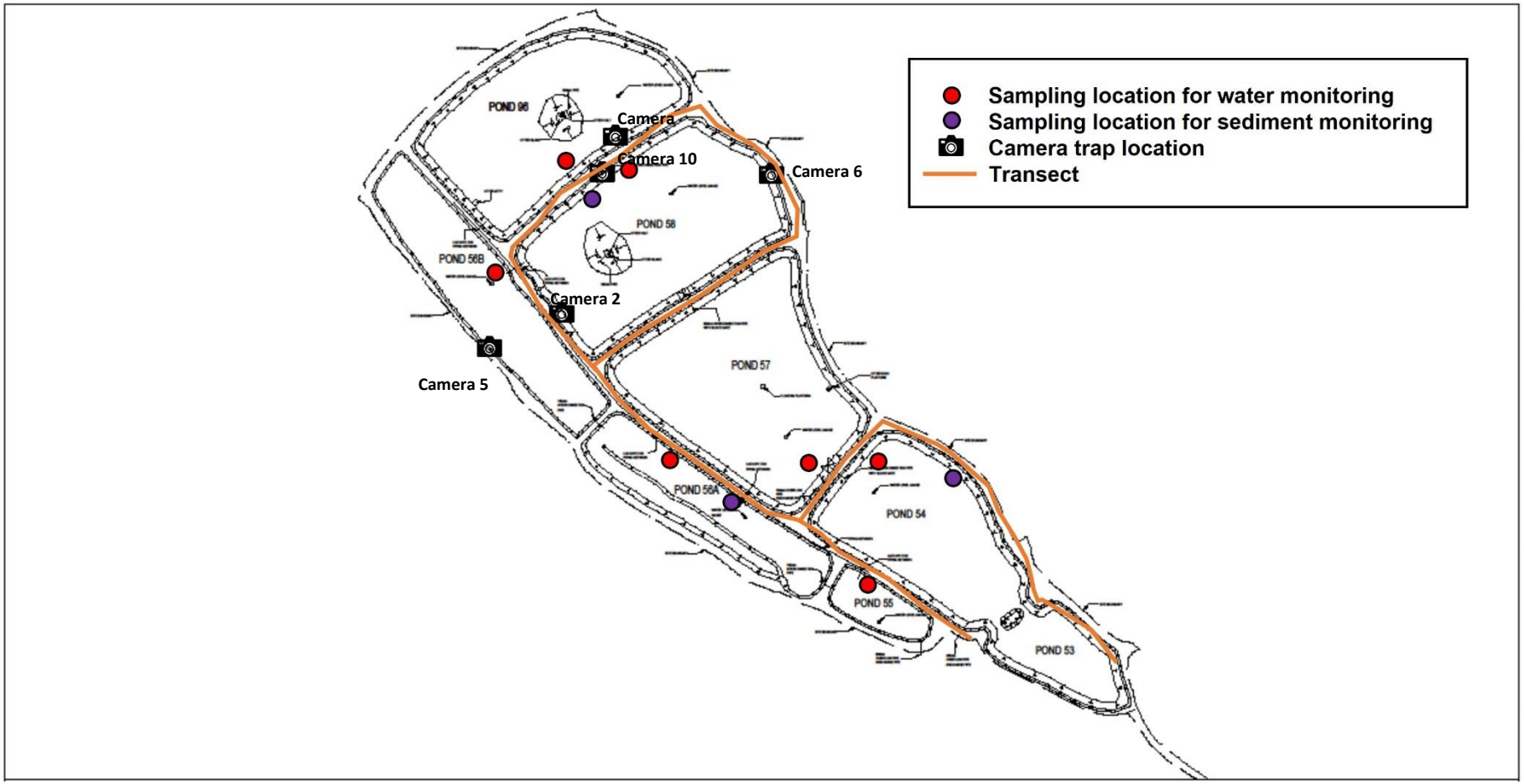


Figure 2.1 Transect and Location of Infrared Camera in Area 2

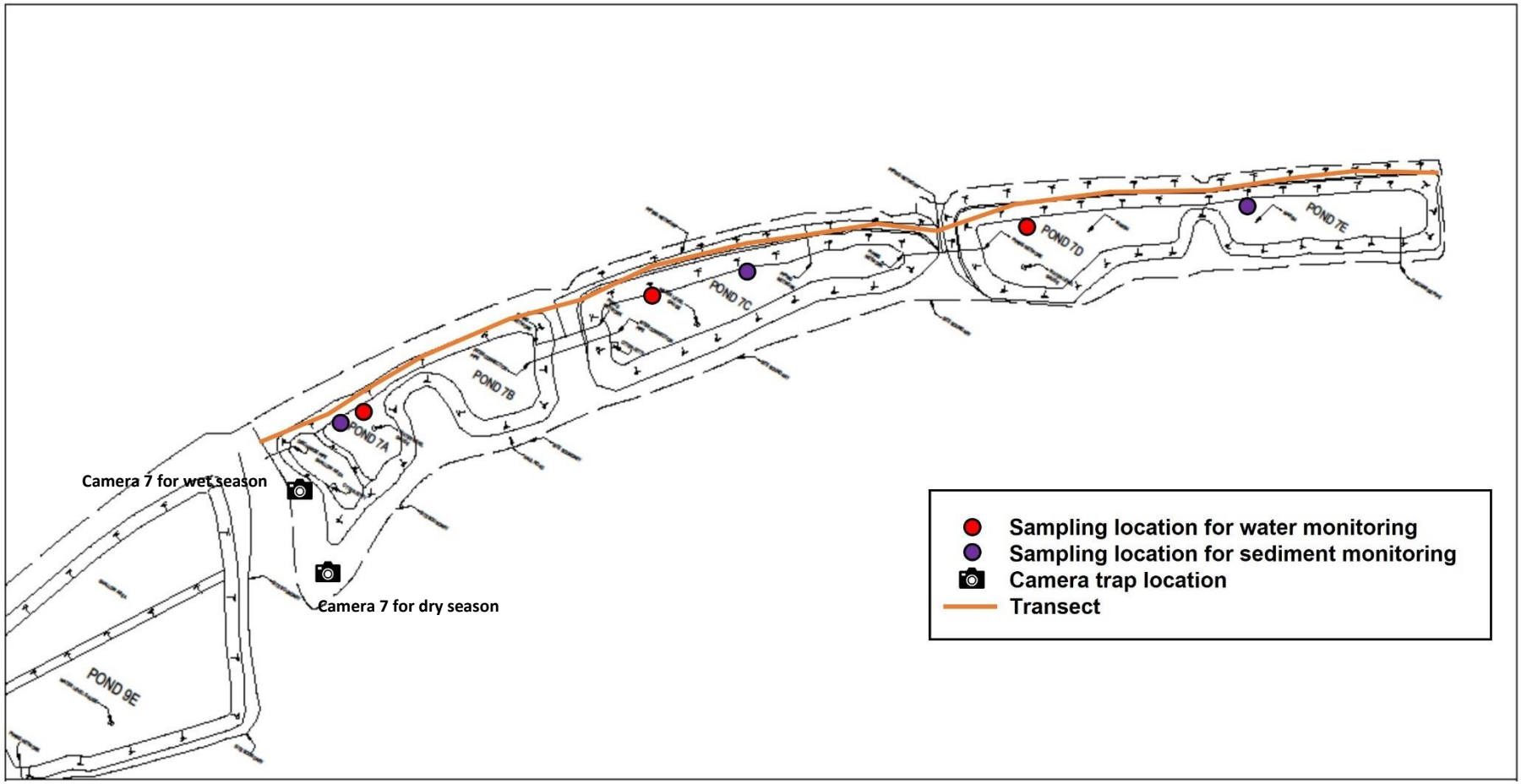


Figure 2.2 Transect and Location of Infrared Camera in Area 7

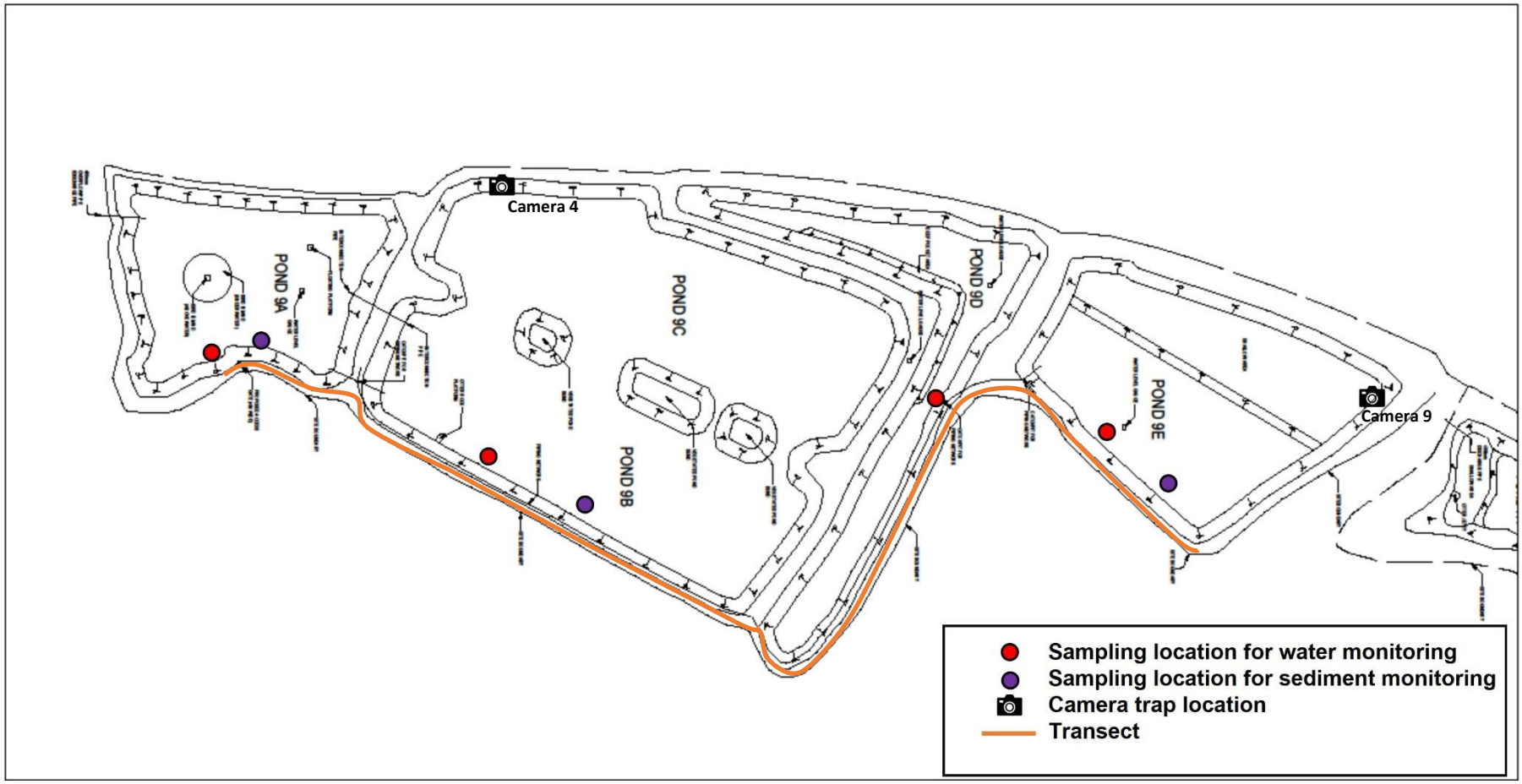
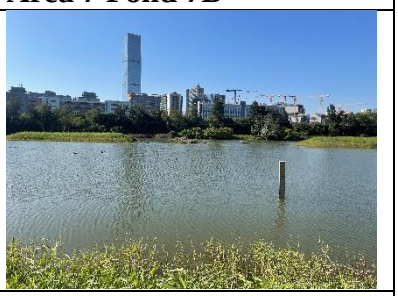


Figure 2.3 Transect and Location of Infrared Camera in Area 9

Camera 10

Figure 3.1 Re-installed Camera trap

Appendix A: Site Photos of Reporting Period in each OWCA

		
Area 2 Pond 53	**Area 2 Pond 54**	**Area 2 Pond 55**
		
Area 2 Pond 56A	**Area 2 Pond 56B**	**Area 2 Pond 57**
		
Area 2 Pond 58	**Area 2 Pond 96**	**Area 7 Pond 7A**
		
Area 7 Pond 7B	**Area 7 Pond 7C**	**Area 7 Pond 7D**
		
Area 7 Pond 7E	**Area 9 Pond 9A**	**Area 9 Pond 9B**

		
Area 9 Pond 9C	**Area 9 Pond 9D**	**Area 9 Pond 9E**

Appendix B: Fauna Species List Recorded in OWCA in December 2022

Common Names	Scientific Names	Rarity and Distribution in Hong Kong	Conservation status	Area 2		Area 7		Area 9	
				1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec
Mammals									
Domestic Dog	*Canis lupus familiaris*	Widely distributed in forested areas throughout Hong Kong.	-	3					
Avifauna									
Eurasian Wigeon	*Anas penelope*	Winter visitor. Found in Deep Bay area, Tai Lam Chung.	Fellowes et al. (2002): RC						1
Northern Shoveler	*Anas clypeata*	Abundant winter visitor. Found in Deep Bay area.	Fellowes et al. (2002): RC					12	
Northern Pintail	*Anas acuta*	Abundant winter visitor. Found in Deep Bay area, Shuen Wan, Long Valley, Kam Tin.	Fellowes et al. (2002): RC						6
Eurasian Teal	*Anas crecca*	Common winter visitor. Found in Deep Bay area, Shuen Wan, Tai Lam Chung Reservoir, Victoria Harbour, urban parks.	Fellowes et al. (2002): RC					1	1
Ferruginous Duck	*Aythya nyroca*	Rare winter visitor. Found in Mai Po.	IUCN Red List Status: NT						1
Tufted Duck	*Aythya fuligula*	Abundant winter visitor. Found in Deep Bay area, Nam Chung, Starling Inlet.	Fellowes et al. (2002): LC						99
Little Grebe	*Tachybaptus ruficollis*	Common resident. Found in Deep Bay area.	Fellowes et al. (2002): LC	4	7		3	7	7
Black-crowned Night Heron	*Nycticorax nycticorax*	Common resident and migrant. Widely distributed in Hong Kong.	Fellowes et al. (2002): (LC)	2			1	1	
Chinese Pond Heron	*Ardeola bacchus*	Common resident. Widely distributed in Hong Kong.	Fellowes et al. (2002): PRC,(RC)	6	6	2	1	1	1
Grey Heron	*Ardea cinerea*	Common winter visitor. Found in Deep Bay area, Starling Inlet, Kowloon Park, Cape D'Aguilar.	Fellowes et al. (2002): PRC			1	5	1	3
Great Egret	*Ardea alba*	Common resident, migrant and winter visitor. Widely distributed in Hong Kong.	Fellowes et al. (2002): PRC,(RC)	3			1	1	1

Common Names	Scientific Names	Rarity and Distribution in Hong Kong	Conservation status	Area 2		Area 7		Area 9	
				1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec
Little Egret	***Egretta garzetta***	**Common resident, migrant and winter visitor. Widely distributed in coastal area throughout Hong Kong.**	**Fellowes et al. (2002): PRC,(RC)**	**10**	**1**	**3**	**2**	**1**	
Great Cormorant	***Phalacrocorax carbo***	**Common winter visitor. Widely distributed in coastal areas throughout Hong Kong.**	**Fellowes et al. (2002): PRC**			**11**	**4**	**22**	**4**
Black Kite	***Milvus migrans***	**Common resident and winter visitor. Widely distributed in Hong Kong.**	**Fellowes et al. (2002): (RC); Appendix 2 of CITES; Cap. 586**	**1**			**1**		
Eastern Buzzard	***Buteo japonicus***	**Common winter visitor. Widely distributed in Hong Kong.**	**Appendix 2 of CITES; Cap. 586**				**1**		
Common Moorhen	*Gallinula chloropus*	Common winter visitor, resident and migrant. Found in Deep Bay area, Shuen Wan, Starling Inlet.	-		1	2		2	
Eurasian Coot	***Fulica atra***	**Uncommon winter visitor. Found in Deep Bay area, Plover Cove Reservoir, Shuen Wan.**	**Fellowes et al. (2002): RC**	**1**				**18**	**7**
Black-winged Stilt	***Himantopus himantopus***	**Common migrant and wintor visitor. Found in Deep Bay area, Long Valley, Kam Tin.**	**Fellowes et al. (2002): RC**	**1**					
Marsh Sandpiper	***Tringa stagnatilis***	**Abundant winter visitor and migrant. Found in Deep Bay area, Shuen Wan, Long Valley, Kam Tin, Sai Kung.**	**Fellowes et al. (2002): RC**	**2**					
Green Sandpiper	*Tringa ochropus*	Common migrant and winter visitor. Found in Deep Bay area, Shuen Wan, Long Valley, Kam Tin, Shek Kong, Ho Chung.	-		1				
Common Sandpiper	*Actitis hypoleucos*	Common passage migrant and winter visitor. Widely distributed in wetland area throughout Hong Kong.	-	4					
Black-headed Gull	***Chroicocephalus ridibundus***	**Abundant winter visitor. Found in Deep Bay area and costal waters.**	**Fellowes et al. (2002): PRC**					**1**	
Oriental Turtle Dove	*Streptopelia orientalis*	Common winter visitor. Widely distributed in Hong Kong.	-			7			

Common Names	Scientific Names	Rarity and Distribution in Hong Kong	Conservation status	Area 2		Area 7		Area 9	
				1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec
Eurasian Collared Dove	*Streptopelia decaocto*	Locally common resident. Found in Mai Po, Tsim Bei Tsui and Fung Lok Wai.	-				4		
Red Turtle Dove	*Streptopelia tranquebarica*	Common passage migrant and winter visitor. Found in Deep Bay area, Cheung Chau, Po Toi, Lantau Island, Hong Kong Island.	-				1		
Savanna Nightjar	*Caprimulgus affinis*	Uncommon resident. Widely distributed in Hong Kong.	-	1					
House Swift	*Apus nipalensis*	Abundant spring migrant and common resident. Widely distributed in Hong Kong.	-	50	2				
White-throated Kingfisher	***Halcyon smyrnensis***	**Common resident. Widely distributed in coastal areas throughout Hong Kong.**	**Fellowes et al. (2002): (LC)**				**1**		
Common Kingfisher	*Alcedo atthis*	Common passage migrant and winter visitor. Widely distributed in wetland habitat throughout Hong Kong.	-		1	1	1	1	2
Pied Kingfisher	***Ceryle rudis***	**Common resident. Widely distributed in lakes and ponds throughout Hong Kong.**	**Fellowes et al. (2002): (LC)**		**1**			**1**	
Common Kestrel	***Falco tinnunculus***	**Common autumn migrant and winter visitor. Widely distributed in Hong Kong.**	**Class 2 Protected Animal of China; Appendix 2 of CITES; Cap. 586**		**1**				
Long-tailed Shrike	*Lanius schach*	Common resident. Widely distributed in open areas throughout Hong Kong.	-					1	
Red-whiskered Bulbul	*Pycnonotus jocosus*	Abundant resident. Widely distributed in Hong Kong.	-		3	10			
Chinese Bulbul	*Pycnonotus sinensis*	Abundant resident. Widely distributed in Hong Kong.	-		2	4	11		
Sooty-headed Bulbul	*Pycnonotus aurigaster*	Common resident. Widely distributed in open areas thorughout Hong Kong.	-	3					
Red-rumped Swallow	*Cecropis daurica*	Locally common passage migrant and winter visitor. Widely distributed in Hong Kong.	-						7

Common Names	Scientific Names	Rarity and Distribution in Hong Kong	Conservation status	Area 2		Area 7		Area 9	
				1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec
Dusky Warbler	*Phylloscopus fuscatus*	Abundant winter visitor and migrant. Widely distributed in shrubland and waterside vegetation throughout Hong Kong.	-		1	2	3	1	2
Zitting Cisticola	***Cisticola juncidis***	**Common passage migrant and winter visitor. Widely distributed in grassland throughout Hong Kong.**	**Fellowes et al. (2002): LC**	**1**					
Yellow-bellied Prinia	*Prinia flaviventris*	Common resident. Widely distributed in Hong Kong.	-		2				
Masked Laughingthrush	*Garrulax perspicillatus*	Abundant resident. Widely distributed in shrubland throughout Hong Kong.	-				1		
Crested Myna	*Acridotheres cristatellus*	Abundant resident. Widely distributed in Hong Kong.	-					5	
Red-billed Starling	***Spodiopsar sericeus***	**Abundant winter visitor. Widely distributed in Hong Kong.**	**Fellowes et al. (2002): GC**	**60**	**50**				**1**
White's Thrush	*Zoothera aurea*	Uncommon winter visitor and migrant. Widely distributed in woodland throughout Hong Kong.	-			1			
Grey-backed Thrush	*Turdus hortulorum*	Common winter visitor and migrant. Widely distributed in woodland throughout Hong Kong.	-				2		1
Oriental Magpie-Robin	*Copsychus saularis*	Abundant resident. Widely distributed in Hong Kong.	-		1	1			
Red-flanked Bluetail	*Tarsiger cyanurus*	Common winter visitor and passage migrant. Widely distributed in woodland throughout Hong Kong.	-				1		
Daurian Redstart	*Phoenicurus auroreus*	Common winter visitor. Widely distributed in Hong Kong.	-	1	4	2	2		
Stejneger's Stonechat	*Saxicola stejnegeri*	Common passage migrant and winter visitor. Widely distributed in open fields throughout Hong Kong.	-	12	2			6	1
Scaly-breasted Munia	*Lonchura punctulata*	Abundant resident. Widely distributed in Hong Kong.	-		10				

Common Names	Scientific Names	Rarity and Distribution in Hong Kong	Conservation status	Area 2		Area 7		Area 9	
				1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec	1st Survey in Dec	2nd Survey in Dec
Eastern Yellow Wagtail	*Motacilla tschutschensis*	Common passage migrant and winter visitor. Widely distributed in agricultural fields and marsh edges throughout Hong Kong.	-		3		1	1	1
White Wagtail	*Motacilla alba*	Resident, common passage migrant and winter visitor. Widely distributed in Hong Kong.	-	6	2				
Richard's Pipit	*Anthus richardi*	Common passage migrant, winter visitor and locally common resident. Widely distributed in Hong Kong.	-		1				
Olive-backed Pipit	*Anthus godlewskii*	Common passage migrant and winter visitor. Widely distributed in Hong Kong.	-			3			
Red-throated Pipit	***Anthus cervinus***	**Common passage migrant and winter visitor. Widely distributed in dry agricutural areas throughout Hong Kong.**	**Fellowes et al. (2002): LC**						**1**
Buff-bellied Pipit	***Anthus rubescens***	**Uncommon passage migrant and winter visitor. Widely distributed in areas of wet agriculture and drained fish ponds throughout Hong Kong.**	**Fellowes et al. (2002): LC**		**1**				

Notes:

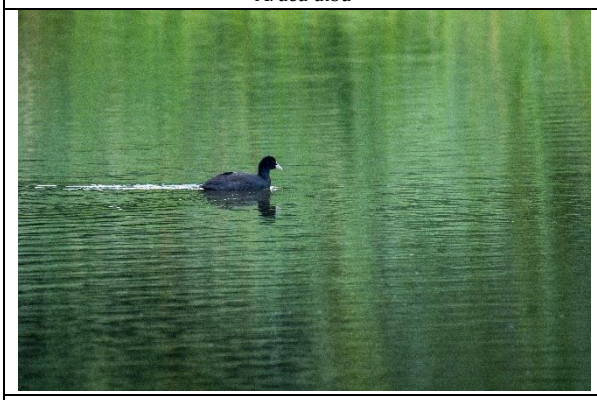
1. AFCD. (2022). Hong Kong Biodiversity Information Hub.
2. Fellowes *et al.* (2002). Wild animals to watch: Terrestrial and freshwater fauna of conservation concern in Hong Kong.
    - For conservation status listed by Fellowes *et al*. (2002), letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence
3. International Union of Conservation for Nature. (2022). The IUCN Red List of Threatened Species. Version 2021-3.
4. Convention on International Trade in Endangered Species of Wild Flora and Fauna (2022). Appendices I, II and III.

Abbreviations:

- Conservation Status in Fellowes et al. (2002): LC = Local Concern, RC = Regional Concern, PGC = Potential Global Concern, PRC = Potential Regional Concern, GG = Global Concern
- Conservation Status in IUCN: NT= Near Threatened
- Caption 170: Wild Animals Protection Ordinance
- Caption 586: Protection of Endangered Species of Animals and Plant Ordinance
- **Species in bold are considered of conservation importance**

Survey Date	Total number of recorded species			
	Bird	Mammal	Dragonfly	Herpetofauna
16/12/2022	36	1	-	-
19/12/2022	42	0	-	-

Appendix C: Selected Target Species Photo

	
Greater Egret *Ardea alba*	Red-billed Starling *Spodiopsar sericeus*
	
Eurasian Coot *Fulica atra*	Grey Heron *Ardea cinerea*
	
Ferruginous Duck *Aythya nyroca*	Great Cormorant *Phalacrocorax carbo*

Appendix D: Photo Record of Infrared Camera

No mammal records in reporting month

Appendix E: Water quality laboratory test reports of December 2022

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 215392WA222666

HOKLAS 015 TEST

Test Report on Analysis of Water

Information Supplied by Client

Client	:	AECOM Asia Company Limited
Client's address	:	AECOM Asia Company Limited, 12/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong
Project	:	Contract No.: YL/2020/01, Development of Lok Ma Chau Loop: Main Works Package 1 – Contract 1 Site Formation and Infrastructure Works Inside Lok Ma Chau Loop and Western Connection Road Phase 1
Sampling date	:	09/12/2022
Sampling location	:	Area 2, 7 & 9
Sample description	:	Fourteen samples of water submitted by client on 09/12/2022
Client sample ID	:	Refer to pages 2 to 4
Tests required	:	1. Biochemical oxygen demand 2. Total Oxidized Nitrogen content 3. Ammoniacal Nitrogen content 4. Reactive phosphorus content

Laboratory Information

Lab. sample ID	:	WA222666/1-14
Date of receipt of sample	:	09/12/2022
Date test commenced	:	09/12/2022
Date test completed	:	15/12/2022
Test methods used	:	1. BS 6068: Section 2.14: 1990 2. APHA 23ed. 4500-NO_3^- I 3. In house method E-T-095 4. In house method E-T-055

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 215392WA222666

HOKLAS 015 TEST

Results :

Test parameters	Sample identification				
	Pond 53&54	Pond 55	Pond 56A	Pond 56B	Pond 57
1. Biochemical oxygen demand, BOD_5, mg/L	5.5	9.5	4.5	3.0	3.0
2. Total Oxidized Nitrogen content, mgN/L	0.009	0.20	0.01	<0.005	<0.005
3. Ammoniacal Nitrogen content, mgN/L	0.10	0.10	0.10	0.11	0.10
4. Reactive phosphorus content, mgP/L	<0.01	0.01	<0.01	0.02	<0.01

Remarks: 1. Detailed information for BOD_5 test :
1. Samples submitted on 09/12/2022 by client.
2. Samples stored at 0-4°C refrigerator prior to testing.
3. Date and hour of commencing BOD_5 test : 09/12/2022 14:00.
4. The BOD_5 test was conducted without suppression of nitrification by ATU.
5. Type of seeding water used was Polyseed BOD_5 seeding water.
6. The samples were incubated at 19-21°C for 5 days.

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 18/1/2023

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 215392WA222666

HOKLAS 015 TEST

Results :

Test parameters	Sample identification				
	Pond 58	Pond 96	Pond 7A&7B	Pond 7C	Pond 7D&7E
1. Biochemical oxygen demand, BOD_5, mg/L	4.0	3.5	8.0	7.5	6.0
3. Total Oxidized Nitrogen content, mgN/L	0.05	0.35	1.2	<0.005	0.08
5. Ammoniacal Nitrogen content, mgN/L	0.10	0.10	0.11	0.10	0.10
7. Reactive phosphorus content, mgP/L	<0.01	<0.01	0.01	<0.01	0.02

Remarks: 1. Detailed information for BOD_5 test :
1. Samples submitted on 09/12/2022 by client.
2. Samples stored at 0-4°C refrigerator prior to testing.
3. Date and hour of commencing BOD_5 test : 09/12/2022 14:00.
4. The BOD_5 test was conducted without suppression of nitrification by ATU.
5. Type of seeding water used was Polyseed BOD_5 seeding water.
6. The samples were incubated at 19-21°C for 5 days.

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 18/1/2023

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 215392WA222666

HOKLAS 015 TEST

Results :

Test parameters	Sample identification			
	Pond 9A	Pond 9B&9C	Pond 9D	Pond 9E
1. Biochemical oxygen demand, BOD_5, mg/L	3.0	5.5	8.0	4.0
3. Total Oxidized Nitrogen content, mgN/L	0.95	<0.005	0.02	<0.005
5. Ammoniacal Nitrogen content, mgN/L	0.52	0.10	0.10	0.11
7. Reactive phosphorus content, mgP/L	0.03	0.01	<0.01	0.02

Remarks: 1. Detailed information for BOD_5 test :
1. Samples submitted on 09/12/2022 by client.
2. Samples stored at 0-4°C refrigerator prior to testing.
3. Date and hour of commencing BOD_5 test : 09/12/2022 14:00.
4. The BOD_5 test was conducted without suppression of nitrification by ATU.
5. Type of seeding water used was Polyseed BOD_5 seeding water.
6. The samples were incubated at 19-21°C for 5 days.

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 18/1/2023

End of Report

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 215392WA222666(1)

Test Report on Analysis of Water

Information Supplied by Client

Client	:	AECOM Asia Company Limited
Client's address	:	AECOM Asia Company Limited, 12/F, Grand Central Plaza, Tower 2, 138 Shatin Rural Committee Road, Shatin, Hong Kong
Project	:	Contract No.: YL/2020/01, Development of Lok Ma Chau Loop: Main Works Package 1 – Contract 1 Site Formation and Infrastructure Works Inside Lok Ma Chau Loop and Western Connection Road Phase 1
Sampling date	:	09/12/2022
Sampling location	:	Area 2, 7 & 9
Sample description	:	Fourteen samples of water submitted by client on 09/12/2022
Client sample ID	:	Refer to pages 2
Tests required	:	1. Temperature 2. Salinity 3. Dissolved oxygen 4. pH value

Laboratory Information

Lab. sample ID	:	WA222666/1-14
Date of receipt of sample	:	09/12/2022
Date test commenced	:	09/12/2022
Date test completed	:	09/12/2022
Test methods used	:	YSI EXO-3 Multi-parameter Water Quality Meter

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 215392WA222666(1)

Results :

Test parameters	Sample identification				
	Pond 53&54	Pond 55	Pond 56A	Pond 56B	Pond 57
1. Temperature, °C	21.94	22.14	24.69	20.18	21.18
2. Salinity, ‰	1.45	4.75	0.98	0.46	1.26
3. Dissolved oxygen, mg/L	9.62	11.16	9.42	3.54	9.43
4. pH value at 25°C	9.14	8.45	7.51	6.35	8.84

Test parameters	Sample identification				
	Pond 58	Pond 96	Pond 7A&7B	Pond 7C	Pond 7D&7E
1. Temperature, °C	21.92	22.45	23.71	22.24	20.70
2. Salinity, ‰	2.27	1.74	9.64	0.25	0.48
3. Dissolved oxygen, mg/L	8.45	9.05	11.00	8.35	5.45
4. pH value at 25°C	7.74	7.53	8.23	7.43	7.37

Test parameters	Sample identification			
	Pond 9A	Pond 9B&9C	Pond 9D	Pond 9E
1. Temperature, °C	20.41	20.42	21.28	21.80
2. Salinity, ‰	14.8	1.52	0.52	2.25
3. Dissolved oxygen, mg/L	7.86	9.65	6.80	8.02
4. pH value at 25°C	7.71	8.65	7.60	7.68

Remarks: The unit '‰' for Salinity means parts per thousand.

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 18/1/2013

End of Report

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

Appendix F: Calibration certificates of the handheld multi-parameter meter

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA222183

Report on Calibration of YSI EXO-3 Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	Fugro Technical Services Limited (MCL)
Client's address	:	13/F, Fugro House – KCC2, No. 1 Kwai On Road, Kwai Chung, N.T., H.K.
Sample description	:	One YSI EXO-3 Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 19A105807
Test required	:	Calibration of the YSI EXO-3 Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA222183/1
Date sample received	:	10/10/2022
Date of calibration	:	21/10/2022
Next calibration date	:	20/01/2023
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA222183

Results :

A. pH calibration

pH reading at 25°C for Q.C. solution(6.86) and at 25°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.18	9.13	-0.05
6.86	6.58	-0.28

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
1	1.01	+0.01	± 0.1
10	9.96	-0.04	± 0.5
20	19.95	-0.05	± 1.0
30	29.80	-0.20	± 1.5
40	39.80	-0.20	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By Titration	By D.O. meter
1	7.77	7.85
2	8.03	8.10
3	8.05	8.10
Average	7.95	8.02

Differences of D.O. Content between Wrinkler Titration and D.O. meter should be less than 0.2 mg/L.

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 11/11/2011

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA222183

Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
22.7	22.826

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
4	4.3	+0.3	± 0.6
8	8.2	+0.2	± 0.8
40	39.8	-0.2	± 3.0
80	80.4	+0.4	± 4.0

Certified by :
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 14/11/2022

** End of Report **

Note : This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

Appendix G: Certification of accreditation of the HOKLAS accredited laboratory

Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

FUGRO TECHNICAL SERVICES LIMITED
輝固技術服務有限公司

Fugro Development Centre, 5 Lok Yi Street, Tai Lam, Tuen Mun, New Territories, Hong Kong
香港新界屯門大欖樂怡街五號輝固發展中心

is accredited by the Hong Kong Accreditation Service (HKAS) to ISO/IEC 17025:2017
for performing specific laboratory activities as listed in the scope of accreditation within the test category of
獲香港認可處根據ISO/IEC 17025:2017認可
進行載於認可範圍內下述測試類別中的指定實驗所活動

Environmental Testing
環境測試

This accreditation to ISO/IEC 17025:2017 demonstrates technical competence for a defined scope and the implementation of a management system relevant to laboratory operation (see joint IAF-ILAC-ISO Communiqué).
此項 ISO/IEC 17025:2017 的認可資格證明此實驗所具備指定範疇內所須的技術能力並實施一套與實驗所運作相關的管理體系(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

The common seal of HKAS is affixed hereto by the authority of the HKAS Executive
現經香港認可處執行機關授權在此蓋上香港認可處的印章

SHUM Wai-leung, Executive Administrator
執行幹事 沈偉良
Issue Date : 25 May 2021
簽發日期：二零二一年五月二十五日

Registration Number : HOKLAS 015
註冊號碼：

Date of First Registration : 23 March 1989
首次註冊日期：一九八九年三月二十三日

This certificate is issued subject to the terms and conditions laid down by HKAS
本證書按照香港認可處訂立的條款及條件發出

L 002252